



**B. Sc (Hons.) Community Science**

**B. Sc (Hons.) Food Nutrition and Dietetics**

**Syllabus as per  
VI Deans Committee  
Recommendations**

**College of Community and Applied Sciences**

Maharana Pratap University of Agriculture and Technology  
Udaipur, Rajasthan

**Framework of the  
Courses B.Sc. (Hons.)  
Community Science**

## Annexure II

### Framework of the Courses B.Sc. (Hons.) Community Science

Type of courses	Credits
Deeksharambh (Foundation Course)	0+2 (NG)
Core courses	112
Common courses (MDC+VAC+AEC)	23 (9+6+8)
Skill Enhancement Courses (SEC)	12
Elective courses	20
MOOCS/SWAYAM	10 (NG)
Study Tour	0+2 (NG)
<b>Total</b>	<b>167+10**+4*</b>

#### NG- non-gradual

#### Summary of credit hours for different categories of courses

Sem-ester	Core Courses (Major+ Minor)	Multi-Discipli-nary Course (MDC)	Value Added Course (VAC)	Ability Enhance-ment Course (AEC)	Skill Enhance-ment Course (SEC)	Internship/ Project/ Student READY	Total Credits	Non- Gradual	Intern-ship	Online Courses/ MOOC
I	12	3 <sup>(2)</sup>		1 <sup>(3)</sup> + 2 <sup>(4)</sup>	4	—	22	2 <sup>(1)</sup>		10
II	10	3 <sup>(5)</sup>	3 <sup>(6)</sup>	1 <sup>(3)</sup> + 2 <sup>(7)</sup>	4	—	23	—	10 <sup>(12)</sup>	
III	16	—		2 <sup>(8)</sup>	2	—	20			
IV	12	3 <sup>(9)</sup>	3 <sup>(10)</sup>	----	2	—	20	—	10 <sup>(13)</sup>	
V	21	—	—	—	—	—	21	2 <sup>(11)</sup>		
VI	21	—	—	—	—	—	21	—		
VII	20*	—	—	—	—	—	20	—		
VIII	-	—	—	—	—	20	20	—		
<b>Total</b>	<b>112</b>	<b>9</b>	<b>6</b>	<b>8</b>	<b>12</b>	<b>20</b>	<b>167</b>	<b>4</b>		<b>10</b>

**Note: The credit hours mentioned in the table includes both theory and practical.**

Deeksharambh (Induction-cum-Foundation Course) of 2 credits (2 weeks duration)<sup>1</sup>

1. Farming based Livelihood Systems<sup>2</sup>
2. NCC/NSS/NSO/Rangers & Rovers<sup>3</sup>
3. Communication Skills<sup>4</sup>
4. Entrepreneurship Development and Business Management<sup>5</sup>
5. Environmental Studies and Disaster Management<sup>6</sup>
6. Personality Development<sup>7</sup>
7. Physical Education, First Aid and Yoga Practices<sup>8</sup>
8. Agriculture Marketing & Trade<sup>9</sup>
9. Agricultural Informatics and Artificial Intelligence<sup>10</sup>
10. Study tour (10-14 days)<sup>11</sup>
11. Only for those opting for an exit with UG-Certificate<sup>12</sup>
12. Only for those opting for an exit with UG-Diploma<sup>13</sup>

## Foundation Courses

S. No.	Course Title	Credits	Total Credits
1.	Deeksharambh (Foundation Course)	0+2 (NG)*	4(0+4) * Credits not included in the total
2.	Study Tour (10-12 days) V Semester	0+2 (NG)* Non-gradial	

## Common Courses

S. No.		Course Title	Credits	Total credits
1.	Multidisciplinary courses (MDC) 9 credits	Farming based Livelihood Systems	3 (2+1)	<b>23</b> <b>(9+6+8)</b>
2.		Entrepreneurship Development & Business Management	3(2+1)	
3.		Agriculture Marketing and Trade	3(2+1)	
4.	Value Added courses +(VAC) 6 credits	Environmental Studies	3 (2+1)	
5.		Agricultural Informatics and Artificial Intelligence	3(2+1)	
6.	Ability Enhancement Courses (AEC) 8 credits	NSS/ NCC/NSO/Rangers & Rovers I & II	2 (0+2)	
7		Personality Development	2(1+1)	
		Physical Education, First Aid and Yoga	2(0+2)	
8.				
9		Communication Skills	2(1+1)	

## Department wise Core and SEC Courses

### Department of Food Science and Nutrition

S. No.	Type of Course	Course Title	Credits	Total Credits
1.	Core courses	Food Standards and Quality Control	2(1+1)	<b>32</b> <b>(20+12)</b>
2.		Food Science & Processing	3(2+1)	
3.		Food Packaging & labelling	2(1+1)	
4.		Institutional Food Service Management	3(2+1)	
5.		Human Physiology	3(3+0)	

S. No.	Type of Course	Course Title	Credits	Total Credits
6.		Human Nutrition	3(3+0)	
7.		Nutritional Biochemistry	3(2+1)	
8.		Food Hygiene and Sanitation	1(1+0)	
9.	Skill Enhancement Courses (SEC Module-12 credits)	Breads and Buns	2(0+2)	
10.		Biscuits & Cookies	2(0+2)	
11.		Cakes & Pastries	2(0+2)	
12.		Chocolate Making	2(0+2)	
13.		Quantity Cookery	1(0+1)	
14.		Traditional Indian Foods	1(0+1)	
15.		Food Preservation & Storage-I	1(0+1)	
16.		Food Preservation & Storage-II	1(0+1)	

### Department of Textile and Apparel Designing

S. No.	Type of Course	Course Title	Credits	Total Credits
1.	Core courses	Textile Science and Fabric Care	3(2+1)	<b>32(20+12)</b>
2.		Fundamentals of Clothing Construction	3(1+2)	
3.		Pattern Making and Draping	3(1+2)	
4.		Retailing and Merchandising	2(1+1)	
5.		Principles of Textile Designing	3(0+3)	
6.		Techniques of Fabric Construction	3(1+2)	
7.		Traditional Textiles and Costumes of India	3(2+1)	
8.	Skill Enhancement Courses (SEC Module12 credits)	Textile Dyeing & printing	2(0+2)	
9.		Fabric Embellishment	2(0+2)	
10.		Indian Embroideries	2(0+2)	
11.		Quilting and Patchwork	2(0+2)	
12.		Garment Designing Technology	1(0+1)	
13.		Accessory Designing	1(0+1)	

S. No.	Type of Course	Course Title	Credits	Total Credits
14.		Fashion Illustration	1(0+1)	
15.		Portfolio Development	1(0+1)	

### Department of Resource Management and Consumer Science

S. No.	Type of Course	Course Title	Credits	Total Credits
1.	Core courses	Fundamentals of Art and Design	2(1+1)	<b>30(18+12)</b>
2.		Fundamentals of Ergonomics	2(1+1)	
3.		Computer aided Interior designing I	3(1+2)	
4.		Housing and Space Management	3(1+2)	
5.		Consumer Education	3(1+2)	
6.		Principles of Management	2(2+0)	
7.		Computer Aided Interior Designing- II	3(0+3)	
8.	Skill Enhancement Courses ( SEC Module 12credits)	Housekeeping and Service Management- I	2(0+2)	
9.		Floral Art and Design- I	2(0+2)	
10.		Housekeeping and Service Management –II	2(0+2)	
11.		Event Planning and Management	2(0+2)	
12.		Interior designing and decoration I	1(0+1)	
13.		Floral Art and Design- II	1(0+1)	
14.		Interior Accessories and Furnishings	1(0+1)	
15.		Interior designing and decoration II	1(0+1)	

### Department of Human Development and Family Studies

S. No.	Type of Course	Course Title	Credits	Total Credits
1.	Core courses	Childhood development	3(2+1)	<b>30(18+12)</b>
2.		Theoretical approaches to parenting	2(2+0)	
3.		Early childhood education	3(2+1)	
4.		Theories and practices in early childhood education	2(2+0)	

S. No.	Type of Course	Course Title	Credits	Total Credits
5.		Adolescence development	3(2+1)	
6.		Adulthood	2(1+1)	
7.		Marriage and Family Dynamics	3(2+1)	
8.	Skill Enhancement Courses (under SEC Modules-12 credits)	Developmental Assessment I (Infancy & Toddlerhood)	2(0+2)	
9.		Developmental Assessment II (childhood)	2(0+2)	
10.		Infant Stimulation practices	2(0+2)	
11.		Health practices in early childhood	2(0+2)	
12.		Establishment of ECCE centers	1(0+1)	
13.		Program planning & execution in ECCE centers	1(0+1)	
14.		Management of ECCE centers	1(0+1)	
15.		Monitoring and evaluation of ECCE centers	1(0+1)	

#### Department of Extension Education and Communication Management

S. No.	Type of Course	Course Title	Credits	Total Credits
1.	Core courses	Communication for Development	2(1+1)	28 (16+12)
2.		Extension and Rural Development	3(2+1)	
3.		Rural Sociology	2(2+0)	
4.		Project Management	3(2+1)	
5.		Diffusion and Adoption of Innovations	3(2+1)	
6.		Training and professional Development	2(0+2)	
7.		Seminar	1(0+1)	

S. No.	Type of Course	Course Title	Credits	Total Credits
8.	Skill Enhancement Courses (SEC Module- 12 credits)	Audio Visual Aids for Communication	2(0+2)	
9.		Extension Teaching Methods	2(0+2)	
10.		Computerized Instructional Aids Production	2(0+2)	
11.		ICT and New Media	2(0+2)	
12.		Print Journalism	1(0+1)	
13.		Electronic Journalism	1(0+1)	
14.		Audio and Video Recording	1(0+1)	
15.		Instructional Video Production	1(0+1)	

### Elective Courses

S.No.	Department	Courses	Credits
1.	Food and Nutrition	Normal and Therapeutic Nutrition	3(2+1)
2.		Food Product Development and Formulations	3(2+1)
3.		Clinical Nutrition	2(2+0)
4.		Diet & Nutrition Counselling	2(0+2)
5.		Sports Nutrition	2(2+0)
6.		Community Nutrition & Education	3(2+1)
7.	Apparel and Textile Designing	Advance Draping Technique	3(0+3)
8.		CAD- Pattern Making &Grading	2(0+2)
9.		Quality Analysis in Textiles & Apparels	3(2+1)
10.		Apparel Production Management	3(3+0)
11.		Agro Textiles	2(1+1)
12.		Recent Advances in Textiles	2(2+0)



S.No.	Department	Courses	Credits
13.	Resource Management and Consumer Science	Residential and Commercial Space Design	3(1+2)
14.		Colour and Lighting in Interiors	3(2+1)
15.		Tourism and Hospitality Management	3(1+2)
16.		Financial Management and Consumer Behaviour	3(2+1)
17.		Work Space and Product Design	3(1+2)
18.	Human development and Family Studies	Developmental Challenges in Children	3(2+1)
19.		Methods and Materials for Teaching Young Children	3(1+2)
20.		Computer application in ECCE	3(1+2)
21.		Guidance and Counseling	3(2+1)
22.		Parent Education and Community welfare Programs	3(2+1)
23.	Extension Education and Communication Management	Extension Program Management	3(1+2)
24.		Extension Training Management	3(1+2)
25.		Advertising and Social Marketing	3(1+2)
26.		Public relations & Communication Management	3(1+2)
27.		Web designing	3(0+3)

## Semester wise course Distribution

### I Year, Semester I

S. No.	Course Title	Course Number	Credit Hours
1.	Deeksharambh (Foundation Course of 2 weeks)	FC 111	2(0+2) Non-gradual
2.	Food Standard and Quality Control	FSN 111	2(1+1)
3.	Textile Science and Fabric Care	ATS 111	3(2+1)
4.	Fundamentals of Art and Design	RMCS 111	2(1+1)
5.	Childhood Development	HDFS 111	3(2+1)
6.	Communication for Development	EECM 111	2(1+1)

S. No.	Course Title	Course Number	Credit Hours
7.	Skill Enhancement Course (SEC-1)*	-	2(0+2)
8.	Skill Enhancement Course (SEC-2)*	-	2(0+2)
9.	Farming based Livelihood Systems	FLS 111	3(2+1)
10.	Communication Skills	CS 111	2(1+1)
11.	NSS/ NCC/ NSO/ Rangers & Rovers- I	-	1 (0+1)

*\* SEC-1 & SEC-2 to be selected from the list of the basket available under SEC-I module*

## Semester II

S. No.	Course Title	Course Number	Credit Hours
1.	Food Science & Processing	FSN 121	3(1+2)
2.	Fundamentals of Clothing Construction	TAD 121	3(1+2)
3.	Principles of Management	RMCS 121	2(1+1)
4.	Theoretical Approaches to Parenting	HDFS 121	2 (2+0)
5.	Personality Development	PD 121	2(1+1)
6.	Entrepreneurship Development and Business Management	EDBM 121	3(2+1)
7.	Environmental Studies & Disaster Management	ESDM 121	3(2+1)
8.	Skill Enhancement Course* (SEC-3)	-	2(0+2)
9.	Skill Enhancement Course* (SEC-4)	-	2(0+2)
10.	NSS / NCC / NSO / Rangers & Rovers -- II	-	1 (0+1)

*\*SEC-3 & SEC-4 to be selected from the list of the basket available under SEC-II module*

## Post- II Semester Internship (Only for exit option for award of UG-Certificate)

S. No.	Course Title	Course Number	Credit Hours
1.	Internship (10 weeks)	INT 121	10(0+10)*

*Compulsory Internship for students exercising exit option (UG-Diploma) after I Year*

**II Year, Semester III**

S. No.	Course Title	Course Number	Credit Hours
1	Food Packaging & labelling	FSN 211	2 (1+1)
2	Pattern Making and Draping	TAD 211	3(1+2)
3	Computer-aided Interior designing-I	RMCS 211	3(1+2)
4	Early childhood Education	HDFS 211	3(2+1)
5	Extension and Rural Development	EECM 211	3(2+1)
6	Rural Sociology	EECM 212	2(2+0)
7	Physical Education, First Aid and Yoga Practices	PE 211	2(0+2)
8	Skill Enhancement Course (SEC-5)*	-	1 (0+1)
9	Skill Enhancement Course (SEC-6)*	-	1 (0+1)

***SEC-5 & SEC-6 to be selected from the list of the basket available under SEC-III module***

**Semester IV**

S. No.	Course Title	Course Number	Credit Hours
1.	Institutional Food Service Management	FSN 221	3(2+1)
2.	Retailing and Merchandising	ATS 221	2(1+1)
3.	Housing and Space Management	RMCS 222	3(1+2)
4.	Theories and Practices in Early Childhood Education	HDFS 221	2(2+0)
5.	Training and Professional Development	EECM 221	2(0+2)
6.	Agriculture Marketing and Trade	AMT 221	3(2+1)
7.	Agricultural Informatics and Artificial Intelligence	COMP 221	3(2+1)
8.	Skill Enhancement Course (SEC-7)*		1 (0+1)
9.	Skill Enhancement Course (SEC-8 )*		1 (0+1)

***\*SEC-7 & SEC-8 to be selected from the list of the basket available under SEC-IV module***

**Post- IV Semester Internship (Only for exit option for award of UG- Diploma)**

S. No.	Course Title	Course Number	Credit Hours
1.	Internship (10 weeks)	INT 221	10(0+10)*

**\*Compulsory Internship for students exercising exit option (UG-Diploma) after II Year**

**III Year, Semester V**

S. No.	Course Title	Course Number	Credit Hours
1.	Human Physiology	FSN 311	3(3+0)
2.	Food Hygiene and Sanitation	FSN 312	1(1+0)
3.	Techniques of Fabric Construction	ATS 311	3(1+2)
4.	Principles of Textile Designing	ATS 312	3(0+3)
5.	Consumer Education	RMCS 311	3(1+2)
6.	Adolescence and Development	HDFS 311	3(2+1)
7.	Adulthood Development	HDFS 312	2(1+1)
8.	Project Management	EECM 311	3(2+1)
9.	On-line courses (MOOC)*	-	NG
10.	Educational Tour (10-12 days)		2(0+2) NG

*\*The students will have to take 10 credits of courses from MOOC/Swayam/ NPTEL/ mooKIT/ edX/ Coursera or any other portal accepted by the University during the III and IV year as a partial requirement for the degree of B.Sc. (Hons.) Community Science. The MOOCS courses may relate to the main discipline or from any other discipline like social science, psychology, anthropology, economics, language/humanity, music, etc.*

**Semester VI**

S. No.	Course Title	Course Number	Credit Hours
1.	Nutritional Biochemistry	FSN 321	3(2+1)
2.	Human Nutrition	FSN 322	3(3+0)
3.	Traditional Textiles and Costumes of India	ATS 321	3(2+1)
4.	Fundamentals of Ergonomics	RMCS 321	2(2+0)
5.	Computer aided Interior designing-II	RMCS 322	3(0+3)

S. No.	Course Title	Course Number	Credit Hours
6.	Marriage and Family Dynamics	HDFS 321	3(2+1)
7.	Diffusion and Adoption of Innovation	EECM 321	3(2+1)
8.	Seminar	EECM 321	1(0+1)
	<b>On-line courses (MOOC)</b>		<b>Non-gradial</b>

#### IV Year, Semester VII

S. No.	Course Title	Credit Hours
1	Elective courses ( Including Research Methodology and Statistical Methods)	20
2	On-line courses (MOOC)	Non-gradial

#### Semester VIII Student READY Programme

S. No.	Course	Course No.	Credit Hours
1	Experiential learning / Project work/ Hands on training *(6 weeks)	EL 421, EL 422/ PW 421	6 (0+6)
2	RAWE (10 weeks)	RAWE 421	10 (0+10)
3	In plant (4 weeks)	INT 421	4 (0+4)
	<b>On-line courses (MOOC)</b>	<b>-</b>	<b>Non Gradial</b>

**Syllabus of Foundation course-Deeksharambh****FC 111 Deeksharambh****2(0+2)****Objective**

- To help the students feel comfortable in the new environment and adjust to the customs and practices of the college
- To enable the students to become familiar with the amenities and accessing the intellectual and physical resources of the institution
- Knowing about the operational framework of academic process in the college
- Stimulating social integration of students among themselves and with teachers
- Instilling life and social skills, leadership qualities, team working spirit

**Practical**

<b>S.No.</b>	<b>Topic</b>	<b>Class</b>
1.	Ice breaking exercises and group activities to identify the strength and weakness of students	2
2.	Orientation about organizational structure of the university; Vision, mission of the college	2
3.	About different departments of the college: Academic programme, infrastructure facilities, carrier opportunities	3
4.	Familiarization with curriculum and semester rules	2
5.	Orientation about examination and evaluation system	1
6.	Introduction about Scholarships & other Grants for students	2
7.	Introducing the college library and book bank	2
8.	Orientation about Placement Cell	1
9.	Rules and regulations regarding code of conduct of students, anti-ragging and indiscipline	2
10.	About NSS, NCC, NSO and Rangers and Rovers units	3
11.	Interaction with SWO	1
12.	Visits to different units of the university (Central library, Educational Museum, Directorate of Extension Education, Sports complex)	5
13.	Session on instilling life and social skills, social awareness, ethics and values, team work, leadership, etc	4
14.	Interaction with alumni entrepreneurs, perspective employers, outstanding achievers in related fields	2
	<b>Total</b>	<b>32</b>

## **Annexure IVa**

# **Common Courses**

## DETAILED SYLLABUS

**FLS-111**

**Farming based Livelihood Systems**

**3 (2+1)**

### Objective

1. To make the students aware about farming based livelihood systems in agriculture
2. To disseminate the knowledge and skill how farming based systems can be a source of livelihood

### Theory

S.No.	Topic	Class
1	Agriculture- Definition and its principles	1
2	Status of agriculture in India, income of farmers and rural people	2
3	Livelihood-Definition, concept and livelihood pattern in urban & rural areas	1
4	Farming systems- Definition and farming based livelihood systems	2
5	Different indicators to study livelihood systems	1
6	Agricultural Livelihood Systems (ALS): Meaning, approaches and framework	2
7	Prevalent farming systems and its contribution to livelihood	2
8	Types of traditional & modern farming systems	2
9	Components of farming system/ farming based livelihood systems, crops and cropping systems	2
10	Livestock (dairy, piggery, goatry, poultry, duckry, pisci-culture, apiculture etc.)	1
11	Horticultural crops, agro-forestry systems	2
12	Enterprises (small, medium and large) including value chains and secondary enterprises as livelihood components for farmers	2
13	Factors affecting integration of various enterprises of farming for livelihood	2
14	Farming system's feasibility under various agro-climatic zones	2
15	Farming based livelihood models	2
16	Factors affecting farming based livelihood systems	1
17	Schemes & programmes for promotion of farming based livelihood opportunities	2
	<b>Total</b>	<b>32</b>



## Practical

S.No.	Topic	Class
1.	Survey of farming systems and agricultural based livelihood enterprises	2
2.	Study of components of important farming based livelihood models/ systems in different agro-climatic zones	2
3.	Study of production and profitability of crop based, livestock based, processing based and integrated farming based livelihood models	3
4.	Field visit of innovative farming system models	1
5.	Visit of agri- based enterprises & their functional aspects for integration of production, processing & distribution sectors	2
6.	Study of agri-enterprises involved in industry and service sectors(Value Chain Models),	2
7.	Learning about concept of project formulation on farming based livelihood systems along with cost & profit analysis,	2
8.	Case study of Start-Ups in agri-sectors	2
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Dixon, J. and A. Gulliver with D. Gibbon. (2001). Farming Systems and Poverty: Improving Farmers' Livelihoods in a Changing World. FAO & World Bank, Rome, Italy & Washington, DC, USA
2. Ashley, C.; Carney, D. (1999). Sustainable Livelihoods: Lessons from Early Experience; Department for International Development: London, UK,; Volume 7. [Google Scholar]
3. Reddy, S.R. 2016. Farming System and Sustainable Agriculture, Kalyani Publishers, New Delhi.
4. Panwar et al. 2020. Integrated Farming System models for Agricultural Diversification, Enhanced Income and employment, Indian Council of Agricultural Research, New Delhi.
5. Singh, J.P., et al. 2015. Region Specific Integrated Farming System Models, ICAR- Indian Institute of Farming Systems Research, Modipuram.
6. Walia, S. S. and U. S. Walia, 2020. Farming System and Sustainable Agriculture, Scientific Publishers, Jodhpur, Rajasthan.
7. Livelihood Improvement of Underprivileged Farming Community: Some Experiences from Vaishali, Samastipur, Darbhanga and Munger Districts of Bihar by B. P. Bhatt, Abhay Kumar, P.K. Thakur, Amitava Dey Ujjwal Kumar, Sanjeev Kumar, B.K. Jha,

Lokendra Kumar, K. N. Pathak, A. Hassan, S. K. Singh, K. K. Singh and K. M. Singh  
ICAR Research Complex for Eastern Region ICAR Parisar, P.O. Bihar Veterinary  
College, Patna - 800 014, Bihar

8. Carloni, A (2001) Global Farming Systems Study: Challenges and Priorities to 2030 – Regional Analysis: Sub-Saharan Africa, Consultation Document, FAO, Rome, Italy
9. Evenson, R.E. (2000). Agricultural Productivity and Production in Developing Countries'. In FAO, The State of Food and Agriculture, FAO, Rome, Italy
10. Agarwal, A. & Narain, S. (1989). Towards Green Villages: A strategy for Environmentally, Sound and Participatory Rural Development, Center for Science and Environment, New Delhi, India

## CS-111

## Communication Skills

2(1+1)

### Objective:

1. To acquire competence in oral, written and non-verbal communication, develop strong personal and professional communication and demonstrate positive group communication.

### Theory

S.No.	Topic	No. of Classes
1.	Basic Communication Skills: Listening, Speaking, Reading and Writing Skills;	2
2.	Precis writing /Abstracting/ Summarizing; Style of technical communication Curriculum vitae/ resume writing;	3
3.	Innovative methods to enhance vocabulary, analogy questions.	2
4.	Structural and Functional Grammar: Sentence structure, modifiers, connecting words and verbals; phrases and clauses;	2
5.	Case: subjective case, possessive case; objective case; Correct usage of nouns, pronouns and antecedents, adjectives, adverbs and articles;	3
6.	Agreement of verb with the subject: tense, mood, voice	3
7.	Writing effective sentences-- Basic sentence faults	1
	<b>Total</b>	<b>16</b>

## Practical

S.No.	Topic	No. of Classes
1.	Listening and notetaking	1
2.	Writing skills: precis writing	2
3.	Summarizing and abstracting	1
4.	Reading and comprehension (written and oral) of general and technical articles	2
5.	Micro-presentations and Impromptu Presentations: Feedback on presentations	3
6.	Stage manners: grooming, body language, voice modulation, speed	2
7.	Group discussions	1
8.	Public speaking exercises; vocabulary building exercises	2
9.	Interview Techniques; organization of events.	2
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Allport, GW, 1937, Personality: A Psychological Interpretation. Holt, New York.
2. Brown Michele & Gyles Brandreth, 1994, How to Interview and be Interviewed. Sheldon Press, London.
3. Carnegie Dale, 1997, The Quick and Easy Way to Effective Speaking. Pocket Books, New York.
4. Francis Peter SJ, 2012, Soft Skills and Professional Communication. Tata McGraw Hill, New Delhi.
5. Kumar S and Pushpa Lata, 2011, Communication Skills. Oxford University Press.
6. Neuliep James W, 2003, Intercultural Communication A Contextual Approach. Houghton Mifflin Co Boston.
7. Pease, Allan, 1998, Body Language. Sudha Publications, Delhi.
8. Raman M and Singh P, 2000, Business Communication. Oxford University Press.
9. Seely J, 2013, Oxford Guide to Effective Writing and Speaking. Oxford University Press.
10. Thomson AJ and Martinet AV, 1977, A Practical English Grammar. Oxford University

**Objective**

To make students realize their potential strengths, cultivate their inter-personal skills and improve employability.

**Theory**

<b>S. No.</b>	<b>Topics</b>	<b>No. of Classes</b>
1.	Personality Definition, Nature of personality, theories of personality and its types	2
2.	The humanistic approach - Maslow's self-actualization theory, shaping of personality, determinants of personality	2
3.	Myers-Briggs Typology Indicator, Locus of control and performance Type A and Type B Behaviours, personality and Organizational Behaviour	2
4.	Foundations of individual behavior and factors influencing individual behavior	1
5.	Models of individual behavior, Perception and attributes and factors affecting perception, Attribution theory and case studies on Perception and Attribution	2
6.	Learning ,meaning and definition ,theories and principles of learning. Learning and organizational behavior, Learning and training, learning feedback.	2
7.	Attitude and values, Intelligence- types of Intelligence, theories of intelligence, measurements of intelligence	2
8.	Factors influencing intelligence, intelligence and Organizational behavior, emotional intelligence.	2
9.	Motivation- theories and principles, Teamwork and group dynamics.	1
	<b>Total</b>	<b>16</b>

**Practical**

<b>S. No.</b>	<b>Topics</b>	<b>No. of Classes</b>
1.	Planning and administering MBTI personality tests and analysis of different types of personalities	2
2.	Planning and preparation of activities for Learning Styles and Strategies	2

<b>S. No.</b>	<b>Topics</b>	<b>No. of Classes</b>
3.	Developing questionnaire to find out the Motivational needs of different people	2
4.	Use of Firo-B, test to understand behavior of others. I Developing questionnaire to find out the interpersonal Communication patterns of people	2
5.	Preparing exercises for Teamwork and team building	2
6.	Group Dynamics,	1
7.	Win-win game, Conflict Management	2
8.	Leadership styles	1
9.	Case studies on Personality and Organizational Behavior.	2
	<b>Total</b>	<b>16</b>

### **Suggested readings**

1. Andrews, Sudhir, 1988, How to Succeed at Interviews. 21st (rep.) New Delhi.Tata McGraw-Hill.
2. Heller, Robert, 2002, Effective Leadership. Essential Manager series. Dk Publishing.
3. Hindle, Tim, 2003, Reducing Stress. Essential Manager series. Dk Publishing.
4. Lucas, Stephen, 2001, Art of Public Speaking. New Delhi. Tata - Mc-Graw Hill.
5. Mile, D.J, 2004, Power of Positive Thinking. Delhi. Rohan Book Company.
6. Pravesh Kumar, 2005, All about Self- Motivation. New Delhi. Goodwill Publishing House.
7. Smith, B, 2004, Body Language. Delhi: Rohan Book Company Shaffer, D. R.,2009, Social and Personality Development (6th Edition). Belmont, CA: Wadsworth

### **EDBM-121 Entrepreneurship Development and Business Management      3(2+1)**

#### **Objective**

1. To provide student an insight into the concept and scope of entrepreneurship.
2. To expose the student to various aspects of establishment and management of a small business unit.
3. To enable the student to develop financially viable agribusiness proposal.

## Theory

S. No.	Topic	No. of Classes
1	Concept, need for and importance of entrepreneurial development.	2
2	Types of entrepreneurs, functions of entrepreneurs	2
3	Characteristics of entrepreneurs, entrepreneurial attributes/competencies	2
4	Evolution of entrepreneurship, objectives of entrepreneurial activities	2
5	Development of entrepreneurship, motivational factors, social factors, environmental factors	2
6	Process of entrepreneurship development -Environment scanning and opportunity identification need for scanning–spotting of opportunity-scanning of environment– identification of product / service – starting a project; factors influencing sensing the opportunities	4
7	Infrastructure and support systems- good policies, schemes for entrepreneurship development; role of financial institutions, and other agencies in entrepreneurship development	3
8	Steps involved in functioning of an enterprise. Selection of the product / services, selection of form of ownership; registration, selection of site, capital sources, acquisition of manufacturing know how, packaging and distribution	3
9	Planning of an enterprise, project identification, selection, and formulation of project; project report preparation	2
10	Enterprise Management; Production management – product, levels of products, product mix, quality control, cost of production, production controls	2
11	Material management. raw material costing, inventory control	2
12	Personal management – manpower planning, labour turn over, wages / salaries.	2
13	Financial management /accounting – funds, fixed capital and working capital, costing and pricing, long term planning and short-term planning, book keeping, journal, ledger, subsidiary books, annual financial statement, taxation	2
14	Marketing management- market, types, marketing assistance, market strategies. Crisis management- raw material, production, leadership, market, finance, natural etc.	2
	<b>Total</b>	<b>32</b>

## Practical

S. No.	Topic	No. of Classes
1	Visit to small scale industries/agro-industries	2
2	Interaction with successful entrepreneurs/ agric- entrepreneurs	2
3	Preparation of case study of successful entrepreneur	3
4	Presentation of case study	2
5	Visit to financial institutions and support agencies-DIC, SIDBI	2
6	Preparation of project proposal for funding by different agencies	3
7	Presentation of report	2
	<b>Total</b>	<b>16</b>

## Suggested Readings

- Charantimath P.M., 2009, Entrepreneurship Development and Small Business Enterprises. Pearson Publications, New Delhi.
- Desai V., 2015, Entrepreneurship: Development and Management, Himalaya Publishing House.
- Gupta CB. 2001. Management Theory and Practice. Sultan Chand & Sons.
- Indu Grover. 2008. Handbook on Empowerment and Entrepreneurship. Agrotech Public Academy.
- Khanka SS. 1999. Entrepreneurial Development. S. Chand & Co.
- Mehra P., 2016, Business Communication for Managers. Pearson India, New Delhi.
- Pandey M. and Tewari D., 2010, The Agribusiness Book. IBDC Publishers, Lucknow.
- Singh D. 1995. Effective Managerial Leadership. Deep & Deep Publ.
- Singhal R.K., 2013, Entrepreneurship Development & Management, Katson Books.
- Tripathi PC & Reddy PN. 1991. Principles of Management. Tata McGraw Hill.
- Vasant Desai, 1997. Small Scale Industries and Entrepreneurship. Himalaya Publ. House

**ESDM-121 Environmental Studies and Disaster Management****3(2+1)****Objectives**

1. To expose and acquire knowledge on the environment and
2. To gain the state of art – skill and expertise on management of disasters

**Theory**

<b>S. No.</b>	<b>Course Titles</b>	<b>Credit Hours</b>
1.	Introduction to Environment - Environmental studies - Definition, scope and importance - Multidisciplinary nature of environmental studies, Segments of Environment - Spheres of Earth - Lithosphere - Hydrosphere - Atmosphere - Different layers of atmosphere.	3
2.	Natural Resources: Classification - Forest resources. Water resources. Mineral resources Food resources. Energy resources. Land resources. Soil resources.	2
3.	Ecosystems - Concept of an ecosystem - Structure and function of an ecosystem - Energy flow in the ecosystem. Types of ecosystem.	2
4.	Biodiversity and its conservation: Introduction, definition, types. Bio-geographical classification of India. Importance and Value of biodiversity. Biodiversity hot spots. Threats and Conservation of biodiversity	2
5.	Environmental Pollution: Definition, cause, effects and control measures of: a. Air pollution.                      b. Water pollution. c. Soil pollution.                      d. Marine pollution. e. Noise pollution.                      f. Thermal pollution h. light pollution.	3
6.	Solid Waste Management: Classification of solid wastes and management methods, Composting, Incineration, Pyrolysis, Biogas production, Causes, effects and control measures of urban and industrial wastes.	2
7.	Social Issues and the Environment: Urban problems related to energy. Water conservation, rain water harvesting, watershed management.	2
8.	Environmental ethics: Issues and possible solutions, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust	2
9.	Environment Protection Act. Air (Prevention Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act.	2
10.	Human Population and the Environment: Environment and human health: Human Rights, Value Education. Women and Child Welfare. Role of Information Technology in Environment and human health.	2



<b>S. No.</b>	<b>Course Titles</b>	<b>Credit Hours</b>
11.	Disaster management - Disaster definition – Types <ul style="list-style-type: none"> <li>Natural Disasters - Floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, Heat and cold waves.</li> <li>Man Made Disasters - Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, road accidents, rail accidents, air accidents, sea accidents.</li> </ul>	4
12.	International and National strategy for disaster reduction. Concept of disaster management, national disaster management framework; financial arrangements; role of NGOs, community-based organizations and media in disaster management.	4
13.	Central, state, district and local administration in disaster control; Armed forces in disaster response; Police and other organizations in disaster management.	2
	<b>Total</b>	<b>32</b>

### Practical

<b>S.No</b>	<b>Experiments</b>	<b>No. of Practicals</b>
1.	Visit to a local area to document environmental assets river/forest/grassland/hill/mountain.	1
2.	Energy: Biogas production from organic wastes.	2
3.	Visit to wind mill / hydro power / solar power generation units	1
4.	Biodiversity assessment in farming system.	2
5.	Floral and faunal diversity assessment in polluted and un polluted system.	2
6.	Visit to local polluted site - Urban/Rural/Industrial/Agricultural to study of common plants, insects and birds.	1
7.	Environmental sampling and preservation. Water quality analysis: pH, EC and TDS. Estimation of Acidity, Alkalinity. Estimation of water hardness. Estimation of DO and BOD in water samples. Estimation of COD in water samples. Enumeration of E. coli in water sample. Assessment of Suspended Particulate Matter (SPM).	4
8.	Study of simple ecosystem - Visit to pond/river/hills.	1
9.	Visit to areas affected by natural disaster	2
	<b>Total</b>	<b>16</b>

**Objective**

- To make the students aware about Physical Education, First Aid and Yoga Practices
- To disseminate the knowledge and skill how to perform physical training, perform firstaid and increase stamina and general wellbeing through yoga.

**Practical**

S. No.	Experiment	No .of practicals
1	Physical education; Training and Coaching - Meaning & Concept	1
2	Methods of Training; aerobic and aerobic exercises; Calisthenics, weight training, circuit training, interval training, Fartlek training	1
3	Effects of Exercise on Muscular, Respiratory, Circulatory & Digestive systems	2
4	Balanced Diet and Nutrition: Effects of Diet on Performance; Physiological changes due to ageing and role of regular exercise on ageing process	2
5	Personality, its dimensions and types; Role of sports in personality development; Motivation and Achievements in Sports	2
6	Learning and Theories of learning; Adolescent Problems & its Management; Posture; Postural Deformities; Exercises for good posture	2
7	Yoga; History of Yog, Types of Yog, Introduction to Yog,	1
8	Asanas (Definition and Importance) <ul style="list-style-type: none"> <li>• Padmasan, Gaumukhasan, Bhadrasan, Vajrajasan, Shashankasan, Pashchimotasan, Ushtrasan, Tadasan, Padhastasan, Ardhchandrasan, Bhujangasan,</li> <li>• Utanpadasan, Sarvangasan, Parvatasan , Patangasan, Shishupalanasan – left leg-right leg, Pavanmuktasan , Halasan , Sarpasan, Ardhhdhanurasan, Sawasan</li> </ul>	1 1 1
9	Suryanamskar Pranayama (Definition and Importance) Omkar, Suryabhedan, Chandrabhedan, Anulom Vilom, Shitali, Shitkari, Bhastrika, Bhramari	2
10	Meditation (Definition and Importance), Yogic Kriyas (Kapalbhati), Tratak, Jalneti and Tribandh	2
11	Mudras (Definition and Importance) Gyanmudra, Dhyanmudra, Vayumudra, Akashmudra, Pruthvimudra, Shunyamudra, Suryamudra, Varunmudra, Pranmudra, Apanmudra, Vyanmudra, Uddanmudra	2

S. No.	Experiment	No .of practicals
12	Role of yoga in sports	1
13	Teaching of Asanas – demonstration, practice, correction and practice	1
14	History of sports and ancient games	1
15	Governance of sports in India; Important national sporting events; Awards in Sports	1
16	History, latest rules, measurements of playfield, specifications of equipment, skill, technique, style	1
17	Coaching of major games (Cricket, football, table Tennis, Badminton, Volleyball, Basketball, Kabaddi and Kho-Kho) and Athletics	1
18	Need and requirement of first aid. First Aid equipment and upkeep	1
19	First AID Techniques <ul style="list-style-type: none"> <li>First aid related with respiratory system. First aid related with Heart, Blood and Circulation. First aid related with Wounds and Injuries. First aid related with Bones, Joints Muscle related injuries.</li> <li>First aid related with Nervous system and Unconsciousness. First aid related with Gastrointestinal Tract. First aid related with Skin, Burns. First aid related with Poisoning. First aid related with Bites and Stings. First aid related with Sense organs</li> </ul>	2 2
20	Handling and transport of injured traumatized persons. Sports injuries and their treatments.	1
	<b>Total</b>	<b>32</b>

## AMT 221 Agriculture Marketing and Trade

3(2+1)

### Objective

1. To understand the fundamentals of agricultural marketing and trade.
2. To analyze the factors influencing supply and demand in agricultural markets.
3. To explore different marketing channels and strategies in agriculture.
4. To examine the role of government policies and regulations in agricultural markets.

## Theory

S.No.	Topic	Class
1.	Agricultural Marketing: Concepts and definitions of market, marketing, agricultural marketing, market structure, marketing mix and market segmentation	2
2.	Classification and characteristics of agricultural markets	1
3.	Demand, supply and producer's surplus of agri commodities: nature and determinants of demand and supply of farm products	2
4.	Producer's surplus – meaning and its types, marketable and marketed surplus, factors affecting marketable surplus of agri- commodities	2
5.	Pricing and promotion strategies: pricing considerations and approaches – cost based and competition based pricing	2
6.	Market promotion – advertising, personal selling, sales promotion and publicity – meaning, merits and demerits	2
7.	Marketing process and functions: exchange functions – buying and selling; physical functions – storage, transport and processing; facilitating functions – packaging, branding, grading, quality control and labelling (Agmark);	3
8.	Market functionaries and marketing channels: Types and importance of agencies involved in agricultural marketing	2
9.	Meaning and definition of marketing channel; number of channel levels; marketing channels for different farm products	2
10.	Marketing efficiency; marketing costs, margins and price spread; factors affecting cost of marketing; reasons for higher marketing costs of farm commodities; ways of reducing marketing costs	2
11.	Role of Govt. in agricultural marketing: Public sector institutions- CWC, SWC, FCI, CACP & DMI – their objectives and functions	2
12.	cooperative marketing in India	1
13.	Risk in marketing: Types of risk in marketing; speculation & hedging; an overview of futures trading	2
14.	Agricultural prices and policy: Meaning and functions of price; administered prices; need for innovations in agricultural price policy	2
15.	Trade: Concept of International Trade and its need	1
16.	WTO; Agreement on Agriculture (AoA) and its implications on Indian agriculture	1
17.	IPR, Role of government in agricultural marketing.	2
18.	Role of APMC and its relevance in the present day context	1
	<b>Total</b>	<b>32</b>

## Practical

S.No	Topic	Class
1.	Plotting and study of demand and supply curves and calculation of elasticities	2
2.	Study of relationship between market arrivals and prices of some selected commodities	1
3.	Computation of marketable and marketed surplus of important commodities	1
4.	Study of price behaviour over time for some selected commodities	2
5.	Construction of index numbers	1
6.	Visit to a local market to study various marketing functions performed by different agencies	2
7.	Identification of marketing channels for selected commodity	1
8.	Collection of data regarding marketing costs, margins and price spread and presentation of report in the class	3
9.	Visit to market institutions –NAFED, SWC, CWC, cooperative marketing society, etc. to study their organization and functioning	2
10.	Application of principles of comparative advantage of international trade	1
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Acharya, S.S. and Agarwal, N.L., 2006, Agricultural Marketing in India, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
2. Chinna, S.S., 2005, Agricultural Economics and Indian Agriculture. Kalyani Pub, N Delhi.
3. Dominic Salvatore, Micro Economic Theory
4. Kohls Richard, L. and Uhl Josheph, N., 2002, Marketing of Agricultural Products, Prentice-Hall of India Private Ltd., New Delhi.
5. Kotler and Armstrong, 2005, Principles of Marketing, Pearson Prentice-Hall.
6. Lekhi, R. K. and Jogindr Singh, 2006, Agricultural Economics. Kalyani Publishers, Delhi.
7. Memoria, C.B., Joshi, R.L. and Mulla, N.I., 2003, Principles and Practice of Marketing in India, Kitab Mahal, New Delhi.
8. Pandey Mukesh and Tewari, Deepali, 2004, Rural and Agricultural Marketing, International Book Distributing Co. Ltd, New Delhi.
9. Sharma, R., 2005, Export Management, Laxmi Narain Agarwal, Agra.

**COMP-221 Agricultural Informatics and Artificial Intelligence****3(2+1)****Objectives**

1. To acquaint students with the basics of computer applications in agriculture, multimedia, database management, application of mobile app and decision- making processes, etc.
2. To provide basic knowledge of computer with applications in Agriculture.
3. To make the students familiar with Agricultural-Informatics, its components and applications in agriculture.

**Theory**

S.No	Topic	Class
1.	Introduction to Computers, Anatomy of Computers, Memory Concepts, Units of Memory	2
2.	Operating System: Definition and types	1
3.	Applications of MS-Office for creating, Editing and Formatting a document,	2
4.	Data presentation, Tabulation and graph creation, Statistical analysis, Mathematical expressions	2
5.	Database, concepts and types, creating database	2
6.	Uses of DBMS in Agriculture	2
7.	Internet and World Wide Web (WWW): Concepts and components	2
8.	Computer programming: General concepts, Introduction to C/ C++, etc. concepts and standard input/output operations. Agriculture, Concepts, design and development	2
9.	Application of innovative ways to use information and communication technologies (IT) in Agriculture	2
10.	Computer Models in Agriculture: Statistical, weather analysis and crop simulation models	3
11.	IT applications for computation of water and nutrient requirement of crops	2
12.	Computer-controlled devices (automated systems) for Agri-input management	2
13.	Smartphone mobile apps in agriculture for farm advice: Market price, postharvest management etc	2
14.	Geospatial technology: Concepts, techniques, components and uses for generating valuable agri-information	2
15.	Preparation of contingent crop- planning and crop calendars using IT tools	2
16.	e-Digital India and schemes to promote digitalization of agriculture in India.	2
	<b>Total</b>	<b>32</b>

## Practical

S.No.	Topic	Class
1.	Study of computer components, accessories, Introduction of different operating systems such as Windows, Unix/ Linux	1
2.	Creating files & folders, File Management	1
3.	Use of MS- WORD and MS Power-point for creating, editing and presenting a scientific document	1
4.	MS- EXCEL - Creating a spreadsheet	1
5.	Use of statistical tools, writing expressions, Creating graphs, Analysis of scientific data, Handling macros	1
6.	MS-ACCESS: Creating Database, preparing queries and reports, Demonstration of Agri- information system, Introduction to World Wide Web (WWW) and its components	2
7.	Introduction of programming languages such as C, C++,	2
8.	Hands on practice on Crop Simulation Models (CSM), DSSAT/Crop-Info/Crop Syst/ Wofost,	2
9.	Preparation of inputs file for CSM and study of model outputs	1
10.	Computation of water and nutrient requirements of crop using CSM and IT tools,	1
11.	Use of smart phones and other devices in agro-advisory and dissemination of market information	1
12.	Introduction of Geospatial Technology, Preparation of contingent crop planning, India Digital Ecosystem of Agriculture (IDEA)	2
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Fundamentals of Computer by V. Rajaroman.
2. Introduction to Information Technology by Pearson.
3. Introduction to Database Management System by C. J. Date.
4. Concepts and Techniques of Programming in C by Dhabal Prasad Sethi and Manoranjan, Wiley

**Objective**

1. To develop qualities of character, courage, comradeship, discipline, leadership, secular outlook, spirit of adventure and sportsmanship and the ideals of selfless service among the youth to make them useful citizen.
2. To create a human resource of organized trained and motivated youth to provide leadership in all walks of life including the Armed Forces and be always available for the service of the nation.

**Practical/ Awareness Activities**

<b>S.No.</b>	<b>Topic</b>	<b>Class</b>
1	Aims, objectives, organization of NCC and NCC song. DG's cardinals of discipline	1
2	Drill- aim, general words of command, attention, stands at ease, stand easy and turning; Sizing, numbering, forming in three ranks, open and close order march, and dressing; Saluting at the halt, getting on parade, dismissing, and falling out	1
3	Marching, length of pace, and time of marching in quick/slow time and halt. Side pace, pace forward and to the rear. Turning on the march and wheeling. Saluting on the march	1
4	Marking time, forward march, and halt. Changing step, formation of squad and squad drill;	1
5	Command and control, organization, badges of rank, honors, and awards	1
6	Nation Building- cultural heritage, religions, traditions, and customs of India. National integration	1
7	Values and ethics, perception, communication, motivation, decision making, discipline and duties of good citizens	1
8	Leadership traits, types of leadership.	1
9	Civil defense organization, types of emergencies, firefighting, protection. Maintenance of essential services, disaster management, aid during development projects	1
10	Basics of social service, weaker sections of society and their needs, NGO's and their contribution, contribution of youth towards social welfare and family planning;	1
11	Structure and function of human body, diet and exercise, hygiene and sanitation...	1
12	Preventable diseases including AIDS, safe blood donation, first aid, physical and mental health	1
13	Adventure activities	1
14	Basic principles of ecology, environmental conservation, pollution and its control	1



**Objective**

1. To develop qualities of character, courage, comradeship, discipline, leadership, secular outlook, spirit of adventure and sportsmanship and the ideals of selfless service among the youth to make them useful citizen.
2. To create a human resource of organized trained and motivated youth to provide leadership in all walks of life including the Armed Forces and be always available for the service of the nation.

**Practical/ Awareness programmes**

S.No	Topic	Class
1	Arms Drill- Attention, stand at ease, stand easy. Getting on parade. Dismissing and falling out. Ground/take up arms, examine arms. Shoulder from the order and vice-versa, present from the order and vice-versa. Saluting at the shoulder at the halt and on the march. Short/long trail from the order and vice- versa. Guard mounting, guard of honor, Platoon/Coy Drill	4
2	Characteristics of rifle (.22/.303/SLR), ammunition, fire power, stripping, assembling, care, cleaning, and sight setting. Loading, cocking, and unloading. The lying position and holding :	2
3	Trigger control and firing a shot. Range Procedure and safety precautions. Aiming and alteration of sight. Theory of groups and snap shooting. Firing at moving targets. Miniature range firing. Characteristics of Carbine and LMG	3
4	Introduction to map, scales, and conventional signs. Topographical forms and technical terms ;	2
5	The grid system. Relief, contours, and gradients. Cardinal points and finding north. Types of bearings and use of service protractor. Prismatic compass and its use. Setting a map, finding north and own position. Map to ground and ground to map. Knots and lashings, Camouflage and concealment, Explosives and IEDs	3
6	Field defenses obstacles, mines and mine lying. Bridging, waterman ship. Field water supplies, tracks and their construction. Judging distance. Description of ground and indication of landmarks. Recognition and description of target. Observation and concealment. Field signals. Section formations. Fire control orders. Fire and movement. Movement with/without arms. Section battle drill. Types of communication, media, latest trends and developments;	2

**Objective**

- Evoking social consciousness among students through various activities viz., working together, constructive, and creative social work, to be skillful in executing democratic leadership, developing skill in programme, to be able to seek self-employment, reducing gap between educated and uneducated, increasing awareness and desire to help sections of society.

**Practical/ Awareness Programmes**

<b>S.No.</b>	<b>Topic</b>	<b>Class</b>
1	Orientation: history, objectives, principles, symbol, badge	1
2	Regular programs under NSS	1
3	Organizational structure of NSS, Code of conduct for NSS volunteers, points to be considered by NSS volunteers' awareness about health	1
4	NSS program activities. Concept of regular activities, special camping, day camps	1
5	Basis of adoption of village/slums, conducting survey, analyzing guiding financial patterns of scheme	1
6	Youth program/ schemes of GOI, coordination with different agencies and maintenance of diary.	1
7	Understanding youth. Definition, profile, categories, issues and challenges of youth; and opportunities for youth who is agent of the social change	1
8	Community mobilization. Mapping of community stakeholders, designing the message as per problems and their culture	1
9	Identifying methods of mobilization involving youth-adult partnership. Social harmony and national integration	1
10	Indian history and culture, role of youth in nation building	1
11	Conflict resolution and peace- building	1
12	Volunteerism and <i>shramdaan</i> . Indian tradition of volunteerism, its need, importance, motivation, and constraints; shaman as part of volunteerism	2
13	Citizenship, constitution, and human rights. Basic features of constitution of India, fundamental rights and duties, human rights, consumer awareness and rights and rights to information	2
14	Family and society. Concept of family, community (PRIs and other community-based organizations) and society	1
	<b>Total</b>	<b>16</b>

**Objectives**

- To evoke social consciousness among students through various activities viz., working together, constructive, and creative social work, to be skillful in executing democratic leadership, developing skill in programme, to be able to seek self-employment, reducing gap between educated and uneducated, increasing awareness and desire to help sections of society.

**Practical/ Awareness Programmes**

<b>S.No.</b>	<b>Topic</b>	<b>Class</b>
1	Importance and role of youth leadership; Meaning, types and traits of leadership, qualities of good leaders; importance and roles of youth leadership	1
2	Life competencies; Definition and importance of life competencies, problem-solving and decision-making, interpersonal communication	1
3	Youth development programs; Development of youth programs and policy at the national level, state level and voluntary sector	2
4	Youth-focused and youth-led organizations	1
5	Health, hygiene and sanitation. Definition needs and scope of health education	1
6	Role of food, nutrition, safe drinking water, water borne diseases and sanitation (Swachh Bharat Abhiyan) for health	2
7	National health programs and reproductive health. Youth health, lifestyle, HIV AIDS and first aid	2
8	Healthy lifestyles, HIV AIDS, drugs and substance abuse, home nursing and first aid	2
9	Youth and yoga. History, philosophy, concept, myths, and misconceptions about yoga	2
10	Yoga traditions and its impacts, yoga as a tool for healthy lifestyle, preventive and curative method	2
	<b>Total</b>	<b>16</b>

## Rangers and Rovers I

1 (0+1)

### Objectives:

- The development of youth in achieving their full physical, intellectual, social and spiritual potentials as responsible citizens and members of local, national and international community.

### Practical

S. No.	Topic	No. of Class
1.	<b>NIPUN Training</b> <ul style="list-style-type: none"><li>• Introduction of the origin of scouting</li><li>• Scout Law and Promise</li><li>• Scout Motto, Sign, Salute and left hand shake</li><li>• Training to wear Uniform</li><li>• Composition and significance of the National flag, the Bharat Scouts &amp; Guides Flag and the World Scout Flag, Patrol and its Flag</li><li>• Scout prayer and Scout Flag Song</li><li>• General rules of health</li><li>• Hand signals and whistle Signals</li><li>• Wood craft signs and follow a track</li><li>• Whip the ends of a rope</li><li>• Tie and knots Troop Games</li><li>• Personality development activities</li><li>• Nature study project</li></ul>	12
3.	Community Services/ Camp/ Fair/visit etc.	4
	<b>Total</b>	<b>16</b>

## Rangers and Rovers II

1(0+1)

### Objectives:

- The development of youth in achieving their full physical, intellectual, social and spiritual potentials as responsible citizens and members of local, national and international community.

### Practical

S. No.	Topic	No. of Class
1.	<b>NIPUN Testing Camp</b> <ul style="list-style-type: none"><li>• Introduction of the origin of scouting</li><li>• Scout Law and Promise</li><li>• Scout Motto, Sign, Salute and left hand shake</li><li>• Training to wear Uniform</li><li>• Composition and significance of the National flag, the Bharat Scouts &amp; Guides Flag and the World Scout Flag, Patrol and its Flag</li><li>• Scout prayer and Scout Flag Song</li><li>• General rules of health</li><li>• Hand signals and whistle Signals</li><li>• Wood craft signs and follow a track</li><li>• Whip the ends of a rope</li><li>• Tie and knots Troop Games</li><li>• Personality development activities</li><li>• Nature study project</li></ul>	12
2.	Community Services/ Camp/ Fair/visit etc.	4
	<b>Total</b>	<b>16</b>

**NSO-I****National Sports Organisation****1(0 + 1)****Objectives**

- To develop understanding about the concept of physical education and Sports
- To develop competence among students regarding indoor and outdoor games
- To develop awareness about traditional games

**Practical**

<b>S. No.</b>	<b>Course Tile</b>	<b>No of Classes</b>
1.	Meaning, Definition, Nature and Scope of Physical Education and Sports Education	1
2.	Aim and Objectives of Physical Education and Sports Education	1
3.	History of Physical Education and Sports Education 1. Ancient Physical Education in India – Harappa civilization, Vedic age, Epic age, etc. 2. Science of Exercise and Sports: Ancient Indian Origin 3. Modern Olympic Games – revival organization and conduct of games and ceremonies (opening and closing ceremonies), objectives and functions of International Olympic Committee (IOC)	2
4.	World Cups and World Championships Commonwealth games, Asian games, SAF games	1
5.	Practice of indoor games- Table Tennis, Badminton, Chess	4
6.	Practice of outdoor games- Volley ball, Basket ball, cricket, Javelin throw, Discus throw, Long jump, High jump etc	4
7.	Practice of Traditional games- Kho Kho, Kabbadi, skipping, etc.	3
	<b>Total</b>	<b>16</b>

**Suggested Readings:**

1. Barrow, H.M. (1983). Man and Movement: Principles and Physical Education. Phi: Lea And Febiger
2. Bucher & Wuest (1987). Foundations of Phy.Edu & Sports. Missouri: C.V.Mosby co.
3. Bucher, C.A., (2010). Foundation of Physical education (16ed.). New Delhi: Tata McGraw-Hill.
4. Burbank, J. M., Andranovich, G. D. & Heying Boulder, C. H. (2001). Olympic dreams: the impact of mega-events on local politics: Lynne Rienner

5. Deshpande, S. H. (2014). Physical Education in Ancient India. Amravati: Degree college of Physicaleducation.
6. Frank, A.M. (2003). Sports & education. CA: ABC-CLIO
7. Kretchmar, R.S. (1994). Practical Philosophy of Sport. IL: Human Kinetics.
8. Nixon, E. E. & Cozen, F.W. (1969). An introduction to physical education. Philadelphia: W.B. Saunders Co.
9. Osborne, M. P. (2004). Magictree house fact tracker: ancient Greece and the Olympics: a nonfiction companion to magic tree house: hour of the Olympics. New York: Random House Books for Young Readers.
10. Susan Capel, Susan Piotrowski (2000). Issues in Physical Education. London: Routledge
- Young, D.C. (2004). A brief History of Olympic Games. UK: Blackwell Publishing.
11. Ziegler, E.F. (2007). An introduction to Sports & Phy.Edu.Philosophy. Delhi: Sp.
12. Mondal. S. Science of Exercise: Ancient Indian Origin, Journal of Association Physicians of India, 2013

## **NSO-II**

## **National Sports Organisation**

**1(0 + 1)**

### **Objectives**

- To develop competence among students regarding indoor and outdoor games

### **Practical**

<b>S. No.</b>	<b>Course Title</b>	<b>No. of Classes</b>
1.	Practice of indoor games- Table Tennis, Badminton, Chess	5
2.	Practice of outdoor games- Volley ball, Basketball, cricket, Javelin throw, Discus throw, Long jump, High jump etc	7
3.	Practice of Traditional games- Kho Kho, Kabbadi, skipping, etc.	4
	<b>Total</b>	<b>16</b>

## **Common Elective Courses**



## DETAILED SYLLABUS

**RM-411**

**Research Methodology**

**3(2+1)**

### Objective

- To understand the meaning and importance of research, research procedures and develop skills in designing and executing research.

### Theory

S. No	Topic	No. of classes
1.	Research – Meaning and Importance	1
2.	Qualities of Researcher	1
3.	Types of Research	2
4.	Steps of Research- Selection and delineating of research problem, statement of general and specific objective, formulation of assumptions and hypothesis, planning research design, selection and development of data collection tools, collection of data, analysis and interpretation of data, drawing conclusion, writing research report	3
5.	Understanding some concepts in research; Assumption, delimitations, operational definition	1
6.	Measurement and its levels	1
7.	Variable and their types	2
8.	Hypothesis – Meaning, importance, characteristics and ways of stating hypothesis	2
9.	Review of literature – Importance, sources of literature, organizing review, collection and presentation	2
10.	Research Design; Historical or documentary, Experimental, Ex-post-facto, Survey, Case study, Field studies	3
11.	Sampling – Meaning and importance; Sampling techniques, determine size of sample	2
12.	Techniques of data collection; Observation, interview and questionnaire, Projective technique	2
13.	Data analysis – tools and methods, interpretations of data, documentation and presentation	3

S. No	Topic	No. of classes
14.	Summary, conclusion and recommendations	1
15.	Writing abstract	1
16.	The research report; Formal style of writing, capitalization, heading, pagination, Tables and figures, Appendices and bibliography, acknowledgement	3
17.	Writing for publications	2
18.	<b>Total</b>	<b>32</b>

### Practical

S. No	Topic	No. of practical
1.	Identifying problem	2
2.	Formulating research hypothesis	1
3.	Development of data collection tool	2
4.	Collection of secondary data,	3
5.	Analysis & report writing.	3
6.	Use of reference management software	3
7.	Article writing	2
	<b>Total</b>	

### Suggested Readings

1. Bajpai SR. 1966. *Methods of social Survey and Research*. Kitab Ghar. Best W. 1983. *Research in Education*. 4<sup>th</sup> Ed. Prentice Hall of India.
2. Carter Good V. 1966. *Essential of Education Research*. Appleton Century Profits, Educational Division, Mereelith Corp.
3. Kaul Lokesh 1984. *Methodology of Education Research*. Vikas Publ. Kerlinger F. 1973. *Foundations of Behavioural Research*. Rinehart Winetons.

**Objectives**

- To develop understanding among students about sampling and data analysis techniques, methods of data analysis using various statistics.

**Theory**

S. No.	Topic	No. of classes
1.	Introduction to Statistics and its applications in agriculture	1
2.	Classification and tabulation of data	2
3.	Diagrammatic and graphical representation of data	1
4.	Measures of central tendency	1
5.	Measures of dispersion	1
6.	Definition of Probability, Addition and Multiplication Theorem (without proof), Simple problems based on probability	1
7.	Definition of Correlation, Scatter Diagram, Karl Pearson's Coefficient of Correlation	1
8.	Introduction to Test of Significance, One sample and two sample t test	2
9.	Chi-Square Test for Goodness of Fit and Independence of Attributes in $2 \times 2$ Contingency Table	1
10.	Introduction to Analysis of Variance, Analysis of one-way and two-way classification	2
11.	Introduction to Sampling Methods, Sampling versus Complete Enumeration, Simple Random Sampling with and without replacement, Use of Random Number Tables for selection of Simple Random Sample	2
12.	Introduction to various statistical packages	1
	<b>Total</b>	<b>16</b>

## Practical

S.No.	Topic	No. of practical
1.	Diagrammatic and graphical representation of data	2
2.	Measures of Central Tendency, Calculation of Quartiles, Deciles and Percentiles.	2
3.	Measures of dispersion	2
4.	Correlation	1
5.	Application of One Sample t-test	1
6.	Application of Two Sample t-test	1
7.	Chi-Square test of Goodness of Fit. Chi-Square test of Independence of Attributes for $2 \times 2$ contingency table	2
8.	Analysis of Variance One Way Classification. Analysis of Variance Two Way Classification	2
9.	Selection of random sample using Simple Random Sampling	1
10.	Use of software packages	2
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Agarwal, B. L. 2006. Basic Statistics. New Age International Publisher.
2. Gupta SC. 2006. *Fundamentals of Statistics*. Himalaya Publ. House.
3. Panse VG & Sukhatme PV. 1985. *Statistical Methods for Agricultural Workers*. ICAR.  
Rao GN. 2007. *Statistics for Agricultural Science*. Oxford & IBH.
4. Snedecor GW & Cochran WG. 1968. *Statistical Methods*. Oxford & IBH.
5. Sprent P. 1993. Applied Non-parametric Statistical Methods. 2<sup>nd</sup>Ed. Chapman & Hall.
6. Sukthame & Ashok C. 1984. *Sampling Theories and Surveys with Application*. 3<sup>rd</sup> Ed. ICAR.
7. Wetherill GB. 1982. Elementary Statistical Methods. Chapman & Hall.
8. William S. Cleveland (1994) The Elements of Graphing Data, 2<sup>nd</sup>Ed., Chapman & Hall

**Department of  
Human Development  
and Family Studies**

**Semester wise Course Distribution HDFS****First year**

	<b>I Semester</b>		
<b>S. No.</b>	<b>Course Title</b>	<b>Course Number</b>	<b>Credit Hours</b>
1.	Childhood Development	HDFS -111	3(2+1)
2.	Developmental Assessment I (Infancy & Toddlerhood)	SEC-HDFS 111	2(0+2)
3.	Developmental Assessment II (childhood)	SEC-HDFS 112	2(0+2)

	<b>II Semester</b>		
<b>S. No.</b>	<b>Course Title</b>	<b>Course Number</b>	<b>Credit Hours</b>
1.	Theoretical Approaches to Parenting	HDFS -121	2 (2+0)
2.	Personality Development	PD-121	2(1+1)
3.	Infant Stimulation practices	SEC-HDFS 121	2(0+2)
4.	Health practices in early childhood	SEC-HDFS 122	2(0+2)

**Post- II Semester Internship** (Only for exit option for award of UG-Certificate)

<b>S. No.</b>	<b>Course Title</b>	<b>Course No.</b>	<b>Credit Hours</b>
1.	Internship (10 weeks)	INT-121	<b>10(0+10)*</b>

\*Compulsory Internship for students exercising exit option (UG-Diploma) after 1<sup>st</sup> Year

**Second year**

	<b>III Semester</b>		
<b>S. No.</b>	<b>Course Title</b>	<b>Course Number</b>	<b>Credit Hours</b>
1.	Early childhood Education	HDFS -211	3(2+1)
2.	Establishment of ECCE centers	SEC-HDFS 211	1 (0+1)
3.	Program planning & execution in ECCE centres	SEC-HDFS 212	1 (0+1)

	<b>IV Semester</b>		
<b>S. No.</b>	<b>Course Title</b>	<b>Course Number</b>	<b>Credit Hours</b>
1.	Theories and Practices in Early Childhood Education	HDFS -221	2(2+0)
2.	Management of ECCE centers	SEC-HDFS 221	1 (0+1)
3.	Monitoring and evaluation of ECCE centers	SEC-HDFS 222	1 (0+1)

**Post- IV Semester Internship** (Only for exit option for award of UG- Diploma)

<b>S. No.</b>	<b>Course Title</b>	<b>Course No.</b>	<b>Credit Hours</b>
1.	Internship (10 weeks)	INT-221	<b>10(0+10)*</b>

\*Compulsory Internship for students exercising exit option (UG-Diploma) after II<sup>nd</sup> Year

**Third year**

	<b>V Semester</b>		
<b>S. No.</b>	<b>Course Title</b>	<b>Course Number</b>	<b>Credit Hours</b>
1.	Adolescence and Development	HDFS -311	3(2+1)
2.	Adulthood Development	HDFS-312	2(1+1)

	<b>VI Semester</b>		
<b>S. No.</b>	<b>Course Title</b>	<b>Course Number</b>	<b>Credit Hours</b>
1.	Marriage and Family Dynamics	HDFS-322	3(2+1)

**Fourth year**

	<b>VII Semester</b>		
<b>S. No.</b>	<b>Course Title</b>	<b>Course No.</b>	<b>Credit Hours</b>
Major/ Minor	Elective courses		
1.	Developmental Challenges in Children	HDFS -411	3(2+1)
2.	Methods and Materials for Teaching Young Children	HDFS -412	3(1+2)
3.	Computer application in ECCE	HDFS -413	3(1+2)
4.	Guidance and Counselling	HDFS -414	3(2+1)
5.	Parent Education and Community welfare Programs	HDFS -415	3(2+1)
	<b>Total</b>	<b>15</b>	

## DETAILED SYLLABUS HDFS

### Semester-I

#### HDFS-111

#### Childhood Development

3(2+1)

#### Objectives

1. To make students aware about the fundamental as well as overall development of the child from conception to late childhood.
2. To understand human development and its significance
3. To create awareness about the process of human growth and development
4. To identify the genetic and environmental influences on human life
5. To study the inter-relatedness of physical, cognitive, social, emotional and motor development
6. To understand the theories of human development

#### Theory

S. No.	Topics	No. of classes
1	Concept of human development, Stages of human development	2
2	Domains of human development and its characteristics.	2
3	Definition of growth and development, Determinants of human growth and development	2
5	Principles of human growth and development-Concept of heredity and environment, The role of heredity and environment on development.	3
6	Perspectives on development: Naturalism, environmentalism, maturational, need, ecological, ethological, cognitive, psycho-analytical, social (socio-cultural and social learning), language, behavior, psycho-social, intelligence and moral reasoning.	4
9	Prenatal, peri-natal and postnatal stages - conception, care during pregnancy, labour/ birth.	3
11	Early Childhood { birth to eight yrs } - Physical, motor, social, emotional development infancy, babyhood, preschool and early school yrs.	4
12	Early Childhood { birth to eight yrs cognitive and language development of infancy, babyhood, preschool and early school yrs.	3
13	Late childhood (eight to 14 yrs) - Physical, motor, social, emotional,	4
14	Late childhood (eight to 14 yrs) - cognitive and language development	3
15	Guidance to parents for promoting holistic development of children	2
	<b>Total</b>	<b>32</b>



## Practical

S. No.	Topics	No. of Classes
1.	Observational visits to well-baby clinics/videos to observe full term and preterm babies and observe/ record its characteristics	2
2.	Visit to Early Childhood Centers, study physical, motor, social, emotional, intellectual, language, moral and personality development at different stages and prepare interpretive reports.	3
3.	Collect and evaluate reports/article/news/ other secondary data related to recent issues trends and challenges of Human development and write an analytical report.	2
4.	Case study of individuals in different stages of development - Infancy, early childhood	2
5.	Case study of individuals in different stages of development - late childhood	2
6.	Critical analysis of case study reports.	3
7.	Preparation of Resource file related to any one stage of life span.	2
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Bronfenbrenner, V. (1979). The ecology of human development. Cambridge, Harvard Univ. Press.
2. Berk, E. L. (2013). Exploring life span development. 3<sup>rd</sup>ed. McGraw Hill, New York.
3. David, M.T., Garavan, L. and Dooley, M. 2012. Fundamentals of human resource development. *SAGE Publications Ltd*
4. Hall, Calvin S and Lindzey. G. (1978). Theories of personality. John Wiley and Sons
5. Harris, J.R. and Liebert, R.M. (1987). The child. Prentice Hall, Inc.
6. Munsinger, H. (1971). Fundamentals of child development. Holt, Reinhart and Winston, Inc.
7. Papalia, D.E. and Olds, SW. (2008). Human development. 11<sup>th</sup>ed. McGraw Hill. New York

## Developmental Assessment I

**SEC-HDFS-111**

**Infancy & Toddlerhood**

**2 (0+2)**

### Objectives

1. To learn about the various standard tools & techniques for assessing development of Infants & toddlers.
2. To learn to administer the standard tools to assess the development of new born, infants and toddlers.
3. To learn about the ethical issues in assessing children on various areas of development.
4. To create awareness about challenges in developmental assessment of young children

### Practical

S. No.	Topics	No. of Classes
1	Orientation on screening and developmental assessment of children for various developments through different tools and techniques -	2
2	Exploring existing areas, Purpose of use of tests and techniques and classification	2
3	Criteria for selection and use of test – reliability and validity and wide acceptability;	2
4	Approaches and tools in developmental screening, Trends and challenges in developmental assessment of young children	3
5	Advantages and uses of testing and tests;	3
6	Orientation on formal and informal measures in assessment	3
7	Special considerations and ethical issues in assessing various areas of developments of New born, Infants, Toddlers,	3
8	Conducting tests and report writing for each test	2
9	Neonatal assessment – APGAR* and Gestational age, Neonatal Behavioral Assessment Scale (NBAS),	3
10	Infant and Toddler hood assessment - Anthropometric measurements* and national and international standards	3
11	Developmental Screening Test,	2
12	Bayley's Scale of Infant. Pramila Pathak's Mental and Motor Growth of Indian babies,	2
13	Vineland social Maturity scale	2
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Anastasi, A. (1997). Psychological testing. 7th ed. Pearson publishers
2. Losardo, A. (2011). Alternative approaches to assessing young children. 2<sup>nd</sup> ed. Brooker publishing
3. Minds, L. (2014). Assessing young children. 5th ed. Pearson publication.
4. Manuals of the respective tests Development (BSID)/latest version\*, Pramila Pathak's Mental and Motor Growth of Indian babies, Vineland social Maturity scale \*

## Developmental Assessment II

**SEC-HDFS-112**

**Childhood**

**2 (0+2)**

### Objectives

1. To learn about the various standard tools & techniques for assessing development of children.
2. To learn to administer the standard tools to assess the development of children.
3. To learn about the ethical issues in assessing children on various areas of development.
4. To create awareness about challenges in developmental assessment of children.

### Practical

S. No.	Topics	No. of Classes
1	Special considerations and ethical issues in assessing various areas of developments of Pre-schoolers, Pre-Primary school children, Primary School Children Middle School Children and Secondary /Higher Secondary School Children, Conducting tests and report writing for each test :	4
2	Screening and assessment of preschool and Pre-primary school children- Stanford Binet Intelligence Scale*, Wechsler Scale of Intelligence for Preschool and Primary School Children*	3
3	Vineland Adaptive Behavior Scale, DAS II, Pea body Picture Vocabulary test or similar test,	3
4	Ecological assessment of Preschool and Pre-primary school children- HOME Inventory, Screening and assessment of Primary School Children	3
5	Parent child relationship Scale- latest test,	2
6.	Wechsler Intelligence Scale of for children,	2
7.	Learning disability tests: Diagnostic test of reading disorder-, Screening and assessment of Middle School Children	3

S. No.	Topics	No. of Classes
8	Children's self concept scale-, Anxiety scale, Thematic Apperception Test (TAT)*,	2
9	Children's Apperception Test (CAT)*,	2
10	General well being scale-, Screening and assessment of Secondary /Higher Secondary School Children -	2
11	Emotional Intelligence scale- /Emotional Maturity Scale	2
12	Case studies, Presentation of reports	2
13	Counseling parents on developmental deviations observed	2
	<b>Total</b>	<b>32</b>

**Note:** The test marked with \* are compulsory. Latest tests with concurrent validity for each area of assessment should be taught.

### Suggested Readings

1. Anastasi, A. (1997). Psychological testing. 7<sup>th</sup>ed. Pearson publishers
2. Losardo, A. (2011). Alternative approaches to assessing young children. 2<sup>nd</sup>ed. Brooker publishing
3. Minds, L. (2014). Assessing young children. 5<sup>th</sup>ed. Pearson publication.
4. Manuals of the respective tests.

## Semester –II

### HDFS -121                      Theoretical Approaches to Parenting                      2(2+0)

#### Objectives

1. To know the parenting roles and practices.
2. To know positive and maladaptive parenting
3. To know the effects of parenting style and practices on child developmental outcomes.

#### Theory

S. No.	Topics	No. of lectures
1	Concepts of parenting ,determinates of parenting behavior	2
2	Parenting Style, Parenting Practices, Parenting Roles	3
3	Parent-child transactions, Influential factors	2
6	Family orchestrated child experiences, information needs	2

<b>S. No.</b>	<b>Topics</b>	<b>No. of lectures</b>
7	Biological, social and Psychological theories	3
9	Attachment Theory approach	2
10	Behaviorist approach, Social Learning approach	4
11	Ecological systems approach	2
12	Parental role theory approach, Disciplinary theory	4
13	Scaffolding approach (Vygotsky),	2
14	Self- determination approach	3
15	Family systems theory approach	3
	<b>Total</b>	<b>32</b>

### **Suggested Readings**

1. Damon, W., Sigel, I.E. and Renninger, A., 1998, Handbook of Child Psychology, 5<sup>th</sup> edition, John Wiley& Sons, Inc., New York.
2. Shonkoff, J.P and Meisels, S.J., 2009, Handbook of early childhood intervention, 2<sup>nd</sup> edition, CambridgeUniversity Press, New York.
3. Charney, D.S., 2004, Psychobiological Mechanisms of Resilience and vulnerability:
4. Carbonell, D.M., Reinherz, H.Z., Giaconia, R.M., Stashwicks, C.a., Paradis, A.D. and
5. Beardslee, White J.M and Klien D.M (2008), Family theories 3<sup>rd</sup> edition, Sage publications.

### **SEC-HDFS -121**

### **Infant Stimulation Practices**

**2 (0+2)**

### **Objectives**

1. To understand the need for providing stimulation to infants.
2. To learn the skills of providing stimulation.

### **Practical**

<b>S. No.</b>	<b>Topics</b>	<b>No. of Classes</b>
1	Planning of stimulating activities for neonates /newborns Newborns at risk Low birth weight babies Newborns with respiratory syndrome	4
2	Stimulatory learning environment at home- Selection of at least two infants by each student and work with them during the course and developing case studies through following steps.	2

S. No.	Topics	No. of Classes
	Selection of two infants Observing adult infant interaction in different settings Preparing an observation schedule Conducting observations Drawing inferences	2
3	Preparation of scrap book containing conventional and current practices of stimulatory learning	4
4	Stimulatory learning environment at ECCE centre's- Understanding competencies of toddlers through observation and planning stimulation activities for- (at ECCE centre's) <ul style="list-style-type: none"> <li>Physical and motor development</li> <li>Language development</li> <li>Cognitive development</li> <li>Social emotional development</li> </ul>	3 3
5	Planning and Preparation of stimulating activities and material for infants <ul style="list-style-type: none"> <li>Physical and motor development</li> <li>Language development</li> <li>Cognitive development</li> <li>Socio-emotional development</li> </ul>	4 3
6	Administration of stimulation programme urban crèche ECCD centre	3
7	Evaluating the outcome of stimulation programme	3
8	Report preparations and Presentation	1
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Kail R V & Cavaugh JC (2004) Human Development - A Life Span View.
2. Santrock J W (2006) Life Span Development. McGraw Hill.
3. Santrock, J. (2014). Lifespan Development. Mc.Graw Hill
4. Steinberg, L., Bornstein, M.H., Vandell, D.L., & Rook, K.S. (2011). Lifespan Development. USA:Wadsworth.
5. Boyd, D. & Bee, H. (2011) Lifespan Development. Pearson.

**SEC-HDFS -122      Health Practices in Early Childhood****2 (0+2)****Objectives**

1. To learn about the importance of health and factors affecting health.
2. To promote health and hygiene in children.
3. To reduce and prevent the incidence of underdevelopment and diseases in young children.
4. To plan need-based programs to address health issues during early childhood.
5. To educate parents/caregivers/ ECE Teachers on good health practices.

**Practical**

<b>S. No.</b>	<b>Topics</b>	<b>No. of Classes</b>
1	Importance of child's health - factors affecting child health	3
2	Important child health indicators- NMR, IMR, CMR(Under 5 years);	2
3	Health care practices during neonatal stage, infancy and childhood period	2
4	Nutrition and health;Health assessment techniques in children;	3
5	ECE Centres and Child's health; Integration of Health care with educational and social services	3
6	Identification of common health problems in children	2
7	Planning and organizing parent/community health education Program	3
8	Review of health Programs and policy	2
9	Digital addiction and child health; Eating disorders and child health; Health care practices in rural /urban/tribal families	3
10	Case study of preschool child;	3
11	Studying health care practices in children	2
12	Report writing and presentation	2
13	Recommendation to parents/caregivers/health care professionals and ECE educators.	2
	<b>Total</b>	<b>32</b>

**Suggested Readings**

1. Santrock, J.W. (2011). Life span Development. 12 nd Mc Graw Hill Education (India).
2. Hurlock, e.b (1978) Child development. 6<sup>th</sup> ed Tata Mc graw hill education (India)
3. Dutt. S. Understanding children. Anmol Publications pvt.ltd.
4. Nandha v.k. (2002) Principles of child development. Anmol publications. Pvt.ltd.
5. Mazar, J.E (2017) Learning and Behaviour. 8<sup>th</sup> ed Rantledge publications.
6. Papalia, D.E., Olds, S.W.& Feldman, R.D. (2004) Human development. 9<sup>th</sup> ed. Mc Graw Hill Education(India).

7. Corbett, A., Gratale, D., Ellis, W., et al. Organization(s): Nemours Date: 2014
8. National Center on Health, Behavioral Health, and Safety 888-227-5125 health @ ecetta.info Page 25 of 25.
9. Charles Nechtem Associates August 2021 EAP: 800-531-0200.  
<https://childcareta.acf.hhs.gov>.
10. <https://www.who.int/health-Topic/child-health>.
11. [www.ruralhealthinfo.org/toolkits/child-health/1/overview](http://www.ruralhealthinfo.org/toolkits/child-health/1/overview).
12. [www.ashaweb.org/wp-content/uploads/2014/08/Childhood-Obesity-Prevention-Strategies-for-Rural-Communities.pdf](http://www.ashaweb.org/wp-content/uploads/2014/08/Childhood-Obesity-Prevention-Strategies-for-Rural-Communities.pdf).

### **Semester –III**

#### **HDFS-211**

#### **Early Childhood Education**

**3(2+1)**

#### **Objectives**

1. To orient the students about significance of ECE for accelerating holistic development of children
2. To enhance knowledge and skills of the students for planning programme and its execution in ECEcentres
3. To sensitize students about significance of inclusive ECCE and also about involving parents andcommunity in ECE programme.

#### **Theory**

<b>S. No.</b>	<b>Topics</b>	<b>No. of lectures</b>
1	Early Childhood Education - Meaning, characteristics and significance of early childhood education.	1
2	History of its evolution, abroad and in India,	2
3	National education policy 2020(Emphasis on ECCE)	1
4	Application of Western and Indian educational philosophies to early childhood education	2
5	Recent trends and challenges in Early Childhood Education-Concept of learning- definition, essential features, types of learning, laws of learning, principles of learning	2
6	Sensations, Perception, Imagination, Attention and Memory, Remembering and Forgetting	2
7	Intelligence-reasoning and thinking, effortful control, problem solving, information processing and learning environment-	2
8	Motivation- definition, types, modes of motivation, relationship of motivation with learning and performance-	2



S. No.	Topics	No. of lectures
9	Performance evaluation –meaning of evaluation/testing, evaluation of student's performance, types of tests used in classroom evaluation	2
10	Programme planning in ECE- Steps and types of programme planning	2
11	Theory of play, Development of play stages, Importance of play, Steps and types of programme planning, Significance of Play way method in ECE.	2
12	Activities to promote all round development of children in early childhood- cognitive, language, socio-emotional and motor development.	2
13	Developing key characteristics in children: Empathy, Adaptation, Boldness, Creativity, Diligence, Patience, Responsibility, Self- reliance, Resilience, Resourcefulness, Positive Self-esteem, Integrity, Humility, Tolerance, punctuality.	2
14	Role, qualities and responsibilities of an early childhood personnel	2
15	Maintenance of registers and records;	2
16	Promotion of inclusive ECCE; involvement of parents and community in ECCE.	2
17.	Guidance to parents on activities to promote child's learning / early identification of learning problems <ul style="list-style-type: none"> <li>• Early identification</li> </ul>	2
	<b>Total</b>	<b>32</b>

### Practical

S. No.	Topics	No. of Classes
1	Observation and recording of activities in ECE center	3
2	Analyzing effect of reinforcement, motivation, discipline on learning	2
3	Developing and conducting activities to promote all round development - Gross and fine motor skills, cognitive skills, language skills, creativity and socio emotional skills.	3
4	Preparation of suitable creative/innovative teaching learning material used for preschool children.	3
5	Application of theories of classroom teaching.	2
6	Application of different methods of evaluating performance and interpretation	3
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Catherine E. Snow and Susan B. Van Hemel, eds.; Early Childhood Assessment: Why, What, and How by the National Research Council. The National Academies Press, 2008.
2. Early childhood Care and Education (ecce): Foundations of Learning NEP, 2020, Department of Elementary Education, NCERT, New Delhi
3. Early Childhood Care And Education, Senior Secondary Course, 376, National Institute of Open Schooling ISO9001:2000 Certified (An autonomous organisation under MHRD, Govt. of India) A-24-25, Institutional Area, Sector-62, NOIDA-201309 (U.P.)
4. Website: [www.nios.ac.in](http://www.nios.ac.in), Toll Free No: 18001809393
5. Eliason, C. & Jenkins, L. (1990). A Practicum Guide to Early childhood Curriculum, 4th edition, London: Merrill Publishing Company.
6. Grewal, J.C. (2000). Methods and Materials of Nursery Education, 4th edition revised, Delhi: Doaba House, Book Sellers & Publishers
7. Grewal, J.S. (1984). Early Childhood Education, Foundations & Practice, Agra: National Psychological Corporation, Modern Printers.
8. Human development and Family studies, Unit III, NCERT, New Delhi,
9. <http://ncert.nic.in/textbook/pdf/lehe107.pdf>
10. Kostelnik, M.J., Soderman, A.K., & Whiren, A.P. (2007). Developmentally Appropriate Curriculum, Best Practices in Early Childhood Education, 4th Edition (pp. 13-29). New
11. Jersey: PEARSON, Merrill Printice Hall.
12. Mohanty, J., & Mohanty, B. (2000). Early Childhood Care and Education, New Delhi: Deep and Deep Publications Pvt. Ltd.
13. National early childhood care and education (ecce) Curriculum framework, ministry of women and child development
14. The Preschool Curriculum, NCERT, 2019
15. UG Courses- Home Science - e-Krishi Shiksha, Early Childhood Development & Education
16. <http://ecoursesonline.iasri.res.in/course/index.php?categoryid=100> 1
17. UG Courses- Home Science - e-Krishi Shiksha, Organization and Management of ECCD
18. Programmes, <http://ecoursesonline.iasri.res.in/course/index.php?categoryid=100>
19. Sinclair H (2004). *Standards for Early Childhood Programmes in Centre based Child Care*. Govt. of New Found Land and Labrador. Dept. of Health and Community Services.

**Objectives**

1. To gain practical experience in establishing different early childhood care and education centres
2. To learn about registration of ECCE centres

**Practical**

S.No.	Topics	No. of Classes
1.	Concept, need, characteristics, functions and types of project planning	1
2.	Ethical considerations in project planning.	1
3.	Types of child care and education programmes - Objectives and services of different programmes.	1
4.	Need assessment Method and significance of need assessment.	1
5.	Funding agencies. Budget planning and accounts. Short term and long term budget planning.	1
6.	Staffing and supervision. Legal and regulatory processes at national and international level. Registration and licensing	1
7.	Infrastructure development- location, indoor and outdoor space requirements.	1
8.	Setting up the physical environment and facilities	1
9.	Physical facilities ECCE centers- basic requirements; class room arrangements, care facilities-	1
10	facilities for different budgets - Format for submission of proposal for physical facilities -	1
11.	Setting the learning environment. – classroom arrangements, equipment procurements- Short term and long term programme planning and evaluation	1
12.	. Preparing a project proposal. Need assessment in different settings for various programmes, selection of locale and clientele	1
13.	Layout planning for different programmes in rural and urban settings. Manpower, finance, infrastructure facilities and cost benefit analysis as input sources. Visit to various funding agencies like banks, cooperatives and other agencies and reporting about schemes and facilities offered by these agencies	1 2
14.	Exploring current government programmes to support self employment under various schemes. Report writing	1
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Evans B.E., Shurb B and Weinsten M. 1971. Day care. Beacon Press, New York.
2. Mohanty J and Mohanty B. 2000, Early Childhood Care and Education, Deep and Deep Publications Pvt.Ltd., New Delhi
3. Murlidharan R and Banerji V. 1969, A Guide for Nursery School Teachers, National Council of Education Research and Training, New Delhi.
4. Sue Dockett, Leonie Arthur , Sue Farmer , Bronwyn Beecher and Elizabeth Death. 2017, Programming and Planning in Early Childhood Settings, Cengage Australia.
5. Jaipaul Roopnarine and James E Johnson. 2015, Approaches To Early Childhood Education, (5<sup>th</sup> edition), Pearson India.
6. NAEYC (National Association for the Education of Young Children). 2022. Developmentally Appropriate Practice in Early Childhood Programs Serving Children from Birth Through Age 8. 4th ed. Washington, DC: NAEYC.

## SEC-HDFS -212 Programme Planning & Execution in ECCE Centres 1 (0+1)

### Objectives

1. To gain practical experience of the planning of all aspects of different early childhood care and education centres.
2. To develop skills for understanding developmental needs of young children belonging to early childhood years.
3. To develop skills for planning and management of early childhood care and education programmes.
4. To provide practical experience in operating an early childhood education centre in urban and rural areas.

### Practical

S. No.	Topics	No. of Classes
1.	Understanding principles of programme planning - planning long and short term programme for various early childhood care and education centers -	2
2.	Issues and goals of curriculum planning - Principles of effective programme planning. Importance of developmentally appropriate planning	1
3.	Observing and recording developmental characteristics of children in various early childhood care and education settings	2

S. No.	Topics	No. of Classes
4.	Preparing developmentally appropriate activities for physical development <ul style="list-style-type: none"> <li>• Fine and large muscle coordination –</li> <li>• Developmentally appropriate activities for cognitive stimulation</li> <li>• Activities for creative expression,</li> <li>• Activities for language development –</li> <li>• Activities for socio emotional interaction –</li> <li>• Pre reading and pre writing activities –</li> <li>• foundations for numeracy</li> </ul>	2 2
5.	Activities for environmental awareness – science experiences Activities for body movements – developing self care, Care of surroundings activities – effective use of material,	2
6.	Mapping of material – developing classroom teaching learning accessories	1
7.	Activities for parent and community involvement – execution of all activities through practice teaching different age groups of children	2
8.	Conducting activities with parents and community- submitting records of observation of children's activities, Parent and community activities.	2
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Brophy J.E., Good T.I. and Nedler S.E. 1975. Teaching in the preschool. Harper Row publisher, NewYork
2. Day, B.1983. Early Childhood Education: Creative learning activities Macmilla Publishing Co., Inc. NewYork
3. Frost J.Lan Kissinger J.B. 1976. The young child and the educative process. Holt, Rinehort and Winston,New York
4. Grewal J.S. 1984. Early childhood education: Foundations and practice. National PsychologicalCorporation, Agra.
5. Leeper S.H, Skipper D.S and Witherspoon R.L. 1979. Good schools for young children MacmillanPublishing Co., Inc. New York.
6. Morrison GS 1998 Early childhood education today. 7<sup>th</sup> edition, Merril, an imprint of Prentice Hall, UpperSaddle River, New Jersey Columbus, Ohio.

7. Robert V. and Kail (2019) Children and their Development Pearson India Education Services Pvt. Ltd, Uttar Pradesh, India.
8. Aparajita and Rita Chowhary (2016) Development Care and Education of Pre-School Children discoveryPublishing House, New Delhi
9. Mina Swaminath and Prema Daniel (2019) Play Activities for Child development National Book Trust, India
10. T.S Sararwathi, Shailaja Menon and Ankur Madan (2021) Childhood in India. Routledge Toylnr& FrancisGroup New York
11. Christopher Green (2000) Beyond Toddlerdom, Vermilion Landon
12. Johnsons (2004) Your Baby & Toddler DK & Penguin Company, London

## **Semester IV**

### **HDFS-221 Theories and Practices in Early Childhood Education 2(2+0)**

#### **Objectives**

1. To understand the various theories of Early Childhood Education.
2. To learn scientific practices in Early Childhood Education.

#### **Theory**

<b>S. No.</b>	<b>Topics</b>	<b>No. of lectures</b>
1	Importance of theoretical perspectives in early childhood care and education.	2
2	Early childhood education practices - Play – based, Montessori, Waldorf, Reggio- Emilia, Religious schools, High Scope, Direct instruction, Bank street approach	3
3	Attachment theory of Bowl by and Ainsworth	2
4	Ecological systems theory of Bronfenbrenner	2
5	Theories of Learning- classical conditioning, Operant conditioning of Skinner	3
6	Trial and Error learning by Thorndyke	2
7	Social learning theory of Bandura	2
8	Cognitive theory of Maria Montessori	2
9	Cognitive development theory Jean Piaget	2
10	Socio- cultural theory of Lev Vygotsky	2

S. No.	Topics	No. of lectures
11	Multiple intelligences theory of Howard Gardner	2
12	Erikson's Psycho Social development theory	2
13	Disciplining children, Theories of parenting styles, Hoffman's disciplinary techniques	2
14	Application of theories in classroom	2
15	Challenging aspects of practice of theories in early childhood care and education.	2
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Soni R (2015). Theme Based Early Childhood Care and Education Programme– A Resource Book. NCERT, New Delhi.
2. Wiltshire M (2010). Understanding the High Scope Approach, Early Years Education in Practice. Taylor and Francis.
3. Deiner P L (2006). *Inclusive Early Childhood Education*. Cengage Learning Press.
4. Jaipaul I Roopnarian and James E J (2008). *Approaches to Early Childhood Education*. Pearson Education, Atlantic.
5. Kaul V (1997). Early Childhood Education Programmes. NCERT, Delhi.

## SEC-HDFS -221      Management of ECCE Centres      1 (0+1)

### Objectives

1. To gain practical experience in monitoring the different early childhood care and education centres.
2. To develop skills for management of early childhood care and education programmes.
3. To provide practical experience in monitoring an early childhood education centre in urban and rural areas.

### Practical

S. No.	Topics	No. of Classes
1.	Principles of management – Theories of management ; benefits of using management theories	2
2.	the seven theories; Scientific management theory, principles of administrative management theory, bureaucratic management theory,	3

S. No.	Topics	No. of Classes
	human relations theory, systems management theory, contingency management theory	
3.	Theory of X (authoritarian) and Y (participative) – Motivation; Maslow's theory, McClelland theory, McGregor's Theory X and Theory Y,	2
4.	Herzberg's Two-Factor Theory - Goal setting; Locke and Latham Goal setting principles, essential elements in goal setting -	2
5.	Framing administrative policies for ECCE center	1
6.	Elements in administrative policies. Conducting mock interviews for selection of various staff members, and framing criteria for their selection	2
7.	Budget provisions for various ECCE centres - short term and long budget term planning. Cost of operation, expenditure on equipment, salaries and other benefits to staff	2
8.	Maintenance of daily, weekly and monthly accounts Preparing a plan to meet emergencies.	2
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Neeru Vashist ,Vibhuthi Vashist - Principles of Management (other basic management textbooks)
2. Brophy J.E., Good T.I. and Nedler S.E. 1975. Teaching in the preschool. Harper Row publisher, NewYork
3. Day, B.1983. Early Childhood Education: Creative learning activities Macmillan Publishing Co., Inc.New York
4. Evans B.E., Shurb B and Weinsten M. 1971. Day care. Beacon Press, New York.
5. Frost J.Lan Kissinger J.B. 1976. The young child and the educative process. Holt, Rinehart and Winston,New York
6. Grewal J.S. 1984. Early childhood education: Foundations and practice. National PsychologicalCorporation, Agra.
7. Leeper S.H, Skipper D.S and Witherspoon R.L. 1979. Good schools for young children MacmillanPublishing Co., Inc. New York.
8. Morrison GS 1998 Early childhood education today. 7th edition, Merrill, an imprint of Prentice Hall,Upper Saddle River, New Jersey Columbus, Ohio.
9. Murlidharan R. and Banerji V. 1991. A guide for nursery school teachers, National Council of EducationalResearch and Training, New Delhi.



10. Mohanty J and Mohanty B. 2007. Early childhood care and education. Deep and Deep publications Pvt.Ltd., New Delhi.
11. Sinha A (2005) manual of early childhood education Print Palace, Agra.
12. Taraporevala R and Chhugani N (2002) Early childhood years- Handbook for parents and teachers.English Edition Publishers, Mumbai.
13. Kuppaswamy B (1990). Child behaviour and development. Konark Publishers Pvt. Ltd. New Delhi.
14. Singh B (1997). Pre-school education. APH publishing Corporation, New Delhi.
15. Swaminathan M. (1991) Play Activities for young children, P.S. press Service, Pvt. Ltd, New delhi.
16. Seefeldt C and Barbour N (1994) Early Childhood Education – An introduction Maxwell Macmillan,Canada.

## **SEC-HDFS -222 Monitoring and Evaluation of ECCE Centre's 1 (0+1)**

### **Objectives**

1. To learn to monitor the ECCE programme.
2. To learn about the regulations of standards for Quality of ECCE centre.

### **Practical**

<b>S. No.</b>	<b>Topics</b>	<b>No. of Classes</b>
1.	Concept of quality and minimum regulations in early childhood education - important factors to consider in quality;	2
2.	The four dimensions are: those of society, the child, the teacher and the learning context; four dimensions in quality assessment such as the society the child, the teacher and the learning context	2
3.	Concept of evaluation and monitoring; defining the concepts; Monitoring and evaluation of budget distribution for ECCE activities	2
4.	Monitoring admissions of children - monitoring and evaluation of lesson plans - monitoring and evaluation of classroom practices -	2
5.	Monitoring and evaluation of children's assessment; monitoring and evaluation of staff supervision and performance; characteristics of ideal child care supervisors and teachers, their qualifications and training	2
6.	Monitoring and evaluation of adult and child spaces and their arrangements and utilization Monitoring and evaluation of service activities such as cleanliness, feeding, health care	2

<b>S. No.</b>	<b>Topics</b>	<b>No. of Classes</b>
7.	Monitoring, use and evaluation of teaching – learning equipment and material – Monitoring and evaluation of record keeping	2
8.	Awareness of national and international organizations working for ECCE.	2
	<b>Total</b>	<b>16</b>

### **Suggested Readings**

1. Mohanty J and Mohanty B. 2000, Early Childhood Care and Education, Deep and Deep Publications Pvt.Ltd., New Delhi
2. Murlidharan R and Banerji V. 1969, A Guide for Nursery School Teachers, National Council of Education Research and Training, New Delhi.
3. Sue Dockett, Leonie Arthur, Sue Farmer, Bronwyn Beecher and Elizabeth Death. 2017, Programming and Planning in Early Childhood Settings, Cengage Australia.
4. Jaipaul Roopnarine and James E Johnson. 2015, Approaches To Early Childhood Education, (5<sup>th</sup> edition), Pearson India.
5. NAEYC (National Association for the Education of Young Children). 2022. Developmentally Appropriate Practice in Early Childhood Programs Serving Children from Birth through Age 8. 4th ed. Washington, DC: NAEYC.

## **Semester V**

### **HDFS-311**

### **Adolescent Development**

**3 (2+1)**

### **Objectives**

1. To understand the ways in which physical, cognitive, social, emotional, and personality development interact in development of adolescent
2. To educate about the contemporary issues in adolescent development, challenges and issues

### **Theory**

<b>S. No.</b>	<b>Topics</b>	<b>No. of lectures</b>
1.	Meaning, Significance, characteristics and developmental tasks	2
2.	Theoretical perspectives on adolescence –biological, psycho-analytical, psycho-social, social-cognitive and cultural, lifespan perspective, learning perspective, humanistic perspective, ecological perspective, socio cultural perspective, and the positive youth development perspective.	3

<b>S. No.</b>	<b>Topics</b>	<b>No. of lectures</b>
3.	Physical and sexual development in adolescence - physical transition from child to adult, puberty - causes and changes, psychological impact of puberty, early and late maturation and its psychological implications, body image and its psychological implications	3
4.	Early and late maturation and its psychological implications,	2
5.	Cognition during adolescence, theoretical perspectives on adolescent cognitive development, gender differences in mental abilities	2
6.	Socio- emotional development during adolescence - transition in emotions, heightened emotionality, common emotional patterns, coping mechanism, maturity and adjustment	3
7.	Socialization difficulties in social transition, Social attitudes and behaviour, influence of peers, conformity and self-assertiveness	3
8.	Identity development , Erikson's identity formation theory , Marcia's Statuses Identity ; identity diffusion, identity foreclosure, identity moratorium, self-concept.	3
9.	Moral development during adolescence and value orientation – theoretical perspectives.	2
10.	Mental Health and resilience. Life skills and their importance	2
11.	Challenges of adolescence - sexuality, aggression, delinquency, understanding of AIDS substance abuse, alcoholism, personality disorders, depression, suicide, eating disorders, health problems, psychological problems, social problems- dating and relationships	3
12.	Guidance and Counseling for adolescents– need and importance	2
13.	changing roles in family and society	2
	<b>Total</b>	<b>32</b>

### **Practical**

<b>S. No.</b>	<b>Topics</b>	<b>No. of Classes</b>
1.	Survey on adolescent problems and conflicts	2
2.	Attitude towards sexuality/Substance abuse	2
3.	Profile of behavioural problems through Case study	2
4.	Gender issues of adolescence, adolescents future planning and	2

S. No.	Topics	No. of Classes
	orientation study through interviews.	
5.	Tests related to skills and abilities of Adolescence: Eg: “Adolescence Girl’s Empowerment scale”	2
6.	“Differential Aptitude Test- <ul style="list-style-type: none"> <li>• Behaviour Problem checklist (CBCL)-</li> <li>• Problem solving ability test (PSAT)</li> <li>• Guidance need inventory</li> <li>• Life Style Scale</li> <li>• Anecdotal records</li> <li>• Observation and events</li> <li>• Interpretation and analysis</li> <li>• Description of behaviour</li> </ul>	1 1 1 1 1 1 1
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Conger JJ. 1977. Adolescence and Youth: Psychological Development in a Changing World. Harper and Row, New York
2. Berk LE and Meyers AB. 2010. Infants, Children, and Adolescents. 7th Ed., Prentice Hall, PTR
3. Dandekar K. 1996. The Elderly in India. Sage Publications, New Delhi.
4. Hayslip B and Panek P. 1989. Adult Development and Aging. Harper & Row.
5. Newman BM and Newman PR. 2003. Development Through Life: A Psycho Social Approach. Cengage Learning Boston
6. Hazen E P, Goldstein M A, Goldstein M C (2011). Mental Health Disorders in Adolescents: A Guide for Parents, Teachers, and Professionals. Rutgers University Press: New Brunswick, NJ.

### HDFS-312

### Adulthood Development

**2(1+1)**

#### Objectives

1. To acquaint students regarding the developmental areas of adults and its theoretical orientation
2. To develop understanding of changes and adjustments in adulthood

## Theory

S. No.	Topic	No. of lectures
1.	Emerging adulthood, importance, stages, characteristics, conflicts - Meaning, characteristics and developmental tasks of adulthood	1
2.	stages of adulthood, Principles of adult development - Four principles of adult development and aging -	2
3.	Theoretical and ecological perspectives of adult development - Psychosocial theory, Peck elaboration of Erickson, Levinson's theory, Sheehy's adult transition, Erikson's Psychosocial theory, Identity Process Theory, Activity Theory, Socio-emotional Selectivity Theory	2
4.	Theoretical perspectives in adult development - Bio-psychosocial perspective, Ecological perspective, Life Course perspective, Klaus Riegel's Dimensions of Development Theory	2
5.	Antecedent influences for growth and development during adulthood - Physical, motor, social, emotional, cognitive and language. Characteristics of Early, Middle and Late adulthood	2
6.	Personality development, Happiness and satisfaction, life style choices, marriage and family transitions; Career, theories of career choice, Job satisfaction	2
7.	Adjustments during adulthood: Menopausal adjustments, Empty nest, career changes, retirement, leisure, Health during adulthood and prevention of chronic diseases, physical and neuro- cognitive disorders	1
8.	Old age: demography of old age, theories of biological aging , Care during old age	1
9.	Antecedent influences for developmental changes during old age	1
10.	Adjustment to death, widowhood, dying and bereavement -	1
11.	Counseling for adults and the aged – need and importance	1
	<b>Total</b>	<b>16</b>

## Practical

S. No.	Topics	No. of Classes
1.	Administering of adulthood scales on personality	2
2.	Preparation of interview schedule for adults on life satisfaction	2
3.	Interviews on career satisfaction	2

<b>S. No.</b>	<b>Topics</b>	<b>No. of Classes</b>
4.	Interviews on dual role burden for women	2
5.	Case study on health condition of aged	2
6.	FGDs on ageing problems(Focus Group Discussion)	2
7.	Content analysis of films, books on adulthood conflicts and resolutions	2
8.	Visits to institution of aged and their evaluation, report writing and presentation	2
	<b>Total</b>	<b>16</b>

### **Suggested Readings**

1. Dacey, J S and Travers J F (2002). Human Development - Across the Lifespan. McGraw Hill, Boston.
2. Dandekar K (1996). The Elderly in India. Sage Publications, New Delhi.
3. Hayslip B and Panek P (1989). Adult Development and Aging. Harper & Row.
4. Hurlock E B (2003). Developmental Psychology - A Life Span Approach. Tata McGraw Hill, New Delhi.
5. Kail R V and Cavanaugh J C (2004). Human Development - A Life-Span View. Thomson-Wadsworth, United

### **Semester –VI**

**HDFS -322**

**Marriage and Family Dynamics**

**3(2+1)**

### **Objectives**

1. To provide the knowledge about the dynamics of Contemporary marriage and family system in India
2. To understand Family stress and crisis;
3. To empower the students by providing them knowledge about the laws and Acts related to marriage and Family life.
4. To develop an understanding about the need and importance of family life education, sex education and family planning
5. To prepare the students to work as Marriage and Family Counselor.

## Theory

S. No.	Topics	No. of classes
1.	<b>Marriage:</b> Definition, philosophy, past and present concept of Hindu Marriage, Goals and Functions of Marriage	1
2.	Characteristic features of Hindu, Muslim and Christian Marriage. Types and Forms of Marriage in India (Ancient and Prevalent Forms).	1
3.	Readiness for marriage – Definition, Meaning and importance of readiness, Areas of readiness for marriage, Identifying characteristics of readiness for marriage.	1
4.	Mate Selection: Meaning, model/method of mate selection, field of mate selection, Theories of mate selection, Ways of mate selection in tribal India. Factors responsible for wrong mate selection. Guidelines for mate selection - Factors influencing mate selection and desirable qualities in mate, Trends in mate selection- Newspaper ads for marriages, Online matrimonial sites; their use and problems and prospects.	2
5.	-Dating, Courtship and engagement: Meaning and objectives of Dating, courtship and engagement - Importance of engagement	1
6.	Wedding: Definition meaning and purpose of Wedding ceremonies rituals and ceremonies of marriage in different religions of India.	1
7.	Marital roles and behaviour- Definition, importance and concept of marital roles (marriage as status and role transition)	1
8.	Changing gender roles - factors responsible for change in gender roles, role conflict	1
9.	Marital Adjustment and Success: Definition, Areas of marital adjustment - types of marital relations and adjustment, factors influencing marital adjustment, marital adjustment over the family life cycle, obstacles in marital adjustment, improving marital adjustment - marital adjustment techniques. general technique of resolving differences	2
10.	Marital Success and criteria of Marital Success	1
11.	Marital dissolution: Definition, types of marital dissolution ,Voluntary and Involuntary, Causes of Marital Dissolution, Separation distress and factors effecting it	1
12.	Divorce, factors responsible for divorce, consequences of divorce on spouse and children , factors responsible for an increase in the rate of marital dissolution, factors responsible for refraining from divorce after	1

<b>S. No.</b>	<b>Topics</b>	<b>No. of classes</b>
	marriage failure, social process of marital failure and divorce, children's response to divorce, children as weapon against divorce, Adjustment to Divorce.	
13.	Alternatives to marriage- Singlehood, heterosexual cohabitation/ consensual union, homosexual union, reasons behind it and merits and demerits .	1
	<b>Total</b>	<b>16</b>

### **Theory**

<b>S. No.</b>	<b>Topics</b>	<b>No. of classes</b>
1.	Meaning, Definition and Characteristics of Family, functions of family, forms/types of family. Family structure and relationship in India-Pattern of changes in family structure and relationships in India	1
2.	Impact of globalization, industrialization, technological advancement and immigration on family structure and functions, (education and employment of women) and Extra familial factors (technology, peer group, society) responsible for the change and consequences of these changes on the family life and society.	2
3.	Family life cycle: Definition, Stages of Family Life Cycle, importance of studying family life cycle, developmental tasks of stages of family life cycle - Role expectation of different family members at different stages of family life cycle	2
4.	Forms of Families; typical and alternative forms of families- Characteristics of single parent families, female headed families, single child families, childless families, adoptive families, dual earner families, reasons behind alternative form of family and their merits and demerits	2
5.	family stress – Definition, types/categories of stressors, variables affecting family/response to stress.	1
6.	Hill's ABCX Model/theory of family stress, causes of family stress, effects/impact of family stress, manifestations/recognizing symptoms of family stress, stress coping strategies, correlates of family stress.	1
7.	Family crisis- Definition, Characteristics, Stages of crisis. Effect of crisis and Adjustment to crisis, factors which affect meeting the crisis, general things to do in times of crisis.	2



<b>S. No.</b>	<b>Topics</b>	<b>No. of classes</b>
8.	Marriage Laws and acts - Dowry, adoption, divorce and inheritance in India - Education for Parenthood and Family Planning	1
9.	Family Life Education, Concept, Definition, objectives of Family Life Education, role of family and related agencies in Family Life Education	2
10.	Family Planning: Meaning; objectives Importance and Methods	1
11.	Family counseling - Fundamentals of Premarital, marital and family counseling: Objectives and Importance	1
	<b>Total</b>	<b>16</b>

### **Practical**

<b>S. No.</b>	<b>Topics</b>	<b>No. of Classes</b>
1.	Study of motives of marriage and trends in mate selection	2
2.	Study of characteristics of nuclear, joint, atypical and alternative forms of families.	2
3.	Study of marital roles and adjustments	2
4.	Study of changing roles and relationship in marriage and family system across family life cycle	2
5.	Study of family crisis and coping strategies in families	2
6.	Visit to marriage bureau and family counseling centers	2
7.	Interviewing, assessment and developing case studies on people undergoing Premarital, marital and family stress	2
8.	Reviews of books and films on marital relationships conflicts and coping.	2
	<b>Total</b>	<b>16</b>

### **Suggested Readings**

1. Adams, B. N. (1980). The family: A Sociological Interpretation. Chicago: Rand McNally College Publishing Company.
2. Ahuja, R. (2005). Indian social system. New Delhi: Rawat publication.
3. Atkinson, B.J. (2005). Emotional Intelligence in Couple Therapy. NY Norton
4. Benokraitis, V.N. (2014). Marriage and families. Delhi: Pearson Publication.
5. Brownman, A.H. 1970. Marriage for Mordens. MacGaw-Hills Inc.. U.S.A

6. Gottman, J.M. (Ed) (2004). The Marriage Clinic Casebook N.Y. : Norton (0-609-60809-0)
7. Gottman, J.M. (1999). The Marriage Clinic: A scientifically based marital therapy. N.Y. : Norton
8. Gottman, J, M. with J. DeClair (2001). The Relationship Cure. N.Y. Crown (0-609-60809-6)
9. Gupta G.R.2001. Family and Social Change in Morden India,Oxford University Press Kolkata India.
10. Gurman, A.S. and Jacobson N.S. (Eds.) (2002). Clinical Handbook of Couple Therapy, Third Edition,Newyork Guilford

## **Semester –VII**

### **HDFS-411                      Developmental Challenges in Children                      3(2+1)**

#### **Specific Objectives**

1. To be able to identify children with developmental challenges
2. To develop a positive attitude among people towards the developmentally challenged
3. To create awareness of mainstreaming
4. To understand the rights of the developmentally challenged child
5. To impart knowledge on intervention strategies
6. To create awareness among people regarding the various welfare services available for those with developmental challenges

#### **Theory**

<b>S. No.</b>	<b>Topics</b>	<b>No. of lectures</b>
1	Defining Developmental Challenges- classification and types. General provisions for persons with developmental challenges, Identification of 'At Risk' children, Special needs and special education	2
2	Definition of special needs of children and special education, terminologies for children with special needs, history of special education, current trends and issues in special education,	2
3	Need and objectives of Special Education, The NEP/NPE (2020) and the programme of action relating to special education	2

S. No.	Topics	No. of lectures
4	Legislation and litigations of special education. Labelling- definition and its effects. Mainstreaming- definition, models of mainstreaming, problems in implementing mainstreaming, effect of mainstreaming on children with special needs	2
5	<b>Intellectual disabilities-</b> definition, classification, Identification, Diagnosis, Prevalence, causes and measurement / Assessment of Intellectually challenged, their psychological and behavioral characteristics and educational considerations for Intellectually challenged children, Instructional methodology, managing child in school	2.
6	<b>Learning disabilities-</b> definition, types, prevalence, causes and measurement of LD, psychological and behavioural characteristics of LD children, educational considerations for LD children, managing child in school	2
7	<b>Communication disorders-</b> definition, speech production, speech disorders, language disorders, multiple disorders (disorders associated with cerebral palsy, hearing impairment, cleft palate or cleft lip, MR, ED and LD), prevalence, causes of CD, identification, psychological and behavioural characteristics of CD children, educational considerations for CD children, managing child in school	3
8	<b>Auditory impairment-</b> definition, anatomy and physiology of ear, classification, prevalence, causes, measurement of AI children, psychological and behavioural characteristics of AI children, educational considerations for AI children, managing child in school	2
9	<b>Visual impairment</b> - anatomy and physiology of eye, definition, classification, prevalence, Identification, causes and measurement of VI children, psychological and behavioural characteristics of VI children, educational considerations for VI children, aids and equipment, managing child in school.	2
10	<b>Physically challenged-</b> definition, classification, prevalence, musculoskeletal conditions, congenital malformations, accidents, diseases and other conditions, psychological and behavioural characteristics of P challenged children, educational considerations for PC children, managing child in school.	2

S. No.	Topics	No. of lectures
11	<b>Neurological impairments</b> -Convulsive disorder- causes, types, diagnosis, treatment, characteristics, managing child in school. Cerebral palsy- Definition, types, causes, Diagnosis, Treatment and managerial provisions, educational provisions for the children with cerebral palsy. Autism- definition, diagnosis and identification, assessment, causes, characteristics	2
12	<b>Emotional disorders</b> - definition, classification, prevalence, causes and identification of ED, psychological and behavioural characteristics of ED children, educational considerations for ED children, managing child in school.	2
13	<b>Giftedness</b> - definition, prevalence, origins of giftedness, screening and identification of giftedness, psychological and behavioural characteristics of gifted children, attitudes towards gifted children, educational considerations for gifted children, managing child in school.	2
14	Rights and provisions for children with special needs in India. Constitutional provisions and protection for differently able children in India	1
15	General provisions for persons with developmental challenges, Intervention- concept, methods, steps and process, intervention strategies for children with special needs, role of professionals, need and importance of family centered intervention	2
16.	Family counseling for children with special needs	2
	<b>Total</b>	<b>32</b>

**Department of  
Resource Management  
and Consumer Sciences**

## Semester wise Course Distribution RMCS

### I Year

#### Semester I

S.No.	Course Title	Course Number	Credit Hours
1	Fundamentals of ArtandDesign	<b>RMCS 111</b>	2(1+1)
2	House-keeping and Service Management-I	SEC-RMCS 111	2(0+2)
3	Floral Art and Design-I	SEC-RMCS 112	2(0+2)

#### Semester II

S.No.	Course Title	Course Number	Credit Hours
1	Principles of Management	<b>RMCS 121</b>	2(1+1)
2	Housekeeping and Service Management II	SEC-RMCS 121	2(0+2)
3	Event Planning and Management	SEC-RMCS 122	2(0+2)

#### Post-II Semester Internship (Only for exit option for award of UG-Certificate)

S. No.	Course Title	Course Number	Credit Hours
1.	Internship (10weeks)	<b>INT 121</b>	<b>10(0+10)*</b>

\*Compulsory Internship for students exercising exit option (UG-Certificate) after I Year

### II Year –

#### Semester III

S. No.	Course Title	Course Number	Credit Hours
1	Computer-aided Interior designing-I	<b>RMCS-211</b>	3(1+2)
2	Interior Designing and Decoration I	SEC-RMCS 211	1(0+1)
3	Floral Art and Design II	SEC-RMCS 212	1(0+1)

#### Semester IV

S. No.	Course Title	Course Number	Credit Hours
1	Housing and Space Management	RMCS 221	3(1+2)
2	Interior Accessories and Furnishings	SEC-RMCS 221	1(0+1)
3	Interior designing and decoration II	SEC-RMCS 222	1(0+1)

**Post-IV Semester Internship** (Only for exit option for award of UG-Diploma)

S. No.	Course Title	Course Number	Credit Hours
1.	Internship (10weeks)	INT 221	10 (0+10)*

\*Compulsory Internship for students exercising exit option (UG-Diploma) after II Year

**III Year****Semester V**

S. No.	Course Title	Course Number	Credit Hours
1	Consumer Education	RMCS 311	3(1+2)

\*On-line courses (MOOC);NG-Non-gradual 10 credits to be completed in III & IV year

**Semester VI**

S. No.	Course Title	Course Number	Credit
1	Fundamentals of Ergonomics	RMCS 321	2(2+0)
2	Computer aided Interior designing-II	RMCS 322	3(0+3)

**IV year****Semester VII**

S. No.	Course Title	Course Number	Credit Hours
1.	Residential and Commercial Space Design	RMCS 411	3(1+2)
2.	Colour and Lighting in Interiors	RMCS412	3(2+1)
3.	Tourism and Hospitality Management	RMCS 413	3(1+2)
4.	Financial Management and Consumer Behaviour	RMCS 414	3(2+1)
5.	Work Space and Product Design	RMCS415	3(1+2)
6.	Research Methodology	RM 411	3(2+1)
7.	Statistical Methods	STAT 411	2(1+1)
	<b>Total</b>		<b>20</b>

**Semester VIII**

S. No.	Course Title	Credit Hours
1.	Experiential learning/ Project work	6 (0+6) 6 weeks
2.	RAWE	10(0+10) 12 weeks
3.	plant	4 (0+4) 6 weeks

## Detailed Syllabus RMCS

**RMCS-111**

**Fundamentals of Art and Design**

**2 ( 1 + 1 )**

### Objective

1. To make the students aware of the fundamentals of Art and design' and develop skills in designing functional and decorative interiors.
2. To help students gain knowledge of-
  - Element of Art and principles of Design,
  - Colour- its importance, characteristics and applications in interior Furniture and furniture arrangement.
  - Types of floor and floor finishes
  - Types of windows, Functional and decorative window treatments.
  - Types and placement of Accessories.
  - Importance and Types of Home lighting

S.No.	Course Title	Number of classes
	<b>Theory</b>	
1.	Introduction and objectives of interior decoration. Design- Definition, Types, features and requirements	1
2.	Elements of art and their importance in interior decoration: Line, Form, Colour, Texture, Pattern.	1
3.	Principles of design and their application to enrich the interiors: Harmony, Proportion, Rhythm, Emphasis, Balance	1
4.	Colour: sources of colour, Colour theories, properties of colour, emotional effect of colour, colour schemes, colour plans for interiors.	3
5.	Furniture: types of furniture, materials and finishes of furniture, factors affecting the selection of furniture, care and maintenance of furniture, furniture arrangement	2
6.	Walls- Classification, Types of building wall, Exterior and interior wall finishes.	2
7.	Floor: importance, types of floor & floor covering, Selection, care and maintenance of floor covering	1
8.	Ceilings: types, materials and functions, Doors, windows and ventilators: Importance and types, Functional and decorative window treatments,	1
9.	Curtain and draperies, top treatments of windows- pelmets, valances, swags & tails. Hardware for curtains, blinds Factors considered in selection of curtain and draperies.	2



S.No.	Course Title	Number of classes
10.	Lighting: importance, types of lighting and its application.	2
	<b>Total</b>	<b>16</b>

### Practical

S.No.	Course Title	Number of classes
1.	Learning elements of art and principles of design. Development of motif and design through art principles.	2
2.	Colour- colour schemes, values and intensity scale, colour wheel.	2
3.	Furniture - care and arrangement of furniture.	2
4.	Accessories - preparation and placements of accessories	3
5.	Window treatment: Preparation of soft window treatment	3
6.	Study of lighting fixtures. coverings.	1
7.	Market survey – different types of wall and floor	1
8.	Types of flower arrangement, learning different types of table setting, napkin folding.	2
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Kasu Ahmed A. (2005) An introduction to Art, Craft, Science, Technique & profession of Interior design. Ashish Book Center.
2. Parimalam P., Andal A. and Premalatha M.R. (2008). A Textbook of interior Decoration. Satish SerialPublishing house.
3. Seetharaman P (2019) Interior design and Decoration. CBS publishers and distributors. New Delhi.
4. Dodsworth S. (2019) The Fundamentals of interior design. Bloomsbury Publishing PLC.Sixth Dean Draft Report24
5. Faulkner and Faulkner. (1975). Inside Today's Home. New York: Holt, Rinehart and Winston.
6. Suman Singh (2024) Resource Management. RM: ASSETS. Himanshu Publications, New Delhi and Udaipur.
7. Suman Singh (2024) Habitats- Holistic Approaches to Buildings, Interiors and Technical Systems. Himanshu Publications, New Delhi and Udaipur.

## Module on Event Management and Housekeeping- I

### SEC-RMCS 111 Housekeeping and Service Management I

2 ( 0 + 2 )

#### Objectives

1. To provide an overview of the key issues of housekeeping and maintenance management.
2. To understand the theoretical and practical knowledge that constitutes the work of housekeeping
3. To illustrate the complexities and demands of working in the industry through the scope of housekeeping
4. Provide the student with the competencies to function professionally within the housekeeping department.

S.No.	Course Tile	Number of classes
	<b>Practical</b>	
1.	Types of lodging establishments,	2
2.	organizational chart – duties and responsibilities of housekeeping employees.	2
3.	Handling of clients. - Handling complaints and emergencies	2
4.	Accommodation operation - of co-ordination between Front Office	3
5.	Maintenance and Security departments	2
6.	setting and different types of Bed making	2
7.	Napkins Folding	2
8.	Table etiquettes	2
9.	Cleaning equipment – Selection and care of equipment	2
10.	Use and care material required by the House Keeping Department	2
11.	Cleaning methods	2
12.	Placement of flower arrangements and other decorative items	2
13.	Pest control and eradication	2
14.	Reporting accidents	1
15.	Safety procedures at the workplace	2
16.	Use protective equipment	2
	<b>Total</b>	<b>32</b>

### **Suggested Readings**

1. Housekeeping - M. Robinson (2004) Picador USA (first published March 1st 1980)
2. Casado, M. (2000) Housekeeping Management. New York: John Wiley and Sons, Inc.
3. Martin, R. (1998) Professional Management of Housekeeping Operations. (3rd ed.). New York: JohnWiley and Sons, Inc.
4. Kappa, M., Nitschke, A. and Schappert, P. (1995) Housekeeping Management. New York: Educational Institute of the American Hotel and Motel Association.

### **SEC-RMCS 112**

### **Floral Art and Design – I**

**2 ( 0 + 2 )**

### **Objectives**

By the end of the course, the student must be able to:

1. Understand how to use fundamental techniques for creating floral designs.
2. Develop floral designs according to the occasion - weddings, birthdays, parties, funerals etc., - each having specific flower arrangement patterns.
3. Create popular forms of flower art such as flower carpet and stage decoration, flower painting, garlands, bouquets and flower show, drying flowers, Driftwood Craft, Potpourri.
4. Get awareness about Ikebana flower arrangements, indoor plants and Bonsai Culture to convey through symbolism on how nature and art relate to daily living.
5. Study and analyze floral art creations

### **Practical**

<b>S.No</b>	<b>Course Tile</b>	<b>Number of classes</b>
1.	Practice on applying elements and principles of design in floral art	2
2.	Selection and preparation of plant and other material for floral art	2
3.	Practicing techniques and tools, Rules, Styles and Colour schemes in flower arrangement and floral craft	2
4.	Creating theme or idea in floral art	2
5.	Applying preservation techniques of flowers/ foliage	2
6.	Developing basic shapes and practicing different styles of flower arrangements	2
7.	Developing theme boards, designing backgrounds and floral décor suitable to the occasion	2
8.	Developing designs for Garland, flower bouquet, Potpourri, flower painting and carpets etc	2
9.	Preparation of permanent/ dry floral arrangement/ Driftwood Craft	2

S.No	Course Title	Number of classes
10.	Visit to shows and gardens to acquire basic knowledge about Bonsai techniques and Indoor gardening	2
11.	Visit to a florist store to understand the basic procedures for selection and care of flower and plant materials	2
12.	Developing theme boards for stage decoration	4
13.	Visit to different occasions to evaluate commercial stage decoration ideas	2
14.	Organizing shows/ exhibitions for sale of flower craft	4
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. AkeshiAkinseyeand Sade Akisanya. 2016. The Art of Floral and Event Design. Kesh Luxury Group,Chicago.
2. Benzakein, E., Chai, J and Jorgensen, J. 2020. Floret Farm's - A Year in Flowers: Designing Gorgeous Arrangements for Every Season. Chronicle Books LLC, San Francisco.
3. Caballero Roberto. 2012. Decorating with Flowers: A Stunning Ideas Book for all Occasions. TuttlePublishing, United States.
4. Dupon Olivier. 2014. Art Flowers: Contemporary Floral Designs and Installations. Potter Style Publishers, Australia.
5. Jan Hall and SarahWaterkeyn. 1994. The Art of Flower Arranging. Smithmark Publishers.
6. Judith Blacklock. 2016. Buying & Arranging Cut Flowers - The Essential A - Z Guide. Flower Press; Spl.Edition, United Kingdom.
7. Putnam, D and Putnam, M. 2021. Flower Colour Theory. Phaidon Press Ltd., London, United Kingdom.
8. Rachel Siegfried. 2017. The Flower Book: Let the Beauty of Each Bloom Speak for Itself. Dorling Kindersley Limited, London, United Kingdom.
9. Shinchi Nagatsuka. 2021. Modern Japanese Ikebana: Elegant Flower Arrangements for Your Home (Contains 42 Projects). Tuttle Publishing, United Kingdom.
10. Sonya Patel Ellis. 2022. The Modern Gardener: A practical guide to houseplants, herbs and container gardening. HarperCollins Publishers, New York

**Objectives**

The course aims to help students-

1. To understand the nature of management
2. To know about the process of management
3. To study the systems approach to management

**Theory**

<b>S.No.</b>	<b>Course Title</b>	<b>Number of classes</b>
1.	Management: Concept, nature, Importance ,Management as a profession, Universality of management, Professionalism of management on India, Tasks of a professional manager	2
2.	Motivating factors of management: Values- concept, significance, characteristics, sources, classification, development of value pattern	2
3.	Goals -Concept, classification, SMART goal setting, strategies for achieving SMART goals. Standards - Concept, classification; Standard of living - Inter - relatedness of Values, goals and standards.	2
4.	Inter - relatedness of Values, goals and standards. Resources	2
5.	Definition, Meaning and importance, types, characteristics, factors affecting their use and guidelines,	2
6.	Role of resources in management, conservation of resources	2
7.	Management of resources: Time - tools and process of time management, time plan and steps in making time plan, Factors affecting time use; GANTT Chart - Energy - types and management techniques-work simplification	3
8.	Body Mechanics	2
9.	Functions of management, Management skills; Process of Management: Planning: Importance, types, characteristics and techniques, barriers to effective planning; Organizing: Meaning and importance, characteristics and techniques; Controlling: Definition, Concept, Importance, phases and factors; Evaluating: Definition, Need and types of evaluation	3
10.	Decision making process: Concept, Importance, scope, types, steps and factors affecting decision making	2
11.	Communication: Process, types of communication, barriers of communication	3
12.	Systems approach to management: Conceptual framework of management, systems approach, sub - systems and interactions with other systems	3

S.No.	Course Title	Number of classes
13.	Family - the managerial unit, the environment surrounding the family, management and changes in environment	2
14.	Origin, classification and role of Motivation in Management	2
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Gupta, R.S., Sharma, B.D. and Bhalla, N.S. (1997) Principles and Practice of Management. Kalyani Publishers, New Delhi.
2. Mullick, P. (1997) Handbook for homemakers. Kalyani Publishers, New Delhi.
3. Gupta, S., Garg, N. and Aggarwal, A (1993) Textbook of Home Management, Hygiene and Physiology. Kalyani Publishers, New Delhi.
4. Kaur, H and Macneil, C (1994) Theory and Practice of Home management. Surjeet Publications, New Delhi.
5. Nickell, P. and Dorsey, J.M. (1959) Management in Family Living. Wiley Eastern Private Ltd., New Delhi.
6. Shakul, M. and Gandotra, V. (2006) Home Management and Family Finance. Dominant Publishers, New Delhi.
7. Varghese, M.A., Ogale, M.N. and Srinivasan, K. (1996) New Age International (P) Limited, New Delhi.
8. Suman Singh (2024) Resource Management. RM: ASSETS. Himanshu Publications, New Delhi and Udaipur.

## Module on Event Management and Housekeeping- II

### SEC-RMCS 121 Housekeeping and Service management-II

2 ( 0 + 2)

#### Objectives

By the end of the course, the student must be able to:

1. understand role and responsibility of housekeeping department
2. discuss relationship of housekeeping with other departments
3. demonstrate an understanding of housekeeping basic planning activity and its organization.
4. understand and analyze housekeeping standards together with safety and security aspects
5. demonstrate the creativity on housekeeping standards and trends.

## Practical

S. No	Course Title	Number of classes
	<b>Practical</b>	
1.	Understanding the role of housekeeping and its relationship with other departments.	<b>2</b>
2.	Housekeeping department and its role and responsibility. Housekeeping organization chart. Positions and job descriptions in housekeeping department	<b>3</b>
3.	Developing a schedule outlining the housekeeping department and their roles and responsibility in various types of organizations	<b>3</b>
4.	Developing a housekeeping organization chart with positions and job descriptions in housekeeping department in various types of organizations	<b>3</b>
5.	Different types and importance of keys- section key, master key, floor key and grand master key. Key of executive officers and public areas, and computerized key. Understanding the role of housekeeping and its relationship with other departments -Front office, Food and beverage, Engineering departments.	<b>4</b>
6.	Planning and organizing housekeeping department Planning the work in housekeeping department	<b>3</b>
7.	Area inventory, Frequency schedule .Performance standard ,Productivity standard ,Supply and equipment inventory level	<b>3</b>
8.	Housekeeping standards / trends Housekeeping standard building. standard set up.	<b>3</b>
9.	Human resource and training employees in housekeeping	<b>4</b>
10.	Staffing and training employees .Motivating employees	<b>4</b>
	<b>Total</b>	<b>32</b>

## Suggested Readings

1. Casado, M. (2000) Housekeeping Management. New York: John Wiley and Sons, Inc
2. Martin, R. (1998) Professional Management of Housekeeping Operations. (3rd ed.). New York: JohnWiley and Sons, Inc.
3. Kappa, M., Nitschke, A. and Schappert, P. (1995) Housekeeping Management. New York: Educational Institute of the American Hotel and Motel Association.

**Objectives**

By the end of the course, the student must be able to:

1. To understand event planning and management, its scope and significance.
2. To know about the stages and domains of event management.
3. To understand the process of planning and management

**Practical**

<b>S. No</b>	<b>Course Title</b>	<b>Number of classes</b>
	<b>Practical</b>	
1.	Developing a SWOT analysis of identifying and conducting an event. Identify various corporate events.	3
2.	Identifying and develop a schedule for any one event for a college event, themed celebration, festival.	3
3.	Develop a plan for budget / sponsors / fundraising / marketing strategies for the identified events	3
4.	Listing of fundamentals of corporate hospitality	2
5.	Study event specifications of Celebrity events and Award Ceremonies, Destination weddings.	3
6.	Establish a plan for risk assessment and management within the Event Laws and Administration and Health and Safety Requirements.	2
7.	Plan an event for themed celebration, Festival	6
8.	Record outcome of events and evaluate the event through SWOT analysis	4
9.	Report on the success and weakness of the events	6
	<b>Total</b>	<b>32</b>

**Suggested Readings**

1. Berridge, G. (2006) Event Design and Experience. Oxford: Butterworth - Heinemann.
2. Bowdin, G., McDonnell, I., Allen, J., O'Toole, W. (2010) Events Management 3rd edition. Oxford: Butterworth - Heinemann.
3. Getz, D. (2007) Event Studies: Theory, Research and Policy for Planned Events. Oxford: Butterworth -Heinemann.
4. Goldblatt, J. (2010) Special Events: A New Generation and the Next Frontier. New York: Wiley.
5. Judy Allen. (2009) Event Planning Ethics and Etiquette: A Principled Approach to the Business of SpecialEvent Management, Wiley (first published 2003)
6. Vineet Gera (2012) Event Management and Planning. Atlantic Publishers and Distributors



**Objectives**

This course aims to help the students

1. To get oriented with use of AUTOCAD software
2. To understand various draw and edit commands in AUTOCAD software
3. To draw the furniture templates through AUTOCAD
4. To draw the structural building features through AUTOCAD
5. To develop conceptual drawings through AUTOCAD

S. No	Course Title	Number of classes
	<b>Theory</b>	
1	Introduction to AUTOCAD: Drawing templates, dialogue boxes - Toolbar, Difference between Paper drawing and CAD drawing	2
2.	AutoCAD co-ordinate system - Absolute and Relative	2
3.	Methods of using tools in AutoCAD	2
4.	Introduction to 2D drawing tools - line, polyline, polygon, rectangle	2
5.	Ellipse - Introduction to modify tools- Copy, mirror, offset, Array, Move, Rotate, Scale, stretch, extend, Trim, Break, Chamfer	2
6.	Fillet - Adding Text to drawings, text styles, Dimension tools and styles	3
7.	Methods of adding dimensions to drawings, Blocks and inserts : Methods of inserting drawings	3
	<b>Total</b>	<b>16</b>
	<b>Practical</b>	
1.	Orientation about Auto CAD software through demo mode- Opening the software, Opening the document and setting up to start drawing	4
2.	Use of Auto CAD Co-ordinate system – Relative and Absolute, Demo of using basic drawing tools – Line, polyline, polygon, rectangle	4
3.	Ellipse - Demo of use of modify tools – Copy, mirror, offset, rotate, trim, extend, chamfer, filter, array, move, break	4
4.	Developing different 2-D features in drawings through AUTOCAD- Door, windows, furniture templates, stairs	16
5.	Adding Text to drawings, text styles	4
	<b>Total</b>	<b>32</b>

### **Suggested Readings**

1. Beverly L. Kirkpatrick & James M. Kirkpatrick, 2000. Auto CAD for Interior Design and Space Planning using Auto CAD 2000. Peach pit press
2. Cheryl R. Shrock & Steve Heather 2019, Auto CAD Pocket Reference 8th edition Best Seller Publication.
3. Dean Muccio, 2020 Auto CAD 2021 for the Interior Designer. SDC publications
4. Ibrahim Zeid & R. Sivasubramanyan, 2009. CAD/CAM: Theory & Practice Special Indian edition. McGraw Hill Education
5. Elise Moss, 2019 Auto CAD 2020 Fundamentals SDC publications
6. Fiorell Joseph A.C. CAD for Interiors

### **Module on Interior Design and Decoration – I**

#### **SEC -RMCS 211 Interior Design and Decoration I**

**1 (0+1)**

#### **Objectives**

This course aims to help the students

1. To understand the concept of elements and principles of design.
2. To understand basic principles of illumination and application of natural lighting in interiors.
3. To impart knowledge on working and managing of interior design as professional practice.

<b>S. No</b>	<b>Course tile</b>	<b>Number of classes</b>
	<b>Practical</b>	
1.	Application of elements and of principles of design	1
2.	Colour concept: colour schemes and its cost estimation, colour scheme for problematic area	1
3.	Curtains and draperies, types of curtain material and hardware's, and it's costing	2
4.	Lighting, types of light fixture, use of lights and lamps, lighting plan for problematic area	1
5.	Floor treatments and its type	1
6.	Wall treatment and its types	1
7.	Accessories for interiors	1
8.	Materials used for interior designing and decoration	1

<b>S. No</b>	<b>Course tile</b>	<b>Number of classes</b>
9.	Indoor landscaping	1
10.	Flower arrangements	2
11.	Auto cad for interiors	2
12.	Visit to any residential and commercial building to study about materials used for interior designing and decoration	2
	<b>Total</b>	<b>16</b>

### **Suggested Readings**

1. Ch'ing, Francis D K, Binggeli, Cork, "Interior Design Illustrated", Wiley Publications, New Jersey, 2004.
2. Christine M Piotrowski, "Designing Commercial Interiors", John Willey Publishers, 3rd edition, 2016.
3. Diane Patrice, Tap Scott, "Curtains, Draperies and Shades", Lane, Menlo Park, California, 2000.
4. Faulkner S, Faulkner R N, "Inside Today's Home", Holt, Rinehart and amp; Winston, 1968.
5. Gary Gordon, "Interior Lighting for Designers", 5th edition, Wiley Publishers, 2015.
6. Gurcharan Singh, "Building materials", Standard Publishers Distributors, Delhi, 2017.
7. Joseph Dechiara, Julius Panero and Martin Zelnik, "Time Saver Standards for Interior design and Space Planning", McGraw Hill, London, 2011.
8. Joseph Dechiara, Julius Panero, "Standards for Interior Design and Space Planning", McGraw Hill Professional, 2011.
9. Maureen Mitton and Courtney Nystuen, "Residential Interior Design - A Guide to Planning Spaces", Wiley Publication, 3rd edition 2016.
10. Miles Keeping, David Shiers, "Sustainable Building Design: Principles and Practice", Wiley Blackwell, 1st edition, 2017.
11. Pratap R M, "Interior Design Principles and Practice", Standard Publications, Delhi, 2012.
12. Seetharam P and Pannu P, "Interior Design and Decoration", CBS, 1st edition, New Delhi, 2009.
13. Suman Singh (2024) Habitats- Holistic Approaches to Buildings, Interiors and Technical Systems. Himanshu Publications, New Delhi and Udaipur.

**Objectives**

This course aims to help the students:

1. To get oriented with modern and world over most popular techniques of floral craft.
2. To understand aesthetics of Ikebana, Driftwood and Bonsai culture
3. To develop conceptual indoor landscaping designs for official, industrial, commercial and residential areas.
4. To study dry flower technologies for developing long lasting floral craft.
5. Get awareness about Ikebana flower arrangements, indoor plants and Bonsai Culture to convey through symbolism on how nature and art relate to daily living.

S. No	Course Tile	Number of classes
	<b>Practical</b>	
1.	Learning basic Ikebana techniques - Practice on concept and styles of classic ikebana flower arrangements such as Rikka, NageireBana, Seika, Moribana, Jiyūka	2
2.	Study of various Indoor landscaping - plant scaping or interior scaping, greenery ideas to reimagine a professional space - office/ hotel, retail, hospital or lobby,	2
3.	Indoor plan maintenance work study. Designing various types of indoor landscape gardening such as Living Walls/Vertical Gardens, Table garden Dish or bowl garden, Green Garden, Stone Scaping, Holy Scape, Floating, Indoor Landscaping, Water Scapes	3
4.	Cost estimation of indoor garden designing	1
5.	Dry Flower Technology: Method of drying Flowers and Foliage, Freeze Drying, Glycerin Drying (Glycerining), Microwave/ Oven Drying, Water Drying, Embedding Oven Drying, Air Drying, sun drying, Press Drying	2
6.	Skeletonizing, Potpourri, Sulphuring and Bleaching techniques. Cost estimation of dry flower techniques - Learning Styling techniques of bonsai, Bonsai aesthetics, Bonsai, Care and Culture of Miniature Trees	3
7.	- Designing useful and decorative Driftwood articles.- Indian traditional ideas of floral decoration for floor, wall, windows and doors. Elements and colour theory in floral designing.	3
	<b>Total</b>	<b>16</b>

**Suggested Readings**

1. Kubo, K. 2006. Keiko's Ikebana: A Contemporary Approach to the Traditional Japanese Art of Flower

2. Arranging. North Clarendon: Tuttle Publishing, North Clarendon, USA.
3. Steere, W. C. 1972. Flower Arrangement: The Ikebana Way. Madison Square Press, Chicago, USA.
4. Conder, J. 1899. The Floral Art of Japan. Kelly and Walsh Ltd., Tokyo.
5. Averill, M. 1913. Japanese Flower Arrangement. John Lane Company, New York.
6. Lesniewicz, P. 1996. Bonsai in Your Home. Sterling Publishing Company, New York.
7. Gaines, R. L. 1977. Interior Plantscaping. Architectural Record Books, New York.
8. Scrivens, S. 1980. Interior Planting in Large Buildings. The Architectural Press, London.
9. Adams, P. D. 1981. The Art of Bonsai. Ward, Lock & Co., London.
10. Douthitt, J. 2001. Bonsai: The Art of Living Sculpture. Rizzoli International Publications Inc., New York.
11. Shofunotomo. 1982. The Essentials of Bonsai. Timber Press, Oregon.

## **RMCS-221**

## **Housing and Space Management**

**3 (1+2)**

### **Objectives**

By the end of the course, the student must be able to:

1. Recognize a family's needs in relation to housing and gain knowledge on housing issues and building services.
2. Gain practical knowledge in designing space for different family needs.
3. Learn the basics of architectural symbols and plans.
4. To learn about the efficient arrangement of space in interiors.
5. To learn to develop the house plans including furniture.

<b>S. No</b>	<b>Course Title</b>	<b>Number of classes</b>
	<b>Theory</b>	
1.	Housing – importance, characteristics and effects of insufficient housing - Housing needs at different stages of family life cycle	2
2.	Housing problems in India - rural and urban housing: Housing legislation and regulations in India - Building Codes, Floor Space Index (FSI/FAR	1
3.	Factors to be considered in the selection of family housing, selection of site - Advantages and disadvantages of renting and owning a house	2
4.	Types of house plans - floor plan, site plan, cross sectional plan, perspective plan, elevation plan and landscape plan	2

S. No	Course Title	Number of classes
5.	Principles of house planning: orientation and aspect, privacy, grouping, roominess, prospect, flexibility, circulation, sanitation, furniture requirement and practical considerations	2
6.	Space management based on functional areas - Space management and Interior types based on functional needs - interiors for youth/elderly/other special needs	2
7.	Building Services-Electrical layout and wiring, Plumbing and sanitation - Construction Techniques for safety- damp proofing, fire proofing, termite Proofing, sound proofing, security features	2
8.	Housing standards -Technology in housing	1
9.	Advanced technology in housing construction/ Low cost building technologies, low cost building materials	2
	<b>Total</b>	<b>16</b>
	<b>Practical</b>	
1.	Learning and comprehending architectural symbols; Lettering design and techniques	2
2.	Planning Space arrangement for different room / areas in the home	4
3.	Different types of Kitchens	3
4.	Designing for special needs	4
5.	Planning Space saving storage solutions for various rooms uses	4
6.	Drawing of House plans - EWS, LIG, MIG, HIG, Rural	4
7.	Electrical wiring and fixtures, plumbing and water supply	4
8.	House plan for renovation according to needs of residents	4
9.	Market survey to study the available building materials in the local market	3
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Agan Tessie, The House: Its Plan and Use. Oxford and IBH Publishing Co., New Delhi.
2. Agarwala S.C., (2008) Architecture and Town Planning, Dhanpat Rai & Co, N. Delhi
3. Arora and Bindra , Building Construction
4. Cherunilam, F. and Heggade, O. (1987). Housing in India. Mumbai: Himalaya Publishing.
5. Dutt D.R., How best to plan and build your home, Pustak Mahal, Delhi

6. Dorothy Stepat - Devan, Kathryn Camp Logan, Darlene M. Kness, Laura Szekely. Macmillan PublishingCo., Inc, New York.
7. Faulkner, R. and Faulkner, S. (1975). Inside Today's Home. New York: Rinehart and Winston.
8. Mathur, G.C. (1993). Low Cost Housing in Developing Countries. New Delhi: Mohan Primlani, Oxfordand IBH.
9. Punmia B.C. (1993) Building Construction, Laxmi Publications, N. Delhi
1. Suman Singh (2024) Habitats- Holistic Approaches to Buildings, Interiors and Technical Systems. Himanshu Publications, New Delhi and Udaipur.

## **Module on Interior Design and Decoration – II**

### **SEC- RMCS 221 Interior Accessories and Furnishings**

**1 (0+1)**

#### **Objectives**

By the end of the course, the student must be able to:

1. Identify different types of accessories and furnishings used in interiors, along with their use and features.
2. Design and develop furnishings for different areas in the interiors.
3. Design and develop accessories used for decorating interiors.
4. Understand how accessory and furnishing designing can be taken up as an entrepreneurial activity.

<b>S. No</b>	<b>Course Tile</b>	<b>Number of classes</b>
	<b>Practical</b>	
1.	Identifying different accessories, their use, placement, and features	1
2.	Market Survey to study the design features and financial aspects of different interior accessories	1
3.	Understanding the application of art elements and design principles for designing accessories	1
4.	Exploring and selecting different art media for designing and developing a functional/ decorative accessory: mud/ clay/ paper/ glass/ fabric/ wood/ MDF/ painting/ printing	2
5.	Designing and preparation of accessories suitable for different types of staircases, table decoration, floor decoration	2
6.	Interior landscaping: Exploring its importance and different plants used in interiors	1

<b>S. No</b>	<b>Course Title</b>	<b>Number of classes</b>
7.	Applying Vastu Shastra in selection and placement of accessories	1
8.	Identifying different furnishings, their use, placement, suitable materials and features	1
9.	Market Survey to study the design features and financial aspects of different interior furnishings	1
10.	Understanding the application of art elements and design principles for designing furnishings for residential and commercial space	2
11.	Exploring Indian handicrafts, paintings, embroideries, printing techniques etc. and application of feasible techniques in designing accessories and furnishings	2
12.	Cost estimation, Sale of products and Self - evaluation.	1
	<b>Total</b>	<b>16</b>

### **Suggested Readings**

1. Erin T. Gates. 2014. Elements of Style: Designing a Home & a Life. Simon & Schuster, New York, USA.
2. Anne Massey. 2020. Interior Design Since 1900: Fourth Edition. Thames and Hudson, London, UK.
3. Jaya Jaity. 2012. Crafts Atlas of India: Special Edition. Niyogi books, New Delhi, India.
4. Tarun Chopra. 2006. Exotic Indian Interiors. Prakash Books India Pvt. Ltd, New Delhi, India.
5. Henry Wilson. 2001. India: Decoration - Interior - Design. Watson-Guptill Publishers, New York, USA.
6. Suman Singh (2024) Habitats- Holistic Approaches to Buildings, Interiors and Technical Systems. Himanshu Publications, New Delhi and Udaipur.

## **SEC RMCS 222      Interior Design and Decoration II      1 (0+1)**

### **Objectives**

By the end of the course, the student must be able to:

1. To understand the concept of wall and floor treatment.
2. To understand basic principles of acoustical insulation to interior spaces.
3. To impart knowledge on working and managing of interior design as professional practice.



S. No	Course Title	Number of classes
	<b>Practical</b>	
1.	Application of elements and of principles of design;	1
2.	colour concept: colour schemes and its cost estimation, colour scheme for problematic area	2
3.	curtains and draperies, types of curtain material and hardware's, and it's costing	2
4.	lighting, types of light fixture, use of lights and lamps, lighting plan for problematic area	2
5.	floor treatments and its type; wall treatment and its types	2
6.	accessories for interiors	1
7.	flower arrangements	2
8.	Auto CAD for interiors	3
9.	Visit to any residential and commercial building to study about materials used for interior designing and decoration.	1
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. BreeClaffey, "Indoor Green: Living with Plants", Thames and Hudson, 1st edition, 2017.
2. Ch'ing, Francis D K, Binggeli, Cork, "Interior Design Illustrated", Wiley Publications, New Jersey, 2004.
3. Christine M Piotrowski, "Designing Commercial Interiors", John Willey Publishers, 3rd edition, 2016.
4. Faulkner S, Faulkner R N, "Inside Today's Home", Holt, Rinehart and amp; Winston, 1968.
5. Ivo D Drpic, "Sketching and Rendering of Interior Space", Watson - Guptill, 1988.
6. Joseph Dechiara, Julius Panero and Martin Zelnik, "Time Saver Standards for Interior design and Space Planning", McGraw Hill, London, 2011.
7. Joseph Dechiara, Julius Panero, "Standards for Interior Design and Space Planning", McGraw Hill Professional, 2011.
8. Lothar Cremer, "Principles and Application of Room Acoustics", Peninsula Publishing, 2016.
9. Maureen Mitton and Courtney Nystuen, "Residential Interior Design - A Guide to Planning Spaces", Wiley Publication, 3rd edition 2016.

10. Miles Keeping, David Shiers, "Sustainable Building Design: Principles and Practice", Wiley Blackwell, 1st edition, 2017.
11. Pratap R M, "Interior Design Principles and Practice", Standard Publications, Delhi, 2012.
12. Seetharam P and Pannu P, "Interior Design and Decoration", CBS, 1st edition, New Delhi, 2009.

## RMCS-311

## Consumer Education

3(1+2)

### Objectives

This course aims to help the students:

1. To create awareness on the importance of consumer education and management at individual and family levels
2. To create awareness among the consumers about their problems, rights, responsibilities and food adulteration and durable goods.
3. Identification of food adulterants,
4. Practical applications of consumer redressal forum

S. No.	Course Title	Number of classes
	<b>Theory</b>	
1.	Consumer: definition and role	1
2.	Consumer issues and challenges: unfair trade practices, adulteration, faulty weights and measures, misleading advertisements etc	1
3.	Sources of consumer information – advertisements, labels, packaging etc	1
4.	Consumerism and consumer protection: history of consumer movement in the developed and developing countries,	2
5.	Consumer rights and responsibilities.	1
6.	Consumer Protection Act 2019, other important Govt. Laws/ Acts for protecting consumers.	2
7.	Consumer Courts: Redress mechanism.	1
8.	Consumer Protection Councils	1
9.	Advertising Standards Council of India	2
10.	Standards and standardization and legislative measures for regulating quality of various consumer products	2
11.	Role of Govt. and NGOs for consumer protection and welfare. E-consumerism.	2
	<b>Total</b>	<b>16</b>

S. No.	Course Title	Number of classes
	<b>Practical</b>	
1.	Understanding and identification of consumer problems related to Weights and Measures	2
2.	Collection and detection of food samples for adulteration – Spices– Milk and Milk Products, Ghee & oils, Rice & pulses etc	4
3.	Reviewing of misleading advertisements through print and electronic media.	2
4.	Evaluation of labels on consumer products	4
5.	Studying various standardization marks for authenticity and knowledge- ISI, FSSAI, Hallmark, wool mark, eco- mark etc	4
6.	Visit to consumer protection Organizations, Review of case studies of consumer disputes redressal.	3
7.	Organizing programs in community about consumer education and protection.	4
8.	Preparation of exhibits and organizing exhibition for consumer education.	5
9.	Study cases of e-frauds in consumerism.	4
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Rice, Nickel and Tucker (1976) Management in Family Finance John Wiley and Sons, New York
2. Seetharaman, P., Sethi M. (2002) Consumerism Strategies and Tactics CBS Publishers and Distributors New Delhi
3. Verghese, MN Ugale, W N and Srinivasan, K (1997) Home Management, New Delhi: New Age International
4. Mike, L. (1986). The Complete Interior Decoration. United Kingdom: Mc Donald
5. Himachalam (1998). Consumer protection and Law. New Delhi: APH Publishing Corporation
6. John Clarke. Janet Newman. Nick smith, Elizabeth Vidler, Louise Westmorland (2007) Creating
1. Consumers New Delhi-Sage Publications
7. Ramanuj Majumdar (2010). Consumer Behaviour Insights from Indian Market. New Delhi: PHI Learning Private Limited

8. David B. Eastwood (1997). The micro Economics of Consumer Behaviour Houston: Dame Publications, INC.
9. Suman Singh (2023) Family Finance and Consumption Economics. Himanshu Publications, New Delhi and Udaipur.

## **RMCS-321**

## **Fundamentals of Ergonomics**

**2(1+1)**

### **Objectives**

1. To acquaint the students with the fundamentals of Ergonomics.
2. To acquaint the students in gaining knowledge on importance of Ergonomics and learn how the body is used while performing different activities
3. To develop skill among students in onsite evaluation of ill effects of ergonomics risk factors.

### **Theory**

<b>S. No</b>	<b>Course Tile</b>	<b>Number of classes</b>
1.	Introduction of Ergonomics - Definition, History of Ergonomics, Significance and Scope of Ergonomics, Domains of Ergonomics	<b>1</b>
2.	Human Factors and Ergonomics- Relationship between human factors and ergonomics, Human capabilities and limitations.	<b>2</b>
3.	Human anatomy relevant to ergonomics (Muscles, how it works,), Types of activities (Static and dynamic).	<b>1</b>
4.	Fatigue -types of fatigue; Physical Fitness.	<b>1</b>
5.	Anthropometry – Definition, Types, User Population, Factors affecting Anthropometric Data, Anthropometric Measurements,	<b>1</b>
6.	Application of anthropometry in ergonomic design	<b>2</b>
7.	Biomechanics: Definition, Types, Biomechanics of the Human Body, Application of Biomechanics in ergonomic design	<b>2</b>
8.	Work environment factors and their impact of environmental factors, such as light, noise, temperature, and air quality, on human performance and well-being.	<b>1</b>
9.	Work station design- ergonomic principles for workstation design, layout, and organization, Ergonomic considerations for seating, lighting, and environmental factors.	<b>2</b>
10.	Ergonomic risk factors-common ergonomic hazards and risks, musculoskeletal disorders and prevention.	<b>2</b>
11.	Posture and Movement.	<b>1</b>
	<b>Total</b>	<b>16</b>

S. No	Course Title	Number of classes
	<b>Practical</b>	
1.	Study of Anthropometric measurements- understanding different anthropometric data and terminologies and its usages	4
2.	on-site postural studies	8
3.	Determination of physical fitness	4
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Suman Singh (2007) Ergonomic Interventions for Health and Productivity. Himanshu Publications, New Delhi and Udaipur.
2. Handbook of Human Factors And Ergonomics, Editor(s):Gavriel Salvendy, Waldemar Karwowski ,First published:13 August 2021, Print ISBN:9781119636083 |Online ISBN:9781119636113 |DOI:10.1002/9781119636113 © 2021 John Wiley & Sons, Inc.
3. Ergonomics Principles in Design An Illustrated Fundamental Approach By Prabir Mukhopadhyay Edition1st Edition First Published 2022 eBook Published12 September 2022 Pub. Location Boca Raton Imprint CRC Press DOI<https://doi.org/10.1201/9781003302933> Pages162

## RMCS-322

## Computer Aided Designing-II

2 (0+2)

### Objectives

The course aims to help students-

1. To draw the room plans for various activities
2. To draw the floor plans with different SQFT areas
3. To add the interior details in developed drawings

S. No	Course Title	Number of classes
	<b>Practical</b>	
1.	Developing a simple bubble diagram and schematic diagrams of various residential zones through CAD	2
2.	Cooking, dining, living, Rest areas, entrance, operative zone, service zone	2
3.	Drawing the floor plans of various rooms through CAD drawing: kitchen, dining room, bedroom, living room	2
4.	Drawing the conceptual floor plans with different SQFT area	2

<b>S. No</b>	<b>Course Title</b>	<b>Number of classes</b>
5.	Dimensioning the floor plans	2
6.	Adding Text to Floor plan	2
7.	Adding furniture to floor plan	2
8.	Drawing elevations of different types of residential buildings through CAD	3
9.	Creating 3-D Models of structural features using viewport	3
10.	Creating varietal effect through hatching technique in CAD	3
11.	Use of Rendering Techniques in Interiors through CAD	3
12.	Developing conceptual drawing of small residential project	3
13.	Printing and plotting a drawing	3
	<b>Total</b>	<b>32</b>

### **Suggested Readings**

1. CAD Artifex. 2016.
2. AutoCAD 2017: A Power Guide for Beginners and Intermediate, 2nd Edition, Create Space Independent Publishing Platform
3. Cline, L. 2014. Sketch Up for Interior Design: 3D Visualizing, Designing, and Space Planning, 1<sup>st</sup>Edition, Wiley Secondary Reading
4. Fane. B. 2016. AutoCAD For Dummies, 17th Edition, For Dummies
5. Chopra. A. And Huehls. R. 2017. Sketch Up For Dummies (For Dummies (Computer/Tech)) 1<sup>st</sup>Edition, For Dummies
6. Obermeier. B. And Ted Padova. T. 2016. Photoshop Elements 15 For Dummies 1st Edition, For Dummies
7. Onstott. S. 2010. Enhancing Architectural Drawings and Models with Photoshop, 2nd Edition, Sybex
8. Tondreau. B. 2011. Layout Essentials: 100 Design Principles for Using Grids (Design Essentials) 1<sup>st</sup>Edition, Rockport Publishers
9. Ching, F. D.K. 2015. Architectural graphics 6th Edition. Wiley

## ELECTIVE COURSES

### RMCS-411 Residential and Commercial Space Design

3 (2+1)

#### Objectives

By the end of the course the students will be able to:

1. Gain knowledge in designing space for family living.
2. Get exposure to design and decorate residential spaces
3. Gain managerial skills and handle space efficiently for multiple functions
4. Study building Codes, fire safety and barrier – free designs as essential components of laying out interior space
5. Learn use of presentation boards to assist clients in visualizing the design project.

S. No.	Course Tile	Number of classes
	<b>Theory</b>	
1.	Residential and commercial buildings: types and characteristics	2
2.	Factors influencing building design	2
3.	Approaches to planning residential and commercial spaces	3
4.	Steps in Design process	3
5.	independent houses and apartments of different income groups	3
6.	Estimation of cost of fittings	3
7.	commercial interiors for business establishments hotels/ restaurants, hotels/ restaurants, hospitals, educational buildings, public service buildings	12
8.	Specifications writing, tenders and contracts	4
	<b>Total</b>	<b>32</b>
	<b>Practical</b>	
1.	Develop conceptual drawings and floor plans for various income groups, Develop layouts of furniture, lighting, electrical and plumbing for various income groups.	3
2.	Practical applications of design and space organization of apartments and flats and analysis. Cost estimation for designing interiors of various income groups	2
3.	Planning of ergonomic work layout for a small project (1000 sq. ft.)Planning of ergonomic work layout for hills areas and commercial areas	2
4.	Evolving interior decoration details with material sample for hills areas	2
5.	Evolving interior decoration details with material sample for the large commercial area	2
6.	Presentation of the detailed work done for small projects. Presentation of the detailed work done for hill areas. Presentation of the detailed work done for large commercial projects.	5
	<b>Total</b>	<b>16</b>

### **Suggested Readings**

1. fundamentals of Building Orientation and Green Building features. Fourth edition. October 2015. Published by Indian Railways Institute of Civil Engineering, Pune.
2. Model Building Bye – Laws, 2016. Ministry of Urban Development, Government of India.
3. National Building Code of India 2016. Volume 1. Published by Bureau of Indian Standards, New Delhi.
4. Indian Standard – Recommendations for Basic requirements of Educational Buildings. 2006. Published by the Indian Standards Institute, New Delhi.
5. S. Renuka and Mahalakshmi V. Reddy. 2009. Housing and Space Management. Published by the Project Director, Directorate of Information, and publications of Agriculture (DIPA), ICAR, New Delhi.
6. James Ambrose. 1997. Building Construction – Interior systems. Published by S.K. Jain for CBS Publishers and Distributors, New Delhi.
7. Joseph De Chiara, Julius Panero and Martin Zelnik. 1991. Time – Saver Standards in Interior Design and Space Planning.
8. Sam Kubba. 2003. Space Planning for Commercial and Residential Interiors. McGraw – Hill Professional, New York.
9. Lynn M. Jones and Phyllis S. Allen. 2009. Beginnings of Interior Environments. 10<sup>th</sup> Edition. Pearson Education Inc., New Jersey.
10. Mark Karlen. Space Planning Basics. 2009. Space Planning Basics. Third Edition. John Wiley and Sons Inc., New Jersey.
11. Evelyn Knowles and Kay Millet Boehr. 2014. A comprehensive guide for selecting interior Sixth Dean Draft Report 113 finishes. Pearson education, USA
12. Bonda P. and Son snowchik K. (2007). Sustainable Commercial Interiors. John Wiley and Sons Publication.
13. Crafts. (2004). The office – Designing for Success. Images Publication
14. Francis, D. (1997). The New Office. Conran Octopus Publication
15. Harmon. S and Kennon, K. The Codes guidebook for Interiors. Fifth Edition. John Wiley and Sons Publication.
16. Leibing W. Ralph (1999). Architectural Working Drawings, 4<sup>th</sup> edition John Wiley and sons, New York
17. Piotrowski, C and Rogers, E. (1999). Designing Commercial Interiors. Second Edition. John Wiley and Sons Publication.



**Objectives**

This course aims to help students

1. To acquaint with various aspects of color and lighting.
2. To understand the theories and qualities of colour
3. To study uses and applications of different colours
4. To understand various aspects of colour in vision
5. To get awareness about different sources of light and benefits of effective lighting
6. To enrich the students with knowledge about right placement of lighting fixtures
7. To study the amount of light needed for different activities

**Theory**

<b>S. No</b>	<b>Course Tile</b>	<b>Number of classes</b>
1.	Importance of colour and light in interior environment.	1
2.	A brief history of Colour as an interior design element; Physics of light - Physiology of vision - Properties of colour - Hue, value and intensity - harmony, mixing and colour interactions.	2
3.	Approaches and theories of colour. Cultural, physical and psychological effects of colour; Types of colour schemes - Related and contrast colour schemes;	3
4.	Factors to consider while choosing colour schemes for buildings	2
5.	Visual tricks	1
6.	Use and application of colour in interiors of residential and non - residential buildings. Suitable colour schemes for residential, commercial, public, educational and religious building interiors	3
7.	Importance and sources of lighting; Cultural and social aspects of lighting; Properties of lighting -Reflection, absorption, transmission and diffusion;	2
8.	Types of lighting - Decorative aspects of lighting -Lighting requirements for household activities	2
9.	Lighting requirements in commercial buildings. Measurement of light audits units; Types of lamps, their characteristics and suitability to various rooms	2
10.	Types of lighting based on direction of use, place of use, purpose and portability	2
11.	Lighting controls - Lighting Luminaries/ fixtures. Factors affecting the quantity of illumination in a room	2

S. No	Course Title	Number of classes
12.	Method of calculating lighting requirements for various rooms; Lighting for outdoor living and gardens	2
13.	Colour rendition; Use of colour and lighting in architecture - Use of colour and lighting in problematic areas - disguise and camouflage	2
14.	Lighting different spaces in the interiors. Important Lighting term	2
15.	Importance of Controlling Luminance. Eco - friendly lighting benefits and ideas.	2
16.	Need for quality in the selection of colors and lighting in the built environment	2
	<b>Total</b>	<b>32</b>
	<b>Practical</b>	
1.	Study of types of colour schemes in residential interiors. Study of types of lamps and lighting used in residential interiors. Planning colour schemes for residential interiors. Group discussion on use of colour and lighting in interiors	3
2.	Study of types of colour schemes in commercial interiors. Study of types of lamps and lighting used in commercial interiors. Presentation on use of colour and lighting in commercial interiors. Suggesting suitable colour schemes for commercial buildings and its cost estimation. Group discussion on suitable colour schemes for residential and commercial buildings.	3
3.	Suggesting suitable colour schemes for commercial buildings and its cost estimation. Group discussion on suitable colour schemes for residential and commercial buildings.	3
4.	Suggesting suitable lighting fixtures for residential buildings and its cost estimation. Drawings to show the effect of different types of lighting in interior spaces. Lighting calculations for interior spaces using different methods cavity method and point to point method. Suggesting suitable lighting fixtures for commercial buildings and its cost estimation. Group discussion on suitable lighting fixtures for residential and commercial buildings	3
5.	. Prepare a colour and lighting plan for problematic areas like space below stair case and estimate the cost. Prepare a colour and lighting plan for problematic areas like, irregular shape rooms or narrow areas and estimate the cost.	2
6.	Market survey to understand the available safety and emergency lighting systems and presentation of report	2
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Grosslight J (1984) Effective use of daylight and electric lighting in residential and commercial spaces. Practice Hall, New Jersey.
2. Itten J (1970) The Elements of Colour. VanNostrand Reinhold Company, New York.
3. Nielson K J and Taylor D A (1990) Interiors An Introduction. Wm. C. Brown Publishers. IA, USA.
4. Nissen Lu Ann, Faulkner R and Faulkner S (1994) Inside Today's Home. Harcourt Brace College Publishers, New York.
5. Seetharaman P and Pannu P (2005) Interior Design and Decoration. CBS Publishers and Distributors. New Delhi.
6. Zelanski P and Fisher M P (1999) Colour. Prentice Hall, New Jersey.

## **RMCS 413                      Tourism and Hospitality Management                      3 (1+2)**

### Objectives

The course aims to help the students to gain a basic knowledge of:

1. Skills associated with problem solving, creative and critical thinking; related to tourism industry.
2. Applying the concepts and skills necessary to achieve guest satisfaction.
3. Demonstrating knowledge of multi - cultural perspectives to meet the needs of the guests and employees.
4. Leading with the knowledge that the foundation of tourism and hospitality is based on the respect for the host culture with the responsibility to perpetuate unique values, traditions, and practices of that place.
5. Demonstrating ability to perform basic and supervisory level job functions in hotel and restaurant careers.

S. No	Course Title	Number of classes
	<b>Theory</b>	
1.	Tourism Management Introduction to Tourism, Growth and development of modern tourism, Tourism in India, Heritage/ Cultural, Pilgrimage Tourism, Medical, Hot Spots and Culinary Tourism	1
2.	Business and Cruise Tourism - Eco-tourism/ Rural tourism - Emergence of Eco-tourism / Rural tourism	1
3.	Concept and definitions - Growth and development issues in eco-tourism	1

S. No	Course Title	Number of classes
4.	Travel Agency and Tour Operation and logistics (Airlines operation and ticketing. Ships cruise services) business in India, Emerging trends of tourism, Impacts of Tourism, Ethics issues in tourism	2
5.	Introduction to Hospitality Management. Basic Management Principles: planning, organizing, staffing, leading, controlling with specific reference to hospitality. Hotel hierarchy: GM, departmental heads, supervisors, operational employees	2
6.	Soft Skills in Hospitality; personal development, motivation. Communication techniques and skills	1
7.	Hostess training Services offered to guests such as food and accommodation services and personal services	2
8.	Front Office management. Maintenance of front office records	2
9.	housekeeping services - cleaning and linen services, bed making	2
10.	Accommodation Operations - Role of accommodation operations in hospitality. Public areas maintenance and decoration	2
	<b>Total</b>	<b>16</b>
	<b>Practical</b>	
11.	Study of all the activities of a tourism office and report Planning for a tour	2
12.	Heritage, Eco, Wildlife, Pilgrimage, medical etc.	2
13.	Planning for Accommodation operations	2
14.	Preparation of a tour package	3
15.	Visit to different tourist spots	4
16.	Planning layouts of front office of different institutions - Mock sessions on front office handling - Mock sessions on Communication Techniques and Skill	4
17.	Mock sessions on Handling Complaints and Emergencies - Mock sessions on Handling various types of clients	5
18.	Practical sessions on Hostess training - Services offered - Practical sessions on housekeeping services	5
19.	Report writing	5
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Dharmarajan.S. and R. Seth, Tourism in India-Trends and Issues, Haranand Publications Pvt. Ltd.New Delhi, First edition.

2. Gupta. S., World Tourism in New Millennium, ABD Publishers, Jaipur, First edition.
3. Kamra, K.K and M.Chand, Basics of Tourism-Theory, Operation and Practice, Kanishka Publishers, New Delhi. First Edition. 2006
4. Maken. D. Strategies and Planning in Tourism and Industry, Adhyayan Publishers and Distributors, Delhi, First edition.
5. Puri M. and G.Chand, Tourism Management, Pragun Publications, New Delhi. First Edition.2006.
6. Roday. S, Biwal. A. and Joshi. V., TOURISM Operations and Management, Oxford University press publication, New Delhi, First addition 2009
7. Sharma. R.B., World Tourism in 21st Century, Alfa Publications, New Delhi, First edition

## **RMCS 414 Financial Management and Consumer Behaviour 3 (2+1)**

### **Objectives**

1. To develop understanding of concepts of income and expenditure among families.
2. To provide skills and techniques requisite to tackle consumer problems and management of finance
3. To enhance knowledge on consumer behavior and issues and e-tailing concepts.

<b>S.No</b>	<b>Course Tile</b>	<b>Number of classes</b>
<b>Theory</b>		
1.	Meaning and importance of financial management.	2
2.	Income concepts; Family income: types, income profiles, and management of family income.	3
3.	Methods of handling money. Family Budget and Account keeping: types, steps, advantages and disadvantages. Engel's Law of family expenditure	3
4.	Circular flow of Income: the wheel of wealth, factors affecting fluctuations in income, depreciation in money value: inflation, deflation	3
5.	Cost of Living: factors affecting, measurement of changes in cost of living. Introduction to financial system of India, components of Indian financial system, Digital transformation of Indian financial system	4
6.	Savings and Investment- types of savings / investment, Saving institution and its importance, criteria for judging family investments.	3

S.No	Course Title	Number of classes
7.	Credit and credit instruments. Taxation-, characteristics and classification, calculation of Income Tax. Market and merchandising – types of market, definition and importance of merchandising	3
8.	Consumer behaviour: Definition, meaning and importance. Environmental influences on consumer behaviour; Individual determinants of consumer behaviour	4
9.	Application of consumer behaviour knowledge in marketing; Consumer decision process- Problem recognition, search and evaluation, purchasing process, post purchasing behavior	4
10.	Researching consumer behavior. E -consumer behavior: Digital marketing: techniques and strategies and its impact on consumer behavior.	3
	<b>Total</b>	<b>32</b>
	<b>Practical</b>	
1.	Conducting survey on few families to study various sources of family income, drawing income profiles, and studying their methods of handling money income.	3
2.	Planning Budgets for families with different income groups.	3
3.	Exercise on calculation of Consumer Price Index	2
4.	Carryout a short study (may be using google forms) to study Consumer behavior components in buying any product.	3
5.	Reporting and presentation	3
6.	Explore problems/ cheating in e -shopping. Exercise on calculating income tax	2
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Albert, E. Waugh. 1987. Principles of Economics. McGraw Hill Book Company, Inc. New York.
2. Bhatt R. 2010. Consumer Behaviour. Common Wealth Publishers Pvt. Ltd.
3. Dewett, K.K., Navalur M.H. 2006. Modern Economic Theory. S Chand Publications. New Delhi.
4. Gross, Grandall and Knoll. 1980. Management for Modern Families (3rd Ed.). Prentice – Hall,
5. Inc. Englewood Cliffs, New Jersey.
6. Kaur, Surinder, Lekhi, R.K. and Singh, Joginde. 1997. Consumer Economics. Kalyani Publishers, New Delhi.

7. Khan, Martin, 2011. Consumer Behaviour and Advertising Management. New Age International (P) Limited Publishers.
8. Nickel and Dorsey. 1976. Management in Family Living (4th ed.) Wiley Eastern Limited, New Delhi.
9. Rice, Nickel and Tucker. 1976. Management in Family Living (5th ed.). John Wiley and Sons, Inc. New York, London.
10. Sharma S and Kumar D. 2001. Advertising, Planning, Implementation and Control. Mangal Deep Publ.
11. Shukul M and Gandotra V. 2006. Home Management & Family Finance, Dominant Publishers & Distributors New Delhi.
12. Seetharaman P and Sethi M. 2001. Consumerism. Strategies and Tactics. CBS.
13. S.N. Das. 1973. An Introduction to Economic Theory Premier Publisher, New Delhi.
14. Swanson, Bettye B. 1983. Introduction to Home Management. Macmillan Publishing Co. Inc., New York

## **RMCS 415**

## **Workspace and Product Design**

**3 (1+2)**

### **Objectives**

The course aims to help students:

1. In developing skills in space designing for different activities
2. In understanding the importance of space designing to avoid health hazards.
3. In developing skills in designing workspace for residential, commercial units.
4. In developing skills in design consideration in product development
5. Familiarizing with product design & product manufacturing terminologies
6. Understanding how to use users in product design cycle
7. How to evaluate the products in the consumer market from usability perspective.

<b>S. No.</b>	<b>Course Title</b>	<b>Number of classes</b>
	<b>Theory</b>	
1.	Functional design of workspace - Concept of functional design, center concept,	1
2.	design and arrangement of different work centers, designing of work surface, storage and work accessories/ appliances	2
3.	Lighting/ furniture requirements for different activities; Hazards of ill designed workstations	2
4.	Functional designing of workspace for physically handicapped and elderly population	2
5.	Design concepts – Design definition, design terminologies (user-centered design, user -friendly design, accessible design, universal design, usability, etc.);	3

S. No.	Course Title	Number of classes
6.	Design process; Design sustainability - Ergonomic factors in design, user interface, use of design elements for ease of operation of a product	2
7.	Quality Control and Standardization of Product, and product certification; Design consideration for accessible products	2
8.	Work, worker workplace interrelationship.	2
	<b>Total</b>	<b>16</b>
	<b>Practical</b>	
1.	Evaluation of existing workstation in a residential product	7
2.	Understanding the selected consumer products through guidelines given by manufacturers;	7
3.	Evaluation of selected product to find out the ease of operation	8
4.	Ideation of design concepts.	10
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Marcelo M. Soares. 2021. Design Methodology for production designing for Human – centered approach, CRC Press.
2. Marcelo M. Soares. 2021. Handbook of usability and User experience research and case studies, CRC press.
3. Waldemar Karwowski, Ann Szopa, Marcelo M. Soares. 2021. Standards and guidelines in Human factors and Ergonomics, CRC press
4. Boothroyd G, Dewhurst P & Knight W. 2002. Product Design for Manufacture and Assembly. CRC Press.
5. Frey D. 1998. AutoCAD 14. BPB Publ.
6. Ron H. 2000. Using Auto CAD 2000. Special Ed. Prentice Hall of India.
7. Sharma DD. 2000. Total Quality Management. Sultan Chand & Sons.
8. Dalela S & Saurabh. 1999. Textbook of Work Study and Ergonomics, Standard Publ.
9. Grandjean E. 1978. *Ergonomics of the Home*. Taylor & Francis.
10. Ian Galer. 1982 *Applied Ergonomics Handbook*. Butterworths & Co.
11. Panero J & Zelnik M. 1979. *Human Dimension and Interior Space*. Whitney Library of Design.
12. Singh S. 2007. *Ergonomics Interventions for Health and Productivity*. Himanshu Publ



**Department of  
Textile and  
Apparel Designing**

## Semester wise Course Distribution TAD

### I Year

#### Semester I

S.No	Course Title	Course Number	Credit Hours
1.	Textile Science and Fabric Care	ATS 111	3(2+1)
2.	Textile Dyeing & Printing	SEC-ATS 111	2(0+2)
3.	Fabric Embellishment	SEC-ATS 112	2(0+2)

#### Semester II

S.No	Course Title	Course Number	Credit Hours
1	Fundamentals of Clothing Construction	ATS 121	3(1+2)
2	Indian Embroideries	SEC-ATS 121	2(0+2)
3	Quilting and Patchwork	SEC-ATS 122	2(0+2)

**Post-II Semester** Internship (for students exercising exit option (UG Certificate) after I<sup>st</sup> Year)

S.No	Course Title	Course Number	Credit Hours
1	Internship (10 weeks)	INT 121	10(0+10)

### II Year

#### Semester III

S.No	Course Title	Course Number	Credit Hours
1	Techniques of Fabric Construction	ATS 211	3(1+2)
2	Garment Designing Technology	SECATS 211	1(0+1)
3	Accessory Designing	SECATS 212	1(0+1)

#### Semester IV

S.No	Course Title	Course Number	Credit Hours
1	Retailing and Merchandising	ATS 222	2(1+1)
2	Fashion Illustration	SECATS 221	1(0+1)
3	Portfolio Development	SECATS 222	1(0+1)

**Post-IV Semester** Internship (for students exercising exit option (UG Diploma) after II Year)

S.No	Course Title	Course Number	Credit Hours
1	Internship (10 weeks)	INT 221	10(0+10)

### III Year

#### Semester V

S.No	Course Title	Course Number	Credit Hours
1	Pattern Making and Draping	ATS 311	3(1+2)
	Principles of Textile Designing	ATS 312	3(0+3)

#### Semester VI

S.No	Course Title	Course Number	Credit Hours
1	Traditional Textiles and Costumes of India	ATS 321	3(2+1)

### IV Year

#### Semester VII (Elective Courses)

S.No.	Course Title	Course Number	Credit Hours
1	Advance Draping Technique	ATS 411	3(0+3)
2	CAD-Pattern Making & Grading	ATS 412	2(0+2)
3	Quality Analysis in Textiles &Apparels	ATS 413	3(2+1)
4	Apparel Production Management	ATS 414	3(3+0)
5	Agro Textiles	ATS 415	2(1+1)
6	Recent Advances in Textiles	ATS 416	2(2+0)
7	Research Methodology	RM 411	3(2+1)
8	Statistical Methods	STAT 411	2(1+1)

#### Semester VIII (Experiential Learning Courses)

S.No	Course Title	Course Number	Credit Hours
1	Apparel Production Technologies	ATS 421	3(0+3)
2	Commercial Apparel Production	ATS 422	3(0+3)

## DETAILED SYLLABUS TAD

### SEMESTER I

**ATS-111**

**Textile Science and Fabric Care**

**3(2+1)**

#### Objectives

1. To impart knowledge about the basics of textiles and their care.
2. To develop a basic understanding of different textile fibres, yarn and fabrics
3. To gain knowledge of the processing of natural fibres and manufacturing of man-made fibres
4. To inculcate an understanding of fibre morphology and physical and chemical properties of fibres
5. To learn about the laundry practices of clothes made of natural and man-made fibres and their care and storage.

#### Theory

S. No.	Topic	No. of Classes
1	Textile: definition, forms of textile, importance of textile industry in national economy	1
2	Classification of textile fibres Properties of textile fibres; primary and secondary properties	2
3	Molecular structure of textile fibres: Monomers, polymers and their types, polymerization and its types, degree of polymerization and orientation	1
4	Cotton: Fibre production, fibre varieties and their grading ,fibre morphology, physical, chemical and biological properties and end-uses	2
5	Bast fibres: Flax, jute, hemp and ramie; Fibre production, fibre morphology, physical, chemical and biological properties and end-uses	3
6	Wool and specialty hair fibres: classification, processing, wool labelling, fibre morphology, physical, chemical, biological properties and end-uses.	2
7	Silk: Fibre processing, classification, fibre morphology, physical, chemical, biological properties and end-uses.	2
8	Chemical spinning: Wet, melt and dry spinning and common properties of man-made fibres	1
9	Regenerated cellulosic fibres: Viscose, Cupramonium & High Wet Modulus rayons; fibre manufacturing, microscopic structure, physical, chemical, biological properties and end- uses.	2
10	Modified cellulosic fibres: Diacetate and triacetate; fibre manufacturing, fibre microscopic structure, physical, chemical and biological properties and end-uses.	2

<b>S. No.</b>	<b>Topic</b>	<b>No. of Classes</b>
11	Synthetic fibres: Nylon, polyester, acrylic and elastomeric; fibre manufacturing, fibre microscopic structure, physical, chemical, biological properties and end- uses.	2
12	Mechanical spinning: Ring spinning method	1
13	Classification of yarn on the basis of structure- simple and novelty yarns, twist direction, twist amount, fibre length and end-uses	2
14	Methods of fabric construction: Weaving, knitting, braiding, tufting, net, lace making, crocheting, macramé, stitch through fabrics, quilted fabrics, laminated fabrics, bonded fabrics, felt, nonwoven and films	3
15	Laundry: Definition, principles, equipments, laundry methods and dry cleaning	1
16	Stain removal: Classification of stains and methods of removing different stains.	1
17	Laundry agents: Water, soap, laundry auxiliary, stiffening agents, bleaches and blues	2
18	Care of textiles: Labelling Act, importance of labeling, labels and tags used in textiles.	1
19	Storage of clothes: Requirements of short term and long term storage, folding and packaging of clothes	1
<b>Total</b>		<b>32</b>

### **Practical**

<b>S. No.</b>	<b>Topic</b>	<b>No. of Classes</b>
1	Fibre identification: Visual test	1
2	Microscopic view	1
3	Burning test	1
4	Solubility test	2
5	Collection and identification of different types of yarns	2
6	Collection and identification of fabric samples of different construction	2
7	Washing of garments made up of cotton, wool, silk and manmade fibres	3
8	Drycleaning	1
9	Removal of different stains from fabric surface	2
10	Visit to textile industry	1
<b>Total</b>		<b>16</b>

## Suggested Readings

1. Cowan, M.L. and Jungerman, M.E. 1969. Introduction to textiles. 6<sup>th</sup> ed. New York. Appleton Century–Crofts. 325p.
2. Dantyagi, S. 1959. Fundamentals of textiles and their Care. New Delhi. Orient Longman Limited.
3. Deulkar, D. and Tarabai. 1967. House hold textiles and laundry Work. 3<sup>rd</sup> ed. Delhi. Atma Ram and Sons Ltd.
4. Hall, A.J. 1969. A Students Textbook of Textile Science. London. All man and Son Ltd
5. Hollen, N. and Saddler, J. 1968. Textiles. New York. Macmillan Company.
6. Joseph, M.L. 1986. Introductory textile science. 5<sup>th</sup> ed. New York. CBS College Publishing.
7. Labarthe, J. 1969. Textiles: Origins to Usage. New York. McMillan Company Ltd
8. Potter, M.D. and Corbman, B.P. 1967. Textiles :Fibre to fabric. New York. Macmillan Hill Co.
9. Stout, E. E. 1970. Introduction to textiles. 3<sup>rd</sup> ed. New York. John Wiley and Sons, Inc.
10. Tortora, P.G. 1978. Understanding textiles. New York. Macmillan Publishing Company.
11. Vilensky, L.D. and Gohl, E.P.G. 1999. Textile Science. Delhi. CBS Publishers and Distributors.
12. Wingate, I. B. 1970. Textile Fabrics and their selection. 6<sup>th</sup> ed. New Jersey. Prentice Hall Inc.
13. Wynne, A. 1997. Textiles. London, Macmillan Education Ltd. 310p.
14. Vatsala, R. 2003. Textbook of Textiles and Clothing .New Delhi. Indian Council of Agricultural Research.
15. Rastogi Deepali and Chopra Sheetal. 2017. Book on Textile Science, published by Orient Black swan Private Limited. Pages 352.
16. Ryszard Kozłowski, Maria Mackiewicz-Talarczyk. 2020. eBook on natural Fibres: Processing and applications ( Vol II). Woodhead Publishing. ISBN:9780128190708.

## Skill Enhancement Courses (SEC-I module)

### Module on Textile Design and Embellishment-I

**SEC-ATS 111**

**Textile Dyeing and Printing**

**2(0+2)**

#### Objectives

1. To impart skills in dyeing of cotton fabric with different dyes and designing of fabric through tie & dye and batik techniques.
2. To develop competence in printing by using block, screen, and stencil.
3. To give hands on experience in fabric surface enrichment through dyeing and printing techniques.

#### Practical

S. No.	Topic	No. of Classes
1	Introduction to dyeing and printing	1
2	Classification of dyes and their suitability to different fibres	1
3	Different styles of printing: Resist, direct and discharge	1
4	Introduction to different methods of printing: Stencil ,block ,screen and heat transfer printing	1
5	Preparation of fabric for dyeing and printing: Desizing, scouring and bleaching of cotton fabric	2
6	Dyeing of cotton fabric with direct dyes, reactive dyes and naphthol dyes	2
7	Preparation of shade card with different dye concentrations	2
8	Dyeing of Textiles with natural dyes and application of mordants	2
9	Sample designing through different techniques of tie and dye: pleating (diagonal and straight), fold and tie, object tying, ruching, stitching, marbling, tied circles.	3
10	Sample designing through different techniques of batik with wax resist: Painting, scratching, sprinkling and marbling.	2
11	Dyeing with naphthol dyes, washing and dewaxing	3
12	Preparation of printing paste and printing of cotton fabric using: Block printing	2
13	Screen printing: Preparation of screen and printing on fabric	3
14	Stencil printing: Preparation of stencil and negative and positive stencil printing with painting and spraying method	4
15	Preparation of one article using any of the above techniques or combination of them	3
<b>Total</b>		<b>32</b>

### Suggested Readings

1. Gahlot, Mand Rani, A.2016. A Laboratory Manual on Textile Designing and Basic Finishing. Published by Govind Ballabh Pant University of Agriculture & Technology, Pantnagar.
2. Gopal Krishnan, D .andKarthik,T.2016.Basics of Textile Chemical Processing. Daya Publishing House, Astral International Pvt. Ltd., New Delhi.
3. HallAJ. 1955. Handbook of Textile Dyeing & Printing. The National Trade Press.
4. Mahapatra, N.N. 2016. Textile dyes and dyeing. Woodhead Publishing India In Textiles.
5. Matthew, C.2011. Handbook of Textile and Industrial Dyeing: Volume 1: Principles, Processes and Types of Dyes. Woodhead Publishing Series in Textiles
6. Matthew,C.2011. Handbook of Textile and Industrial Dyeing: Volume2: Applications of dyes. Woodhead Publishing Series in Textiles.
7. Prayag R.S. 1988 .*Technology of Textile Printing* Sri Printers
8. Shenai VA. 1985. Technology of Printing, Technology of Textile Processing .Vol. IV. Sevak Publ.
9. Shenai VA. 1994. Technology of Dyeing .Sevak Publ.
10. Story J. 1974.The Thames & Hudson Manual of Textile Printing. Thames & Hudson.

### SEC-ATS 112

### Fabric Embellishment

2(0+2)

#### Objectives

1. To develop awareness among students about fabric embellishment
2. To develop skills in various embellishment techniques

#### Practical

S. No.	Topic	No. of Classes
1	Fabric embellishment	1
2	Fancy Construction Methods: An orientation	1
3	Survey of Embellishment material available in the market	1
4	Introduction about Embroidery tools	1
5	Basic hand embroidery stitches- Stem, chain, lazy dazy, buttonhole, herringbone, satin, bullion, long and short, French knot, feather, fly, spider stitch	2
6	Other fancy embroidery stitches	2
7	Machine Embroidery-Introduction and sample preparation	2



S. No.	Topic	No. of Classes
8	Motif embroidery machine and border embroidery machine	2
9	Metal Thread Embroidery-Ari, Zardosi, Gotapatti, Danka and sample preparation	3
10	Bead work ,Mirror work - sample preparation	2
<b>Total</b>		<b>32</b>

### Suggested Readings

1. D.J. Tyles –Materials Management in Clothing Production-Blackwell Science.
2. Harold Carr and Barbara Latham1992: Fashion Design and Product Development, Blackwell Science.
3. Gahlot, M. and Rani, A. (2016) Textile Designing and Basic Finishing. University Press. G.B. Pant University of Agriculture and Technology, Pantnagar
4. Withers Sara, 2005. Bead-Work. Chartwell Books.

## Semester II

### ATS-121                      Fundamentals of Clothing Construction                      3 (1+2)

#### Objectives

1. To educate students regarding importance and requirement of clothing in human life.
2. To provide primary knowledge about different aspects of clothing construction.
3. To develop basic stitching skills of the students.

#### Theory

S. No.	Topic	No. of Classes
1	Terminology related to clothing construction.	1
2	Sewing tools and supplies, their selection and maintenance-tools required for measuring, drafting, cutting and stitching.	2
3	Different sewing supplies used in clothing construction.	1
4	Sewing machine: Its parts and their function. Types of sewing machines. Operation and maintenance, Solving common machine problems.	2
5	Different methods of making paper pattern their advantages and disadvantages.	2
6	Selection of fabric for different clothing used for different purposes.	2
7	Preparation of fabric for cutting and layout of paper pattern on different fabric patterns including plain, print, lines, plaid and check.	2

<b>S. No.</b>	<b>Topic</b>	<b>No. of Classes</b>
8	Implications of clothing in human life, different functions of clothing. Social, physical, economical and psychological factors affecting clothing selection.	1
9	Clothing for infant, toddler, preschooler, school age children, teenager, adult and senior citizen.	2
10	Elements and principles of design applied to apparel designing.	1
<b>Total</b>		<b>16</b>

### **Practical**

<b>S. No.</b>	<b>Topic</b>	<b>No. of Classes</b>
1	Use and maintenance of different sewing tools, equipment and supplies used for clothing construction.	2
2	Sewing machine – Its operation and care, identifying and solving machine problems.	2
3	Hand stitches and their types – basting, hemming, back stitch, overcast stitch, blanket stitch, button-hole stitch, cross stitch, slip stitch etc.	3
4	Attaching different fasteners- Button and button hole, hook and eyes, snap, tape, fasteners.	2
5	Different types of smocking stitches-Cable, chain, diamond, honeycomb, lattice.	2
6	Seams and seam finishes-Plain, French, Flat-fell, Double-top stitched, Welt and different seam finishing methods	2
7	Creating fullness through different types of pleats, gathers, tucks, dart, shirring.	3
8	Edge finishing – Straight edge finishing, curve edge finishing, decorative edge finishing.	2
9	Plackets opening and finishing-One piece, two piece, binding.	2
10	Taking body measurements for different garments.	1
11	Preparation of fabric for paper pattern layout, marking, cutting and stitching.	2
12	Making basic block of bodice, sleeve and skirt and their adaptation.	3
13	Drafting, cutting & stitching of–Apron, Panty, Bib, Romper, A-line frock, Sari Petticoat.	6
<b>Total</b>		<b>32</b>

### **Suggested Readings**

1. Labanya, Mand, Vastala, R, 2004, Textbook of Fundamentals of Clothing Construction, ICAR, New Delhi.
2. Thomos, A. J 1993, The art of sewing, UBS Publishers, Bombay
3. Armstrong, H. J1 986, Pattern Making for fashion Design. Harper and Row, New York
4. Kefgen, M. and Phyllis, T.S. 1971. Individuality in Clothing Selection and Personal Appearance. New York. The Macmillan Company
5. Lewis, V. S 1984, Comparative Clothing Construction Techniques. Surjeet Publication, New Delhi.
6. Gerry Cooklin 1991. Introduction to Clothing Construction
7. Horn, M J 1981, Second Skin, Houghton Muffin, London.
8. Readers Digest 'Complete guide to sewing' Reader Digest Association 1977
9. Sannapapamma, K. J. and Jahan, S. TXAD 111-Fundamentals of Clothing Construction. E-course. Iasri.res.in.
10. Sakshi (2013) Fundamentals of Clothing Construction. University Press, G. B. Pant University of Agriculture and Technology.
11. <http://www.stitchrippers.com/forum/Topic/sewing-terminology>

### **Skill Enhancement Courses (SEC-II module)**

#### **Module on Textile Design and Embellishment-II**

**SEC-ATS 121**

**Indian Embroideries**

**2(0+2)**

#### **Objectives**

1. To learn the characteristic features /designs of the traditional embroideries of different states of India.
2. To develop an understanding of the methods and materials used in different traditional embroideries.
3. To develop an understanding of the techniques of traditional embroideries of India.

#### **Practical**

S. No.	Topic	No. of Classes
1	Historic perspective, classification and importance of traditional Indian Embroideries.	2
2	Documentation of motifs of traditional Indian embroideries of different States of India	2

S. No.	Topic	No. of Classes
3	Sample preparation of traditional Indian embroideries-Kashida of Kashmir, Chamba Rumal,	3
4	Phulkari and Bagh of Punjab.	3
5	Embroideries of Gujarat, Chikankari and Zari work of Uttar Pradesh	3
6	Kantha of Bengal	2
7	Manipuri Embroidery, Kasuti of Karnataka.	3
8	Patchwork of Bihar and Orissa	3
9	Folk embroidery of Rajasthan.	2
10	Creative projects: Preparation of one article by adapting traditional motifs and embroidery in contemporary textiles.	6
11	Visit to National craft museum and exhibition/art galleries.	3
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Naik, S .D. (2012). Traditional Embroideries of India, New Delhi: APH Publishing Corporation.
2. Rai, I. (2008). Indian Embroidery and Textiles (First Edition). Jodhpur Books Treasure.
3. Naik, S. D. (1997). Folk embroidery and traditional handloom weaving, New Delhi: APH Publishing Corporation.
4. A Compendium of Indian Handicrafts & Handlooms covered under Geographical Indications (GI), Ministry of Textiles, Govt. of India, New Delhi, 204p.
5. Pauline B., (2016). Encyclopedia of Embroidery Techniques, A unique visual directory of all the major embroidery techniques, plus inspirational examples of traditional and innovative finished work, 176p, ISBN-:101782214755
6. Kashmir to Kanyakumari Indian Embroidery: State By State Embroidery of India by Smita Kale, Publisher- Author House, ISBN -10: 1456779532, ISBN -13: 978-1456779535

**Objectives**

1. To develop awareness among students about quilting techniques.
2. To develop skills in various designs of Quilting and Patchwork.

**Practical**

S. No.	Topic	No. of Classes
1	Patch work: Definition, Different styles of Patchwork.	1
2	Techniques- Pieced Patchwork, Shell Patchwork, Suffolk Puffs,	3
3	Crazy Patchwork, Log Cabin Patchwork, Strip Patchwork,	3
4	Seminole Patchwork, Folded Star Patchwork,	2
5	Mayflower Patchwork and Pleated Patchwork,	2
6	Applique: Definition, Various Styles of Applique Techniques,	2
7	Standard applique, Applique Perse, Reverse applique,	3
8	Padded appliqué, folded applique, Shadow applique, Lace appliqué	4
9	Quilting: Definition, Various Styles of Quilting	2
10	Wadded Quilting, Padded Quilting, Corded Quilting, Shadow Quilting	4
11	Preparation of two commercially viable article using above techniques	6
	<b>Total</b>	<b>32</b>

**Suggested Readings**

1. W.H.Allen,1985Mc-callsbigbookofQuiltsandOtherTreasures, London Fall Cheryl,
2. HappyQuilts,StorlingPublisher,NewYork.1994
3. Indian Designs: For Use as Quilt Patterns, Needlepoint, Applique, Machine and Hand Embroidery, Clothing, Trapunto, Fabric Painting, Crafts Projects...Other Uses (Native American) by David Villasenor (Author): Publisher- Nature graph Pub; ISBN-10-0879611227;

## Semester III

ATS 211

## Techniques of Fabric Construction

3(1+2)

### Objectives

1. To acquire an understanding of loom and knitting machine.
2. To develop skill in making different types of weaving and knitting
3. To acquaint with the various fabric construction methods.

### Theory

S. No.	Topic	No. of Classes
1	Introduction of different types of fabric construction techniques.	1
2	Woven fabrics - simple and compound woven structures, characteristics of woven fabric	2
3	History of weaving and looms	1
4	Classification of looms on the basis of mechanism, means of running loom, structure and means of weft insertion	2
5	Parts of loom, loom accessories and their functions (Mechanism of weaving: primary, secondary and tertiary motions)	2
6	Basic weaves: Plain, twill, satin and their variations; Complex/ Fancy weaves: extra yarn fabrics, pile fabrics, leno weave, dobby and jacquard weave	2
7	Knitting: principle of knitting, types of knitting machines, their parts and functions	2
8	Knitting stitches: warp and weft knits, types of knit fabrics	2
9	Non-woven Fabrics: Manufacturing process, characteristics and end uses.	2
	<b>Total</b>	16

### Practical

S. No.	Topic	No. of Classes
1	Observation of fabric structures–Woven, knitted and non-woven fabrics.	2
2	Collection of fabric samples of different types of basic and fancy weave and their identification	3
3	Manual representation of woven design on graph sheet– plain weave, rib weave, basket weave, twill weave, satin and sateen weave	3
4	Handloom and its parts	2

S. No.	Topic	No. of Classes
5	Observation of loom setting, weaving calculations and yarn preparation and making a plain weave sample on loom	2
6	Introduction and practice to various tools used in CAD weave software	2
7	Representation of basic weaves (plain, rib, basket, twill and satin) using textile design software	3
8	Hand knitting-two needle method, holding the needles and the yarn, casting on and knitting of plain, rib and purl knit sample	3
9	Knots of macramé	3
10	Stitches of crochet	3
11	Manual felting	3
12	Visit to weaver's service center/textile industry for observation of weaving/ knitting mechanism/ finishing of fabrics	3
	<b>Total</b>	32

### Suggested Readings

1. Gokarneshan, N., (2020) Fabric Structure and Design. 3<sup>rd</sup> Edition. New Age International (P) Ltd.
2. Hollen, N and Saddler J (1968) Textiles New York Macmillan Company
3. Joseph, M..L. (1986) Introductory Textile Science. 5<sup>th</sup> edition. New York CBS College Publishing.
4. John G. (1999) World Textiles: A visual guide to traditional techniques. Thames Hudson publications.
5. Kadoh S J (2013) Textiles: Pearson New International Edition. Pearson Education Ltd, Asia
6. Kaur. N (2011) Fashion Concepts. Comdex: Fashion Design (Vol.1). Dream tech Press
7. Labarthe, J. (1969) Textiles: Origins to usage. New York. Macmillan Company Ltd.
8. Potter M D and Corbman B P (1967) Textiles: Fiber to fabric. New York. Macmillan Hill Co.
9. Vatsala R (2003) Text book of textiles and clothing. New Delhi. Indian Council of Agriculture Research.
10. Wynne A (1997) Textiles the motivate series, Macmillan Hill Co.
11. <https://www.textileblog.com/cad-cam-in-textile-and-garment-industry/>
12. <https://textilelearner.net/application-of-cad-in-textile/>
13. <https://www.slideshare.net/mjrtpu/different-software-use-for-textile-design>
14. <https://textilelearner.net/best-textile-design-software/>

## **Skill Enhancement Courses (SEC-III module)**

### **Module on Fashion Design and Technology–I**

**SEC-ATS 211**

**Garment Designing Technology**

**1(0+1)**

#### **Objectives**

1. To develop awareness among students about garment designing.
2. To develop skills in various fabric construction techniques.

#### **Practical**

<b>S. No.</b>	<b>Topic</b>	<b>No. of Classes</b>
1	Selection of figure template for children, women and men.	1
2	Designing of garments for children using different construction features: Yoke, gather, pleats, tucks, shirring, smocking, trimmings.	2
3	Designing of garments for women using different construction features: collar, sleeve, and neckline.	2
4	Designing of garments for men using different construction features: shoulder yoke, collar, sleeve, and cuff.	2
5	Drafting and construction of following garments for women, men and children (Fancy frock, Salwar/ pyjama/ pyjama, Kurta(gents) /kameez (ladies)and Night dress/ gown).	9
	<b>Total</b>	<b>16</b>

#### **Suggested Readings**

1. Gerry Cooklin– Introduction to clothing Manufacture, Black Well Science.
2. Harold Carr and Barbara Latham– The Technology of Clothing Manufacture–Blackwell Science.
3. A. J. Chuter –Introduction to Clothing Production Management–Black well Science.
4. 4. D. J. Tyles– Materials Management in Clothing Production-Blackwell Science.

**SEC-ATS 212**

**Accessory Designing**

**1(0+1)**

#### **Objectives**

1. To develop awareness among students about Accessory designing
2. To develop skills in construction of various accessories



## Practical

S. No.	Topic	No. of Classes
1	Accessories: introduction and classification	1
2	Different types of footwear, hand bags, belt, jewelry, gloves, hats, scarves and umbrella	1
3	Designing of accessories for children, women and men	3
4	Selection of designs for construction of accessories	1
5	Accessories Construction for Children, Women, Men	10
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Harold Carr and Barbara Latham 1992: Fashion Design and Product Development, Blackwell Science.
2. Mike Easey–Fashion Marketing Black well Science
3. Peacock, J. 2000. Fashion accessories-The complete 20<sup>th</sup> century source book .London. Thames and Hudson.
4. Meadows, C.S.2003.Know your fashion accessories. New York. Fair child books.

## Semester IV

### ATS 222

### Retailing and Merchandizing

2(1+1)

## Objectives

5. To learn about retailing and various formats of retailing.
6. To understand the organizational structure of the retail firms.
7. To know about the merchandising division in an apparel firm
8. To gain knowledge of the sales promotion techniques used in the industry
9. To become familiar with the export and import procedures and organizations in export promotion.

## Theory

S. No.	Topic	No. of Classes
1	Retailing-Introduction to textile and apparel industry, nature, scope, importance of retailing and merchandising.	1
2	Retailing concept and principles, retail life cycle, market segmentation, key players at domestic, national and global level.	1

<b>S. No.</b>	<b>Topic</b>	<b>No. of Classes</b>
3	Retailing and merchandising in India – status, evolution and trends.	1
4	Classification of retail formats – store or onsite retailers, non-store or off-site retailers, e-tailing and online/virtual sales and promotions.	1
5	Organizational set up- on site retailers and off-site retailers.	1
6	Merchandising – concepts, terminology of merchandising, factors affecting buying function, merchandising plan, buying plan, fashion calendar and merchandising planner.	2
7	Merchandising –functions of buying for store, chain store, buying house, studios, export houses, catalogue sales.	1
8	Merchandising – categories, textile, apparel and fashion merchandising, retail merchandising.	1
9	Roles and responsibilities of merchandiser, merchandising team.	1
10	Factors affecting merchandising-Franchising, trade promotions, supply chain management, logistics management, physical distribution.	1
11	Sales promotion techniques, fashion advertising and promotion – media, trends and methods.	1
12	Visual merchandising – introduction, functions, elements, interior display, exterior display, plano gram, trends, mall designing and visual display planning for commercial spaces.	2
13	Export and import procedure in India; primary and ancillary documents.	1
14	Export Promotion Councils and their roles.	1
	<b>Total</b>	<b>16</b>

### Practical

<b>S. No.</b>	<b>Topic</b>	<b>No. of Classes</b>
1	Introduction to retail markets.	1
2	Developing questionnaire and survey to assess the retail /wholesale scenario in Apparel & textiles.	1
3	Analysis of textile and apparel market -visit to wholesale sectors.	1
4	Analysis of textile and apparel market -visit to retail and exclusive showrooms.	1
5	Analysis of textile and apparel market -visit to chain stores and reporting.	1

S. No.	Topic	No. of Classes
6	Analysis of textile and apparel market- visit to factory outlets.	1
7	Analysis of textile and apparel market-value addition techniques and products.	1
8	Analysis of textile and apparel market reports in view of selected product category for business development.	1
9	Developing and presentation of the visual display techniques–textiles/ Apparel.	2
10	Planning promotion techniques for textile, apparel and fashion items. (Design and Product development, textile and apparel categories, fashion direction, Forecasting, Product Specification, Sample/ Prototype Development, range planning, product assortment and their significance in product planning, pricing of the products)* <i>Can utilize the products developed in other courses also.</i>	3
11	Textile, apparel and fashion promotion event planning and organization.	3
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Barry Berman (1983) Retail Management-A strategic Approach, Macmillan, NY
2. Bell, J., 2006, Silent Selling, 3<sup>rd</sup> edition, Fairchild Publications, NY
3. Bellenger, D. N., & Gold Stucker, J. L. 1983, Retailing Basics, Richard D. Irwin Inc.
4. C. Bickle, 2005, Fashion Marketing–Theory, Principles and Practice Marianne Fair Child Publications, NY
5. Diamond, E., 2006, Fashion retailing, Pearson publications
6. Fiore, A. M., & Kinkle, P. A., 1997, Understanding aesthetics for the merchandising and design professional, Fairchild Publications, NY
7. Ginis. Frings (1998) Fashion from concept to consumer, Prentice Hall, USA
8. Kincade D. H & Gibson (2012), “Merchandising of Fashion Products” Pearson Education
9. Kumar, M. K., 2010, Apparel Merchandising, Abhishek Publications
10. Jackson T. and Shaw D. (2001)- Mastering fashion buying and merchandising management-Palgrave publication
11. John Donnellan (2013), “Merchandise Buying and Management”, A & C Black
12. Mike Easey (2000), Fashion Marketing, Second Edition, Blackwell Publications
13. Poloian, L. G., 2003, Retailing Principles–A Global Outlook, Fairchild Publications
14. Pradhan, S., 2008, Retailing and Merchandising–text and cases, McGraw Hill Publications

15. Rabolt, N. and Miller, J., 2008, Concepts and cases in Retail and Merchandise Management, Mc Graw Hill Publications
16. Rabolt, N. J., 2009, Retailing and Merchandising Management, Mc Graw Hill Co.
17. Rosenau, J.A. & Wilson, D. L., 2006, Apparel Merchandising—the line starts here, 2<sup>nd</sup> Edition, Fairchild Publications, NY
18. Sheshadri M.S.-Apparel Marketing and Merchandising, First edition, M.S. Publications
19. Stone, E., 1985, Fashion Merchandising, 4<sup>th</sup> Edition, McGraw Hill Co. NY, USA
20. Stone, E., 2007, Fashion, Fairchild Publications, NY
21. Stone, E., 2007, In Fashion—Fun, Fame, Fortune, Fairchild Publications, NY

#### **Websites:**

1. <http://ecoursesonline.iasri.res.in/course/view.php?id=233>

#### **e-Books:**

1. e-Book on Research Methodology by C. K. Kothari (2021 Ed)
2. e-Book on Retail recovery by Mark Piginton
3. <https://bookauthority.org/book/Retail-Recovery/1472987179>
4. e-Book on The Effects of E-Commerce on Retail supply Chains by Steven Humphrey (2021 Ed)
5. <https://bookauthority.org/book/The-Effects-of-E-Commerce-on-Retail-Supply-Chains/B098CWD6JB>
6. E-Book on An Introduction to Fashion Retailing From Managing to Merchandising by Dimitri Koumbis (2021 Ed)
7. <https://bookauthority.org/book/An-Introduction-to-Fashion-Retailing/1350098272>

### **Skill Enhancement Courses (SEC-IV Module)**

#### **Module on Fashion Design and Technology-II**

**SEC-ATS 221**

**Fashion Illustration**

**1(0+1)**

#### **Objectives**

- To gain knowledge on fashion illustration and development of design studio.

#### **Practical**

S. No.	Topic	No. of Classes
1	Human Body and body proportion theory.	1
2	Preparation of fashion figure. Drawing 10 and 12 headed fashion figure using geometric body shape.	1
3	Figures in different poses.	2
4	Drawing of facial features-eyes, nose and lips.	1

5	Proportion of body parts-head, face, hands and feet according to different age group. Sketching figures of different age group based on head theory.	1
6	Sketching of garment features minimum three: collars, neckline, fasteners, sleeves, pockets, cuffs and hemline.	1
7	Sketching of added fullness: frills, flounce, gather and pleats.	1
8	Sketching of accessories: hats, shoes, boots, belts and purses.	1
9	Designing of garments for adult and child –Male and Female.	3
10	Illustration of fabric design and texture using different media -water colour, pencil colour, collage, poster colour and crayon colour.	1
11	Theme based Portfolio development through CAD.	3
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Brambatt. M (2017) Fashion Illustration and Design: Methods & Techniques for Achieving Professional Results, Promo press publishing, ISBN-10:8416851069, ISBN-13: 978-8416851065.
2. Kiper. A (2011) Fashion Illustration: Inspiration and Technique, David & Charles publishing,ISBN-10: 0715336185, ISBN-13 :978-0715336182
3. Hart. C.(2013) Fashion Design Studio: Learn to Draw Figures, Fashion ,Hairstyles & More (Creative Girls Draw), Sterling; Illustrated edition,ISBN-10:1936096625, ISBN-13:978-1936096626
4. Berthoud. F.(2011) Francois Berthoud Studio: The Art of Fashion Illustration Hatje Cantz; Bilingual edition,ISBN-10: 9783775730143, ISBN-13:9783775730143
5. Bina, A. 2012. Fashion Sketch book. IV Ed. New York. Fairchild books.
6. Ireland, P. J. 1970. Fashion Design Drawing. London. B. T. Bats ford Ltd.
7. Ireland, P. J. 1980. Basic Fashion Design. London. B. T. Bats ford Ltd.
8. Ireland, P. J. 1974. Fashion Drawing for Advertising. London. B. T. Bats ford Ltd.
9. Kathryn, K. C. and Munslow, J. 1997. Illustrating Fashion. Oxford. Blackwell Science.
10. Riegelman, N.2009. 9 heads: A guide to drawing fashion. Boston. Pearson education
11. Allen and Seaman, "Fashion drawing-The Basic Principles", B. T. Bats ford, London, 1994.

**Objectives**

1. To impart practical skills for developing theme-based portfolio.
2. To make students understand the importance and significance of Portfolio Development through CAD.

**Practical**

S. No.	Topic	No. of Classes
1	Introduction to CAD, Different advanced software used in fashion industry.	1
2	Portfolio preparation- Definition, types and importance, Contents of portfolio,	1
3	Different portfolio presentation, skills and material management.	1
4	Experimenting and creating a story board,	2
5	Steps to do forecasting, Mood board, client board and colour board, swatch board.	2
6	Illustrations and Flat sketches, Production of Spec sheet and costing.	2
7	Development of Logo, Hang tags, Concept board.	2
8	Role of fashion illustrator and career opportunities.	1
9	Theme based Portfolio development through CAD.	4
	<b>Total</b>	<b>16</b>

**Suggested Readings**

1. Hart. C (2013) Fashion Design Studio: Learn to Draw Figures, Fashion, Hairstyles & More (Creative Girls Draw), Sterling; Illustrated edition, ISBN-10: 1936096625, ISBN-13: 978-3775730143
2. Barrett J. C (2012) Designing Your Fashion Portfolio: From Concept to Presentation, Bloomsbury Publishing India Private Limited; Nil edition, ISBN-10 : 1609010078, ISBN-13: 978-1609010072.
3. Tate. S. L., Edwards. M. S. (2006). INSIDE FASHION DESIGN, Pearson Education India, ISBN-10: 8131706958.
4. Greenwood, M. and Murphy, M. F. 1978. Fashion innovation and marketing. New York, Mac Milan Publishing Company.
5. Stone, E. and Sample, J. A. 1985. Fashion merchandising-An Introduction. IV Ed., New York, Mac Graw- Hill Book Company.
6. Drake and Ireland, Patrick John, "Fashion Design Drawing and Presentation", B. T, Batsford, London, 1996.

## Semester V

**ATS-311**

## Pattern Making and Draping

**3(1+2)**

### Objectives

1. To enable students to develop patterns for designer garments
2. To develop understanding about basics of pattern making and draping
3. To upgrade skills for commercialized apparel manufacturing using advance pattern making techniques
4. To develop skills in obtaining perfect fit and create harmony between the fabric and garment design

### Theory

S. No.	Topic	No. of Classes
1	Flat pattern: Terminology, tools, applications and limitations.	1
2	Anthropometric measurements: Importance, standardization and standard measurement charts of children and adults.	1
3	Pattern development process: Design analysis, plotting, alteration of basic patterns and development of production patterns for fabric layout.	2
4	Principles of pattern making: Dart manipulation, added fullness and contouring.	2
5	Pattern making techniques: Slash-spread and pivot	1
6	Draping: Terminology, tools, applications and limitations.	1
7	Basic draping techniques for bodice front and back, skirt front and back.	2
8	Application of dart manipulation, added fullness and contouring principles in draping.	1
9	Factors affecting patternmaking and apparel construction using special fabrics: Stretch fabrics, knits, checks, plaids, velvet and lace etc.	2
10	Fitting: Principles of fitting, standards for good fit, common fitting problems and their remedies.	2
11	Pattern grading: Importance, terminology and techniques.	1
	<b>Total</b>	<b>16</b>

### Practical

S. No.	Topic	No. of Classes
1	Taking measurements: Circumference, horizontal and vertical measurements.	1

S. No.	Topic	No. of Classes
2	Preparation of basic pattern set- bodice front and back, skirt front and back and sleeve.	2
3	Development of design patterns through flat pattern making technique: Designs analysis, adaptation of basic patterns through slash-spread and pivot-transfer techniques to design patterns having single-dart series, two-dart series, tuck-darts, graduated, radiating and parallel darts, pleats, flare, gathers, princess style lines.	2
4	Development of design patterns through flat pattern making technique: Design analysis, adaptation of basic patterns through added fullness in different forms and at various locations.	2
5	Development of design patterns through flat pattern making technique: Designs analysis, adaptation of basic patterns through contouring to empire, surplice, off-shoulder and halter designs.	2
6	Preparation of paper patterns for different yokes, collars, necklines, sleeves and skirts.	1
7	Development of design patterns through flat pattern making technique for six garments incorporating various style features- two of each principle of pattern making.	2
8	Construction of three garments using developed design patterns- one each of dart manipulation, added fullness and contouring.	2
9	Preparation of muslin for draping, development of foundation block for upper and lower garments.	2
10	Designing of different garments through draping using dart manipulation.	2
11	Designing of different garments through draping with added fullness.	2
12	Designing of different garments through draping using contouring.	2
13	Designing upper garments with different yokes, collars, built-up necklines and cowls through draping.	2
14	Development of design paper patterns of six garments of draped patterns incorporating various style features – two of each principle of pattern making.	2
15	Construction of three garments using developed design patterns of draped patterns- one each of dart manipulation, added fullness and contouring for casual, formal and party wear. Assessment of constructed garments for fitting.	2
16	Pattern grading: Grading of basic blocks through draft grade and track grade systems of grading, pattern grading using different zero points. Projection of work.	2
17	Visit to apparel manufacturing units and fashion institutes.	2
	<b>Total</b>	<b>32</b>



### Suggested Readings

- Amaden Crawford, C. (2018). The Art of Fashion Draping. Bloomsbury Publishing Inc. USA.
- Bane, A. (1996). Creative Clothing Construction. McGraw-Hill Publication, USA.
- Bane, A. (1972). Flat Pattern Design. McGraw-Hill Publication, USA.
- Bray, N. (2003). Dress Fitting: Basic Principles and Practice. Classic Edition, Blackwell Publishing.
- Cooklin, G. (1991). Pattern Grading for Women's Clothes. Blackwell Publishing.
- Goul bourn, M. (1998). Introducing Fashion Cutting, Grading and Modelling. Bats ford Publications, UK.
- Handford, J. (2003). Professional Pattern Grading for Women's, Men's and Children's Apparel. Fairchild Books, New York.
- Kiisel, K. (2020). Draping: The Complete Course. Laurence King Publishing.
- Mee, J. and Purdy, M. (1987). Modeling on the Dress Stand. BSP Professional Books.
- Tate, S. L. (2003). Inside Fashion Design. 5<sup>th</sup> Edition. Prentice Hall Publishing Co.
- Taylor, P. J. and Shoben M. M. (1990). Grading for the Fashion Industry. Stanely Homes Ltd.
- Winfred, A. (2015). Metric Pattern Cutting for Women's Wear. Black well Publishing.

### ATS-312

### Principles of Textile Designing

3(0+3)

#### Objectives

1. To impart knowledge about textile designs and process of applied designing.
2. To inculcate ability to develop and arrange motifs in to patterns for various articles.

#### Practical

S. No.	Topic	No. of Classes
1	Introduction to textile designing (Basic process of textile designing, skills and qualities required in textile designer	2
2	Classification of textile designs and methods of producing designs on textiles	2
3	Structural designs through yarn manipulation, weaving, knitting and other techniques	2
4	Decorative designs through printing, dyeing, painting, finishing, embroidery and appliqué work.	2
5	Elements of design: Line, shape, space, form and colour ( Drawing various types of lines, shapes and forms	3
6	Colour: Colour wheel, value and intensity charts, related and contrasting colour schemes	3

S. No.	Topic	No. of Classes
7	Concept of positive and negative design space	2
8	Principles of design: Balance, rhythm, proportion, emphasis and harmony	3
9	Proportion: Planning of basic shapes, scale of shapes and forms, division of space, creating optical illusion with lines and shapes	3
10	Balance: Creating formal and informal balance in design, Rhythm: Creating rhythm through repetition, progression, radiation and gradation of colour and pattern	3
11	Emphasis: Creating emphasis in design by the use of contrast of hue, value, line, shape and size and use of spacing around motif	3
12	Harmony: Harmony of line, shape, size, colour and texture in a design	3
13	Motif and its geometry (Motif as basic unit of design: selection of components of motif, motif development, symmetrical and asymmetrical motifs and their arrangements)	3
14	Geometry involved in basic textile designing: translation, rotation, reflection and glide reflection, Pattern arrangements with motif in different repeats	3
15	Software for textile designing	1
16	Tools and menu of CAD software and its use for motif development	2
17	Development of patterns using different types of motifs (Developing geometrical /abstract /stylized /naturalistic motifs & Pattern arrangements using different colour schemes to create variety in pattern)	2
18	Use of CAD for pattern arrangement using different design repeat and colour schemes.	2
19	Development of different types of border patterns	2
20	Preparation of swatch book: Fabric samples of different types of applied designs (dyed and printed fabrics).	2
	<b>Total</b>	<b>48</b>

### Suggested Readings

1. Beitler, E. J. and Lockhart, B. 1961. Design for you. 2<sup>nd</sup> Edition. New York: John Wiley and Sons, Inc.
2. Bhatnagar, P. 2005. Decorative design history in Indian textiles and costumes. Chandigarh, India: Abhishek Publications.
3. Broomer, G.F. and Horn, G.F. 1977. Art in your world. Worcester, Massachusetts, Davis publications, Inc. 282p.
4. Evans, H. M. and Dumesnil, C. D. 1982. An invitation to design. New York: Macmillan

Publishing Co. Inc.

5. Goldstein, H. and Goldstein, V. 1954. Art in everyday life. 4<sup>th</sup> Edition. New York: Macmillan Publishing Co. Inc.
6. Graves, M. 1951. Art of Colour and design. 2<sup>nd</sup> Edition, New York. McGraw-Hill Company.
7. Miller, J. 2003. The style source book. London: Octopus Publishing.
8. Wilson, J. 2001. Handbook of textile design: Principles, processes and practice. CRC Press, Cambridge: Wood head Publishing Limited.
9. Gahlot, M. and Naik, S. D., 2014. Principle of design and application. E-Home Science Courseware Consortium (NAIP).
10. Naik, S. D. and Wilson, J. A. 2006. Surface Designing of Textile Fabrics. New Delhi, New Age International (P) Limited Publishers. 120p.
11. Wilson, J. 2001. Handbook of textile design. Woodhead Publishing Series in Textiles.

### **E-References**

1. <https://nios.ac.in/media/documents/srsec321newE/321-E-Lesson-29B.pdf>
2. <https://www.mathsisfun.com/geometry/index.html> <https://coe.hawaii.edu/ethnomath/wp-content/uploads/sites/12/2019/10/Geometry-Translations-Rotation-Reflection-and-Dilations-in-Ethnic-Patterns-and-Designs.pdf>
3. [https://teachers.yale.edu/curriculum/viewer/initiative\\_10.04.09\\_u](https://teachers.yale.edu/curriculum/viewer/initiative_10.04.09_u)
4. [https://en.wikipedia.org/wiki/Textile\\_design](https://en.wikipedia.org/wiki/Textile_design)
5. <https://www.emis.de/monographs/Isometrica/isometrica-2.pdf>
6. <https://condor.depaul.edu/ppereira/sym/Notes/Seven.pdf> <https://silo.tips/download/borders-decorative-borders-are-everywhere-an-expression-of-the-pleasure-we-find> <https://math.okstate.edu/geoset/Projects/Borders/howclass.htm>

## **Semester VI**

**ATS-321                      Traditional Textiles and Costumes of India                      3(2+1)**

### **Objectives**

1. To learn the characteristic features/designs of the traditional textiles and costumes of different states of the India.
2. To learn the characteristic features of the traditional textiles and style in costumes of different states of the India.
3. To develop an understanding of the classification of traditional textiles based on the process of making it.
4. To develop an understanding of the methods and materials used in processing and production for different categories of traditional textiles.
5. To develop an understanding of the techniques of traditional embroideries, prints and woven textiles.
6. To inculcate skill for adaptation of traditional textiles' designs and costumes' styles in contemporary textiles and apparels.

## Theory

S. No.	Topic	No. of Classes
1	Historic perspective, classification and importance of traditional Indian textiles and costumes in Textiles and Apparel industry	1
2	Introduction of Textile Arts -Embroideries, rugs, carpets, shawls, sarees and wraps	1
3	Factors affecting diversity of textiles and costumes of India	1
4	Geographical factors, socio-economic factors, customs, traditions and religious factors	1
5	Impact of adaptation of traditional motifs and costumes in contemporary apparel designing	1
6	Traditional Indian costume of Northern India- Jammu and Kashmir, Punjab and Haryana. Western India- Rajasthan, Gujrat and Maharashtra, Southern India-Andhra Pradesh, Tamil Nadu, Kerala and Karnataka, Eastern India-Orissa, West Bengal, Assam, Nagaland, Meghalaya, Manipur, Arunachal, Mizoram, Tripura. Central India-Uttar Pradesh, Madhya Pradesh and Bihar	6
7	Style of costumes; stitched garment, draped garment, head covers, wraps	2
8	Importance of Geographical Indications for traditional Indian textiles	2
9	Woven textiles(Origin, material& techniques used) Shawls from Kashmir, Assam and Nagaland,	2
10	Sarees- Kota Doria, Patola,Sujani, Tangaliya, Pachhedi, Chanderi, Maheshwari,Brocades,Daccamuslin,Baluchari,JamdaniTangail,Paithani, Himroo,Amru, Dharvaram, Sambhalpuri, Vichitrapuri, Venkatgiri, Gadwal, Narayanpet, Ilkal, Khann, Kanjeevaram, Lepcha, Pochampalli, Ikat	6
11	Printed, painted and dyed textiles (Origin, material & techniques used)	2
12	Painted textiles- Patachitra, Pichhavai, Worli and Phad mordant painted textiles Kalamkari- Masulipatnam and Srikalahasti, Madhubani	3
13	Printedtextiles-Calico printingandHandblockprinted- Ajrakh,Rogan,Sanganeri,Bagh,Dabu,	2
14	Yarn resist dyed Patola, Mashru, Ikat, Bandhej; Fabric resist- Sugadi, Bhandej, Laheriya.	2
<b>Total</b>		<b>32</b>

## Practical

S. No.	Topic	No. of Classes
1	Documentation of motifs and sample preparation of traditional textiles	2
2	Creative projects: Preparation of one article by adapting traditional motifs and embroidery in contemporary textiles	1
3	Preparation of portfolio and collection of visuals that depict the different traditional textile and its application in contemporary apparel designing	1
4	Pictures of traditional textiles with the descriptive analysis & Pictures of the traditional costumes with constructional details	1
5	Collection of varied style of male and female traditional costumes of different states of India for hands on experience	1
6	Documentation of traditional textiles and styles in traditional costumes and development of portfolio	1
7	Collection of images and samples for development of theme board	1
8	Development of story board	1
9	Development of range of textile/apparel product & Display and presentation of portfolio	1
10	Creative projects: organizing exhibition/fashion show	1
11	Creating dolls display of traditional costumes of different states	2
12	Preparation of mini costumes of both male and female in group assignments and project work	1
13	Visit to National craft museum and exhibition/art galleries	1
<b>Total</b>		<b>16</b>

## Suggested Readings

1. A Compendium of Indian Handicrafts & Handlooms covered under Geographical Indications (GI), Ministry of Textiles, Govt. of India, New Delhi
2. Bhatnagar, P. (2005). Decorative Design History in Indian Textiles and Costumes. Chandigarh, Abhishek Publication.
3. Bhatnagar, P.(2006).Traditional Indian Costumes & Textiles. Chandigarh, Abhishek Publications.
4. Chisti, R. K.(2013).Sari Tradition and beyond, Roli books Pvt Ltd. NewDelhi.
5. Gillowand BarnardN.(2014). Indian Textiles. 1<sup>st</sup>Edition. Thames and Hudson, London.
6. Gosh, G. and Shukla G.(2014).Ikat Textiles of India. A.P.H. Publishing NewDelhi.
7. Karolia, A.(2019).Traditional Indian Handcrafted Textiles: History, Techniques, Processes, Design Vol I & II (First Edition). New Delhi: Niyogi Books Pvt. Ltd.

8. Mehta, RJ .(1970). Master Piece of Indian Textiles. D.B. Taraporevale Sons and Co. Private Ltd.
9. Parul Bhatnagar (2004) .Traditional Indian Costumes and Textiles ,Abhishek Publications, Chandigarh
10. Treasure of Indian Textiles. 1980. Calico Museum. Ahmedabad. Marg Publication Bombay

## Semester VII

The student will choose elective courses as suggested

S. No.	Course Title	Credit Hours
1	Research Methodology	3(2+1)
2	Statistical Methods	2(1+1)
3	<b>Elective courses (any one specialization)</b>	<b>15</b>
	<b>Total</b>	<b>20</b>

## ELECTIVES COURSES

Course Number	Course	Course Code	Credit Hours
	<b>Elective- Apparel and Textile Science</b>		
1.	Advance Draping Technique	ATS-411	3(0+3)
2.	CAD-Pattern Making & Grading	ATS-412	2(0+2)
3.	Quality Analysis in Textiles & Apparels	ATS-413	3(2+1)
4.	Apparel Production Management	ATS-414	3(3+0)
5.	Agro Textiles	ATS-415	2(1+1)
6.	Recent Advances in Textiles	ATS-416	2(2+0)
	<b>Total</b>		<b>15</b>

**ATS-411****Advance Draping Techniques****3 (0+3)****Objectives**

1. To enable the students to make pattern from sketch/photograph using draping technique.
2. To enable the students to obtain perfect fit and harmony between the fabric and design of the garment

**Practical**

S. No.	Topic	No. of Classes
1	Draping trueing and stitching– dartless shirt, surplice front, bustier,	5
2	Draping and stitching skirts	4
3	Draping collars	4
4	sleeves, lowered exaggerated armhole sleeve	6
5	Cowls; Flounces, ruffles and peplums	6
6	Dresses – sundress and sculptured dress	6
7	Draping knits	3
8	Designing custom clothing	8
9	Analysis and presentation	6
<b>Total</b>		<b>48</b>

**Suggested Readings**

1. Bane A. 1996. *Creative Clothing Construction*. McGraw-Hill.
2. Connie Amaden-Crawford. 1989. *The Art of Fashion Draping*. Fairchild Publ.
3. Janine Mee & Michal Purdy. 1987. *Modelling on the Dress Stand*. BSPP Professional Books.
4. Natalie Bray. 1994. *Dress Fitting*. Blackwell.

**ATS-412****CAD–Pattern Making and Grading****2(0+2)****Objectives**

1. To impart skill in Computer Aided Designing in Apparel Designing.
2. To learn skill in pattern making and grading using CAD software.

**Practical**

S. No.	Topic	No. of Classes
1	Introduction to pattern making software.	2
2	Basics of pattern making tools ( System and general tool bar, Edit tool bar, Accessories toolbar, Insert tool bar, Modify tool bar and Advance toolbar).	4

S. No.	Topic	No. of Classes
3	Basics of pattern making menus (File menu, Edit menu, Piece menu, Grading menu, Pleat menu, Dart menu, Design menu, View menu, Option menu and Help menu).	4
4	Creating grading basic patterns (Bodice front, back and sleeve, Skirt front and back).	4
5	Fundamentals of pattern making software. Detailed use of drawing and editing tools. Creating basic sloper/pattern set- bodicefront and back, skirt front and back and sleeve.	4
6	Development of sloper/patterns of selected designed dresses using pattern making software.	4
7	Grading sloper/ patterns in pattern making software.	3
8	Marker making in pattern making software by manual and automatic methods.	3
9	Preparation of portfolio of developed sloper/pattern.	4
<b>Total</b>		<b>32</b>

### Suggested Readings

1. CAD pattern making software manual
2. Winfred Aldrich 1992 CAD in Clothing & Textiles BSP Professional Books.
3. Davis L. Msrin 1980 Visual Design in Dress, Prentice Hall.
4. Rene, W. C. 1997. *CAD for Fashion Design*. Prentice Hall.
5. Taylor, P. 1990. *Computers in Fashion Industry*. Heinemann Publications.
6. Winfred, H.A. 1992. *CAD in Clothing and Textiles*. BSP Professional Books, London.
7. Veinsinet, D.O. 1987. Computer Aided Drafting and Design- Concept and Application

## ATS-413                      Quality Analysis in Textiles and Apparels                      3(2+1)

### Objectives

1. To inculcate knowledge on quality control aspects.
2. To impart knowledge and hands on experience on textile testing procedures.
3. To impart skill in Inspection and quality analysis of different apparels.

### Theory

S. No.	Topic	No. of Classes
1	Importance of quality control & textile testing and	2
2	introduction to various organizations/institutes dealing with textile testing.	2



S. No.	Topic	No. of Classes
3	Sampling techniques of fibre, yarn and fabric for testing.	2
4	Standard conditions of testing and their importance.	2
5	Testing of fibre dimensions- length ,thickness, fineness, crimp, moisture content, strength, elasticity, linear density, and fibre imperfections.	3
6	Testing of yarn dimensions: count, twist, single yarn strength and elongation, lea strength, evenness, hairiness, crimp, moisture regain, burst strength, pilling and yarn imperfections.	3
7	Testing of fabrics- Physical, mechanical, comfort, colourfastness and fabric imperfections	3
8	physical testing of fabrics - thickness, GSM, fabric count, drapability, thermal conductivity, shrinkage, stiffness, elongation and crease resistance,	2
9	Mechanical testing of fabrics- tensile strength, tear strength, dimensional stability, abrasion resistance, bending length and flexural rigidity,	2
10	Testing of Comfort properties of fabrics- heat transfer, thermal protection, air and moisture permeability, water absorption and water repellence,	2
11	Tests for colour fastness- washing, perspiration, light, rubbing and dry cleaning).	2
12	Accepted Quality level (AQL) - Pre-production, production and post-production inspection of fabrics, sewing threads, buttons, zippers, buckles and ancillaries like linings and interlinings, labels and packaging material.	4
13	Statistical quality control (SQC)- Different statistical techniques and their application in textile and apparel testing.	2
<b>Total</b>		<b>32</b>

### Practical

S. No.	Topic	No. of Classes
1	Demonstration of fibre testing for length, thickness, fineness, crimp, moisture content, strength, elasticity, and linear density.	2
2	Demonstration of yarn testing for count, twist, single yarn strength and elongation, lea strength, evenness, hairiness, crimp, moisture regain, burst strength and pilling.	1
3	Physical testing of fabrics for testing thickness, GSM, fabric count, drapability, thermal conductivity, shrinkage, stiffness, elongation, and crease resistance.	1

S. No.	Topic	No. of Classes
4	Mechanical testing of fabrics for testing tensile strength, tear strength, dimensional stability, abrasion resistance, bending length and flexural rigidity.	1
5	Testing for comfort properties of fabrics for heat transfer, thermal protection, air and moisture permeability, water absorption and water repellence.	1
6	Quality analysis of selected apparels- women's <i>kurti</i> , men's shirt and t-shirt.	1
7	Visit to textile testing laboratory/ Quality control department in a textile or apparel industry.	1
<b>Total</b>		<b>16</b>

### Suggested Readings

1. Booth JE (1996) Principles of Textile Testing. CBS Publishers and Distributors Pvt. Ltd, Delhi.
2. Mehta PV, Satish P E and Bhardwaj b K(1998) Managing Quality in the Apparel Industry. New Age International Publishers.
3. Kothari VK(1999) Testing and Quality Management. IAFL Publications.
4. Saville BP (1999) Physical testing of textiles. Woodhead Publishing Limited.
5. Paul J (2005) Textile Testing. APH Publishing Corporation.
6. Rao JV (2008) Quality Evaluation. NITRA Handbook.
7. Grover E B and Hamby DS (2011) Handbook of Textile Testing and Quality Control. Wiley India Pvt. Ltd.
8. Goel, A. and Kholiya, R. 2014. Textile Testing A Laboratory Manual. University Press. G.B. Pant University of Agriculture and Technology, Pantnagar

## ATS-414 Apparel Production Management

**3(3+0)**

### Objectives

1. To make students aware of the whole apparel production system
2. To endow the students with the advanced apparel production process
3. To introduce students with various trends in management of Garment industry
4. To familiarize students with apparel costing methods and pricing techniques.

### Theory

S. No.	Topic	No. of Classes
1	Introduction to apparel industry- apparel product types, organizational structure and sectors of the garment industry, developments in recent years,	2

<b>S. No.</b>	<b>Topic</b>	<b>No. of Classes</b>
2	opportunities and challenges in Indian apparel sector, overview of global apparel industry,	2
3	major trends in international apparel technological concepts).	3
4	Different departments of apparel industry and their functioning Design department, Marketing and business development department, Purchasing department, Finance department, Production department, Operations department	3
5	Apparel Production Technology (Material sourcing	3
6	Cutting technology- Forms of spreading for different types of fabrics, types of spreading machinery	3
7	Cutting techniques, considerations of cutting parameters for different fabrics, cutting machines and its working principle,	3
8	Fusing technology: Fusing materials, components of fusing, types of resin coating & its applications. Fusing machine types, working principle and their application,	3
9	Sewing technology: Features, mechanism, working principle and application of single needle lock stitch (SNLS) machine, double needle lock stitch (DNLS) machine, over lock machine, blind stitch machine, button sewer and buttonhole machines, bar tack machines; stitches and seams, feed mechanism and working aids, needles and threads	3
10	Pressing and finishing technology: Classification of pressing, components of pressing/finishing machinery and equipment.	3
11	Thread trimming, quality checking of garments and pressing, Apparel Production Systems.	3
12	Warehousing- Assortment and storage methods.	3
13	Packing: Function and scope of packing, packing methods, instructions, materials, weight, ratio, and labelling considerations for shipment by air and sea, packing marks..	3
14	Capital management: Support system – banks, govt. agencies & institutions. Fixed and working capital. Cost accounting: Classification of cost elements-direct and indirect. Determination of factory cost, administration cost and sales cost of an apparel product. Manufacturing cost account statement - preparation and analysis, cost behaviour patterns –fixed, variable, semivariable. Calculations related to job order costing and process costing	3
15	Pricing methods: Cost plus pricing methods / full cost pricing, conversion cost pricing, differential cost pricing; variable cost pricing, direct cost pricing. Derivation of cost of apparel products – woven/ knits. CM, CMT cost analysis for various styles. Activity based costing, Cost analysis for various styles of garments. FOB/CIF/C&F pricing of apparels.	3

S. No.	Topic	No. of Classes
16	Personnel management- Human Resource Planning, job analysis, recruitment and selection, Training and development, compensation, performance appraisal, communication, career planning and development, conflict solution, personal audit, organization development, work environment. Industrial psychology.	3
17	Trade globalization and its effect on Indian apparel industry.	2
<b>Total</b>		<b>48</b>

### Suggested Readings

1. Arunmonappa, Mirza SaiyadinS (1991) .Personal Management. McGraw hill publishing company.
2. Chuter. A.J.(1995). Introduction to clothing production management. Blackwell publishing ,2<sup>nd</sup> Edition.
3. Claire Shaeffer (2001).Sewing for the Apparel Industry. Prentice-Hall,1st Edition.
4. Eberle, Hannelore (2008). Clothing technology: from Fibre to Fashion. Verlag Europa-Lehrmittel, Nourney, Vollmer GmbH & Co., 5th Edition.
5. GraceI. Kunz, Ruth E.Glock(2005). Apparel Manufacturing:Sewn Product Analysis. Pearson/Prentice Hall, New Jersey, 4th edition.
6. Gerry Cooklin (2006). Introduction to Clothing Manufacturers. Blackwell publishing, 2<sup>nd</sup> Edition.
7. GraceI.Kunz (2011). Going Global: The Textile and Apparel Industry. Fairchild Books, 2<sup>nd</sup> Edition.
8. Harold Carr & Barbara Latham (2008), The Technology of Clothing Manufacture. Blackwell publishing, 4th edition.
9. John M Nance Vich (1998). Human Resource management. Irvin/Mcgraw Hill.
10. Leap L and Crino M.D.(1989). Personal/ Human resource management. Macmillan Publishing.
11. Paula J. Myers-Mc Devitt (2010), Apparel Production Management and the Technical Package. Bloomsbury Academic.
12. Richard Jones(2006),The Apparel Industry. Wiley-Blackwell, 2<sup>nd</sup> Edition, 2006.
13. Thomas Anna Gawb (1994).The Art of Sewing. UBS Publishers Distributors ltd..
14. <https://www.onlineclothingstudy.com/2018/11/different-departments-in-garment.html>
15. <https://www.techtarget.com/searchhrsoftware/definition/human-resource-management-HRM#:~>
16. [https://en.wikipedia.org/wiki/Human\\_resource\\_management](https://en.wikipedia.org/wiki/Human_resource_management)
17. Newspaper: Economic Times
18. Ecourse: Hayavadana, C.H.Sc., TXAD412, Apparel Industry Management 3(3+0), ANGRAU, Hyderabad.

**Objectives**

1. To impart knowledge about various agro textiles ,its uses ,application fields and advantages.
2. To acquaint the students with the techniques involve in manufacturing of different agro-textiles and study the recent development in the field.
3. To enable the students to Identify the properties required for agrotextiles.

**Theory**

<b>S. No.</b>	<b>Topic</b>	<b>No. of Classes</b>
1	Introduction to Agrotextiles.	1
2	History, significance, Fibres used, Fabric Construction details, Properties required, production techniques and 1Advantages.	1
3	Substantial Role of Agro-Textiles in Agricultural Applications	1
4	Meaning, need, application, materials used, types, characteristics, advantages and constraints of different agro-textiles:	2
5	Sun screen, Bird protection nets, Plant nets, Groundcover, Wind protectors, Windshield, Root ball net, Insect meshes, Turf protection net, mulch mats, monofil nets, cold and frost controls, covering pallets, anti hail stone nets, harvesting nets, packing materials.	4
6	Agro textiles for Animal husbandry,. Meaning, need, application materials used, types, characteristics, advantages and constraints of different agrotextiles used in Animal husbandry,	2
7	Fishing and aquaculture nets	1
8	Marketing strategy	1
9	Significance of agro-textiles in technical textiles industries,	1
10	Past, present and future prospects,	1
11	Techno-economics of agro-tech.	1
<b>Total</b>		<b>16</b>

**Practical**

<b>S. No.</b>	<b>Topic</b>	<b>No. of Classes</b>
1	Introduction to all types of agrotextiles – showcasing the fabric samples and their applications.	2

2	Survey for agro textiles in the market and collection of swatches.	2
3	Identification of swatches,	2
4	Preparation of agro textile portfolio.	2
5	Assessment of the functional property of agro textiles.	2
6	Mini project (group activity)-	2
7	Designing agro-textiles for specific functional performance	4
<b>Total</b>		<b>16</b>

### Suggested Readings

1. [www.textileworld.com/textile-world/.../agrotextiles-a-growing-field/](http://www.textileworld.com/textile-world/.../agrotextiles-a-growing-field/)
2. [textilelearner.blogspot.com/2012/02/agro-textiles-general-property.htm](http://textilelearner.blogspot.com/2012/02/agro-textiles-general-property.htm)
3. <http://www.textilemedia.com/technical-textiles/new-textile-materials/agrotextiles/>
4. [http://www.textileworld.com/Issues/2005/September/NonwovensTechnical\\_Textiles/Agrotexiles-A\\_Growing\\_Field](http://www.textileworld.com/Issues/2005/September/NonwovensTechnical_Textiles/Agrotexiles-A_Growing_Field)
5. <http://www.fibre2fashion.com/industry-article/textile-industry-articles/agrotextiles-a-rising-wave>
6. <http://www.indiantextilejournal.com/articles>
7. Book: Agro- textile Products & Their Usage By-Mrs. Manisha A.Hira Scientist C Sasmira , Mumbai
8. 13.Handbook of Agro textiles: [www.technotex.gov.in](http://www.technotex.gov.in)
9. <http://www.technicaltextile.net/articles/agro-textiles/detail.aspx?articleid=5386>
10. Horrocks A RandAn and SC,“ Handbook of Technical Textiles”, Woodhead Publication Ltd, Cambridge (2000)

### ATS-416

### Recent Advances in Textiles

2(2+0)

#### Objectives

1. To develop an understanding among student about recent trends in fibres, fabrics, chemical processing and bio-finishes.
2. To impart knowledge about smart textiles, wearable clothing, use of micro fibres, nano fibres and its application, microencapsulation, nanotechnology, technical textiles and application areas.

#### Theory

S. No.	Topic	No. of Classes
1	Recent researches in production and manufacture of textile fibers, yarns and fabrics.	6
2	Bio-finishes and processing of natural textiles and their conversion into clothing	6

<b>S. No.</b>	<b>Topic</b>	<b>No. of Classes</b>
3	Developments in the field of functional textiles, technical textiles and its application areas.	6
4	Use of special techniques in textile processing.	6
5	Thrust areas of contemporary research	4
6	Future projections	4
<b>Total</b>		<b>32</b>

### **Suggested Readings**

1. Journals of Apparels and Textiles
2. Online researches available on CERA and other web portals.

## **ATS-421                      Apparel Production Technologies                      3(0+3)**

### **Objectives**

1. To develop knowledge of the students in apparel designing and pattern making using software applications.
2. To develop professional skill among students in designing and development of apparels using advance machines

### **Practical**

<b>S. No.</b>	<b>Topic</b>	<b>No. of Classes</b>
1	Orientation of students with different software used in apparel designing, pattern making, marker making and grading.	6
2	Orientation about working operations of advance sewing machineries and other tools used in apparel production	10
3	Procurement of raw material- selection criterion for quality and fabric design, materials requirement planning, need and demand based selection.	8
4	Introduction about fabric ornamentation and value addition methods in apparel production, significance and scope of surface embellishments..	8
5	Pilot production of various apparel prototypes of standard sizes with design variations and quality specifications	8
6	Checking of finished apparels for quality evaluation, product costing, product labeling, packaging, consumer validation.	8
<b>Total</b>		<b>48</b>

### **Suggested Readings**

1. Carr Harold and John Pomeroy, 1996. Fashion Design and Product Development. Blackwell Science.
2. Cooklin Gerry, 1997. Garment Technology for Fashion Designers. Blackwell Science.

3. Gray, S. 1998 CAD/ CAM in Clothing and Textiles, Gower Publishing Ltd. London.
4. Taylor, P. Computers in Fashion Industry, Heinemann, London.
5. Arena Multimedia 2000. Drawing and illustration- creating basic shapes.
6. Software catalogues.

**ATS- 422**

**Commercial Apparel Production**

**3 (0+3)**

**Objectives**

1. To enhance the creative skill of students for commercial apparel production.
2. To impart the know-how of marketing and sales management

**Practical**

S. No.	Topic	No. of Classes
1	Orientation to enterprise resource planning with special reference to procurement, production, marketing, inventory and account management.	2
2	Commercial apparel production; commercial pattern engineering, grading, marker planning, pattern envelop, pattern guide sheet, fabric and pattern layout, construction steps	8
3	Commercial production of apparels with different themes	10
4	Product costing-cost estimates and economic feasibility, Branding, Labelling, Packaging	8
5	Developing new market through offline and online mode- advertisement, digitalization of information for marketing, marketing tools and techniques	8
6	Exhibitions and window display for product launching and sales promotion.	8
7	Documentation of developed products, preparation of reports and evaluation.	4
<b>Total</b>		<b>48</b>

**Suggested Readings**

1. Bray Natalic, 1995. More Dress Pattern Designing. Blackwell Science.
2. Erwin, M.D. 1970. Practical dress design: Principles of Fitting and Pattern and Marking. USA. The Macmillan Company
3. Helen, J.A. 2009. Pattern making for Fashion Design. New Delhi. Dorling Kindersley India Pvt. Ltd.
4. Armstrong, H. 11986) Pattern making for fashion designing, New York: Harper Collins.
5. Jarnow Jeannette, Guessio Miriam, 1991. Inside the Fashion Business. Prentice Hall
6. Easey Mike, 2000. Fashion Marketing. Blackwell Science
7. Paola de Helena and Mueller Stewart Carol, 1986. Marketing today's Fashion. Prentice Hall, New Jersey
8. Stone, E. and Samples, J.A. 1985 : Fashion Merchandising - An Introduction Mc-Graw Hill Book Company.
9. Packard, S. 1983. Fashion buying and merchandising. (2<sup>nd</sup> Ed.) New Y



**Department of  
Food Science and  
Nutrition**

## Semester wise Course Distribution FSN

### I Year

Course type	Course Topic	Course Number	Credit Hours
<b>Semester I</b>			
Core	Food Standard and Quality Control	<b>FSN 111</b>	2(1+1)
SEC courses	Breads and Buns	SEC – FSN 111	2(0+2)
	Biscuits and Cookies	SEC – FSN 112	2(0+2)
<b>Semester II</b>			
Core	Food Science & Processing	<b>FSN 121</b>	3(1+2)
SEC courses	Cakes and Pastries	SEC – FSN 121	2(0+2)
	Chocolate Making	SEC – FSN 122	2(0+2)
<b>Total</b>			<b>12(10+12)(+ 2NG)</b>

\*SEC-I & SEC-II to be selected from the list of the basket available under SEC-I module

### Post-II Semester Internship (Only for exit option for award of UG-Certificate)

S. No.	Course Topic	Course Number	Credit Hours
1.	Internship (10weeks)	<b>INT 121</b>	<b>10(0+10)*</b>

\*Compulsory Internship for students exercising exit option (UG-Diploma) after I<sup>st</sup> Year

### II Year

#### Semester III

Course type	Course Topic	Course Number	Credit Hours
Core course	Food Packaging & labeling	<b>FSN 211</b>	2(1+1)
SEC	Quantity Cookery	SEC-FSN 211	
	Traditional Indian Foods	SEC-FSN 212	1(0+1)
<b>Total</b>			<b>20(10+10)</b>

\*SEC-V & SEC-VI to be selected from the list of the basket available under SEC-III module

#### Semester IV

Course type	Course Topic	Course Number	Credit Hours
Core course	Institutional Food Service Management	FSN 221	3(2+1)
SEC	Food Preservation and Storage –I	SEC-FSN 221	1(0+1)
	Food Preservation and Storage –I	SEC-FSN 222	1(0+1)
<b>Total</b>			<b>20(10+10)</b>

**Post- IV Semester Internship** (Only for exit option for award of UG- Diploma)

Course type	Course Topic	Course Number	Credit Hours
1.	Internship (10weeks)	<b>INT 221</b>	<b>10(0+10)*</b>

\*Compulsory Internship for students exercising exit option (UG-Diploma) after II<sup>nd</sup> Year

**III Year****Semester V**

Course type	Course Topic	Course Number	Credit Hours
Core courses	Human Physiology	<b>FSN 311</b>	3(3+0)
	Food Hygiene and Sanitation	<b>FSN 312</b>	1(1+0)
<b>Total</b>			

\* Online courses (MOOC); NG – Non – gradial 10 credits to be completed in III and IV year

**Semester VI**

Course type	Course Topic	Course Number	Credit Hours
Core courses	Nutritional Biochemistry	<b>FSN 321</b>	3(2+1)
	Human Nutrition	<b>FSN 322</b>	3(3+0)

**IV Year****Semester VII**

S. No	Course Topic	Credit Hours	Credit Hours
Elective courses	Normal and Therapeutic Nutrition	<b>FSN 411</b>	3(2+1)
	Food Product Development and Formulations	<b>FSN 412</b>	3(2+1)
	Clinical Nutrition	<b>FSN 413</b>	2(2+0)
	Diet & Nutrition Counseling	<b>FSN 414</b>	2(0+2)
	Sports Nutrition	<b>FSN 415</b>	2(2+0)
	Community Nutrition & Education	<b>FSN 416</b>	3(2+1)

## DETAILED SYLLABUS FSN

**FSN 111**

**Food Standards and Quality Control**

**2(1+1)**

### Objectives

1. To understand the adverse effects of chemical substances in food on human beings and about food laws and regulations to prevent adulteration in food.
2. To acquire knowledge about the quality and safety aspects of food.
3. To induce sufficient knowledge regarding national and international food safety standards and regulations.

### Theory

S. No.	Topic	No. of Classes
1.	Food Quality –Meaning and definition of food quality; quality factors in raw and cooked foods, indicators of food quality.	1
2.	Meaning, importance and ways of Food Quality Assessment	1
3	Total quality management; HACCP; Good Hygienic Practices; Good Manufacturing Practices	1
4	Risk Analysis, Risk Management, Risk Assessment, Risk Communication-Traceability and authentication	1
5	Water quality –Methods of assessment, purification	1
6	Sensory evaluation Physiological bases, sensory characteristics of foods, types, selection and training of sensory panel, requirements for sensory evaluation tests, types of tests, analysis and interpretation of sensory evaluation tests; Methods of Sensory Evaluation and Evaluation cards-Ranking and Rating procedures.	3
7	Different methods of Quantitative descriptive analysis. Determination of Sensory thresholds and taste Interactions. Objective methods for quality evaluation- Introduction and application	1
8	Consumer Studies – Types of Consumer studies-Preference Studies Objectives of Consumer Preference Studies-factors affecting consumer acceptance.	2
9	Food laws and regulations at National level and International level-Food Safety & Standards Rules, 2011, FSSAI, AGMARK, BIS, food export and import regulations in India, Codex Alimentarius, Eco friendly products, ISO and others.	2
10	Food Adulteration Meaning, detection of common adulterants	1
11	Food packaging material – Potential contaminants from food packaging material; Food toxins and contaminants- Occurrence, types, their harmful effects, detection in foods, Toxicological effects, limits and methods of removal. Food hygiene and sanitation.	2
	<b>Total</b>	<b>16</b>

### Practical

S. No.	Topic	No. of Classes
1.	Detection of common adulterants in foods	3
2.	Sensory evaluation of some finished products	3
3.	Quality evaluation of some products using objective methods	3
4.	Visit to quality control laboratory/ food processing industries	2
5.	FCI, AGMARK, Food Toxicology lab and notes the procedures and parameters used for quality assessment	2
6.	Market Survey, collection of food labels and preparation of Scrap Book	3
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Impact WTO and Codex.
2. McWilliams, M. (2000) Foods Experimental Perspectives, 4<sup>th</sup> edition, Prentice-Hall, Inc New Jersey.
3. [https://www.fssai.gov.in/https://agriexchange.apeda.gov.in/IR\\_Standards/Import\\_Regulation/FoodandAgriculturalImportRegulationsandStandardsReportNewDelhiIndia352019.pdf](https://www.fssai.gov.in/https://agriexchange.apeda.gov.in/IR_Standards/Import_Regulation/FoodandAgriculturalImportRegulationsandStandardsReportNewDelhiIndia352019.pdf)

### SEC-FSN 111

### Breads and Buns

**2 (0 +2)**

### Objectives

1. To learn the basics of producing breads and buns.
2. To acquaint newer technologies and machineries used in product development.
3. To develop skills in making of breads and buns at professional level.
4. To impart knowledge about commercialization of breads and buns.
5. To build confidence to start a new career in bakery.

### Practical

S. No.	Topics	No. of Classes
1.	Role of ingredients in breads and buns.	1
2.	Characteristic features of ingredients of bread and buns	1
3.	Quality assessment of raw ingredients used in bread and buns	2
4.	Various types of breads and buns	2

S. No.	Topics	No. of Classes
5.	Basic procedure in production	2
6.	Type of bread and bun- <ul style="list-style-type: none"> <li>• multigrain bread, pita bread, rye bread</li> <li>• sour dough, whole wheat bread, bread stick, banana bread</li> </ul>	2 3
7.	Bread and bun packaging	2
8.	Costing and financial management	2
9.	Marketing (open and digital)	2
10.	Bread and bun Licensing	2
11.	Commercialization of bread and buns	2
12.	Storage of breads and buns– slightly cool, dry, dark place	3
13.	Visit to breads and buns industry	1
14.	Project planning for financial assistance for a small-scale industry on breads and buns making	3
15.	Writing report.	2
<b>Total</b>		<b>32</b>

### Suggested Readings

1. Chakrabarty M M. 2003. Chemistry and Technology of Oils and Fats. Prentice Hall.
2. Dendy DAV & Dobraszczyk BJ. 2001. Cereal and Cereal Products. Aspen.
3. Arora A.K. 2007. Food Service and Catering Management. APH Publishing Corporation, New Delhi.
4. Parvinder S. Bali, 2018. THEORY OF BAKERY. Oxford publishing

## SEC – FSN 112 Biscuits and Cookies2(0+2)

### Objectives

1. To learn the basics of producing biscuit and cookies.
2. To acquaint newer technologies and machineries used in product development.
3. To impart knowledge about commercialization of biscuit and cookies.
4. To build confidence to start a new career in bakery.

### Practical

S. No.	Topics	No. of Classes
1.	Biscuits and cookies– role of ingredients	1
2.	Characteristic features of ingredients of cookies	1

S. No.	Topics	No. of Classes
3.	Various types of biscuit	1
4.	Basic procedure in production	2
5.	Quality assessment of raw ingredients used in cookies	2
6.	Type of cookies <ul style="list-style-type: none"> <li>• Sheeted type cookies, Bar type cookies,</li> <li>• Piped type cookies dropped type cookies, rolled type cookies</li> </ul>	2 2
7.	Type of biscuits- <ul style="list-style-type: none"> <li>• digestive biscuit, custard cream, shortbread,</li> <li>• chocolate biscuit, rolled biscuits, drop biscuit</li> </ul>	2 2
8.	Biscuits and cookies packaging	2
9.	Costing and financial management	2
10.	Licensing	2
11.	Marketing (open and digital)	2
12.	Commercialization of biscuits and cookies	2
13.	Storage of biscuits and cookies– slightly cool, dry, dark place	2
14.	Project planning for financial assistance for a small- scale industry on biscuit and cookie making	3
15.	Writing report	2
<b>Total</b>		<b>32</b>

### Suggested Readings

1. Mathuravalli S.M.D. 2021. Handbook of Bakery and Confectionery. CRC Press
2. Biscuit baking: A review Divyasree Arepally, 2020, Uncan ManleyWoodhead publishing,
3. Chakrabarty MM. 2003. Chemistry and Technology of Oils and Fats. Prentice Hall.
4. Dendy DAV & Dobraszczyk BJ. 2001. Cereal and Cereal Products. Aspen.
5. Arora A.K. 2007. Food Service and Catering Management. APH Publishing Corporation, New Delhi.
6. Parvinder S. Bali, 2018. THEORY OF BAKERY. Oxford publishing.
7. <https://en.m.wikipedia.org/wiki/Biscuit> ZE Martins, Trends in Food Science & Technology 67, 106-128, 2017.

**Objectives**

1. To develop the skills for understanding structural, compositional and nutritional importance of various foods and their processed products.
2. To develop the skills on the properties of food and various food groups and their role in food products.

**Theory**

S . No.	Topics	No. of Classes
1	Food groups, food guide pyramid and My Plate- importance	1
2	Objectives of cooking, processing, preservation, methods of cooking and processing with their merits and demerits. Nutritive value of foods during cooking and processing	1
3	Cereals and millets: Structures, composition, processing techniques, effect of heat and acid, functions of starch in the cookery	2
4	Legumes, nuts and oil seeds - Composition, processing techniques, effect of heat, acid and alkali	1
5	Fruits and vegetables – Types, composition, pigments, changes caused by heat acid and alkali Techniques of processing of fruits and vegetables.	2
6	Milk and milk products :Composition, types, products, effect of acid on milk cookery, uses and functions Milk processing – products	2
7	Eggs -Structure, composition, grading of egg, function and changes during cooking	1
8	Meat, poultry and fish – Types, Structure, composition, pigments, factors affecting tenderness, post-mortem changes and changes during cooking. Processed meat, poultry and fish products	2
9	Sugars- Types, composition, manufacturing process, effect of heat and acid, functions in cookery	1
10	Fats and oils –Kinds, composition, effect of heat and functions in cookery, processing techniques and rancidity of fats.	1
11	Brief overview of Beverages	1
12	Condiments and spices, importance in daily diet Processed spice products.	1
	<b>Total</b>	<b>16</b>



## Practical

S. No.	Experiments	No .of Practicals
1.	Laboratory conduct and responsibilities; knowledge of different food stuffs in English, Hindi and local language	1
2.	Terms used in cookery, weights and measures; identification and use of different kitchen items and equipment.	2
3.	Identification and listing of various food groups; market survey of processed and preserved foods	2
4.	Cereal cookery, Cereal processing – extrusion, puffing, flaking, germination and baking	3
5.	Pulse processing – germination, puffing, convenient mixes Preparation of cereal and pulse combined products and their regional preparations	3 2
6.	Nuts and oilseeds- Oil extraction, Preparation of chikki, til, ladoos, thandai,	2
7.	Milk cookery: Processed milk products	3
8.	Egg cookery: Quality evaluation of egg , preparation of boiled egg, scrambled egg, poached egg	2
9.	Meat and fish cookery, Preparation of meat and fish-based products	2
10.	Fruits and vegetables cookery: Processed fruits and vegetable products – Preparation of sauces, pickles, squash, RTS, Jam, Jelly and chips. Curry and salad	3
11.	Sugar cookery :Stages and products, Crystalline and Non- Crystalline candies	3
12.	Fats and oils : Preparation of puris, cakes and biscuits	2
13.	Appetizers	1
14.	Visit of food industries	1
	<b>Total</b>	<b>32</b>

## Suggested Readings

- Potter, N.N. (1996). Food Science. The AVI Publishing Company, Inc., Westport, Connecticut.
- Sehgal, S., Grewal, R .B., Kawatra, A .and Kaur, Y. (1997). Practical Aspects of Food Preservation .Directorate of Publication. Haryana Agricultural University, Hisar.
- Khadder V., (1999). Text book of Food, Storage and Preservation .Kalyani Publishers, New Delhi.

- Kalia, M .and Sood, S. (2010). Food Preservation and Processing. Revised Edition, Kalyani Publishers, New Delhi.
- Jood, S. and Khetarpaul, N. (2002). Food Preservation .Geeta Somani Agrotech Publishing Academy, Udaipur.
- Sivasankar, B. (2002). Food Processing and Preservation .PHI Learning Pvt .Ltd .Delhi.

## SEC-FSN 121

## Cakes and Pastries

2(0+2)

### Objectives

1. To learn the basics of producing cake and pastry techniques.
2. To acquaint newer technologies and machinery used in product development.
3. To impart knowledge about commercialization of cake and pastry.

### Practical

S. No.	Topics	No. of Classes
1.	Cake and Pastry– Role of ingredients	1
2.	Cake and Pastry making Method's	2
3.	Cake and pastry Mixing Method's	2
4.	Characteristics of cake and pastry	1
5.	Role of ingredients in sponge goods	1
6.	Type of cake – <ul style="list-style-type: none"> <li>• Eggless sponge making, Fruit making, Pound making,</li> <li>• Ganache making, marbled making, Swiss roll making</li> </ul>	3 3
7.	Cake and pastry packaging	2
8.	Costing and financial management,	2
9.	Licensing	2
10.	Marketing (open and digital)	2
11.	Commercialization of cake and pastry	2
12.	Storage of cake and pastry – slightly cool, dry, dark place	2
13.	Visit to a cake and pastry industry	2
14.	Project planning for financial assistance for a small- scale industry on cake and pastry making	3
15.	Writing report	2
<b>Total</b>		<b>32</b>

**Suggested Reading:**

1. Chakrabarty MM. 2003. Chemistry and Technology of Oils and Fats. Prentice Hall.
2. Dendy DAV & Dobraszczyk BJ. 2001. Cereal and Cereal Products. Aspen.
3. Arora A. K. 2007. Food Service and Catering Management. APH Publishing Corporation, New Delhi.
4. Parvinder S. Bali, 2018. Theory of Bakery. Oxford publishing.
5. Matz, Samuel A., Bakery Technology and Engineering, 1992, 3<sup>rd</sup> Edition, Chapman and Hall, London.
6. Cauvain, Stanley P, and Young, Linda S., "Technology of Bread Making, 2007, springer
7. Edwards W. P. "Science of bakery products, RSC, UK, 2007
8. Samuel A. Matz., Equipment for Bakers, Pan Tech International Publication. 1988.

**SEC-FSN 122****Chocolate Making****2(0+2)****Objectives**

1. To learn the basics of producing chocolate making and packaging.
2. To acquaint newer technologies and machineries used in product development.
3. To important knowledge about commercialization of chocolates.

**Practical**

S. No.	Topics	No. of Classes
1.	Chocolate – basic formulation	1
2.	Preparation of types of chocolate like -basic chocolate, liquid filled chocolate, semi-sweet chocolate, bitter sweet chocolate, dark chocolate.	3
3.	Chocolate packaging, Labelling, Packaging material- plastic material, paper material, aluminium material	2
4.	Packaging type- banding, foil packing, sleeve packing, twist packing.	2
5.	Technique use in chocolate packaging process-foil wrapping, fold wrapping, coin wrapping, bar wrapping.	2
6.	Sensory evaluation direct method-appearance, odor, flavor, taste, and texture	1
7.	Sensory evaluation Indirect method – single sample test, triangle test, 9-point hedonic scale and the paired comparison test. Consumer validation	2
8.	Costing and financial management	2
9.	Licensing	2
10.	Marketing (open and digital)	2

S. No.	Topics	No. of Classes
11.	Commercialization of chocolate	2
12.	Storage of chocolate – slightly cool, dry, dark place	1
13.	Shelf life of chocolate- parameters of shelf life, type of deterioration, Shelf- life dating.	2
14.	Method to determine shelf life of chocolate – direct method, challenge test, accelerate shelf-life test	2
15.	Visit to chocolate industry	1
16.	Project planning for financial assistance for a small- scale industry on chocolate making	3
17.	Report writing	2
<b>Total</b>		<b>32</b>

#### **Suggested Reading:**

1. Iuri Baptista, 2021. International Journal of Gastronomy and Food Science 24, 100340.
2. Sugar Confectionery manufacture-(Ed) E.B. Jackson, 2<sup>nd</sup> Edition ,Blackie Academic and professional, Glasgow,1995.
3. Edwards W.P. 2007. Science of bakery products, Published by The Royal Society of Chemistry, UK, 2007
4. Maricel E. Presilla. 2009. The New Taste of Chocolate, Revised: A Cultural & Natural History of Cacao with Recipes. Ten Speed Press; Revised edition (24November2009).

### **FSN-211                                      Food Packaging and Labeling                                      2(1+1)**

#### **Objectives**

This course will enable students to:

1. To impart knowledge of various areas related to food processing and packaging
2. To develop skills required in various industries, research labs and in the field of food and human health.
3. To enable the students to understand packaging materials and effective packaging processes

## Theory

S. No.	Topic	No. of Classes
1.	Importance and Role of packaging in extending shelf life of foods, packaging materials: Use of paper, glass, metals, and plastics as a packaging material	2
2.	Characteristics of basic packaging materials: Paper (paper board, corrugated paper, fibre board), Glass, Metal, Plastics, Foils and laminates, retort pouches.	1
3.	Different forms of packaging, Rigid, semi-rigid, flexible forms of packaging	1
4.	Different packaging system for - Dehydrated foods, Frozen foods, Dairy products, Fresh fruits, Vegetables, Meat, Poultry, Sea foods, beverages, microwave food products.	2
5.	Printing of packages, Barcodes & other marking, Legal requirements of packaging materials and product information.	1
6.	Properties of packaging materials such as tensile strength, bursting strength, tearing resistance, puncture resistance, impact strength, tear strength, methods of testing and evaluation.	2
7.	Barrier properties of packaging materials; theory of permeability, factors affecting permeability, permeability coefficient, gas transmission rate and its measurement, water vapor transmission rate and its measurement.	2
8.	Testing of package performance, Transport worthiness tests, Safety aspects/assessment of food packaging materials.	1
9.	Aseptic packaging of foods: sterilization of packaging material, food contact surfaces & aseptic packaging systems.	1
10.	Modern Packaging Techniques- Vacuum Packaging, Modified atmosphere packaging (MAP), Eco-friendly packaging, Active food packaging – definition, scope, physical and chemical principles involved, Edible films and coatings.	1
11.	Microbiological aspects of packaging materials. Regulation related to Hazardous Packaging. Disposal of waste package materials, Packaging Systems. Hazards from packaging materials in food. Standard packages - package laws and regulation – general guidelines on giving declarations – FSSAI.	1
12.	Packaging equipment and machinery- Vacuum packaging machine, CA & AMP; MA packaging machine, Gas packaging machine, Seal and shrink-packaging machine. Form & fill sealing machine, Aseptic packaging systems, Retort pouches, bottling machines, Carton making machines, Basic Concept of Printing on Packaging, Package printing machines.	1
	<b>Total</b>	<b>16</b>

## Practical

S. No.	Topic	No. of Classes
1.	Familiarization of different types of packaging material.	3
2.	Testing of packaging materials like thickness, GSM, grease resistance, bursting strength, tearing resistance, Water vapour transmission rate (WVTR)	3
3.	Puncture resistance. Vacuum packaging and determination of storage life, Testing the compression strength of the boxes.	3
4.	Packaging of food material in seal and shrink - packaging machine and study its shelf life	3
5.	Testing of strength of glass containers by thermal shock test, testing of strength of filled pouches by drop tester.	2
6.	Packaging of powder foods and estimation of shelf-life. Visit to a food packaging plant.	2
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Robertson, G. L. 2016. Food Packaging: Principles and Practice, Third Edition. CRC Press.
2. Rui M.S. Cruz 2019. *Food Packaging: Innovations and Shelf-life*. . CRC Press.
3. Robertson, G.L. 2009. Food Packaging and Shelf Life: A Practical Guide. Taylor and Francis. CRC Press.
4. Ruben Hernandez, Susan E. MSeleke, John Culter, John D. Culter . *Plastics Packaging: Properties, Processing, Applications, and Regulations* by FSSAI

## SEC-FSN 211

## Quantity Cookery

1(0+1)

## Objectives

1. To learn to produce various food items in quantity, food safety, and hygiene.
2. To learn menu planning, standardized recipes to be served to a large group of people, organizations.

## Practical

S. No.	Topics	No. of Classes
1.	Equipment and kitchen tools used in quantity cookery.	1
2.	Receiving and storage equipments.	2

S. No.	Topics	No. of Classes
3.	Production Equipment.	1
4.	Service Equipment.	1
5.	Cleaning Equipment.	1
6.	Kitchen Organization.	1
7.	Selection of raw materials for quantity cookery.	1
8.	Regional foods for Festivals: snacks, sweets and gravies	3
9.	Menu planning and quantity production.	1
10.	Food Costing.	1
11.	Food Safety- Food handling and hygiene.	2
12.	Food waste management.	1
<b>Total</b>		<b>16</b>

### Suggested Readings

1. Bali, P. S. 2009. Food Production Operations. Ed. 1 and 2, Oxford Publication.
2. Bali, P. S. 2011. Quantity Food Production Operation. Oxford Publication.
3. Bali, P. S. 2012. Food Production Management. Oxford Publication.
4. Krishna Arora. 2011. Theory of Cookery. Frank Brothers and Co. Pvt. Ltd., New Delhi

## SEC-FSN 212

## Traditional Indian Foods

1(0+1)

### Objectives

1. To know the traditional food preparations of different regions of India.
2. To know the nutritive/ therapeutic value of traditional Indian diets.

### Practical

S. No.	Topics	No. of Classes
1.	Survey of region-specific traditional food products having therapeutic/ medicinal values.	3
2.	Calculation of nutritive value of traditional recipes and meals of the state.	2
3.	Planning of characteristic recipes of different states.	1
4.	Preparation of characteristic recipes of different states.	2
5.	Standardization of common recipes of North, East, South and west zone of the country.	3

S. No.	Topics	No. of Classes
6.	Preparation of nutritionally significant foods for physiological conditions in India.	3
7.	Preparation of festive food of the country.	2
<b>Total</b>		<b>16</b>

### Suggested Readings

1. West, B. B., Wood, L. Harger, V.F. and Shugart, G. S. 1997. Food Services in Institutions. John Wiley and Sons, New Delhi.
2. Peckham, G. C. 1995. Foundations of Food Preparations. Prentice Hall, New Jersey.
3. Crusius, V. C. 1984. Quantity Food Management. Surjeet Publications, Delhi.

## **FSN-221                      Institutional Food Service Management                      3(2+1)**

### Objectives

1. To enable them in planning, execution, and control of the management of institutes with ease and profit.
2. To provide practical knowledge about keeping inventory of stocks, tool management and cost calculation.
3. To Proclaim work study, work simplification and its improvement in day-to-day life.

### Theory

S. No.	Topic	No. of Classes
1.	Classification of food service institutions, Function, Profit oriented, public health facility oriented.	2
2.	Processing method- Conventional system, fast food service systems.	2
3.	Service of food- Self-service, tray service, waiter- waitress service, Floor planning and layout.	2
4.	Characteristics of typical food service facilities.	1
5.	Floor planning and layout for catering establishment.	2
6.	Catering Equipment- Introduction, Classification, Factors involved in selection of equipment, Factor involved in purchasing of equipment, Use and care of major equipment.	2
7.	Food preparation- Introduction, Principles of food preparation, Characteristics of food	3
8.	Principles of food purchasing, Methods of food purchasing,	2



S. No.	Topic	No. of Classes
9.	Storages of foods.	1
10.	Menu planning- Definition of menu planning, Principles of menu planning, Types of menus.	3
11.	Standardization of recipe- Definition of standardization of recipe.	1
12.	Standard portion sizes, Portioning equipment, Portion control, Use of left over foods.	2
13.	Management- Definition Principles of management, Steps in effective management, Techniques of effective management Tools of management.	2
14.	Organization chart, Work study, Work simplification, Work improvement financial management.	2
15.	Introduction, Principles, Costing, Budgeting, Accounting, Food cost control methods.	2
16.	Factors affecting food cost, labor cost, operating cost and overhead cost.	1
17.	Personal management Introduction, Personal management concepts, Staff employment, Employee benefit, Methods of selection, Orientation, Training & development, Supervision, Motivation of employees.	2
	<b>Total</b>	<b>32</b>

### Practical

S. No.	Topic	No. of Classes
1.	Standardization of at least 2 recipes in each of the following category: cereal and cereal products vegetables Fruit. Meat, Chicken and other fleshy foods, Sugar and Jaggery, Milk and its products. Pulses, Nuts and Oil seeds, sweet and savory dishes, snacks, traditional recipes.	3
2.	Planning and preparation of menu for various occasions and to calculate amount of each food ingredients: Birth day menu, Holy function menu, New year special menu, wedding menu, Lhori special menu, Christmas special menu.	3
3.	Calculate food cost labor cost operating cost and overhead cost of a home-made dish Calculate gross profit percentage of establishment welfare/ commercial / transport catering.	3
4.	Calculate break-even point any establishment welfare/ commercial / transport catering.	3
5.	Table setting	1
6.	Maintenance of accounts and record keeping.	1

S. No.	Topic	No. of Classes
7.	Visit to various food service institutions and observation of physical facilities menu cards serving style table setting number of personnel and their work schedule hygiene and sanitary conditions safety measures.	1
8.	Report writing and presentation.	1
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Carpenter RP, Lyon DH and Hasdell TA (2002) Guidelines for Sensory Analysis in Food Product Development and Quality Control. 2nd Edition, Aspen Publishers Inc. New York.
2. Earle M and Earle RL (2008) Case Studies in Food Product Development. Woodhead Publishing Limited and CRC Press, New York.
3. Moskowitz HR, Straus T and Saguy S (2009). An Integrated Approach to New Food Products Development. CRC Press, Boca Raton, Florida.
4. Puckett RP (2012) Good Service Manual for Health Care Institutions. 4th Edition, John Wiley and Sons Inc. Hoboken, New Jersey.
5. Beckley JH, Herzog LJ and Foley MM (2017) Accelerating New Food Product Design and Development. 2nd Edition, John Wiley and Sons Inc. Hoboken, New Jersey.
6. Sethi M (2018). Catering Management - An Integral Approach. 3rd Edition, New Age International, New Delhi.
7. Nancy LS (2007) Catering Management. John Wiley and Sons.
8. Arora RS (2012) Banquet and Catering Management. Abhijeet Publications.
9. Harish Bhat (2008) Hotel Management. Crescent Publishing Corporation.
10. Mudit Bhajwani (2007) Food Service Management: Principles and Practice. Rajat publications, New Delhi.
11. <https://www.ferrerofoodservice.com>
12. <https://www.foodservicedirector.com>
13. Vaclavik V (2018) Dimensions of Food. CRC Press.

**SEC-FSN-221                      Food Preservation and Storage-I                      1(0+1)**

### Objectives

1. To learn different methods of preservation and storage of various foods.
2. To know the factors affecting shelf life of preserved foods.

## Practical

S. No.	Topics	No. of Classes
1.	Market survey of raw and preserved foods.	1
2.	Selection, purchase and storage of perishable, non -perishable and semi perishable foods for preservation.	1
3.	Preservation by bacteriostatic methods - drying, dehydration, use of high temperature, Sterilization, blanching, pasteurization, canning, ultra-heating.	1
4.	Preparation of products cereals and starches: Papads: wheat, maize or other cereal grain, sago papad and other regional preparations. Fryums, rolls and other snack items.	1
5.	Preservation of products using pulses: Papads: mung dal, chana dal, urad dal or other pulses, badi, mungodi etc. And other regional preparation.	1
6.	Drying of fruits and vegetables: Leafy vegetables: spinach, fenugreek leaves, coriander, bathua, Other vegetables: peas, beans, tomatoes, lady fingers, cluster beans, bitter gourd etc.,	1
7.	Roots and tubers: potato chips, onion flakes . Fruits: ber, grapes, raw mangoes, banana powder.	1
8.	Sterilization, bottling, corking, blanching.	1
9.	Preparation of products using natural preservatives: Sugar. Squashes - Lemon, orange, grapes, guava, <i>Custard apple</i> , amla, ber, jamun, mix fruits etc.	1
10.	Sugar syrups: Lemon, orange, grapes, guava, rose, kewda etc. With use of low temperature, chilling, freezing, other recent methods in preservation.	1
11.	Preparation of products using natural preservatives Sugar –Squash, Cordial, Syrups, candies, Jam, Jellies, Preserves Murabba, Oil and Salt, Vinegar- pickles with and without oil, Chutneys, other chemical preservatives – Sauces, purees.	2
12.	Storage of perishable, semi perishable and non -perishable foods.	1
13.	Antimicrobial agents, Biological agents, nonionizing and ionizing radiations in preservation of foods. Hurdle technology.	1
14.	Packaging and packaging material, Labelling and costing of the products.	1
15.	Visit of storage go downs –FCI and others.	1
<b>Total</b>		<b>16</b>

### Suggested Readings

1. Potter, N.N. (1996). Food Science. The AVI Publishing Company, Inc., Westport, Connecticut.
2. Sehgal, S., Grewal, R.B., Kawatra, A. and Kaur, Y (1997). Practical Aspects of Food Preservation. Directorate of Publications. Haryana Agricultural University, Hisar.
3. Vijay K., (1999), Text book of Food, Storage and Preservation, Kalyani Publishers, New Dehi.
4. Kalia, M.andSood, S. (2010). Food Preservation and Processing. Revised Edition, Kalyani Publishers, New Delhi.
5. Jood, S .and Khetarpaul, N. (2002). Food Preservation. Geeta Somani Agrotech Publishing Academy,Udaipur.
6. Sivasankar, B. (2002). Food Processing and Preservation. PHI Learning Pvt. Ltd. Delhi.

### SEC-FSN-222

### Food Preservation and Storage–II

1(0+1)

### Objectives

1. To learn the techniques of preservation and storage of fruit and vegetables.
2. To learn the prevention of contamination of food from damaging agents.

### Practical

S. No.	Topics	No. of Classes
1.	Preparation of Jam, Jellies, Preserves, Murabba, Candies, Marmalades. Preservation by using Oil, Salt and Vinegar.	2
2.	Pickles with and without oil – Mango, amla, lemon, green chilli, mix vegetables, fresh turmeric, garlic, gonda, carrot.	2
3.	Pickles using other chemical preservatives – Chutneys, purees.	1
4.	Fermented pickles.	1
5.	Ketchups and sauces.	1
6.	Hurdle technology. Use of anti –microbial agents, food additives and preservatives.	1
7.	Methods of storing preserved foods, prevention of food spoilage.	1
8.	Packaging and packaging material.	1
9.	Labeling and costing of the product.	1
10.	Demonstration on bottling, pasteurization, canning, ultra-heating.	1
11.	Demonstration on ionizing and non-ionizing Irradiation in foods, ohmic heating.	1
12.	Visit to food processing plant.	1

S. No.	Topics	No. of Classes
13.	Packaging and packaging material, Labelling and costing of the products.	1
14.	Visit of storage go downs –FCI and others.	1
<b>Total</b>		<b>16</b>

### Suggested Readings

1. V. Kyzlink, Principal of food preservation, 2<sup>nd</sup> edition, Eisevier press, 2003
2. J.M. Jay, D. Vannostand, modern food microbiology, 7<sup>th</sup> addition, 2005
3. Potter, N.N. (1996). Food Science. The AVI Publishing Company, Inc., Westport, Connecticut.
4. Sehgal, S., Grewal, R.B., Kawatra, A. and Kaur, Y. (1997). Practical Aspects of Food Preservation. Directorate of Publications. Haryana Agricultural University, Hisar.
5. Vijay K., (1999), Text book of Food, Storage and Preservation, Kalyani Publishers, New Dehi.
6. Kalia, M. and Sood, S. (2010). Food Preservation and Processing. Revised Edition, Kalyani Publishers, New Delhi.
7. Jood, S. and Khetarpaul, N. (2002). Food Preservation. Geeta Somani Agrotech Publishing Academy, Udaipur.
8. Sivasankar, B. (2002). Food Processing and Preservation. PHI Learning Pvt. Ltd. Delhi.

## FSN-311

## Human Physiology

(2+1)

### Objectives

1. To acquire knowledge about human physiology, structure of different system and mechanism of human body.
2. To learn knowledge regarding organ system and Integration of the organ systems to maintain proper internal environment.

### Theory

S. No.	Topic	No. of Classes
1	Physiological process - Introduction. Structural basis of human body – cells and their functions. Intra cellular and extra cellular water compartment.	2
2	Structural basis of human body–tissues and their functions.	2
3	Skeletal system and Joints.	2
4	Muscular system-Function and types	2
5	Nervous system Functions of brain. Functions of spinal cord. Nerve impulse reflexes	3

S. No.	Topic	No. of Classes
6	Physiology of digestion. Digestive enzymes and their functions. Functions of liver. Absorption from the intestine.	3
7	Composition and functions of blood. Composition and functions of lymph.	2
8	Structure of heart and course of blood circulation. Blood pressure and factors affecting blood pressure, Pulse rate and heart sounds.	3
9	Mechanism of respiration. Respiratory rates. Volume and transport of gases.	2
10	Physiology of kidney	1
11	The location, secretions and function of various endocrine glands- pituitary, thyroid, parathyroid.	2
12	The location, secretions and function of various endocrine glands – adrenal, testes, ovaries.	2
13	The location, secretions and function of various endocrine glands – Pancreas, Placenta, pineal gland	2
14	Male reproductive organs and their functions. Female reproductive organs and their functions.	2
15	Pregnancy, Changes in the mother. Fertilization, Development of foetus, Lactation.	2
	<b>Total</b>	<b>32</b>

### Practical

S. No.	Experiment	No. of practicals
1	Study of a compound microscope, microscopic structure of epithelial, muscular and connective tissue, bone and cartilage	3
2	Measurement of body temperature, Basal Metabolic Rate, Recording of systemic arterial blood pressure	3
3	Pulmonary function test, Pulse rate and respiratory rate, Effect of posture and exercise on blood pressure.	3
4	Visit to anatomy and physiology lab,	1
5	Estimation of hemoglobin, red blood corpuscles, estimation of white blood corpuscles, determination of blood groups assessment of blood group, determination of bleeding time(bt) and clotting time	3
6	Determination of blood glucose qualitative tests with urine samples- urine sugar and albumin.	3

	<b>Total</b>	<b>16</b>
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### Suggested Readings

1. Best and Taylor. 1979. Physiological as is of medical practice. Tokyo, Igaku Shoin.
2. Chaterjee, C.C. 2012. Human Physiology Vol. I and Vol. II. CBS Publications.
3. Ganong, E.F.(1995).Review of Medica Physiology. Norwalk: Simon and Schuster
4. David, F., Stacia, B.M. and Charles, L.S. 1993. Human Physiology Foundations and Frontiers. 2<sup>nd</sup> Edn., Mosby Pub.
5. Donnersberger, A. BandScott, A.L. 2005. Laboratory Textbook of Anatomy and Physiology. 8<sup>th</sup> Edition, Jones and Bartlett Learning, Burlington, Massachusetts.
6. Hall, J.E. 2016. Gayton and Hall TextBook of Medical Physiology. 13<sup>th</sup> Edition, Elsevier India.
7. Jain, A.K. 2009. Human Physiology for BD. 3<sup>rd</sup> Edition, Avichal Publishing Company, New Delhi.
8. Marieb, E.N.2004. Human Anatomy and Physiology, 6<sup>th</sup> Edition. Pearson Education, Inc. London.
9. Waugh, Land-grant, A. 2014. Ross and Wilson Anatomy and Physiology in Health and Illness. 6<sup>th</sup> Edition. Churchill Livinstone, London.

### FSN-312

### Food Hygiene and Sanitation

**1(1+0)**

### Objectives

1. To enable the students to know the significance of hygiene and sanitation in maintenance of health.
2. To learn the importance of maintaining personal and food hygiene

### Theory

S. No.	Topic	No. of Classes
1	Concept, significance and interrelationship of health, hygiene and sanitation. Principles of food hygiene.	1
2	Food safety hazards: chemical, physical, effect of food composition.	2
3	Beneficial and harmful microorganism in foods: an introduction.	1
4	Food hygiene -Public health hazards due to contaminated foods.	1
5	Food borne infections and intoxication, symptoms, sources and modes of transmission and method of prevention and control.	3
6	Personal hygiene of food handler- Characteristics of good health and hygienic habits to promote good health.	1

S. No.	Topic	No. of Classes
7	Toxins in foods: Naturally occurring, External.	2
8	Effect of environmental pollution on food safety.	1
9	Waste disposal.	2
10	Water pollution, purification of water, quality criteria and standards of portable water.	2
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Park, K. 2000. Text book of Preventive and Social Medicine- A Treatise on Community Health 16<sup>th</sup> ed. M/S Banarasidas Bhanot Publication, Jabalpur.
2. Bedi, Y.P.1970. A Handbook of Hygiene and Public Health. Atma Ram and Sons Publication, New Delhi.
3. Frazier, W.C. and West Hoff, D.C.1988. 4<sup>th</sup>ed, Food Microbiology, Tata McGraw Hill Inc., New Delhi.
4. Jacob, M. 1989 Safe Food Handling: A Training Guide for Managers of Food Service Establishment, WHO, Geneva.
5. Marriott, N. G. 1985.Principles of Food Sanitation A VI book, Van Nostr and Reinhold Publication, New York.

### FSN-321

### Nutritional Biochemistry

**3(2+1)**

#### Objective

1. To understand the relationship of chemical and physiological functions of various specialized cells of the body to their roles in metabolism and nutrition.
2. To describe the major pathways of energy metabolism, how they are regulated, modified during different physiological states and their consequences.
3. To understand the biochemical aspects of nutrients and utilization of nutrients in the body.

#### Theory

S. No.	Topic	No. of Classes
1	Introduction: Definition, historical development, relevance for home science.	3
2	Carbohydrates: definition, classification, structure, glycolysis, TCA cycle.	4



S. No.	Topic	No. of Classes
3	Lipids: definition, classification, structure, $\beta$ - oxidation.	4
4	Protein and amino acids: definition, classification, structure, path of entry of amino acids into metabolism, urea cycle	4
5	Role of vitamins and minerals in metabolism.	4
6	Nucleic acid: Nitrogenous base, nucleotides, DNA and RNA structure	4
7	Enzyme: nature, classification, mechanism of enzyme action and factors affecting it's inhibition, coenzymes and cofactors	4
8	Brief orientation of biochemical energetic and biological oxidation.	3
9	Acid base balance	2
<b>Total</b>		<b>32</b>

### Practical

S. No.	Experiment	No .of practicals
1	Qualitative analysis of carbohydrates	2
2	Qualitative analysis of amino acids	2
3	Qualitative analysis of protein	2
4	Determination of acid value	2
5	Saponification value and iodine number	2
6	Determination of Ph	2
7	Demonstration of estimation of nitrogen by kjeldhal method	2
8	Demonstration on estimation of fat by soxhlet method	2
<b>Total</b>		<b>16</b>

### Suggested Reading

1. Conn, E. E. and Stumpf, P. K. 1976/ 2002 Outlines of Biochemistry. John Wiley and Sons, New Delhi.
2. Deb. A. C. 1996. Fundamentals of Biochemistry, New Central Book Agency Pvt. Ltd. Calcutta.
3. Murray, R. A. Grammer, D. K. Mayes, P. A. and Rodwell, W. 1996/ Harper's Biochemistry, Prentice Hall of India Pvt. Ltd, New Delhi.
4. Rao Ranganathan, K. 1975 Text book of Biochemistry. Prentice Hall of India Pvt. Ltd., New Delhi.
5. Plummer, D.T, 1971. Introduction to Practical Biochemistry. Tata Mc-Graw Hill.

**Objective**

1. To equip the students with basic knowledge about macro and micro nutrients and role in human nutrition
2. To enable them to understand the rich sources, deficiency and toxicity of various nutrients

**Theory**

S. No.	Topic	No. of Classes
1	Historical development of nutrition.	2
2	Definitions of terms used in nutrition-Nutrients, RDA, Daily Value, Balanced diet, , Food pyramid, My plate, Glycemic index, Glycemic load, Food Security, Nutritional Security, BMR, BMI, health, functional foods, phytochemicals, nutraceuticals, dietary supplements.	3 2
3	Energy, units, sources and requirements, fuel value of foods, methods of measuring energy value of foods, Energy requirements of body, physical activity and thermogenic effects of foods, BMR and factors affecting methods of measuring BMR and measuring TEF.	3 3 2
4	Macronutrients: classification, functions, sources, requirements, digestion, absorption of carbohydrates	3
5	Lipids, types, functions, sources, requirements, digestion, absorption and health conditions associated with lipids.	3
6	Proteins, Classification, functions, sources, requirements, Digestion, absorption of proteins, Classification and functions amino acids, Health conditions associated with proteins.	2 1 1 2
7	Fibre- types, source and importance in human health.	2
8	Vitamins, classification, functions, sources, requirements, deficiency and toxicity of  (i) fat soluble vitamins A, D, E & K and (ii) Water soluble vitamins C, B- complex- thiamine, riboflavin, niacin, folic acid, biotin pyridoxine and cyanocobalamine.	3 3
9	Minerals, classification, functions, sources, requirements, deficiency and toxicity of calcium, phosphorous, magnesium, sodium, potassium, chloride, Micro minerals, iron, iodine, fluorine, copper, zinc. Factors affecting bioavailability of important minerals.	3 3 3
10	Water, functions, sources, distribution in body, Water and electrolyte balance.	2 2
	<b>Total</b>	<b>48</b>

### Suggested Readings

1. Mogra, R. and Joshi, P. (2023), Principles of Human Nutrition, 1<sup>st</sup> Edition, Agrotech Publishing Academy, Udaipur.
2. Srilakshmi B., (2018), Nutrition Science, 6<sup>th</sup> edition, New Age International (P) Ltd Publishers, New Delhi.
3. ICMR-National Institute of Nutrition, (2020), Nutrient Requirement of Indians: A Report of the Expert Group, ICMR
4. Agarwal, A. and Udipi, S., (2014), Text Book of Human Nutrition. Jaypee Medical Publication, Delhi. 2.
5. Sehgal, S and Raghuvanshi, R. S., (2007), Text Book of Community Nutrition. ICAR Publication.
6. Gibney M J., Lanham –New S. A., Cassidy A. and Voster H. H., (2019), Introduction to Human Nutrition, 3<sup>rd</sup> edition, Wiley – Blackwell Publication
7. Mann J and Truswell S., (2012), Essentials of Human Nutrition, 4<sup>th</sup> edition, Oxford University Press.

### Elective Courses

**FSN-411                      Normal and Therapeutic Nutrition                      3(2+1)**

#### Objectives

1. To acquire basic knowledge of nutrient requirements, recommended dietary allowances, and dietary modification under different physiological conditions and disease conditions.
2. To develop practical skills in planning and management of diets for the different age groups under normal / physiological conditions keeping in mind the dietary guidelines and to modify the diet plans to suit the disease conditions.

S. No.	Topic	No. of Classes
1.	Determination of nutritional requirements- Basic principles of menu planning, factors affecting planning menus for individual and family. Steps involved in meal planning.	1
2.	Factors (physiological and psychological) affecting food requirements of individuals, families and different groups of people.	1
3.	Concept of calorie consumption unit.	1
4.	Classification of vegetarianism. Importance of balanced diets.	1
5.	Food exchange list. Use of food exchange list in diet planning.	1
6.	Introduction to normal nutrition- Food, nutrient requirement and menu planning of adults (male and female of all activities level), pregnant women, lactating women, Infants	2

S. No.	Topic	No. of Classes
7.	Breast feeding, advantages of breast feeding, breast feeding during illness, feeding of pre-term baby, feeding problems. Weaning and complementary feeding	2
8.	Food and nutrient requirement of pre-school children, school age children, adolescents, old age people Physiological and psychological changes during old age	2
9.	Introduction to therapeutic nutrition - Definition of therapeutic nutrition / Diet therapy, objectives of therapeutic diet. Principles of diet therapy and Importance and modification of normal diet to therapeutic diets.	2
10.	Therapeutic adaption- change in consistency, change in energy intake, change in nutrient, change in fiber, change in frequency of feeding, change in elimination of food. Methods of feeding- enteral feeding, parenteral feeding, advantages and disadvantages of these methods.	2
11.	Routine Hospital Diet-clear liquid diet, liquid diet, semi-solid diet, soft diet, normal diet, bland diet, high and low calorie diet, high and low protein diet, high and low fiber diet, low cholesterol diet etc.	2
12.	Aetiology, symptoms and dietary management in acute and chronic fevers. Typhoid, influenza, tuberculosis. Viral and autoimmune diseases- causes, symptoms and diet management	2
13.	Allergy - causes, symptoms and diet management.	1
14.	etiology, symptoms and dietary management in gastrointestinal disorders- Diarrhoea, constipation, peptic ulcer, diverticular disease, inflammatory bowel disease, celiac disease, lactose intolerance etc. and other disorders.	2
15.	Aetiology, symptoms and dietary management in liver diseases- fatty liver, hepatitis, jaundice, cirrhosis of liver	2
16.	Aetiology, symptoms and dietary management in cardio vascular disease, atherosclerosis and hypertension	2
17.	Aetiology, symptoms and dietary management in diabetes mellitus.	2
18.	Aetiology, symptoms and dietary management in overweight and obesity and underweight	1
19.	Aetiology, symptoms and dietary management in renal disease- nephritis, nephrotic syndrome acute renal failure, chronic renal failure etc	2
20.	Aetiology, symptoms and dietary management in cancer.	1
	<b>Total</b>	<b>32</b>

## Practical

S. No.	Topic	No. of Classes
1.	Standardization of serving size portions.	2
2.	Planning, preparation and calculation of diets for different age groups- Infancy, preschool age, school age, adolescent, adult, old age.	5
3.	Planning, preparation and calculation of diets for pregnant and lactating women	2
4.	Planning, preparation and calculation of packed lunches, clear liquid diet, full fluid diet, soft diet, tube feeding diet, high calorie/ fiber diet etc.	4
5.	Planning, preparation and calculation of diets for following diseased condition-diarrhea, constipation, peptic ulcer, hepatitis, hypertension, atherosclerosis, diabetes, mellitus, overweight / obesity.	3
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Raghuvanshi, R.S. and Mittal, M. (2014). Food Nutrition and Diet Therapy. Westvills Publication Delhi.
2. Agarwal, A and Udipi, S. (2014). Text Book of Human Nutrition. Jaypee Medical Publication Delhi.
3. Antia, p. (1986). Clinical dietetics and nutrition. Oxford univ. Bombay
4. Srilakshmi, B. (1995). Dietetics. New age international publishers, New Delhi.

## **FSN-412              Food Product Development and Formulations              3(2+1)**

### Objectives

1. To learn various aspects of product development and formulation related to production, quality evaluation.
2. To understand the principles of marketing, branding, positioning, viability, feasibility and other commercial aspects of food products.
3. To develop new products in practical situations and improve and innovate the existing food products.
4. To develop entrepreneurship skills in the area of Food Product Development & Formulations.

### Theory

S. No.	Topic	No. of Classes
1	Concept of product development and food formulation.	2
2	Techniques used in forecasting new product's needs.	2

S. No.	Topic	No. of Classes
3	New product ideas. Infra-structural requirement	3
4	Contributory role of various disciplines involved in products development.	3
5	Sequential steps of product development and food formulation.	2
6	Food ingredients; nutritional relevance: physical and chemical properties in relation to product formulation; nutritional changes due to processing.	4
7	Evaluation of sensory characteristics and consumer acceptance of products.	2
8	Consumer protection, nutrition labelling, Food packaging, advertising and marketing and economics.	4
9	Improving success potential of new products, market exploration & acquisitions.	4
10	Quality controls procedures employed in product development.	2
11	Procedure for obtaining patents.	2
12	Legal aspects of product development.	2
<b>Total</b>		<b>32</b>

### Practical

S. No.	Topic	No. of Classes
1	Sensory evaluation techniques: Recognition test; basic tastes, odour recognition, aroma perception.	2
2	Exercises with other senses, tactile and pressure, kinesthetic, temperature, pain, auditory and colour	2
3	Threshold tests for basic tastes.	1
4	Difference tests; paired, triangle and duo trio tests.	2
5	Ranking test.	2
6	Descriptive tests: flavor profile and dilution flavor profile.	3
7	Scoring tests.	2
8	Project: Product formulation and evaluation.	1
9	Visit to a food industry.	1
<b>Total</b>		<b>16</b>

### Suggested Readings

1. Sharma, A. (2018) Food Product Development. CBS, India.
2. Baker, R. C. (1988) Fundamentals of New Food Product Development (Developments in Food Science).Elsevier Science Ltd.
3. Prusa, K. and Gilbert, K. (2019) Food Product Development Lab Manual. Iowa State University, United States

**FSN-413**

**Clinical Nutrition**

**2 (2+0)**

### Objectives

1. To understand basis of RDA derivation and use knowledge to understand individual variations and provide personalized nutrition.
2. To interpret clinical results and apply the findings in formulating therapeutic diet.
3. To understand rationale and use of nutraceuticals and functional foods.

### Theory

S. No.	Topic	No. of Classes
1	Methods for estimating RDA: Basic terminology in relation to nutritional requirements	3
2	Methods for studying the nutrition Requirements	2
3	Population survey of dietary intakes of nutrients, Growth studies, Depletion and repletion studies, Nutrient balance studies,	3
4	Use of isotopically labeled nutrients: Nutrient turnover, Obligatory losses of nutrients.	3
5	Clinical results and their interpretation: Interpretation of clinical testing of blood serum and urine with particular emphasis on their interpretation related to nutritional status and disease (PEM, liver, cardiovascular and renal disorders, diabetes mellitus, underweight, overweight and obesity) Nutritional Biomarkers.	3
6	Introduction to free radicals: Free radicals, reactive oxygen species, production of free radicals in cells, damaging reactions of free radicals on lipids, proteins, Carbohydrates, nucleic acids,	3
7	Free radicals' theory of ageing, enzymatic and non enzymatic antioxidant defence, synthetic antioxidants.	3
8	Nutraceuticals and dietary supplements: Definitions of Nutraceuticals, Functional foods, Dietary supplements, Nutrigenomics, probiotics, Prebiotics and postbiotics, interaction between nutrients, infections and drugs,	3
6	Nutraceutical factors in specific foods - Classification of Nutraceutical factors based on chemical nature and mechanism of action, Occurrence	3

S. No.	Topic	No. of Classes
7	Therapeutic uses of Carotenoids (Lycopene, Lutein, Zeaxanthene, Astaxanthene), Quinones (Tocopherol), Proteins and Minerals (Melatonin, Glutathione, Shilajit, Carnitine), Phenolics and Polyphenolics (Reservetrol, Grapeseed extract, Tea, Pycnogenol, Avenanthramides from Oats, Rutin, Soy Isoflavones, Curcumin), Sulphur Compounds (Glucosinates), Essential Fatty acids (Fish oils, $\alpha$ - Linolenic acid)	3
8	Therapeutic uses of dietary fibres and complex carbohydrates as functional food ingredients, Regulatory issues of Nutraceuticals and Dietary Supplements.	3
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Baetge, E. E., Dhawan, A., & Prentice, A. M. (Eds.). (2016). Next Generation Nutritional Biomarkers to Guide Better Health Care: 84th Nestlé Nutrition Institute Workshop, Lausanne, September 2014. Karger Medical and Scientific Publishers.
2. Das, L., Bhaumik, E., Raychaudhuri, U., & Chakraborty, R. (2012). Role of nutraceuticals in human health. Journal of food science and technology, 49 (2), 173-183.
3. Elia, M., Ljungqvist, O., Stratton, R. J. and Susan, A. L. (Eds.). (2013). Clinical Nutrition. Wiley, Germany.
4. Gupta, R. C., Lall, R., & Srivastava, A. (Eds.). (2021). Nutraceuticals: efficacy, safety and toxicity. Academic Press.
5. Mahan, L.K. and Escott-Stump, S. (2000). Krause's Food, Nutrition & Diet Therapy. 10th Edition, W.B. Saunders Co., Pennsylvania.
6. Nutrient Requirement for Indians: Recommended Dietary Allowances and Estimated average requirements - 2020. National Institute of Nutrition, India (nin.res.in)
7. Raghuvanshi, R.S. and Mittal, M. (2014). Food Nutrition and Diet Therapy. Westvills Publication Delhi.
8. Sobotka, L., & Forbes, A. (Eds.). (2019). Basics in clinical nutrition (Vol. 1, No. 5th). Galen.
9. Wildman, R. E., Wildman, R., & Wallace, T. C. (2016). Handbook of nutraceuticals and functional foods. CRC press.

**FSN-414**

**Diet and Nutrition Counselling**

**2 (0+2)**

### Objectives

1. To develop the knowledge for understanding the concepts of diet, structural, compositional and nutritional importance of various diet
2. To develop the skills in communication, learn the counseling techniques, group process skills and behavior modification theories and develop the educational tools.



## Practical

S. No.	Experiment	No .of practicals
1	Communication to Promote Change; -Interviewing, Counseling, Behavioral Modification	5
2	Modifying Cognitions, Motivation, Principles	5
3	Theories of Learning, Planning Learning, Implementing	5
4	Evaluating Learning, Group Dynamics	5
5	Delivery of Oral Presentations and Workshops,	6
6	Planning, selecting and Using Media.	6
<b>Total</b>		<b>32</b>

## Suggested Readings

1. Baetge, E. E., Dhawan, A., & Prentice, A. M. (Eds.). (2016). NextGeneration Nutritional Biomarkers to Guide Better Health Care: 84th Nestlé Nutrition Institute Workshop, Lausanne, September 2014. Karger Medical and Scientific Publishers.
2. Das, L., Bhaumik, E., Raychaudhuri, U., & Chakraborty, R. (2012). Role of nutraceuticals in human health. Journal of food science and technology, 49(2), 173-183.
3. Elia, M., Ljungqvist, O., Stratton, R.J. and Susan, A. L. (Eds.). (2013). Clinical Nutrition. Wiley, Germany.
4. Gupta, R. C., Lall, R., & Srivastava, A. (Eds.). (2021). Nutraceuticals: efficacy, safety and toxicity. Academic Press.
5. Mahan, L.K. and Escott-Stump, S. (2000). Krause's Food, Nutrition & Diet Therapy. 10th Edition, W.B. Saunders Co., Pennsylvania.
6. Nutrient Requirement for Indians: Recommended Dietary Allowances and Estimated average requirements - 2020. National Institute of Nutrition, India (nin.res.in)
7. Raghuvanshi, R.S. and Mittal, M. (2014). Food Nutrition and Diet Therapy. Westvills Publication Delhi.
8. 8. Sobotka, L., & Forbes, A. (Eds.). (2019). Basics in clinical nutrition (Vol. 1, No. 5th). Galen.
9. Wildman, R. E., Wildman, R., & Wallace, T. C. (2016). Handbook of nutraceuticals and functional foods. CRC Press.

## FSN-415

## Sports Nutrition

**2(2+0)**

## Objectives

1. To learn the selection of the right balance of carbohydrates, proteins, and fats to provide energy and build or maintain muscles, designing diet plans, and use of nutritional supplements.

2. Understand the special nutritional requirements for physical activities related to sports and exercise.
3. Apply the knowledge to improve the performance of sports persons.

### Theory

S. No.	Topic	No. of Classes
1	Introduction, Nutritional considerations for sports / exercising person as compared to normal active person.	2
2	Energy substrate for activities of different intensity and duration, aerobic and anaerobic activities.	2
3	Fluid balance in sports and exercise, importance, symptoms and prevention of dehydration, Sports drink, Energy enhancers and other commercial sports food products.	2 1 1
4	Macro Nutrients-Carbohydrate as an energy source for sport and exercise,	1
5	Carbohydrate stores, Fuel for aerobic and anaerobic metabolism, Glycogen re-synthesis, CHO Loading, CHO composition for pre exercise, during and recovery period.	1 2 1
6	Role of fat as an energy source for sports and exercise.	1
7	Fat stores, regulation of fat metabolism, factors affecting fat oxidation (intensity, duration, training status, CHO feeding), effect of fasting and fat ingestion.	2 1
8	Protein and amino acid requirements, Factors affecting Protein turnover, Protein requirement and metabolism during endurance exercise, resistance exercise and recovery process.	1 2
9	Important micronutrients for exercise- B complex vitamin and specific minerals.	2
10	Exercise induced oxidative stress and role of antioxidants.	2
11	Chronic dieting and eating disorder.	2
12	Female athletic triad, sports anaemia. Dietary supplements and ergogenic aids (nutritional, pharmacological and physiological).	1 2
13	Use of Nutritional supplements in strength/power sports and team sports-use, effects, efficacy and safety – Creatine monohydrate, Sodium bicarbonates, Nitrates – B-Alanine, Caffeine – Protein supplements – Fat burners.	3
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Jeukendrup, A., & Gleeson, M. (2010). Sport nutrition: an introduction to energy production and performance (No. Ed. 2). Human Kinetics.
2. McArdle, W. D., Katch, F. I., & Katch, V. L. (2009). Sports and exercise nutrition. Lippincott Williams & Wilkins.
3. Recommended Dietary Intakes for Indian Sportsman and Women. Satyanarayan, K; Nageshwar Rao. C; Narsinga Rao, B.S.; Malhotra, M.S. (1985)., Hyderabad, National Institute of Nutrition.
4. Banardot, Dan (2000). Nutrition for Serious Athletes. Human Kinetics
5. Energy-Yielding Macronutrients and Energy Metabolism in Sports Nutrition. Edited by Judy A Driskell, Ira Wolinsky, CRC Press 2000.

### FSN-416

### Community Nutrition and Education

3 (2+1)

#### Objectives

1. To develop awareness of the students about the magnitude of nutritional problems and develop ability to assess the problems and devise nutrition education material for them.
2. To comprehend the importance and determinates of nourishment decision practices and apply standards of network appraisal and nourishment instruction to design the appraisal, execution observing and assessment of a focused in community nutrition intercession.

#### Theory

S. No.	Topic	No. of Classes
1	Malnutrition- Definition and causes,	2
2	PEM, Marasmus, Kwashiorkor and vicious cycle of malnutrition.	2
3	Assessment of nutritional status, Clinical signs and symptoms, nutritional anthropometry, biochemical tests, biophysical tests and diet survey methods.	3
4	Major nutritional problems prevalent in India	2
5	The state of Protein energy malnutrition	2
6	Anaemia	2
7	Vitamin A deficiency,	2
8	Iodine deficiency disorders,	2
9	Obesity, hypertension, atherosclerosis and diabetes mellitus.	2
10	National programmes and role of national and international agencies in improving nutritional status of the community, Integrated Child Development Service (ICDS)	3
11	Supplementary Nutrition Program (SNP), Applied Nutrition Program (ANP)	2

12	Mid-Day Meal Program (MDMP), Vitamin A Prophylaxis Program and Anaemia Prophylaxis Programme	2
13	Food and Agricultural Organization (FAO), World Health Organization (WHO), United Nations Children's Fund (UNICEF).	2
14	UNDP, CARE and other Voluntary and Government Agencies.	2
15	Nutrition education- Objectives, methods and principles.	2
<b>Total</b>		<b>32</b>

### Practical

S. No.	Topic	No. of Classes
1	Assessment of nutritional status of an individual/community using anthropometry and Dietary survey.	2
2	Preparation of schedule	2
3	Survey work	2
4	Analysis of data	2
5	Writing of report	2
6	Visit to local health centre to identify clinical signs and symptoms of nutritional problems.	2
7	Identification of adulterants in common foods.	1
8	Visit to an ICDS Block Development of audio-visual aids- radio script, popular article, chart/posters, leaflets etc.	1
9	Planning, implementation and evaluation of nutrition education for a target group.	2
<b>Total</b>		<b>16</b>

### Suggested Readings

1. Sehgal, S. and Raghuvanshi, R.S. (2007) Text Book of Community Nutrition. ICAR, New Delhi.
2. Bamji, S.M., Rao, P.N., and Reddy, V.(2003). Textbook of Human Nutrition. 2nd ed and IBH Publishing Co Pvt Ltd.
3. Swaminathan, M. (ed.) (1998). The First Five Years: A Critical Perspective on Early Childhood Care Education in India. Sage Publication. New Delhi.
4. Jelliffe DB (1966) The assessment of the Nutritional status of the community, WHO Geneva.
5. Salil S and Rita SR (2007) Textbook of community Nutrition ICAR publication New Delhi

## Experiential Learning Courses

**EL-FSN**

**415 Development of Designer Health Foods**

**3(0 + 3)**

### Objective:

1. To enable students to learn the basics of Designer health food products
2. To acquaint the students with newer technologies and machineries used in product development.
3. To develop professional skill among the students to prepare health products and their commercialization.

### Practicals

S. No.	Topic	No .of Classes
1	Familiarization of Designer health foods available in market, Collection of information and Report writing	6
2		4
3	Orientation to processing equipment's; operation, maintenance	5
3	Selection and storage of raw material: perishable, semi perishable, non-perishable	2
5	Product formulation:	5
6	Development and preparation of Nutri dense foods	10
7	Therapeutic foods,	10
8	Procedure for obtaining quality standards	3
9	Consumer validation	3
<b>Total</b>		<b>48</b>

### Suggested Readings

1. Altschul A., ) .1993 .(Low calorie foods .Marcel Dekker. Goldberg, I) .1994 .(Functional foods: Designer foods, Pharma Foods, Nutraceuticals .Springer.
2. Matz, S.A) .2004 .(Formulating and processing of dietetic foods .CHIPS Publ.
3. Kalia, M. and Sood, S. (2010). Food preservation and processing. Revised edition, Kalyani Publishers, New Delhi.
4. Srilakshmi, B) .2010 .(Food science ) Fifth ed (.New Age International Pvt .Limited, Pub., New Delhi.
5. Gordon, W.F) .2011 .(New food product development :From concept to market place )third edition .(CPR, Press.

**Objective:**

1. To enable students to learn the basics of producing bakery products.
2. To develop skill among the students to prepare bakery products.
3. To impart knowledge about commercialization of bakery products.

**Practicals**

<b>S. No.</b>	<b>Topic</b>	<b>No. of Classes</b>
1	Preparation of Dessert (mousse, parfait, tresleches, tiramisu, panacotta)	10
2	Country loaf bread making	6
3	Sourdough bread making	6
4	Lamination folding system	6
5	Cupcake & muffin making and frosting	5
6	Packaging and packaging material, labeling, costing and financial management	5
7	Licensing, Marketing (open and digital) and Commercialization of health food products	5
8	Visit of food industry	
9	Report presentation	2
<b>Total</b>		<b>48</b>

**Suggested Reading**

1. Ashok Kumar Y. 2012. Text book of Bakery and Confectionery. PHI Learning, India.
2. Scott D. 2020. Bread Baking for Beginners: A Simple essential guide to kneading and baking bread.
3. Mathuravalli S M D. 2022. Handbook of bakery and Confectionary. CRC Press.
4. Bakers Handbook on Practical Baking, 1994. US Wheat Associates, New Delhi
5. NIIR Board of consultants and Engineers. 2014. The complete technology book on bakery products (Baking Science with formulation and production). NIIR Project consultancy services, New Delhi.

**Department of  
Extension Education and  
Communication Management**

### Semester Wise Course Distribution EECM

Year & Semester		Course title	Course No.	Credit hours
Courses				
I Year I Sem	Core course	Communication for Development	EECM- 111	2 (1+1)
	Skill Courses	Audio Visual Aids for Communication	SEC- EECM- 111	2 (0+2)
		Extension Teaching Methods	SEC-EECM- 112	2 (0+2)
II Sem	Core course	---	-	-
	Skill Courses	Computerized Instructional Aids Production	SEC-EECM- 121	2 (0+2)
		ICT and New Media	SEC-EECM- 122	2 (0+2)
II Year III Sem	Core course	Extension and Rural development	EECM-211	3 (2+1)
		Rural Sociology	EECM-212	2 (2+0)
	Skill Courses	Print Journalism	SEC_EECM- 211	1 (0+1)
		Electronic Journalism	SEC -EECM- 212	1 (0+1)
IV Sem	Core course	Training and Professional Development	EECM-221	2 (0+2)
	Skill Courses	Audio and Video Recording	SEC -EECM- 221	1 (0+1)
		Instructional Video Production	SEC-EECM- 222	1 (0+1)
3 <sup>rd</sup> Year V Sem	Core course	Project Management	EECM-311	3 (1+2)
VI Sem	Core course	Diffusion and Adoption of Innovations	EECM- 321	3 (2+1)
4 <sup>th</sup> Year VII Sem	Elective course	Extension Programme Management	EECM- 411	3 (1+2)
		Extension Training Management	EECM- 412	3 (1+2)
		Advertising and Social Marketing	EECM-413	3 (1+2)
		Public Relations and Communication Management	EECM-414	3 (1+2)
		Web Designing	EECM-415	3 (0+3)



## Detailed Syllabus EECM

**EECM-111**

**Communication for Development**

**2(1+1)**

### Objective :

1. To develop competence in effective communication.
2. To develop understanding of various concepts of communication process.
3. To develop competence in oral and written communication

### Theory

S. No.	Topic	No. of Classes
1.	Communication process – concept, elements, and their characteristics.	2
2.	Principles of Communication.	1
3.	Basic functions of communication.	1
4.	Models of Communication.	1
5.	Barriers of communication	1
6.	Concepts related to communication; fidelity of communication, empathy credibility, feedback in communication	2
7.	Communication gap and message distortion	2
8.	Forms and types of communication– Oral and written communication	2
9.	Non-verbal communication	1
10.	Interpersonal communication, organizational communication.	2
11.	Digital communication	1
	<b>Total</b>	<b>16</b>

### Practicals

S. No.	Topic	No. of Classes
1.	Practice sessions on written communication- Writing official letters	3
2.	Writing Notices/Circulars, Preparing minutes of meetings	3
3.	Practice sessions on oral communication	2
4.	Planning and delivering an effective talk	3
5.	Planning for digital communication	2
6.	Organizing educational programs using digital media.	3
	<b>Total</b>	<b>16</b>

### **Suggested Readings**

1. Dasgupta, S. (1989). Diffusion Agricultural Innovations in Village India. Wiley Eastern Ltd, New Delhi
2. Jaliha KA & Veerabhadraiah V. (2007). Fundamentals of Extension Education and Management in Extension. Concept Publ. Co.
3. Ray, G.L. (2005). Extension Communication and Management. Kalyani Publ.
4. Reddy, A.A. (1987). Extension Education. Shree Lakshmi Press, Bapatla. Guntur, AP.
5. Somani, L.L. (2012). Extension Methodologies for Transfer of Agricultural Technology. Image PrintMedia, Udaipur
6. Supe, S.V. (2009).Text book of Extension Education. Agro tech Publishing Academy Udaipur.

### **EECM-211                      Extension and Rural development                      3(2+1)**

#### **Objectives**

1. To develop understanding regarding the extension support system.
2. To impart knowledge on rural development programmes.
3. To make them understand the role of extension agencies in rural development.
4. To develop competency in working with the village people in line with the local and national ruraldevelopment programmes.

#### **Theory**

<b>S. No.</b>	<b>Topic</b>	<b>No. of Classes</b>
1.	Extension Education: Concept and importance	1
2.	Philosophy, principles and objectives	1
3.	Evolution of Extension Education - Glimpses of pre- -independence era Post-independence era	1
4.	Community: Meaning ,Types of communities	1
5.	Community Mobilisation: - Meaning and importance	1
6.	Leadership: Concept and types	1
7.	Community Development Programme Concept, objectives activities	2
8.	Community Science: Concept and significance	1

S. No.	Topic	No. of Classes
9.	Rural development: Concept, need, aim and functions. Role of Extension Agencies in Rural development.	1
10.	Panchayati Raj Institutions-Concept, structure and functions	1
11.	Five-year Plans: Concept of Five-year plans(FYP). Planning Commission and NITI Aayog.	2
12.	Sustainable Development Goals (SDGs).	1
13.	Rural Development programmes/ Organisations: SGSY(1999), NRLM(2011) - DDU-AY(Deen Dayal Antyodaya Yojana (DAY),IAY(1985)- Pradhan Matri Awas Yajana Gramin (PMAY-G),	1
14.	Mahatma Gandhi National Rural Employment Gurantee Act(MGNREGA),Integrated Child Development Service Scheme (ICDS).Pradhan Mantri Social Security schemes-Social Welfare and Social Safety Programme.	2
15.	Poshan Abhiyaan, National Health Mission(NHM), Swach Bharat Mission, Pradhan Mantri Kaushal Vikash Yojana (PMKBY). Din DayalUpadhyaya Gramin Kausholya Yojana (DDUGKY)- Skill Development Programme.	3
16.	Sansad Adarsh Gram Yojana (SAGY), National Rurban Mission (NRuM). Atma Nirbhar Bharat Abhiyaan, District Water Management Agency (DWMA),Agricultural Technology Management Agency(ATMA).	3
17.	Role of International/National Organization: United Nations Development Programme(UNDP), United Nations Children's Fund(UNICEF), Food And Agriculture Organization(FAO), Bill & Melinda Gates foundations Trust(BMGF).	3
18.	National Organization and State level organization: Indian Council of Agricultural Research (ICAR), State Agricultural Universities (SAUs), Krishi Vigyan Kendras (KVKs), Integrated Tribal Development Project (ITDP).	3
19.	District Rural Development Agency (DRDA), Farmer Producer Organization (FPO)	2
20.	Self Help Groups (SHGs) in rural development.	1
	<b>Total</b>	<b>32</b>

## Practicals

S. No.	Topic	No. of Classes
1.	Studying the village profile by visiting village: Establishing rapport with rural families and leaders	2
2.	Use of Survey method: Identification of needs of rural women and farm women	2
3.	Exploring Income Generating activities.	1
4.	Collecting information regarding the role of existing rural development programme in operation with village area.	2
5.	Prepare a village profile based on collected information. Presentation of Report.	2
6.	Exposure Visit to: KVK.	1
7.	Exposure Visit to: PHC (for collecting information on health service specially to women and children).	1
8.	Exposure Visit to: DRDA	1
9.	Exposure Visit to: AWCs.	1
10.	Exposure Visit to: Mahila Mandals/SHGs/Youth Club	1
11.	Exposure Visit to: Cooperatives to make interaction programme with Extension Professionals of the Institutions.	2
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. R. Ganesan, I. Mohamed Iqbal and N. Anandaraja (2019): Reaching the Unreached, ISBN: 978-8185211- 57-2 (HB), Associated Publishing Company, A division of Astral International Pvt. Ltd., Ansari Road, Darya Ganj, New Delhi-110 002
2. Sagar Mondal (2018): Textbook of Agricultural Extension with Global Innovations, ISBN: 978-93-272- 2877-9, Mrs. Usha Raj Kumar, Kalyani Publishers, B-15, Sector-8, NOIDA, New Delhi-110 002
3. Chamola Dr. S.D, Bharati Dr. Anirudha(2018), Agriculture and Rural Development in India. Global Vision Publishing House
4. Sagar Mondal (2017): Fundamentals of Agricultural Extension Education (A complete Textbook for U.G.Students of Agriculture, Horticulture, Forestry, Fishery, Home Science and Dairy Faculties), ISBN 978- 93-272-8203-0 , Kalyani Publishers, Rajinder Nagar, Ludhiana-141 008

**Objectives**

1. To develop understanding about sociological concepts with special reference to rural community.
2. To understand approaches to rural planning and status of rural women.

**Theory**

S. No.	Topic	No. of Classes
1.	Sociology and Rural sociology- Meaning and significance;	2
2.	Difference between rural, urban and tribal community	1
3.	Indian rural social stratification: <ul style="list-style-type: none"> <li>• Caste – Concept and Characteristics</li> <li>• Class- Concept, Characteristics and difference between class and caste</li> </ul>	2 2
4.	Changes in social stratification and implementation of constitutional provisions.	3
5.	Indian rural institutions- <ul style="list-style-type: none"> <li>• Social- Family and marriage</li> <li>• Economic</li> <li>• Political</li> </ul>	3 2 2
6.	Rural poverty: Meaning and causes	2
7.	Religion : concept, belief, traditions and customs	3
8.	Rural social change: <ul style="list-style-type: none"> <li>• Concept, process</li> <li>• Factors of transformation.</li> </ul>	2 2
9.	Planned social change	3
10.	Status of rural women- <ul style="list-style-type: none"> <li>• Social</li> <li>• Economic</li> <li>• Health</li> </ul>	3
	<b>Total</b>	<b>32</b>

**Suggested Readings**

1. Chitambar, J.B. (1973). Introductory rural sociology. New York, John Wiley and Sons.
2. Desai, A.R. (1978). Rural sociology in India. Bombay, Popular Prakashan, 5<sup>th</sup> Rev. ed.
3. Doshi, S.L. (2007). Rural sociology. Delhi Rawat Publishers.
4. Jayapalan, N. (2002). Rural sociology. New Delhi, Altanic Publishers.
5. Sharma, K.L. (1997). Rural society in India. Delhi, Rawat Publishers.

**Objectives**

1. To impart basic knowledge on types and techniques of training for professional development
2. To develop the skill on designing and conducting a training programme
3. To develop an understanding of the various techniques like team building, group discussion and brainstorming for professional development.

**Practical's**

S. No.	Topic	No. of Classes
1.	Interaction with trainees and training officials and find out the method and apply the same for professionals.	3
2.	Phases of Training- Planning Phase –Setting the goals and objectives of an organization, analyzing –the human resources, efficiency indices and organizational climate.	2
3.	Preparation of training - content and procedures (methods and materials).	2
4.	Pre-service training. In service training and staff development. Evaluation and assessment of training.	2
5.	Detect and predict defects in the procedural design of a training activities.	2
6.	Implementation Phase –publicity, develop training brochures, annual calendar of learning opportunities, time about their teaching plans.	2
7.	Evaluation Phase - reaction, behavior and result. Types of Evaluation – evaluation for planning, process of evaluation, terminal evaluation and impact evaluation.	3
8.	Key elements of the training activities are systematically monitored, problems are to be identified and attempts are to be made to rectify.	2
9.	Designing training programme - Gain attention, Inform learner and objectives, Stimulate recall of prior learning,	2
10.	Present stimulus material, Provide learner guidance, Elicit performance, Provide feedback, Assess performance,	2
11.	Enhance retention transfer, Interact with trainers and learn the practical requirements.	2
	<b>Total</b>	<b>32</b>

**Suggested Readings**

1. Chitambar, J.B. (1973). Introductory rural sociology. New York, John Wiley and Sons.
2. Desai, A.R. (1978). Rural sociology in India. Bombay, Popular Prakashan, 5<sup>th</sup> Rev. ed.
3. Doshi, S.L. (2007). Rural sociology. Delhi Rawat Publishers.
4. Jayapalan, N. (2002). Rural sociology. New Delhi, Altanic Publishers.
5. Sharma, K.L. (1997). Rural society in India. Delhi, Rawat Publishers.

**Objectives**

1. To develop understanding regarding project, project management and its techniques.
2. To develop skill in writing a project proposal.

**Theory**

S. No.	Topic	No. of Classes
1.	Project – Concept, characteristics and types; Project Management – Concept and elements	2
2.	Phases of Project Lifecycle- initiation, planning, execution, and closure	3
3.	Formulation of Project Proposal- Concept and need	2
4.	Elementsof Project Formulation- Project Appraisal <ul style="list-style-type: none"> <li>• Techno Feasibility Analysis</li> <li>• Techno Economic Analysis</li> <li>• Input Analysis</li> </ul>	3
5.	Financial Analysis	2
6.	<ul style="list-style-type: none"> <li>• Cost- Benefit Analysis</li> <li>• Network Analysis</li> </ul>	2
7.	Project management techniques- PERT and CPM	2
	<b>Total</b>	<b>16</b>

**Practicals**

S. No.	Topic	No. of Classes
1.	Visit to institutions managing following types of projects: <ul style="list-style-type: none"> <li>i. Technology generation project</li> <li>ii. Transfer of Technology(ToT) project</li> <li>iii. Women entrepreneurship project</li> <li>iv. Women and child development project</li> <li>v. Agriculture developmentproject</li> <li>vi. Rural development project</li> </ul>	1 1 1 1 1 1
2.	Preparation of reports of the institutions visited	4
3.	Presentation of report	4
4.	Visitto State Level Funding Agencies	4
5.	Preparing reports of the funding agencies visited	3
6.	Presentation of report	3

S. No.	Topic	No. of Classes
7.	Preparation of a short-term project proposal	4
8.	Working on project management techniques: PERT, CPM.	4
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Goel B B. 2008. Project Management- Principles & Techniques. Deep & Deep Publications Pvt. Ltd. New Delhi.
2. Agarwal M. R. 2010. Project Management. Garima Publications, Jaipur (Raj)

## EECM-321                      Diffusion and Adoption of Innovations                      3(2+1)

### Objectives

1. To develop skills in identification of appropriate technologies for rural families.
2. To develop competence in diffusion of need based technologies among rural families

### Theory

S. No.	Topic	No. of Classes
1.	Concept and elements of diffusion process	3
2.	Adoption- Definition, adoption process	2
3.	Different terms used in Diffusion of Innovation and Adoption process: Rate of adoption, over adoption, innovativeness, dissonance, rejection, discontinuance	3
4.	Perceived attributes of innovation	2
5.	Innovation Decision Process, Types of Innovation Decision, consequences of innovation Decision Process	2
6.	Factor affecting adoption of an innovation	3
7.	Innovativeness and Adopter categories – concept, types and characteristics.	3
8.	Change agents and opinions leader	2
9.	Change proneness – acceptance and resistance to social change	2
10.	Appropriate technologies for rural families with special reference to Community science	3
11.	Appropriate technologies for rural families with special reference to Drudgery reduction, Agriculture and Animal husbandry	3
12.	Constraints in adoption of technologies.	2
13.	Behaviour change communication (BCC) strategies.	2
	<b>Total</b>	<b>32</b>



## Practicals

S. No.	Topic	No. of Classes
1.	Identification of key communicators and opinion leaders in locality,	1
2.	Identification and rating of appropriate technologies by rural women	1
3.	Survey on adoption of appropriate technologies in community,	2
4.	Diffusion of need based appropriate technologies among rural families through various communication methods Farm and home visits	2
5.	Diffusion of need based appropriate technologies among rural families through various communication methods- demonstration, group discussion, role play and exhibitionetc	4
6.	Case studies/Success stories regarding adoption of technologies,	2
7.	Identification of constraints faced by rural families in adoption of technologies	2
8.	Preparation and presentation of report.	2
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Dasgupta, S.( 1989). Diffusion Agricultural Innovations in Village India. Wiley Eastern Ltd, New Delhi
2. Jalihal KA &Veerabhadraiah V.( 2007). Fundamentals of Extension Education and Management in Extension. Concept Publ. Co.
3. Ray, G.L. (2005). Extension Communication and Management. Kalyani Publ.
4. Reddy, A.A. (1987). Extension Education. Shree Lakshmi Press, Bapatla. Guntur, AP.
5. Rogers, E.M. (2003). Diffusion of Innovations. 5 th Ed. The Free Press, New York
6. Somani, L.L. (2012). Extension Methodologies for Transfer of Agricultural Technology. Image PrintMedia, Udaipur
7. Supe, S.V. (2009).Textbook of Extension Education. Agrotech Publishing Academy Udaipur.

## EECM-411

## Extension Programme Management

**3(1+2)**

### Objectives

1. To understand the importance of extension programme and programme planning.
2. To impart knowledge regarding monitoring and evaluation of extension programmes.
3. To acquire skills in collecting village information using PRA tools.
4. To gain practical experience in developing schedules and collecting information in rural areas.
5. To develop practical experience in planning, implementing and evaluating small need based programme

## Theory

S. No.	Topic	No. of Classes
1.	Extension programme: meaning; objectives and characteristics	1
2.	Extension programme planning: concept; objectives; Principles	1
3.	Steps in extension programme planning	2
4.	Professional abilities needed by planners	1
5.	Concept of RRA and PRA, Participatory Rural Appraisal (PRA) tools and techniques : Transect walk, seasonal calendar, venn diagram, daily routine charts	2
6.	Participatory Rural Appraisal (PRA) tools and techniques : flow diagram, social mapping, matrix ranking	2
7.	Programme implementation: <ul style="list-style-type: none"> <li>i. environment and rapport building</li> <li>ii. role of local leaders; local bodies</li> <li>iii. Organizations and extension agencies in programme implementation</li> </ul>	1 1 1
8.	Steps in programme implementation	1
9.	Constraints in implementation of programmes at grass root level	1
10.	Monitoring and evaluation of extension programme: concept and types of evaluation	2
	<b>Total</b>	<b>16</b>

## Practicals

S. No.	Topic	No. of Classes
1.	Visit to village to identify key informants and establishing rapport	2
2.	Visit to village to identify rural institutions	1
3.	Identifying needs and problems of the village with the help of questionnaire	2
4.	Different PRA tools and its application for data collection: Transect walk, seasonal calendar, venn diagram, daily routine charts.	3
5.	Participatory Rural Appraisal (PRA) tools and techniques : flow diagram, social mapping, matrix ranking	3
6.	Development of schedule for collecting baseline information of village	2

S. No.	Topic	No. of Classes
7.	Conducting village and household survey: Socio-economic survey, nutritional status	2
8.	Conducting village and household survey: Agricultural problems use of Government schemes/programs	2
9.	Development of need assessment schedule. Collection of data through the developed schedules.	2
10.	Conduct of need assessment. Analysis of data. Preparation of survey reports	3
11.	Planning a small need based programme. Developing a detailed plan of work for the need based programme	3
12.	Implementation of the need based programme	2
13.	Evaluation of the need based programme implemented	3
14.	Documentation and presentation of programme findings	2
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Dahama, O.P. and Bhatnagar, O.P. 2003. Education and Communication for Development. OxfordIBH, New Delhi.
2. Govind, Santha, Tamilselvi G. and Meenambigai J. 2013. Extension Education and RuralDevelopment. Agrobios (India), Jodhpur.
3. Gupta, Debabrata Das Gupta. 2011. Extension Education: Core contents and emerging areas. Agrobios (India), Jodhpur.
4. Ray, G.L. 2004. Extension Communication and Management. Kalyani Publishers, New Delhi.
5. Reddy, A.A 2001. Extension Education. Sri Lakshmi Press, Bapala.
6. Sandhu, A.S. 2003. Extension Programme Planning. Oxford IBH Publishing, New Delhi.

## **EECM-412                      Extension Training Management                      3 (1+2)**

### Objectives

1. To develop understanding about process of training
2. To develop skills in use of different training methods.
3. To develop competence in designing, implementation & evaluation of training programme.

## Theory

S. No.	Topic	No. of Classes
1.	Adult learning - Characteristics of adult learner	2
2.	Principles of adult learning.	1
3.	Training -concept & importance	1
4.	Types of training : Online and blended training	1
5.	Phases of training and its management	1
6.	Qualities of a good trainer	1
7.	Facilitation skills in training.	1
8.	Identification of training needs	1
9.	Training methods - Lecture, demonstration, Field trip, Group discussion, case study, role play, T-group training, games, practice clinics, small group task.	3
10.	Steps of designing training programme.	1
11.	Training evaluation – meaning, importance, indicators & methods	1
12.	Problems in training.	1
13.	Important training institutions in India for extension functionaries, farmers & entrepreneurs.	1
	<b>Total</b>	<b>16</b>

## Practicals

S. No.	Topic	No. of Classes
1.	Visit to training institutes	2
2.	Hands on experience on training methods – Lecture/Lecturette	3
3.	Hands on experience on training methods –Demonstration, Case study, Role Play and Games	4
4.	Identifying training needs & needs analysis	2
5.	Formulation of training objectives	2
6.	Familiarization with different steps of training with ice-breaking session, online and blended training and monitoring and evaluation tools.	4
7.	Prepare a Checklist for planning training programme	3
8.	Planning of a training programme according to mode of training	3

<b>S. No.</b>	<b>Topic</b>	<b>No. of Classes</b>
9.	Procurement of training material & all preparation- Execution of training programme	3
10.	Evaluation of training programme	3
11.	Preparation and presentation of report.	3
	<b>Total</b>	<b>32</b>

### **Suggested Readings**

1. Singh, R. P. 2000. Management of Training Programmes. Anmol Publications Pvt. Ltd. New Delhi -110002 (India).
2. Lynton R. & Pareek U. 1991. Training for development, Vistar Publ., New Delhi
3. Singh R. P .Jhamtani A. and Singh P. 1996. Training Management- A hand book, Jain brothers, 16/873, EastPark road, Karol Bagh, New Delhi.

### **EECM-413**

### **Advertising and Social Marketing**

**3(1+2)**

### **Objectives**

1. To build competence in designing digital social advertisements.
2. To capacitate students in developing and implementing social marketing program.

### **Theory**

<b>S. No.</b>	<b>Topic</b>	<b>No. of Classes</b>
1.	Evolution and history of advertising, relevance of advertising in marketing	1
2.	Role of advertising agency	1
3.	Types of advertising- Traditional versus digital advertising, commercial versus social advertising	1
4.	Various media for advertising	1
5.	Advertising writing process: Steps for writing effective advertisement	1
6.	Laws and ethics in advertising.	1
7.	Steps to create advertising strategy for marketing. Different types of advertising strategies	2
8.	Social marketing- concept, need and philosophy, difference between commercial and social marketing	1
9.	Principles and importance of social marketing in development	1

<b>S. No.</b>	<b>Topic</b>	<b>No. of Classes</b>
10.	Marketing mix of social marketing, Models of Social Marketing	1
11.	Role and strategies for digital marketing in community development	1
12.	Social Marketing process: Assessment and analysis of the problems	1
13.	Planning for social marketing strategy based on the identified problems	1
14.	Execution of social marketing programme, Planning for publicity campaign, Execution of publicity campaign	1
15.	Evaluation of programme and reporting	1
	<b>Total</b>	<b>16</b>

### **Practicals**

<b>S. No.</b>	<b>Topic</b>	<b>No. of Classes</b>
1.	Visit to advertising agency and report writing	1
2.	Designing social advertisements for newspaper	2
3.	Designing advertisements for radio, television, poster, hoardings and wall paintings	2
4.	Designing digital advertisement on social issues for social platforms like WhatsApp and Facebook	2
5.	Analysis of the situation to find out the social problems in a community: collect information through secondary sources like newspapers, government documents etc	2
6.	Focus group discussions with groups/ community to identify social problems and analyzing the situation.	2
7.	Scanning social market situations-opportunities and constraints.	2
8.	Assessment and analysis of the problems	1
9.	Preparation of report on collected information	1
10.	Planning for social marketing strategy based on the identified problems: purpose, target audiences, objectives and goals, marketing mix strategies (4Ps), evaluation, budget, and implementation plans	3
11.	Designing and pricing social products	2
12.	Rally on selected social issue at selected village	2
13.	Skill training on selected problem	2
14.	Field trip to relevant stakeholder (SAU/ State departments/ Entrepreneurs/	2

S. No.	Topic	No. of Classes
	SHGs)	
15.	Post knowledge test at field level (selected village)	2
16.	Evaluation of social marketing programme.	2
17.	Report writing and oral presentations and discussions based on observations and experiences gained in social marketing program.	2
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Kotler P and Roberto E L (1989) Social marketing: strategies for changing public behavior. The free press, New York.
2. Manoff R K (1985) Social marketing: New imperative for Public Health. Praeger, New York
3. Indeed editorial team (21 December 2021) How to write an effective advertisement: a complete guide. Retrieved from <https://in.indeed.com/career-advice/career-development/how-to-write-an-effective-advertisement>
4. Bhasin H (12 October 2021) Advertising Strategy in Marketing – Definition and Types Retrieved from <https://www.marketing91.com/advertising-strategy/>.

## EECM-414 Public Relations and Communication Management 3(1+2)

### Objectives

1. To provide knowledge about public relations and imparting skills in designing and preparing publicrelations tools.
2. To equip students in planning and executing public relations program
3. To provide knowledge and capacitate students in effectively using communication skills andcommunication management.

### Theory

S. No.	Topic	No. of Classes
1.	Public relation-Concept and related terms.	2
2.	Role of government institutions in maintaining public relations.	2
3.	Process of public relation and publics in public relation.	1
4.	Principles of Public relation. Public relation tools. Publicrelation models.	3

5.	Communication skills: Reading; writing; speaking; listening; soft skills. Public speaking: Characteristics, techniques, importance.	3
6.	Modes of delivery in public speaking, check list, need and purpose of public speaking. Communication techniques and communication network.	3
7.	Message distortion- with special reference to public relation.	2
	<b>Total</b>	<b>16</b>

### Practicals

S. No.	Topic	No. of Classes
1.	Visit to public relation office under government sector for analyzing their public relations activities	2
2.	Visit to non- government institutions for analyzing their public relations activities..	2
3.	Visit to university PRO office for analyzing their public relation activities.	2
4.	Design Flyer for establishing public relations of your organization.	2
5.	Design brochure for establishing public relations of your organization. Design newsletter for maintaining public relations of your organization	3
6.	Plan a public relation strategy for popularizing new technology developed by your organization. Writing different types of press releases. Writing feature article.	3
7.	Prepare a consumer survey to know about preferences and attitude of your clientele regarding new technology.	3
8.	Prepare presentation for popularizing new technology among your clientele and show it to them, use public relations tools for it	3
9.	Gather data on prepared consumer survey and analyze it. Prepare feedback form and get it filled from clientele. Learning activities to assess and learn listening skills.	3
10.	Learning experiences for improving reading skills with an emphasis on building vocabulary and correct use of grammar.	2
11.	Writing report. Simulation games in communication distortion. Exercise on informative speaking. Exercise on persuasive speaking.	3
12.	Exercise on entertaining speaking. Exercise on impromptu speaking. Exercise on extempore speaking.	2
13.	Exercise on memorize speaking. Exercise on manuscript speaking.	2
		<b>32</b>



### Suggested Readings

1. Chandrakandan K, Karthikeyan C, Venkatesan C and Balaji Babu C (2002) Public Relations. Authorspress global network, Delhi.
2. Loyd H (1970) Public relations. The English universities press ltd., London.
3. Stephenson H (1960) Handbook of Public relations. McGraw hill book co, New York
4. Sharma Diwakar Public relations: An emerging specialized profession Deep & Deep publications pvt.ltd. New Delhi

### EECM-415

### Web Designing

**3 (0+3)**

#### Objectives

By the end of the course the students will be able to

1. Get insight of using tools in Adobe Photoshop, Dream Weaver
2. Learn the basics to advanced HTML, Markup language, structural tags and attributes for webconstruction
3. Hands on experience with working on website for page wise, popup windows, cascading styles, navigational elements.
4. Design websites, mobile application screens, advertisements with animations

#### Practicals

S. No.	Topic	No. of Classes
1	Orientation to web designing, software used and familiarization with stock photography, image graphics, vector graphics and tools.	4
2	Hands on experience with Adobe Photoshop: Pallets, colour modes, resolution options, file types and Using tools with real time example layers.	4
3	Blending, filters and designing of website, Designing banners for web site, web advertisements	3
4	Orientation to HTML 5.0	4
5	Construction of web site, content/ media tags for construction of web site using latest software.	4
6	Construction of web site: Working on forms, Home page and Other page, Adding navigational elements and links	3
7	Adding asides and side bars and applying styles, Creating popup windows.	3
8	Hands on experience with cascading style sheets: Border images, shadows, gradients, Text-shadow and stroke etc	3
9	Introduction to Adobe Dream weaver: Basics, Meta tags, Script tags, Links, Inserting tables.	3

S. No.	Topic	No. of Classes
10	Images, videos, Template design and Importing etc., Live website design project: Designing template	3
11	Adding menu system to project Insertion of web banners and advertisements and Final project evaluation	3
12	Designing for Social media- Blog, Twitter, Face book. Familiarization and working on SEO.	3
13	Web analytics and Making use of web analytics Configuration of Web Analytics with domain name.	3
14	Introduction of User Interface design and hands on experience - User Interface elements and principles.	3
15	Creating mockups, buttons, menus and forms, Designing of icons and vector objects.	3
16	Creating pages in HTML by using user interface design.	3
17	Applying style sheets and navigational elements and link.	3
18	Designing of mobile application screen mockups/ screen in HTML	3
19	Presentation of developed websites,	3
20	Final Practical examination.	3
	<b>Total</b>	<b>64</b>

### Suggested Readings

1. Dahama, O.P. and Bhatnagar, O.P. 2003. Education and Communication for Development. OxfordIBH, New Delhi.
2. Govind, Santha, Tamilselvi G. and Meenambigai J. 2013. Extension Education and RuralDevelopment. Agrobios (India), Jodhpur.
3. Gupta, Debabrata Das Gupta. 2011. Extension Education: Core contents and emerging areas. Agrobios (India), Jodhpur.
4. Ray, G.L. 2004. Extension Communication and Management. Kalyani Publishers, New Delhi.
5. Reddy, A.A 2001. Extension Education. Sri Lakshmi Press, Bapala.
6. Sandhu, A.S. 2003. Extension Programme Planning. Oxford IBH Publishing, New Delhi.
7. Supe, S.V. 2011. Integrated Extension Education. Agrotech Publishing Academy, Udaipur.
8. Verma, V., Verma, S., & Rani, E. (2019). Chapter-1 Programme Planning and Evaluation. *MULTIDISCIPLINARY*, 1.

## Skill Enhancement Courses (SEC-1 module)

### I - Semester

#### SEC- EECM-111 Audio Visual Aids for Communication

2 (0+2)

#### Objectives

1. To equip with practical skills in planning and preparation of various audio-visual aids.
2. To provide hands-on experience in the use and presentation of various audio-visual aids.

#### Practicals

S. No.	Topic	No. of Classes
1.	Planning, designing of poster	1
2.	Preparation of posters	2
3.	Planning, designing and preparation of <ol style="list-style-type: none"><li>i. Bars charts</li><li>ii. Flow charts</li><li>iii. Striptease charts</li><li>iv. Line chart</li><li>v. Flip chart</li><li>vi. Overlay charts</li></ol>	 1 1 2 1 1 1
4.	Planning, designing and development of <ol style="list-style-type: none"><li>i. 2D models</li><li>ii. 3D models</li></ol>	 1 2
5.	Planning, designing of flash cards	3
6.	Preparation of flash cards	3
7.	Collection of samples and specimens	2
8.	Preparation of various types of puppets	2
9.	Presentation of puppetry	2
10.	Planning of simple audio messages	2
11.	Recording of simple audio messages	2
12.	Presentation of simple audio messages	1
13.	Organization of exhibition with audio visual aids.	2
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. G L Ray (2017): Extension Communication and Management, 8<sup>th</sup> edition., Kalyani Publishers, Ludhiana.
2. Adivi Reddy (2007): Extension Education, 7<sup>th</sup> edition., Sree Lakshmi Press, Guntur.
3. O.P. Dahama & O.P. Bhatnagar (2012): Education and Communication for Development, 2<sup>nd</sup> edition., Oxford & IBH Publishing Co. Pvt. Ltd.
4. V.K. Dubey & Indira Bishnoi (2009): Extension Education and Communication, First edition., New Age International Publishers, New Delhi.
5. Indu Grover, Lali Yadav, Sushma Kaushik & Shashi Kanta Varma (2002): Communication and Instructional Technology, Agrotech Publishing Academy, Udaipur.
6. Prof. Harmesh Lal, Dr. Shailendra Bhushan, Dr. Meenu Kumar (2018): Audio-Visual Aids to Educational Technology
7. AS Sandhu, Anoop Singh Sandhu (2019): Textbook on Agricultural Communication (Process And Methods), CBS Publishers and Distributors Pvt. Ltd.
8. Dr. Jitendra Chauhan (2016): Communication and Extension Management, 2<sup>nd</sup> Edition, Kushal Publications and Distributors.

### SEC-EECM-112

### Extension Teaching Methods

2 (0+2)

#### Objectives

1. To enhance the extension teaching skills for development communication.
2. To develop an understanding about the group specific extension teaching methods for dissemination of information.
3. To provide hands on experience for application of extension teaching methods.

#### Practicals

S. No.	Topic	No. of Classes
1.	Orientation to various extension teaching methods	1
2.	Planning & use of selected extension teaching methods-	2
3.	Familiarization with individual methods – <ul style="list-style-type: none"><li>• Farm and home visit</li><li>• Field trip</li><li>• Office calls</li><li>• Personal letters</li><li>• Telephone calls.</li></ul>	1 1 1 1 1
4.	Group methods- <ul style="list-style-type: none"><li>• Method demonstration</li><li>• Group meeting</li></ul>	1 1

S. No.	Topic	No. of Classes
	<ul style="list-style-type: none"> <li>• Focused group discussion</li> <li>• Role play</li> <li>• Drama</li> <li>• Puppet show</li> <li>• Small group teaching method</li> </ul>	1 1 1 1 1
5.	Mass media methods– <ul style="list-style-type: none"> <li>• Farm publications</li> <li>• Circular letters</li> <li>• Campaigns</li> <li>• Exhibitions</li> <li>• Posters</li> <li>• Banners</li> <li>• Radio</li> <li>• Tv</li> <li>• Social networking sites</li> </ul>	1 1 1 1 1 1 1 1 1
6.	Selection and use of suitable audio-visual aids for effective extension teaching; <ul style="list-style-type: none"> <li>• E-extension- Internet</li> <li>• Radio and teleconferencing</li> <li>• Mobile phone- applications</li> </ul>	1 1 1
7.	Computer based instruction- teaching/learning platforms	2
8.	Preparation of a lesson plan using conventional methods	2
9.	Presentation of a lesson plan using conventional methods	1
		<b>32</b>

### Suggested Reading

1. G L Ray (2017): Extension Communication and Management, 8<sup>th</sup> edition., Kalyani Publishers,Ludhiana.
2. Adivi Reddy (2007): Extension Education, 7 edition., Sree Lakshmi Press, Guntur.
3. O.P. Dahama & O.P. Bhatnagar (2012): Education and Communication for Development, 2<sup>nd</sup> edition., Oxford & IBH Publishing Co. Pvt. Ltd.
4. V.K. Dubey& Indira Bishnoi (2009): Extension Education and Communication, First edition., New AgeInternational Publishers, New Delhi

## Skill Enhancement Courses (SEC-II module)

### II-Semester

#### SEC- EECM-121 Computerized Instructional Aids Production 2 (0+2)

##### Objectives

1. To develop an understanding about the software used for production of computerized information material.
2. To build competency in application of different software tools for production of instructional aids.

##### Practicals

S. No.	Topic	No. of Classes
1.	Familiarization with the parts of computer	1
2.	Software for creation of instructional materials MS Word 2020/latest version – i. Getting started ii. Editing documents iii. Proofing tools iv. Text formatting v. Formatting document vi. Using templates vii. Creating tables viii. Charts	3
3.	Using reference and review option in word	2
4.	WPS for smart phones	2
5.	Creating Google forms	2
6.	MS PowerPoint 2020/latest version– i. Getting started ii. Working with text in slides, iii. Working with charts, iv. Printing v. Animating custom shows vi. Adding hyperlinks	3
7.	Recording PPTs, Screen capture recording E-Presentation	3

S. No.	Topic	No. of Classes
8.	Ms-Excel 2020/latest version – i. Getting started ii. Using workbooks iii. Entering data iv. Editing data v. Formatting worksheet vi. Working with range of cells vii. Creating formulas and functions viii. Working with charts ix. Object linking and embedding	3
9.	Importance of colours in designing of visual aids.	2
10.	Familiarization with recent developing software's	2
11.	Working with recent developing software's -Planning and production of selected instructional aids	3
12.	Familiarization of menus required for designing various publications and print material.	2
13.	Planning and designing of i Visiting Card i Customized cards for gift hampers i Leaflet iv Folder v Poster vi Brochure vi Booklet vi Newsletter ix Magazine	4
		<b>32</b>

### Suggested Readings

1. Jain S., Geetha M., and Kratika, 2012, Computer Course Windows 7 with MS Office 2010, First Edition, *BPB Publications*, New Delhi – 110 001.
2. Murthy G.R.K., Reddy K.M. Ramarao D., Rao V.K.J and Kumar V.V.S., 2012, Resource Material on Innovative Approaches to E- Learning, *National Academy of Agricultural Research Management, Rajendranagar, Hyderabad*, 500 030.
3. Rajaraman V. 2001, Fundamentals of computers, Third Edition, *Prentice-Hall of India private limited*, New Delhi – 110 001.
4. Sarvanan R., Nesa Rani P.M., MadhavaRao V and Rao V.K.J., 2015, AEM -204

Information and Communication Technology in Agriculture, *National Institute of Agricultural Extension Management, Rajendranagar, Hyderabad – 500 030, India.*

5. Simonson M (a), 37<sup>th</sup> Annual Proceedings - Jacksonville: Practice of Educational Communications and Technology Vol. 1 & 2, 2014, *Nova Southeastern University*, North Miami Beach, Florida.
6. Simonson M (b), 38<sup>th</sup> Annual Proceedings, Indianapolis: Practice of Educational Communications and Technology, Vol. 1 & 2, 2015, *Nova Southeastern University*, North Miami Beach, Florida.
7. <https://www.renderforest.com>
8. <https://www.socrative.com>

## **SEC-EECM-122**

## **ICT and New Media**

**2 (0+2)**

### **Objectives**

1. To provide hands-on experience on application of ICT tools and devices.
2. To develop an understanding about the e-learning tools.
3. To build competency in usage of different digital platforms for dissemination of information.

### **Practicals**

<b>S. No.</b>	<b>Topic</b>	<b>No. of Classes</b>
1.	e- Learning systems – learning objects development	1
2.	e-Learning systems –fundamental characteristics of learning objects	2
3.	Typical components of learning objects.	2
4.	Role of Internet in e-Learning – <ol style="list-style-type: none"> <li>i. Computer networking</li> <li>ii. Domain names</li> <li>iii. URL</li> <li>iv. ISP</li> <li>v. Types of internet protocols.</li> </ol>	2
5.	Social media for e-Learning under Web 2. Platform – <ol style="list-style-type: none"> <li>i. YouTube,</li> <li>ii. Blogs</li> <li>iii. Vlogs</li> <li>iv. Virtual</li> <li>v. Classrooms</li> </ol>	2





### Suggested Readings

1. Robert Reinhard & Snow Dowd 2004. Macromedia Flash Mx 2004 Bible. Wiley.
2. Tay Vaghan 2002. Multimedia- Making it Work. 5th Ed. Tata McGrawHill.

### Skill Enhancement Courses (SEC-III Module)

#### III - Semester

**SEC- EECM-211**

**Print Journalism**

**1 (0+1)**

#### Objectives

1. To equip with necessary knowledge about various print journalism.
2. To impart skills in development and use of various print media.
3. To develop comprehensive skill in writing and editing of an article.

#### Practicals

S. No.	Topic	No. of Classes
1.	Identification and discussion on various types of print material,	1
2.	<ul style="list-style-type: none"><li>• Planning and production of news –</li><li>• News gatheringby using direct and indirect methods,</li><li>• News gathering by using interview techniques</li><li>• Different forms of news reports and writing news- (Any five)<ul style="list-style-type: none"><li>▪ curtain raiser</li><li>▪ Spot news</li><li>▪ Live report</li><li>▪ Investigative report</li><li>▪ Interpretative</li><li>▪ In-depth report</li><li>▪ Advocacy report</li><li>▪ Cultural events</li><li>▪ Civil and social events reporting</li><li>▪ Crime and sports reporting</li><li>▪ Specialized reporting</li><li>▪ Environment and ecology</li><li>▪ Agriculture,</li><li>▪ Health/nutrition issue</li><li>▪ Women and children issues</li><li>▪ Human interest stories,</li></ul></li></ul>	<div>2</div> <div>2</div> <div>2</div>

S. No.	Topic	No. of Classes
	<ul style="list-style-type: none"> <li>▪ Travelogues,</li> <li>▪ Humor writing</li> <li>▪ Types of column writing</li> <li>▪ Editing of news</li> </ul>	
3.	Planning for article writing for magazines and its production.	1
4.	Editing of article- <ul style="list-style-type: none"> <li>i. Rewriting,</li> <li>ii. Integrating,</li> <li>iii. Updating,</li> <li>iv. Referencing</li> <li>v. Proof reading.</li> </ul>	2
5.	Planning for feature writing and its production.	1
6.	Editing of feature.	1
7.	Planning, production and editing of advertisements.	2
8.	Exposure visits and hands on experience on printing technology,	1
9.	Visit to University press to understand the production process and equipment.	1
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Bhatnagar, R. (2001). Print Media and Broadcast Journalism. Indian Publisher Distributors, New Delhi.
2. Ajay D. Basic concepts of journalism.
3. Ahuja, B.N. & Chabra s. s., Principles and Techniques of Journalism.
4. Rangaswami, P. 1984. Basic journalism.
5. Kamath M.V., The journalist's handbook.
6. Bisht, M.S, 2007. Journalism techniques and practices. first edition, cybertech publications: New Delhi.

### SEC- EECM-212

### Electronic Journalism

**1 (0+1)**

### Objectives

1. To equip with necessary knowledge about various electronic media.
2. To impart skills in development and usage of various electronic media formats
3. To impart skill in planning and developing of script.
4. To develop skills in production technology of TV and radio programs.

## Practicals

S. No.	Topic	No. of Classes
1.	Visit to Radio station Doordarshan/local television channel,	2
2.	Formats of Radio Programmes – features, discussions, news bulletins, drama, talk, Writing and editing script for radio programme, Rehearsal, recording and editing with computer-based editing software and presentation for radio script,	2
3.	Application of photographic principles	1
4.	Formats of Television Programmes, Screening TV cultural news programs Screening of TV political and sports news programs Screening of developmental TV programmes,	2
5.	Video script -basic production script, Different types of video scripts – storyboard script,	2
6.	Planning script for video programme – 1 minute program	1
7.	Writing and editing script for programme,	1
8.	Script writing for documentary and drama,	1
9.	Script writing for educational programme	1
10.	Planning script for advertisements – storyboard, Practice news reading,	1
11.	Anchoring for radio programme, Presenting Radio and TV news, Rehearsal	1
12.	Recording and editing with computer-based editing software and presentation.	1
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Bhatt, S.C. Broad cast journalism, basic principles. Har Anand Publisher, Delhi.
2. Millerson, G. and Owens, J. (2008).A Handbook of video production, Butterworth-Heinemann, oxford.
3. Millerson, G. and Owens, J. (2008).Television production. Focal Press London.
4. Pray, G. L (2004). Communication and Management. Kalyani Publishers, New Delhi.
5. Sandhu, A.S. (1993). Textbook on Agricultural Communication: Process and Methods.

Oxford and IBHPublishing Pvt. Ltd., New Delhi.

6. Hedgecoe, J.(1997). The Photographer's Handbook: A complete reference manual of photographic techniques, procedures and equipment.
7. Kimberly A. Neuendorf (2019).The Content Analysis Guidebook. Online Publication. DOI: <https://dx.doi.org/10.4135/9781071802878>
8. Waters, A. (2018 ).Confident Digital Content : master the fundamentals of online video, design, writing and social media to surcharge your career[https://books.google.co.in/books/about/Confident\\_Digital\\_Content.html](https://books.google.co.in/books/about/Confident_Digital_Content.html)

## **Skill Enhancement Courses (SEC-IV Module)**

### **IV-Semester**

**SEC- EECM-221                      Audio and Video Recording                      1 (0+1)**

#### **Objectives**

1. To impart skills in handling video camera and camera support systems.
2. To provide technical exposure to shooting.
3. To build competency in planning, writing and shooting basic video production script, story board and camera script.
4. To impart skill in audio and video recording, editing and mixing.

#### **Practicals**

<b>S. No.</b>	<b>Topic</b>	<b>No. of Classes</b>
1.	Exposure to different types of cameras, Care and maintenance of cameras	1
2.	Familiarization of video camera and parts of video camera	1
3.	Familiarization with other accessories of video camera changing and loading battery pack	1
4.	Handling of camera support systems	1
5.	Handling of video camera –home video camera and Practicing video camera with white balance	1
6.	Handling compositions of video camera, handling of VHS camera and advanced professional cameras	1
7.	Practical exercise on focusing, zooming and shooting,	1
8.	Planning of different camera positions - long shot, medium shot, close up, zoom, Tilting and panning, Lighting Techniques and moods	2
9.	Familiarization of drone camera and its parts, Handling and operation of drone cameras	1

S. No.	Topic	No. of Classes
10.	Practical exercise on different types of video scripts – basic production script, story board script, camera script	1
11.	Shooting with different camera positions in Outdoor - tilting & panning,	2
12.	Exposure to audio recording equipment's Handling of audio editing software, Sound - Audio recording and voice dubbing, Sound - Audio mixing	1
13.	Presentation of produced programme.	2
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Alan Wetzel (1985) Television production McGraw-Hill Book Company New York S - New Delhi
2. Arkin Glyn (1975) Television Sound Operation, Hunting house New York McGraw-Hill Book Company New York S -- New Delhi
3. Eargle John (1980) Sound Recording. Van Nostrand Reinhold Now
4. Gerald Millerson and Jim Owens, 2009: Television Production, Focal Press, London
5. Gerald Millerson and Jim Owens, 2008: A Hand book of Video Production Butterworth-Heinemann, Oxford.
6. Herbert Zettle, 2010: Video Basics, Wadsworth Publishing, Belmont, California

## SEC-EECM-222      Instructional Video Production      1 (0+1)

### Objectives

1. To impart skills in handling video camera and camera support systems.
2. To provide technical exposure to shooting.
3. To build competency in mobile editing applications
4. To impart skill in linear and non-linear editing techniques
5. To get familiar with the video editing open source software

### Practicals

S. No.	Topic	No. of Classes
1.	Familiarization of open source software for video editing and audio editing	1
2.	Video editing with using of smart phones (mobile) in mobile apps	1
3.	Synchronization of audio in video editing smart phones (mobile)	1
4.	Familiarization of exporting final video output in mobile apps,	1
5.	Familiarization of creating videos using images and text,	1

S. No.	Topic	No. of Classes
6.	Designing of videotitles with using adobe photoshop (text),	1
7.	Importing text titles from photoshop in video editing,	1
8.	Familiarization of voice recording techniques with using of smart phones (mobile),	1
9.	Practicing – installing of video and audio software into desktop computer and with sound card	1
10.	Advanced techniques of exporting of final video for different formats and sizes	1
11.	Advanced video editing techniques – voice synchronization to video with using advanced software	1
12.	Working with video libraries and graphics libraries	1
13.	Recording techniques - video and audio online and offline editing - Video and audio linear editing and video and audio nonlinear editing	1
14.	Editing of the recorded outdoor programme by non-linear editing, Importing video - working methods of offline video editing,	1
15.	Advanced techniques of editing - cut. - mix with advanced software etc. and Using graphics and animation in video production,	1
16.	Application of open source software–gimp, blender, Open Broad casting Software (OBS), google sketch up and any other, Presentation of produced programme.	1
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Television Production by Gerald Millerson
2. Editing Digital Video: The Complete Creative and Technical Guide (Digital Video and Audio) by Robert M. Goodman, Patrick McGrath
3. [https://onlinecourses.swayam2.ac.in/ntr21\\_ed09/preview](https://onlinecourses.swayam2.ac.in/ntr21_ed09/preview)
4. Computer Graphics & Animation book pdf
5. <http://cs.wellesley.edu/~cs110/lectures/M01-color/graphics.pdf>
6. Learning Modern 3D Graphics Programming book pdf
7. <https://www.docdroid.net/UKocmTz/arcsynthesis.pdf.html#page=194>
8. Blender master class book pdf
9. <http://dl.finebook.ir/book/9e/11032.pdf>
10. A basic tutorial of Blender 3D <https://www.cs.auckland.ac.nz/~jli023/opengl/blender3dtutorial.htm>
11. Camp Blender <http://web.engr.oregonstate.edu/~mjb/blender/blender.1pp.pdf>
12. Using Sketch Ups <http://web.engr.oregonstate.edu/~mjb/sketchup/sketch>

**Framework of the Courses  
B.Sc. (Hons.) Food Nutrition  
and Dietetics**



**Framework of the Courses B.Sc. (Hons.) Food Nutrition and Dietetics**

Type of courses	Credits
Deeksharambh (Foundation Course)	0+2 (NG)
Core courses	112
Common courses (MDC+VAC+AEC)	23 (9+6+8)
Skill Enhancement Courses (SEC)	12
Elective courses	20
MOOCS/SWAYAM	10 (NG)
Study Tour	0+2 (NG)
<b>Total</b>	<b>167+10*+4*</b>

\*NG- non-gradual

**Credits Allocation Scheme of UG Food Nutrition and Dietetics**

Sem-ester	Core Courses (Major+ Minor)	Multi-Disciplinary Course (MDC)	Value Added Course (VAC)	Ability Enhancement Course (AEC)	Skill Enhancement Course (SEC)	Internship/ Project/ Student READY	Total Credits	Non-Gradual	Internship	Online Courses/ MOOC
I	12	3(2)		1(3) + 2(4)	4	-	22	2(1)		<b>10</b>
II	08	3(5)	3(6)	1(3) + 2(7)	4	-	21	-	10(12)	
III	18	----		2(8)	2	-	22			
IV	12	3(9)	3 (10)	----	2	-	20	-	10(13)	
V	21	-	-	-	-	-	21	2(11)		
VI	21	-	-	-	-	-	21	-		
VII	20*	-	-	-	-	-	20	-		
VIII	-	-	-	-	-	20	20	-		
<b>Total</b>	<b>112</b>	<b>9</b>	<b>6</b>	<b>8</b>	<b>12</b>	<b>20</b>	<b>167</b>	<b>4</b>		<b>10</b>

Note: The credit hours mentioned in the table includes both theory and practicals.

- Deeksharambh<sup>(1)</sup> (Induction-cum-Foundation Course) of 2 credits (2 weeks duration).
- Farming based Livelihood systems<sup>(2)</sup>
- NCC/NSS/ NSO/ Rangers & Rovers<sup>(3)</sup>
- Communication Skills<sup>(4)</sup>
- Entrepreneurship Development and Business Management<sup>(5)</sup>
- Environmental Studies and Disaster Management<sup>(6)</sup>
- Personality Development<sup>(7)</sup>
- Physical Education, First Aid and Yoga Practices<sup>(8)</sup>
- Agriculture marketing & trade<sup>(9)</sup>
- Agricultural Informatics and Artificial Intelligence<sup>(10)</sup>
- Study tour (10-14 days).<sup>(11)</sup>
- Only for those opting for an exit with UG-Certificate<sup>(12)</sup>
- Only for those opting for an exit with UG-Diploma<sup>(13)</sup>

## Foundation Courses

S. No.	Course Title	Credits	Total Credits
1.	Deeksharambh (Foundation Course )	0+2 (NG)*	4(0+4) * Credits not included in the total
2.	Study Tour (10-12 days) V Semester	0+2 (NG)* Non-gradial	

## Common Courses

S. No.		Course Title	Credits	
1.	Multidisciplinary courses (MDC) <b>9 credits</b>	Farming Based Livelihood Systems	3 (2+1)	<b>23 (9 + 6+8 )</b>
2.		Entrepreneurship Development & Business Management	3(2+1)	
3.		Agriculture Marketing and Trade	3(2+1)	
4.	Value Added courses +(VAC) <b>6 credits</b>	Environmental Studies	3 (2+1)	
5.		Agricultural Informatics and Artificial Intelligence <sup>6</sup>	3(2+1)	
6.	Ability Enhancement Courses (AEC) <b>8 credits</b>	NSS/ NCC/NSO/Rangers & Rovers <b>I &amp; II</b>	2 (0+2)	
7.		Personality Development	2(1+1)	
8.		Physical Education, First Aid and Yoga	2(0+2)	

## SEMESTER WISE COURSE DISTRIBUTION

### I Year, Semester I

S. No.	Course Title	Course Number	Credit Hours
1.	Deeksharambh (Foundation Course of 2 weeks)	FC 111	2(0+2) Non-gradual
2.	Introduction to Food Science and Nutrition	FND 111	3(3+0)
3.	Principles and Practices of Food Preparation	FND 112	2(1+1)
4.	Indian Cuisinology	FND 113	2(0+2)
5.	Nutritional Status Assessment	FND 114	3(2+1)
6.	Convenience and Health Food Formulation	FND 115	2(0+2)
7.	Farming based Livelihood Systems	FLS 111	3 (2+1)
8.	Skill Enhancement Courses(SEC-1)*	–	2(0+2)
9.	Skill Enhancement Courses(SEC-2)*	–	2(0+2)
10.	Communication Skill	CS 111	2( 1+1 )
11.	NSS/ NCC/ NSO/ Rangers & Rovers- I	–	<b>1 (0+1)</b>
	<b>Total</b>		<b>22 (9+13)</b>

\* SEC-1 & SEC-2 to be selected from the list of the basket available under SEC-I module

### Semester II

S. No.	Course Title	Course Number	Credit Hours
1.	Bakery Science and Technology	FND 121	3(2+1)
2.	Nutritional Programme Surveillance	FND 122	3(1+2)
3.	Food Preservation and Storage	FND 123	2(0+2)
4.	Personality Development	PD 121	2(1+1)
5.	Entrepreneurship Development and Business Management	EDBM 121	3(2+1)
6.	Environmental Studies & Disaster Management	ESDM 121	3(2+1)
7.	Skill Enhancement Courses (SEC-3)*	–	2(0+2)
8.	Skill Enhancement Courses (SEC-4)*	–	2(0+2)
9.	NSS/ NCC/ NSO/ Rangers & Rovers- II	–	1(0+1)
<b>Total</b>			<b>21 (8+13)</b>

\* SEC-3 & SEC-4 to be selected from the list of the basket available under SEC-II module

**Post- Semester II** (Only for exit option for UG-Certificate)

S. No.	Course Title	Course Number	Credit Hours
1.	Internship*(10 weeks)	INT 121	10(0+10)*

*\*Internship (only for exit option for award of UG-Certificate) 10 weeks 10(0+10)*

**Semester III**

S. No.	Course Title	Course Number	Credit Hours
1.	Principles of Human Nutrition	FND 211	4(4+0)
2.	Fundamentals of Food Science	FND 212	2(1+1)
3.	Community Nutrition & Education	FND 213	3(2+1)
4.	Human Physiology	FND 214	3(2+1)
5.	Economics & Food Business Management	FND 215	2(2+0)
6.	Food Psychology	FND 216	2(2+0)
7.	Skill Enhancement Courses (SEC-5)*	-	2(0+2)
8.	Physical Education, First Aid and Yoga	PE 211	2(0+2)
9.	Food Nutrition and Agriculture	FND 217	2(2+0)
<b>Total</b>			<b>22 (15+7)</b>

*\*SEC-5 to be selected from the list of the basket available under SEC-III module*

**Semester IV**

S. No.	Course Title	Course Number	Credit Hours
1.	Normal Nutrition & Meal Planning	FND 221	3(2+1)
2.	Public Health Nutrition	FND 222	3(2+1)
3.	Nutritional Biochemistry	FND 223	3(3+0)
4.	Food Standards & Quality Control	FND 224	3(2+1)
5.	Skill Enhancement Courses (SEC-6)*	-	2(0+2)
6.	Agriculture Marketing and Trade	AMT 221	3(2+1)
7.	Agricultural Informatics and Artificial Intelligence	COMP 222	3(2+1)
<b>Total</b>			<b>20 (13+7)</b>

*\* SEC-6 to be selected from the list of the basket available under SEC-IV module*

**Post- Semester IV** (Only for exit option for UG- Diploma)

S. No.	Course Title	Course Number	Credit Hours
1.	Internship (10 weeks)	INT 121	10(0+10)*

\*Mandatory requirement for UG-Diploma.

**Semester V**

S. No.	Course Title	Course Number	Credit Hours
1.	Therapeutic Nutrition	FND 311	4(3+1)
2.	Food Analysis	FND 312	3(2+1)
3.	Current Food Processing Technologies	FND 313	3(2+1)
4.	Statistical Methods	STAT 311	3(2+1)
5.	Diet & Nutrition Counselling	FND 314	2(0+2)
6.	Nutraceuticals and Health Foods	FND 315	2(2+0)
7.	Introduction to Clinical Nutrition	FND 316	3(2+1)
8.	Educational Tour (10-12 days)		2(0+2) NG
9.	On-line courses (MOOC)*		
<b>Total</b>			<b>20 (13+7)</b>

\* The students will have to take 10 credits of courses from MOOC/Swayam/ NPTEL/ mooKIT/ edX/ Coursera or any other portal accepted by the University during the III and IV year as a partial requirement for the degree of B.Sc. (Hons.) Community Science. The MOOCS courses may relate to the main discipline or from any other discipline like social science, psychology, anthropology, economics, language/humanity, music, etc

**Semester VI**

S. No.	Course Title	Course Number	Credit Hours
1.	Food and Nutrition Security	FND 321	2(1+1)
2.	Nutrition, Body Composition & Physical Fitness	FND 322	3(2+1)
3.	Food Microbiology	FND 323	3(2+1)
4.	Milk Processing and Technology	FND 324	3(2+1)
5.	Cereals & Millets: Processing & Technology	FND 325	3(2+1)
6.	Sustainable Nutrition	FND 326	3(2+1)
7.	Hospitality Management	FND 327	3(2+1)
8.	Food Hygiene and Sanitation	FND 328	3(2+1)
9.	On-line courses (MOOC)*		
<b>Total</b>			<b>23(15+8)</b>

\* Online courses (MOOC); NG – Non – gradial 10 credits to be completed in III and IV year

## Semester VII

S. No.	Course Title	Course Number	Credit Hours
1.	Elective courses (total 18 credit hours)	ND/FS/IFSM 411-419	18
2.	Ethics in Human Research	EHR 411	1(1+0)
3.	Seminar	SEM 411	1(0+1)
	<b>Total</b>		<b>20</b>

## Semester VIII

S. No.	Course Title	Credit Hours
1.	<b>Student READY (Any one from Option A and B)</b>	
	<b>Option A (Any Two)</b>	
	IV. In plant Training (10 weeks) *	10(0+10)
	V. Student Project**	10(0+10)
	VI. Hands on Training	10(0+10)
	<b>Option B</b>	
	Internship***	20(0+20)
	<b>Total</b>	<b>20</b>

\* Internship/ In plant training / attachment with Industry/ Research Institute/Hospitals (May be conducted in split manner in more than one industry/ institution/ organization).

\*\* The student project will be R & D based, hospitals/ field study based or entrepreneurship based (incubation/experiential learning)

\*\*\*The internship can be taken in service Industry (e.g.Hospital or Hotel) OR in Production Industry (e.g.Food/ nutraceuticals Industry) OR in Food Quality and Analysis Laboratories

### List of Elective Courses

S. No.	Course	Course Number	Credit Hours
<b>Elective-1 : Nutrition and Dietetics</b>			
1.	Diet Therapy for Hospitalized Cases	ND 411	4(1+3)
2.	E-applications for Dietetics	ND 412	4(1+3)
3.	Nutrigenomics	ND 413	2(2+0)
4.	Nutrition for Special Conditions	ND 414	3(2+1)
5.	Nutrition through life cycle	ND 415	3(2+1)
6.	Fundamentals of research methodology and library search	ND 416	2(1+1)
7.	Sports Nutrition	ND 417	3(2+1)
8.	Diet and Immunity	ND 418	3(2+1)
9.	Global Nutrition	ND 419	2 (2+0)
<b>Elective-2 : Food Science</b>			
1.	Food processing and packaging	FS 411	4 (3+1)
2.	Fruits & Vegetables Processing and Technology	FS 412	4(2+2)
3.	Food Safety and Packaging	FS 413	2(1+1)
4.	Food Toxicology and Quality Testing	FS 414	3(2+1)
5.	Food Chemistry	FS 415	3(3+0)
6.	Meat Processing and Technology	FS 416	3(2+1)
7.	Pulses and oilseeds: Processing and Technology	FS 417	3(2+1)
8.	Sensory Evaluation of Foods	FS 418	2(1+1)
<b>Elective-3 : Institutional Food Service Management</b>			
1.	Institutional Food Service Management	IFSM 411	3(0+3)
2.	Sensory Evaluation of Foods	IFSM 412	2(1+1)
3.	Event Management	IFSM 413	3(0+3)
4.	Food processing and packaging	IFSM 414	4 (3+1)
5.	Ergonomics in Food Service	IFSM 415	2(2+0)
6.	Food Standards & Quality Control	IFSM 416	3(2+1)
7.	Food Toxicology and Quality Testing	IFSM 417	3(2+1)
8.	Print and Electronic Journalism	IFSM 418	3(0+3)
9.	Tourism and Hospitality Management	IFSM 419	3(1+2)

**Students of other disciplines may choose any elective courses from the list of following minor courses in Food Nutrition and Dietetics.**

<b>Course Number</b>	<b>Course</b>	<b>Course Number</b>	<b>Credit Hours</b>
<b>Elective-1 : Nutrition and Dietetics</b>			
1.	Principles of Human Nutrition	FND 211	4(4+0)
2.	Community Nutrition & Education	FND 213	3(2+1)
3.	Normal Nutrition & Meal Planning	FND 221	3(2+1)
4.	Diet & Nutrition Counselling	FND 314	3(0+3)
5.	E-applications for Dietetics	FND 412	4(1+3)
6.	Nutrition for Special Conditions	FND 414	3(2+1)
7.	Nutrition through life cycle	FND 415	3(2+1)
8.	Fundamentals of research methodology and library search	FND 416	2(1+1)
<b>Elective-2 : Food Science</b>			
1.	Food Preservation and Storage	FND 123	2(1+1)
2.	Principles of Human Nutrition	FND 211	4(4+0)
3.	Fundamentals of Food Science	FND 212	4 (3+1)
4.	Food processing and packaging	FS 411	2(0+2)
5.	Fruits & Vegetables Processing and Technology	FS 412	4(2+2)
6.	Meat Processing and Technology	FS 416	3(2+1)
7.	Pulses and oilseeds: Processing and Technology	FS 417	3(2+1)
8.	Sensory Evaluation of Foods	FS 418	2(1+1)
<b>Elective-3 : Institutional Food Service Management</b>			
1.	Principles of Human Nutrition	FND 211	2(2+0)
2.	Fundamentals of Food Science	FND 212	4(4+0)
3.	Food Psychology	FND 216	2(1+1)
4.	Normal Nutrition & Meal Planning	FND 221	3(2+1)
5.	Food Standards & Quality Control	FND 224	2(1+1)
6.	Sensory Evaluation of Foods	FS 411	4 (3+1)
7.	Event Management	IFSM 413	3(0+3)
8.	Ergonomics in Food Service	IFSM 415	2(2+0)
9.	Food processing and packaging	FS 418	2(1+1)
10.	Print and Electronic Journalism	IFSM 418	2(0+2)



## Skill Enhancement Courses

S. No.	Semester	Course Title	Course Number	Credit Hours
	I	<b>Assessment of clinical signs and symptoms</b>	SEC-FND 111	2(0+2)
		<b>Development of nutritional educational material</b>	SEC-FND 112	2(0+2)
		Cake making	SEC-FND 113	2(0+2)
		Cake decoration and icing	SEC-FND 114	2(0+2)
		Pickle preparation	SEC-FND 115	2(0+2)
	II	<b>Ready to eat snacks</b>	SEC-FND 121	2(0+2)
		<b>Hygiene management in food service units</b>	SEC-FND 122	2(0+2)
		Candy making	SEC-FND 123	2(0+2)
		Savory Snack preparation	SEC-FND 124	2(0+2)
		Sugar processing and confectionary	SEC-FND 125	2(0+2)
	III	<b>Quality control in food processing units</b>	SEC-FND 211	2(0+2)
		Web designing and multimedia production	SEC-FND 212	2(0+2)
		Jam jelly preparation	SEC-FND 213	
		Development of audio-visual aid	SEC-FND 214	2(0+2)
	IV	<b>Indian traditional sweets</b>	SEC-FND 221	2(0+2)
		Development of project proposals	SEC-FND 222	2(0+2)
		Laboratory analysis	SEC-FND 223	2(0+2)
		Practical skills in Writing and Speaking	SEC-FND 224	2(0+2)

## **INTERNSHIP OPTIONS in 7<sup>th</sup> and 8<sup>th</sup> SEMESTERS**

### **(a) In-plant in Hospitals**

Understanding role of dietitian – role, concept, the recipients, duties, work schedule, Licenses, Certifications, and Registrations. Preparation of SOAP notes based on case studies and group discussion. Planning component. Preparation of list of parenteral and enteral products. Diabetic diet counselling- organizing exhibition in for the benefit of public- food exchange list and software used in diabetic diet counselling. Cardiovascular diseases- planning and presentation of different types of diet for disease conditions. Practicing diet counselling for CV patients. Preparation of diet chart for different types of liver diseases, collection of case history of patient suffering from hepatitis, cirrhosis of liver and alcoholics. Kidney diseases- preparation of facts list handout and development of counselling tips- dietary counselling in a specialty hospital and diet exhibition for kidney disorder. Diet for gastro intestinal disorders- preparation of handouts- ulcer, high fiber, low residue- counselling- diarrhea, constipation, colitis, diverticulosis and ulcer. Preparation of overweight and underweight fact list handout and development of counselling guidelines, workshop for patients, Weight loss counselling– use of role play technique and workshop for patients at obesity clinic and fitness centers. Diet for pre and post-surgery, burns. Preparation of cancer facts list handout. Home care for critically ill and requiring long term nutrition support. Planning normal and therapeutic diets – diabetes, cardiovascular diseases, liver diseases, kidney diseases, gastrointestinal disorders. Role play exercises for counselling. Supervised counselling of patients/clients.

### **(b) In-plant in Testing Labs**

Role of regional testing laboratories - methods of sample collection- handling and storage of samples, physical, chemical and microbiological. FSSAI - Role of Food Safety officer, method of inspection, processing of license, conducting awareness camps for stakeholders. Analysis of energy, protein, fat, vitamin, mineral and antioxidants in food groups. Attachment with food testing laboratories.

### **(c) In-plant in Food Processing Units**

Attachment with – primary processing cereal, pasta making, flaking and puffing, cereal based convenience foods manufacturing, primary pulse processing, RTE / RTU foods manufacturing, fruit beverage manufacturing, Canning, pickling, preserve/ candy/ jam manufacturing, banana processing, milk processing, oil manufacturing, bakery and confectionary units.

**Detailed Syllabus**  
**B.Sc. (Hons.)**  
**Food Nutrition and Dietetics**

## DETAILED SYLLABUS FND

### SEMESTER I

**FC-111**

**Deeksharambh**

**0+2 (NG)**

#### Objective

- To help the students feel comfortable in the new environment and adjust to the customs and practices of the college
- To enable the students to become familiar with the amenities and accessing the intellectual and physical resources of the institution
- Knowing about the operational framework of academic process in the college
- Stimulating social integration of students among themselves and with teachers
- Instilling life and social skills, leadership qualities, team working spirit

#### Practical

S.No.	Topic	Class
1.	Ice breaking exercises and group activities to identify the strength and weakness of students	1
2.	Orientation about organizational structure of the university; Vision, mission of the college	1
3.	About different departments of the college: Academic programme, infrastructure facilities, carrier opportunities	2
4.	Familiarization with curriculum and semester rules	1
5.	Orientation about examination and evaluation system	1
6.	Introduction about Scholarships & other Grants	1
7.	Introducing the college and central Library of the university	1
8.	Orientation by Placement Cell	1
9.	Rules and regulations regarding code of conduct of students, anti ragging and indiscipline	1
10.	About NSS, NCC, NSO and Rangers and Rovers units	1
11.	Visits to different units of the university	2
12.	Session on instilling life and social skills, social awareness, ethics and values, team work, leadership, etc	1
13.	Interaction with alumni entrepreneurs, perspective employers, outstanding achievers in related fields	1

**Objectives**

- To make student understand basic nutrients, their functions, requirements and availability in different food groups.
- Understanding of the changes that occur in foods during preparation, processing and preservation.
- Understanding the nutritive value of different foods and methods of preserving them during cooking.

**Theory**

S. No.	Topic	No .of Lectures
1.	Introduction and overview of basic principles of nutrition.	1
2.	Relationship of nutrition to health, growth and human welfare.	2
3.	Definitions of terms used in nutrition - recommended dietary allowances, balanced diet, health, Functional foods, phytochemicals, nutraceuticals, dietary supplements, Food groups.	2 2 1
4.	Concepts of foodscience : Definitions Measurements, density, phase change, pH, osmosis, surface tension etc.) Colloidal systems.	1 3 2
5.	Food composition and chemistry i. (Carbohydrates, proteins, fats) ii. (vitamins, minerals) iii ( Water) ii. (Flavors, colors, miscellaneous bioactive compounds, important reactions).	3 3 1 3
6.	Food microbiology (bacteria, yeast, molds) Spoilage of fresh and processed foods Production of fermented foods.	1 3 3
7.	Principles and methods of food processing and preservation (use of heat, low temperature, chemicals, radiation, drying etc.).	3
8.	Food and nutrition, malnutrition (over and under nutrition) Nutritional disorders.	2 3
9.	Energy metabolism (carbohydrate, fat, proteins).	3
10.	Balanced/modified diets. Menu Planning	2 2
11.	New trends in food science and nutrition.	2
	<b>Total</b>	<b>48</b>

### **Suggested Readings**

1. Khader V (2003) Food, Nutrition and Health. Kalyani Publishers, Ludhiana
2. Sehgal S. and Raghuvanshi RS. (2007). Textbook of Community Nutrition Directorate of Information and Publications of Agriculture, Indian Council of Agricultural Research, New Delhi.
3. Gopalan, C, Rama Sastri, B V and Balasubramanian, S C (2011). Nutritive value of Indian Foods. National Institute of Nutrition, ICMR, Hyderabad.
4. Gurtherie H A (1989) Introductory Nutrition. Times Mirror, St. Louis
5. Joshi, S A (1999). Nutrition and Dietetics. Tata McGraw Hill Publishing Co Ltd, New Delhi.
6. Sunetra Roday (2010) Food Science and Nutrition. Oxford University Press, New Delhi.
7. Srilakshmi, B. 2005. Food Science. New Age International (P) Ltd., Publishers, New Delhi.
8. Potter, N. 2005. Food Science, CBS Publishers and Distributors, Delhi
9. Srilakshmi. B. 2015. Nutrition Science. New Age International Pvt. Ltd. New Delhi.
10. Shakuntala Manay N, Shadaksharaswamy M. 1998. Foods, Facts and Principles, New Age International Publishers, New Delhi.

### **FND-112                      Principles and Practices of Food Preparation                      2(1+1)**

#### **Objective**

- Upon completion of the course, assignments, readings, and laboratory activities, the student will be able to:
- Understand effect of heat transfer on texture, flavour, taste and appearance of food.
- Demonstrate correct use of small equipment and appliances;
- Identify and apply scientific principles of food selection and preparation, prepare and handle food using safe, sanitary practices; in order to retain Nutritive value and produce quality food products;
- Demonstrate and understand ingredient substitution for recipe and describe characteristic properties of quality food products;

**Theory**

S. No.	Topic	No .of Lectures
1.	Kitchen attire and equipment	1
2.	Cooking of food, heat and heat transfer cooking methods, effect of cooking on food and their nutritive value,	2
3.	Basics of culinary practice	1
4.	Thickening and binding agents, basic flavoring stocks essence and glazes.	2
5.	Sauces, soups, garnishes	2
6.	Basics of cookery of various foods - cereals, pulses, egg, fish, meat and poultry,	3
7.	Principles and practice of boiling, steaming, Frying, stewing, roasting, Baking, grilling and combined methods of cookery	2 1 2
	<b>Total</b>	<b>16</b>

**Practical**

S. No.	Experiment	No .of practical's
1.	Kitchen Equipment - Identification, Description, Uses & handling.	1
2.	Market survey to assess the types and availability of processed products. Identification and Selection of Ingredients.	1
3.	Preparation of cereal products and pulse products- boiling and steaming, puffing, roasting methods.	1
4.	Basic dry heat cooking methods. Basicmedium fat cooking – Roasting, grilling, frying.	1
5.	Milk cookery – pudding, custard and ice creams.	1
6.	Preparation of Vegetable- Boiled vegetables and Glazed vegetables. Preparation of Vegetable- Fried vegetables and Stewed vegetables.	1
7.	Egg cookery - Boiled (Soft & Hard), Fried, Poaches, Scrambled, Omelets.	2

S. No.	Experiment	No .of practical's
8.	Preparation of Simple Salads: Potato salad, Beet root salad, green salad, Fruit salad,	1
9.	Preparation of baked products.	1
10.	Cold desserts - Caramel Custard, Bread and Butter Pudding, Soufflé – Lemon / Pineapple, Mousse (Chocolate Coffee Apricot Pudding) HOT desserts - Steamed Pudding.	2
11.	Preparation of meat & products. Preparation of Continental Stock: White stock, brown stock, chicken stock and emergency stock. Identification of meat cuts of lamb, Curing of meat – sugar, salt and nitrite,	2
12.	Preparation of confectionery products - fudge, fondant, candies, toffees and chocolates	1
13.	Cost reporting system – daily, monthly and for special managerial decisions. Visit to kitchen equipment stores	1
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Brown, A. (2018). Understanding Food: Principles and Preparation. Wadsworth Publishing Co Inc.
2. Chambers, M. D. (2009). Principles of food preparation; a manual for students of home economics. Boston cooking-school magazine Company, 1914.
3. Sethi, M. (2007). Catering Management – An Integrated Approach. New Age International (P) Limited Publishers, New Delhi.
4. The BC Cook Articulation Committee (2015). Basic Kitchen and Food Service Management. BCcampus, British Columbia.

### FND-113

### Indian Cuisinology

**2(0+2)**

#### • Objectives

- This course will impart a hands-on, skill oriented intense curriculum on Indian Cuisine and Culture.
- The programme will examine the central place of cuisine in Indian culture and society.
- This course uses practical experiences in cooking to understand the importance of cuisine in cultural practices.



## Practical

S. No.	Title	No. of Practicals
1.	Exploring Indian regional cuisines - North India, North East, South India, Western and Eastern India.	2 2
2.	Familiarization and identification of Indian herbs and spices.	2
3.	Preparation of dry/wet masalas, Pastes and curries/gravies.	2 2
4.	Preparation of common recipes and meals of North, South, East, West and central zones of the country.	2 2
5.	Preparation of Mughlai cuisines.	3
6.	Preparation of food according to festivals in India.	3
7.	Preparation of non-alcoholic Indian beverages.	3
8.	Use of modern crockery/cutlery for presentation.	3
9.	Special meals during fasting.	3
10.	Street foods of India – Exploration and preparation.	3
	<b>Total</b>	<b>32</b>

## Suggested Readings

1. Achaya K T (1998) Indian Food: A Historical Companion. Oxford University Press, USA.
2. Pant P (2007). Cuisines – Incredible India. Wisdom Tree, India.
3. O'Brien C (2012) Food Guide to India. Penguin India.
4. Mehta N (2013) Cookbook of Regional Cuisines of India. Snab Publishers, India.
5. Shukla S (2022) Plant-Based India: Nourishing Recipes Rooted in Tradition. The Experiment.
6. Richard E. Martland., Derek A. Eelsy. (1998). Text book of basic cookery, Fundamental recipes and variations.
7. [https://www.unigoa.ac.in/uploads/syllabus/bsc-culinary-arts\\_syllabus\\_33020210830.055146.pdf](https://www.unigoa.ac.in/uploads/syllabus/bsc-culinary-arts_syllabus_33020210830.055146.pdf)
8. <https://www.uou.ac.in/sites/default/files/syllabus/BHM-401T.pdf>

**Objectives**

- This course covers the basic concepts of malnutrition, describes how nutritional status is assessed, and identifies the most commonly used nutrition indicators.
- It also explains the criteria to consider when selecting the indicators in specific contexts and situations.

**Theory**

<b>S. No.</b>	<b>Title</b>	<b>No. of Lectures</b>
1.	Major Nutritional Problems–Global	3
2.	Major Nutritional Problems– India.	3
3.	Nutritional Status assessment – Direct & Indirect method, Anthropometric	3
4.	Body composition methodology (indexes and references)	3
5.	Biochemical Methods of Nutritional Assessment	3
6.	Clinical nutrition methodology	3
7.	Dietary Assessment methods	3
8.	Nutrition Intervention programmes & policies,	3
9.	Sustainable Nutrition Goals,	3
10.	Mental Health & well-being.	2
11.	Rapid assessment methods.	3
	<b>Total</b>	<b>32</b>

**Practical**

<b>S. No.</b>	<b>Title</b>	<b>No. of Practicals</b>
1.	Assessment of nutritional status of community using dietary surveys, clinical surveys.	2
2.	Anthropometric measurements-Data collection	2
3.	Tabulation, data analysis (indexes and references),	2
4.	Interpretation and report writing.	2
5.	Target group selection from pediatrics, adults, elderly, pregnant and lactating women	2
6.	Target group selection from elderly, pregnant and lactating women	2
7.	Tabulation, interpretation	2
8.	Report writing of their tested biomarkers.	2
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Sehgal S. and Raghuvanshi RS. (2007). Textbook of community nutrition Directorate of Information and Publications of Agriculture, Indian Council of Agricultural Research, New Delhi.
2. Latham. M.C. (1997). Human nutrition in the developing world. Food and Agricultural Organization of United Nations.
3. Dahiya, S., Boora, P. and Rani, V. (2013). A manual on Community Nutrition, Department of Foods and Nutrition, published under ICAR Assistance scheme.
4. Bamji, S.M., Rao, N.P. and Reddy, V. (1996). Textbook of human nutrition. Oxford and IBH publishing Co. Pvt. Ltd., New Delhi.
5. Flamino Fidanza .1991. Nutritional Status Assessment, Springer Science Business Media.
6. Beghan I, Cap M, Dajardan B (1988) A guide to Nutritional Status Assessment WHO Geneva.
7. Raghuvanshi, R. S., Mittal, M. 2014. Food Nutrition and Diet Therapy. India: Westville Publishing House New Delhi.

### **FND-115                      Convenience and Health Food Formulation                      2(0+2)**

#### **Objectives**

- Imparting understanding of convenience foods among students
- Nutritional and health benefits of various healthy food recipes and convenience foods

#### **Practical**

S.No.	Experiment	No .of practical's
1.	Importance and need for convenience foods. Usefulness and types of convenience foods.	2
2.	FSSAI standards on health food formulations.	2
3.	Health foods-definition, classification and types.	2
4.	Food safety and quality control issues in product development.	3
5.	Packaging of convenience foods. Needs for effective marketing of convenience and health foods.	2
6.	Market survey of convenience and health foods.	3

S.No.	Experiment	No .of practical's
7.	Cereal based traditional convenience foods and snacks. Convenience foods of millets. Ready to eat breakfast cereals. Pasta products.	3 1
8.	Legume/pulse based traditional convenience foods and snacks. Extruded products.	3 1
9.	Milk based products and mixes	3
10.	Vegetable and fruit-based convenience foods.	2
11.	Food adjuncts (Pickles, chutneys, papad/vadi etc. Soupmixes	2 1
12.	Fried products	2
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Khatkar, B.S. (2007) Food Science and Technology. Daya Publishing House, Delhi.
2. Pant P (2006) Indian Fast Food. Roli Books Pvt Limited.
3. Shukla S (2022) Plant-Based India: Nourishing Recipes Rooted in Tradition. The Experiment.
4. Arya, S.S. (1990) Grain based snack and convenience foods. Indian Food Packer, Sept – Oct, page: 17-34.
5. Shiby. V.K., Sinija, V.R. and Mishra, H.N. (2007) Ready to eat health foods: A promising concept. Indian food Industry. Nov-Dec.pg.47-53.
6. Chattopadhyay, P.K. (2007) Cereal Food Technology. Published by National Institute of Industrial Research. Pg 137-139.
7. Selves, J. and Devipriya, J. (2010) Health foods as Soya bean. Beverages and Food World Feb Pg-64.
8. Chaughan G.S., N. S. Verma and G.S. Bains, 1985. Effect of extrusion processing on the nutritional quality of protein in rice – legume blends. Die Nahrung.
9. Guy R. Extrusion Cooking, Technologies and Applications. Wood head Publishing Limited, Abington, and Cambridge.
10. Fast R.B. and Caldwell E.F. (2000). Breakfast Cereals and How they are made. American Association of Cereal Chemists, St. Paul, Minnesota.

**Objective**

- i) To make the students aware about farming-based livelihood systems in agriculture.
- ii) To disseminate the knowledge and skill how farming based systems can be a source of livelihood.

**Theory**

<b>S. No.</b>	<b>Topic</b>	<b>Class</b>
1.	Agriculture- Definition and its principles	1
2.	Status of agriculture in India, income of farmers and rural people	2
3.	Livelihood-Definition, concept and livelihood pattern in urban & rural areas	1
4.	Farming systems- Definition and farming based livelihood systems	2
5.	Different indicators to study livelihood systems	1
6.	Agricultural Livelihood Systems (ALS): Meaning, approaches and framework	2
7.	Prevalent farming systems and its contribution to livelihood	2
8.	Types of traditional & modern farming systems	2
9.	Components of farming system/ farming based livelihood systems, crops and cropping systems	2
10.	Livestock (dairy, piggery, goatry, poultry, duckry, pisci-culture, apiculture etc.)	1
11.	Horticultural crops, agro-forestry systems	2
12.	Enterprises (small, medium and large) including value chains and secondary enterprises as livelihood components for farmers	2
13.	Factors affecting integration of various enterprises of farming for livelihood	2
14.	Farming system's feasibility under various agro-climatic zones	2
15.	Farming based livelihood models	2
16.	Factors affecting farming based livelihood systems	1
17.	Schemes & programmes for promotion of farming based livelihood opportunities	2
	<b>Total</b>	<b>32</b>

## Practical

S. No.	Topic	Class
1.	Survey of farming systems and agricultural based livelihood enterprises	2
2.	Study of components of important farming based livelihood models/ systems in different agro-climatic zones	2
3.	Study of production and profitability of crop based, livestock based, processing based and integrated farming based livelihood models	3
4.	Field visit of innovative farming system models	1
5.	Visit of agri- based enterprises & their functional aspects for integration of production, processing & distribution sectors	2
6.	Study of agri-enterprises involved in industry and service sectors(Value Chain Models),	2
7.	Learning about concept of project formulation on farming based livelihood systems along with cost & profit analysis,	2
8.	Case study of Start-Ups in agri-sectors	2
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Dixon, J. and A. Gulliver with D. Gibbon. (2001). Farming Systems and Poverty: Improving Farmers' Livelihoods in a ChangingWorld. FAO & World Bank, Rome, Italy & Washington, DC, USA
2. Ashley, C.; Carney, D. (1999). Sustainable Livelihoods: Lessons from Early Experience; Department for International Development: London, UK,; Volume 7. [Google Scholar]
3. Reddy, S.R. 2016. Farming System and Sustainable Agriculture, Kalyani Publishers, New Delhi.
4. Panwar et al. 2020. Integrated Farming System models for Agricultural Diversification, Enhanced Income and employment, Indian Council of Agricultural Research, New Delhi.
5. Singh, J.P., et al. 2015. Region Specific Integrated Farming System Models, ICAR-Indian Institute of Farming Systems Research, Modipuram.
6. Walia, S. S. and U. S. Walia, 2020. Farming System and Sustainable Agriculture, Scientific Publishers, Jodhpur, Rajasthan.
7. Livelihood Improvement of Underprivileged Farming Community : Some Experiences from Vaishali, Samastipur, Darbhanga and Munger Districts of Bihar by B. P. Bhatt, Abhay Kumar, P.K. Thakur, Amitava Dey Ujjwal Kumar, Sanjeev Kumar, B.K. Jha,

Lokendra Kumar, K. N. Pathak, A. Hassan , S. K. Singh, K. K. Singh and K. M. Singh  
ICAR Research Complex for Eastern Region ICAR Parisar, P.O. Bihar Veterinary  
College, Patna - 800 014, Bihar

8. Carloni, A (2001) Global Farming Systems Study: Challenges and Priorities to 2030 – Regional Analysis: Sub-Saharan Africa, Consultation Document, FAO, Rome, Italy
9. Evenson, R.E. (2000). Agricultural Productivity and Production in Developing Countries'. In FAO, The State of Food and Agriculture, FAO, Rome, Italy
10. Agarwal, A. & Narain, S. (1989). Towards Green Villages: A strategy for Environmentally, Sound and Participatory Rural Development, Center for Science and Environment, New Delhi, India

## CS-111

## Communication Skills

$$2(1+1)$$

## Objective

1. To acquire competence in oral, written and non-verbal communication, develop strong Personal and professional communication and demonstrate positive group communication.

## Theory

S. No.	Topic	No. of Classes
1.	Basic Communication Skills: Listening, Speaking, Reading and Writing Skills;	2
2.	Precis writing /Abstracting/ Summarizing; Style of technical communication Curriculum vitae/ resume writing;	3
3.	Innovative methods to enhance vocabulary, analogy questions.	2
4.	Structural and Functional Grammar: Sentence structure, modifiers, connecting words and verbals; phrases and clauses;	2
5.	Case: subjective case, possessive case; objective case; Correct usage of nouns, pronouns and antecedents, adjectives, adverbs and articles;	3
6.	Agreement of verb with the subject: tense, mood, voice	3
7.	Writing effective sentences-- Basic sentence faults	1
	<b>Total</b>	<b>16</b>

## Practical

S. No.	Topic	No. of Classes
1.	Listening and note taking;	1
2.	Writing skills: precis writing	2
3.	Summarizing and abstracting;	1
4.	Reading and comprehension (written and oral) of general and technical articles	2
5.	Micro-presentations and Impromptu Presentations: Feedback on presentations	3
6.	Stage manners: grooming, body language, voice modulation, speed	2
7.	Group discussions	1
8.	Public speaking exercises; vocabulary building exercises	2
9.	Interview Techniques; organization of events.	2
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Allport, GW, 1937, Personality: A Psychological Interpretation. Holt, New York.
  2. Brown Michele & Gyles Brandreth, 1994, How to Interview and be Interviewed. Sheldon Press, London.
  3. Carnegie Dale, 1997, The Quick and Easy Way to Effective Speaking. Pocket Books, New York.
  4. Francis Peter S J, 2012, Soft Skills and Professional Communication. Tata McGraw Hill, New Delhi.
  5. Kumar S and Pushpa Lata, 2011, Communication Skills. Oxford University Press.
  6. Neuliep James W, 2003, Intercultural Communication A Contextual Approach. Houghton Mifflin Co Boston.
  7. Pease, Allan, 1998, Body Language. Sudha Publications, Delhi.
  8. Raman M and Singh P, 2000, Business Communication. Oxford University Press.
  9. Seely J, 2013, Oxford Guide to Effective Writing and Speaking. Oxford University Press.
  10. Thomson A J and Martinet A V, 1977, A Practical English Grammar. Oxford University Press.
- NCC I National Cadet Corps 1(0+1)



## Objective

1. To develop qualities of character, courage, comradeship, discipline, leadership, secular outlook, spirit of adventure and sportsmanship and the ideals of selfless service among the youth to make them useful citizen.
2. To create a human resource of organized trained and motivated youth to provide leadership in all walks of life including the Armed Forces and be always available for the service of the nation.

## Practical/ Awareness activities

S.No.	Topic	No. of Practicals
1.	Aims, objectives, organization of NCC and NCC song. DG's cardinals of discipline	1
2.	Drill- aim, general words of command, attention, stands at ease, stand easy and turning; Sizing, numbering, forming in three ranks, open and close order march, and dressing; Saluting at the halt, getting on parade, dismissing, and falling out	2
3.	Marching, length of pace, and time of marching in quick/slow time and halt. Side pace, pace forward and to the rear. Turning on the march and wheeling. Saluting on the march	1
4.	Marking time, forward march, and halt. Changing step, formation of squad and squad drill;	1
5.	Command and control, organization, badges of rank, honors, and awards	1
6.	Nation Building- cultural heritage, religions, traditions, and customs of India. National integration	1
7.	Values and ethics, perception, communication, motivation, decision making, discipline and duties of good citizens	1
8.	Leadership traits, types of leadership.	1
9.	Civil defense organization, types of emergencies, firefighting, protection. Maintenance of essential services, disaster management, aid during development projects	1
10.	Basics of social service, weaker sections of society and their needs, NGO's and their contribution, contribution of youth towards social welfare and family planning	2
11.	Structure and function of human body, diet and exercise, hygiene and sanitation	1

S.No.	Topic	No. of Practicals
12.	Preventable diseases including AIDS, safe blood donation, first aid, physical and mental health	1
13.	Adventure activities	1
14.	Basic principles of ecology, environmental conservation, pollution and its control	1
	<b>Total</b>	<b>16</b>

## NSS-I

## National Service Scheme

**1(0+1)**

### Objective

1. Evoking social consciousness among students through various activities *viz.*, working together, constructive, and creative social work, to be skilful in executing democratic leadership, developing skill in programme, to be able to seek self-employment, reducing gap between educated and uneducated, increasing awareness and desire to help sections of society.

### Practical/ Awareness programmes

S. No.	Topic	Class
1.	Orientation: history, objectives, principles, symbol, badge	1
2.	Regular programs under NSS	1
3.	Organizational structure of NSS, Code of conduct for NSS volunteers, points to be considered by NSS volunteers' awareness about health	1
4.	NSS program activities. Concept of regular activities, special camping, day camps	1
5.	Basis of adoption of village/slums, conducting survey, analyzing guiding financial patterns of scheme	1
6.	Youth program/ schemes of GOI, coordination with different agencies and maintenance of diary.	1
7.	Understanding youth. Definition, profile, categories, issues and challenges of youth; and opportunities for youth who is agent of the social change	1
8.	Community mobilization. Mapping of community stakeholders, designing the message as per problems and their culture	1
9.	Identifying methods of mobilization involving youth-adult partnership. Social harmony and national integration	1

S. No.	Topic	Class
10.	Indian history and culture, role of youth in nation building	1
11.	Conflict resolution and peace- building	1
12.	Volunteerism and <i>shramdaan</i> . Indian tradition of volunteerism, its need, importance, motivation, and constraints; shaman as part of volunteerism	2
13.	Citizenship, constitution, and human rights. Basic features of constitution of India, fundamental rights and duties, human rights, consumer awareness and rights and rights to information	2
14.	Family and society. Concept of family, community (PRIs and other community-based organizations) and society	1
	<b>Total</b>	<b>16</b>

## NSO-I

## National Sports Organisation

1 (0 + 1)

### Objectives

To develop understanding about the concept of physical education and Sports

- To develop competence among students regarding indoor and outdoor games
- To develop awareness about traditional games

### Practical

S. No.	Course Tile	No of Classes
1.	Meaning, Definition, Nature and Scope of Physical Education and Sports Education	1
2.	Aim and Objectives of Physical Education and Sports Education	1
3.	History of Physical Education and Sports Education 1. Ancient Physical Education in India – Harappa civilization, Vedic age, Epic age, etc. 2. Science of Exercise and Sports: Ancient Indian Origin 3. Modern Olympic Games – revival organization and conduct of games and ceremonies (opening and closing ceremonies), objectives and functions of International Olympic Committee (IOC)	2
4.	World Cups and World Championships Commonwealth games, Asian games, SAF games	1
5.	Practice of indoor games- Table Tannis, Badminton, Chess	4
6.	Practice of outdoor games- Volley ball, Basket ball, cricket, Javelin throw, Discus throw, Long jump, High jump etc	4
7.	Practice of Traditional games- Kho Kho, Kabbadi, skipping, etc.	3
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Barrow, H.M. (1983). Man and Movement: Principles and Physical Education. Phi: Lea and Febiger
2. Bucher & Wuest (1987). Foundations of Phy.Edu & Sports. Missouri: C.V.Mosby co.
3. Bucher, C.A., (2010). Foundation of Physical education (16ed.). New Delhi: Tata McGraw-Hill.
4. Burbank, J. M., Andranovich, G. D. & Heying Boulder, C. H. (2001). Olympic dreams: the impact of mega-events on local politics: Lynne Rienner
5. Deshpande, S. H. (2014). Physical Education in Ancient India. Amravati: Degree College of Physicaleducation.
6. Frank, A.M. (2003). Sports & education. CA: ABC-CLIO
7. Kretchmar, R.S. (1994). Practical Philosophy of Sport. IL: Human Kinetics.
8. Nixon, E. E. & Cozen, F.W. (1969). An introduction to physical education. Philadelphia: W.B. Saunders Co.
9. Osborne, M. P. (2004). Magictree house fact tracker: ancient Greece and the Olympics: a nonfiction companion to magic tree house: hour of the Olympics. New York: Random House Books for Young Readers.
10. Susan Capel, Susan Piotrowski (2000). Issues in Physical Education. London: Routledge
- Young, D.C. (2004). A brief History of Olympic Games. UK: Blackwell Publishing.
11. Ziegler, E.F. (2007). An introduction to Sports & Phy.Edu.Philosophy. Delhi: Sp.
12. Mondal. S. Science of Exercise: Ancient Indian Origin, Journal of Association Physicians of India, 2013

### SCOUT-I

### Rangers and Rovers

(0+1)

#### Objectives

- The development of youth in achieving their full physical, intellectual, social and spiritual potentials as responsible citizens and members of local, national and international community.

#### Practical

S. No.	Topic	No. of Class
1.	<b>NIPUN Training</b> <ul style="list-style-type: none"><li>• Introduction of the origin of scouting</li><li>• Scout Law and Promise</li><li>• Scout Motto, Sign, Salute and left hand shake</li></ul>	12

S. No.	Topic	No. of Class
	<ul style="list-style-type: none"> <li>• Training to wear Uniform</li> <li>• Composition and significance of the National flag, the Bharat Scouts &amp; Guides Flag and the World Scout Flag, Patrol and its Flag</li> <li>• Scout prayer and Scout Flag Song</li> <li>• General rules of health</li> <li>• Hand signals and whistle Signals</li> <li>• Wood craft signs and follow a track</li> <li>• Whip the ends of a rope</li> <li>• Tie and knots Troop Games</li> <li>• Personality development activities</li> <li>• Nature study project</li> </ul>	
2.	Community Services/ Camp/ Fair/visit etc.	4
	<b>Total</b>	<b>16</b>

**Skill Enhancement Courses (Choose any two from SEC-FND 111 to115)\***

**SEC-FND-111 Assessment of Clinical Signs and Symptoms 2(0+2)**

**Practical**

S. No.	Title	No. of Practicals
1.	Preparation of list of signs and symptoms of PEM	2
2.	Preparation of poster on signs and symptoms of vitamin deficiency.	2
3.	Preparation of folder on mineral deficiencies.	2
4.	Visit to aanganwadi to assess signs of deficiency in children.	2
5.	Visit to hospital to assess the deficiency signs and symptoms in pregnant women.	2
6.	Survey of adolescent boys and girls to assess micronutrient deficiency.	2
7.	Assessment of clinical signs and symptoms of malnutrition in school age children.	2
8.	Nutrition education to target groups on micro nutrient deficiency.	2
9.	Visit to local health centre to identify clinical signs and symptoms of nutritional problems.	2
10.	Community survey for nutritional deficiency disorders- data collection, tabulation analysis, interpretation, report writing.	2

S. No.	Title	No. of Practicals
11.	Presentation of reports and group discussion	2
12.	Comparison of data on status of various deficiency diseases in India NFHS 3, NFHS 4, NFHS 5 in vulnerable groups.	2
13.	Development of tools for assessing signs and symptoms of micronutrient deficiency in vulnerable groups.	2
14.	Collection of data on locally available common foods and their cost and unavailability of certain foods leading to the deficiency in particular region.	2
15.	Surveillance of national nutrition programmes	2
16.	Data analysis and report writing.	2
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. "Clinical Signs and Symptoms: A Guide for Nurses" by Fiona Roberts (2019)
2. "Assessment of Clinical Signs and Symptoms" by Mary Louise Kotz (2018)
3. "Clinical Assessment: A Guide for Healthcare Professionals" by Janet Wilson (2020)
4. "Signs and Symptoms: A Clinical Guide" by David B. Newman (2019)
5. "Clinical Evaluation: A Guide for Healthcare Professionals" by Susan M. Venella (2018)
6. "Assessment of Clinical Signs and Symptoms in Nursing" by Sandra F. Smith (2019)
7. "Clinical Signs and Symptoms: A Quick Reference Guide" by Jane M. Brannan (2020)

## SEC-FND-112 Development of Nutritional Educational Material 2(0+2)

### Practical

S. No.	Topic	No. of lectures
1.	Objectives, principles and importance of nutrition education in a community	3
2.	Deficiency diseases and publichealth problems-Vit. A, iron and iodine deficiencies, other micronutrient deficiencies	7
3.	Identification of nutritional problems and target groups (Survey)	2
4.	Communication techniques: Process, its components. Mass, group and individual Communication; advantages and disadvantages	4
5.	Classification and use of audio-visual aids (Electronic aid, non-projected and three dimensional)	2

S. No.	Topic	No. of lectures
6.	Preparation of instructional material (Chart, Poster, Flipbook, Pamphlet, Calendar);	5
7.	Practicing and use of nutrition education material on vulnerable groups in the community, rural and urban	4
8.	Planning and organizing nutritional education programme for community	3
9.	Evaluation of nutrition education programme	2
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Grover I., Sethi N. and Grover, D. 2004. Handbook of communication and media. Agrotech Publishing Academy, Udaipur.
2. Govind S., Tamilselvi g and Meenambigai J. 2011. Extension Education and Rural Development, AGROBIOS (India)

### SEC-FND-113

### Cake Making

**2 (0+2)**

### Objectives

- Students will learn to develop basic skills of preparation of cakes. This will build confidence among students to start new venture.
- To impart knowledge of various types of preparations of cakes.
- To enable the students to develop skill of preparing different types of cakes.

### Practical

S. No.	Course outline	No. of practical's
1.	Ingredient used in Cake Making Types & Varieties: Flour, Sugar, Shortening – Fats and oil. Egg, Moistening agent, Leavening Agents.	3 3
2.	Cake Making Methods: Sugar butter process, Flour butter process. Genoise method, Blending and rubbing method	3 3
3.	Characteristic of Cakes: External characteristics, Internal Characteristics.	3
4.	Balancing cake formula	3
5.	Cake Faults and remedies	2

S. No.	Course outline	No. of practical's
6.	Basic Cake Making: Plain Sponge, Madeira Cake, Rock Cake. Fruit Cake, Fatless Sponge, Swiss Rolls, Genoise Sponge.	3 3
7.	Market survey for cake and confectionary food stuffs.	3
8.	Project writing of small-scale bakery and confectionery unit.	3
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Ashok Kumar Y. 2012. Textbook of Bakery and Confectionery. PHI Learning, India.
2. Scott D. 2020. Bread Baking for Beginners: A Simple essential guide to kneading and baking bread.
3. Mathuravalli S M D. 2022. Handbook of bakery and Confectionary. CRC Press.
4. Bakers Handbook on Practical Baking, 1994. US Wheat Associates, New Delhi
5. NIIR Board of consultants and Engineers. 2014. The complete technology book on bakery products (Baking Science with formulation and production). NIIR Project consultancy services, New Delhi.

## SEC-FND-114

## Cake Decoration and Icing

**2 (0+2)**

### Objectives

- Students will learn to develop basic skills of decorating and icing the cake. This will build confidence among students to start new venture.
- To impart knowledge of various types of preparations of icings.
- To enable the students to develop skill of preparing icings and toppings.

### Practical

S. No.	Course outline	No. of practical's
1.	Techniques of Icing –ingredients used in icing Role of ingredients in Icing	2 2
2.	Tools of icing, preparing Applying various types of icing	3 3
3.	Icings and Toppings; Fondant American frosting Butter cream icing.	3 2 2 2



S. No.	Course outline	No. of practical's
4.	Royal icing;	2
	Gum paste	2
	Marzipan	2
	Marshmallow	2
	Lemon meringue	1
	Fudge	1
	almond paste	1
	Glaze icing	2
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Ashok Kumar Y. 2012. Textbook of Bakery and Confectionery. PHI Learning, India.
2. Scott D. 2020. Bread Baking for Beginners: A Simple essential guide to kneading and baking bread.
3. Mathuravalli S M D. 2022. Handbook of bakery and Confectionary. CRC Press.
4. Bakers Handbook on Practical Baking, 1994. US Wheat Associates, New Delhi
5. NIIR Board of consultants and Engineers. 2014. The complete technology book on bakery products (Baking Science with formulation and production). NIIR Project consultancy services, New Delhi.

### SEC-FND-115

### Pickle Preparation

**2 (0+2)**

#### Objectives

- Students will learn to develop basic skills of preparation of Pickles. This will build confidence among students to start new venture.
- To impart knowledge of various types of preparations of pickles.
- To enable the students to develop skill of preparing pickles.

#### Practical

S. No.	Course outline	No. of practical's
1.	Nutritional aspect of Fruits and vegetables; Basic characteristics of pickles	2
2.	Role of various ingredients used in fruit and vegetable preservation	2
3.	Introduction to various food additives used in pickle making- Spices and other constituents, condiment.	3
	Additives and ingredients, and flavouring, colouring agent and preservative.	2

S. No.	Course outline	No. of practical's
4.	Basic tools and equipment used in the preparation of pickle making such as boilers, choppers, mechanized peelers, sealers, autoclaves, steam jacketed kettle, pickle mixer	3
5.	Introduction to different types of packaging materials used. Identification of different types of spoilage occurring in fruits; Selection and grading of raw and ripe fruits and vegetables for preservation.	2 3
6.	Preparations of different types of pickles from fruits and vegetables- <ul style="list-style-type: none"> <li>Preparation of salty and oily pickle (green mango, green chili, lemon, ginger, mixed type).</li> <li>Preparation of sweet pickle (Mango, plum, papaya, date, mango lather, mixed type etc.</li> </ul>	3 3
7.	Examination of processed products- Examination of processed products- Detection of benzoic acid, sulphur dioxide and KMS in fruits and vegetable products.	3
8.	Cleaning and maintenance of the equipment; Study of containers like Glass, Tin, packaging materials, such as plastic pouches, glass containers, plastic bottle and cartons; Information to be mentioned on label and pack	3
9.	Waste Management and up keeping of work place	2
	<b>Total</b>	<b>32</b>

## SEMESTER II

**FND-122**

**Nutritional Programme Surveillance**

**3(1+2)**

### Objective

This course will enable the students to-

- Understand the concept of nutritional status and its relationship to health.
- Know aims, objectives, methods used for assessment of nutritional status.
- Identify the factors responsible for the malnutrition.

### Theory

S. No.	Topic	No .of Lectures
1.	Nutrition monitoring and surveillance – definition, introduction, need and significance.	1
2.	Principles of a foodand nutrition surveillance system and implementation steps.	1
3.	Nutrition surveillance in developed and underdeveloped countries.	1

S. No.	Topic	No .of Lectures
4.	Setting up food and nutrition surveillance system activities -strengthening a foodand nutrition surveillance system.	1
5.	Nutritional programmes – implementation, monitoring and evaluation.	1
6.	Concept of E-surveillance on the Nutritional situation in the country.	1
7.	Elements of the nutritional assessment Individual and population assessment - measuring malnutrition.	1 1
8.	Sampling of population. Supervision, monitoring and evaluation. Real time monitoring system.	1 1 1
9.	Malnutrition – causative factors. Food security assessment, health assessment and its significance in nutrition surveillance.	1 1
10.	Indicators of food and nutritionsecurity – types and characteristics of indicators. Application and usefulness of indicators for different objectives and nutritional problems.	1 1
11.	Selection of indicators and levels of assessment.	1
	<b>Total</b>	<b>16</b>

### Practicals

S. No.	Experiment	No .of practicals
1.	Surveillance of National nutrition programs: ICDS	3
2.	Mid-day meal	3
3.	Availability of iodized salt in markets & Households	3 3
4.	Distribution of Iron-folic acid tablets	3
5.	Visit and Assessing nutritional status, data analysis & ICDS centers, PHCs, Aanganwadis, Report writing	3 3 3 3
6.	Visit to mid-day meal kitchen, supervising food preparation in hygienic manner, Report writing.	3 2
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Bamji M. S, Prahlad Rao N. & Vinodini Reddy. 2003. Text book of Human Nutrition (p- p 197-201), New Delhi. Oxford & IBH Publishing Co. PVT. LTD.
2. Derrick. B. Jelliffe. 1966. The assessment of the nutritional status of the community (With special reference to field surveys in developing regions of the World). World Health Organization, Geneva.
3. Sehgal S. and Raghuvanshi RS. 2007. Textbook of community nutrition Directorate of Information and Publications of Agriculture, Indian Council of Agricultural Research, New Delhi.
4. WHO 2014. Food and nutrition surveillance systems A manual for policy-makers and programme manager
5. Spinello S. 2018. The duties of a community nutritionist. Cited from: <https://careertrend.com/list-6526713- duties-community-nutritionist.html>
6. Beghan I Cap M Dajardan B 1988. A guide to Nutritional Status Assessment WHO Geneva.
7. Flaminio Fidanza .1991. Nutritional Status Assessment, Springer Science Business Media.
8. Gopaldas T and Seshadri S. 1987. Nutrition monitoring and assessment, Oxford University press.
9. Mason J B Habicht J P Tabatabai H Valverde V. 1984: Nutritional Surveillance WHO
10. Saln D R Lockwood R Scrimshaw N S. 1981. Methods for the evaluation of the Impact and Nutrition Programme, U N University.

### FND-123

### Food Preservation and Storage

2(0+2)

#### Objective

- This course will provide the information about the shelf life of different food products, differentpreservations and processing techniques
- Students will also get hands on experience and knowledge about handling of food items on scientific lines to prepare and develop different preserved food product

#### Practical

S. No.	Experiment	No .of practicals
1.	Market survey of raw and preserved products	2
2.	Preparation of preserved products- Squash, cordial, crush	1 1 1

S. No.	Experiment	No .of practicals
3.	Jams, jellies, marmalade	1 1 1
4.	Candy, preserves, murabbas	1 1 1
5.	Pickles with and without oil	1 1
6.	Chutneys, ketchup, sauces	1 1 1
7.	Candies, Toffees	1 1
8.	Cheese and Syrup	1 1
9.	Drying of blanched and unblanched fruits and vegetables by solar dryer, sun and oven drying methods	2
10.	Shelf life and sensory evaluation of developed products	2
11.	Packaging of fruits and vegetables.	1
12.	Labelling and costing of products	1
13.	Demonstration on canning and bottling of fruits and vegetables	1
14.	Demonstration on storage of food grains	1
15.	Preparation of papad, wadian utilizing cereals and legumes and their storage	2
16.	Visits to food processing and preservation units, canning bottling units, grain storage institute.	2
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Bhutani, R. C. 2011. Fruit and Vegetable Preservation. Daya Publishing House.
2. Sehgal, S., Grewal, R.B., Kawatra, A. and Kaur, Y. 1997. Practical Aspects of Food Preservation. Directorate of Publications. Haryana Agricultural University, Hisar.
3. Vijay K., 1999. Text book of Food, Storage and Preservation, Kalyani Publishers, New Dehi.
4. Kalia, M. and Sood, S. 2010. Food Preservation and Processing. Revised Edition, Kalyani Publishers, New Delhi.

5. Jood, S. and Khetarpaul, N. 2002. Food Preservation. Geeta Somani, Agrotech Publishing Academy, Udaipur.
6. Sivasankar, B. 2002. Food Processing and Preservation. PHI Learning Pvt. Ltd. Delhi
7. Srivastava R P and Kumar S. 2019. Fruits and Vegetable Preservation: Principles and Practices. Revised and Enlarged 3rd Edition. CBS publishers and distributors.
8. Subbulakshmi, G. and Udipti, S.A. 2006. Food processing and preservation. New Age International Publishers.
9. Potter, N.N. (1996). Food Science. The AVI Publishing Company, Inc. Westport, Connecticut.

## **PD-121**

## **Personality Development**

**2(1+1)**

### **Objective**

To make students realize their potential strengths, cultivate their inter-personal skills and improve employability.

### **Theory**

<b>S. No.</b>	<b>Topics</b>	<b>No. of Classes</b>
1.	Personality Definition, Nature of personality, theories of personality and its types	2
2.	The humanistic approach -Maslow's self-actualization theory, shaping of personality, determinants of personality	2
3.	Myers-Briggs Typology Indicator, Locus of control and performance Type A and Type B Behaviours, personality and Organizational Behaviour	2
4.	Foundations of individual behavior and factors influencing individual behavior	1
5.	Models of individual behavior, Perception and attributes and factors affecting perception, Attribution theory and case studies on Perception and Attribution	2
6.	Learning, meaning and definition, theories and principles of learning Learning and organizational behavior, Learning and training, learning feedback.	2
7.	Attitude and values, Intelligence- types of Intelligence, theories of intelligence, measurements of intelligence	2
8.	Factors influencing intelligence, intelligence and Organizational behavior, emotional intelligence.	2
9.	Motivation- theories and principles, Teamwork and group dynamics.	1
	<b>Total</b>	<b>16</b>

## Practical

S. No.	Topics	No. of Classes
1.	Planning and administering MBTI personality tests and analysis of different types of personalities	2
2.	Planning and preparation of activities for Learning Styles and Strategies	2
3.	Developing questionnaire to find out the Motivational needs of different people	2
4.	Use of Firo-B, test to understand behavior of others. I Developing questionnaire to find out the interpersonal Communication patterns of people	2
5.	Preparing exercises for Teamwork and team building	2
6.	Group Dynamics,	1
7.	Win-win game, Conflict Management	2
8.	Leadership styles	1
9.	Case studies on Personality and Organizational Behavior.	2
	<b>Total</b>	<b>16</b>

## Suggested readings

1. Andrews, Sudhir, 1988, How to Succeed at Interviews. 21st (rep.) New Delhi. Tata McGraw-Hill.
2. Heller, Robert, 2002, Effective Leadership. Essential Manager Series. Dk Publishing.
3. Hindle, Tim, 2003, Reducing Stress. Essential Manager Series. Dk Publishing.
4. Lucas, Stephen, 2001, Art of Public Speaking. New Delhi. Tata - Mc-Graw Hill.
5. Mile, D.J, 2004, Power of Positive Thinking. Delhi. Rohan Book Company.
6. Pravesh Kumar, 2005, All about Self- Motivation. New Delhi. Goodwill Publishing House.
7. Smith, B, 2004, Body Language. Delhi: Rohan Book Company Shaffer, D. R., 2009, Social and Personality Development (6th Edition). Belmont, CA: Wadsworth.

## **EDBM-121 Entrepreneurship Development and Business Management     3 (2+1)**

### Objective

1. To provide student an insight into the concept and scope of entrepreneurship.
2. To expose the student to various aspects of establishment and management of a small business unit.
3. To enable the student to develop financially viable agribusiness proposal.

**Theory**

<b>S. No.</b>	<b>Topic</b>	<b>No. of Classes</b>
1.	Concept, need for and importance of entrepreneurial development.	2
2.	Types of entrepreneurs, functions of entrepreneurs	2
3.	Characteristics of entrepreneurs, entrepreneurial attributes/competencies	2
4.	Evolution of entrepreneurship, objectives of entrepreneurial activities	2
5.	Development of entrepreneurship, motivational factors, social factors, environmental factors	2
6.	Process of entrepreneurship development -Environment scanning and opportunity identification need for scanning–spotting of opportunity-scanning of environment– identification of product / service – starting a project; factors influencing sensing the opportunities	4
7.	Infrastructure and support systems- good policies, schemes for entrepreneurship development; role of financial institutions, and other agencies in entrepreneurship development	3
8.	Steps involved in functioning of an enterprise. Selection of the product / services, selection of form of ownership; registration, selection of site, capital sources, acquisition of manufacturing know how, packaging and distribution	3
9.	Planning of an enterprise, project identification, selection, and formulation of project; project report preparation	2
10.	Enterprise Management; Production management – product, levels of products, product mix, quality control, cost of production, production controls	2
11.	Material management. raw material costing, inventory control	2
12.	Personal management – manpower planning, labour turn over, wages / salaries.	2
13.	Financial management /accounting – funds, fixed capital and working capital, costing and pricing, long term planning and short-term planning, book keeping, journal, ledger, subsidiary books, annual financial statement, taxation	2
14.	Marketing management- market, types, marketing assistance, market strategies. Crisis management- raw material, production, leadership, market, finance, natural etc.	2
	<b>Total</b>	<b>32</b>



## Practical

S.No.	Topic	No. of Classes
1.	Visit to small scale industries/agro-industries	2
2.	Interaction with successful entrepreneurs/ agric- entrepreneurs	2
3.	Preparation of case study of successful entrepreneur	3
4.	Presentation of case study	2
5.	Visit to financial institutions and support agencies-DIC, SIDBI	2
6.	Preparation of project proposal for funding by different agencies	3
7.	Presentation of report	2
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Charantimath P.M., 2009, Entrepreneurship Development and Small Business Enterprises. Pearson Publications, New Delhi.
2. Desai V., 2015, Entrepreneurship: Development and Management, Himalaya Publishing House.
3. Gupta CB. 2001. Management Theory and Practice. Sultan Chand & Sons.
4. Indu Grover. 2008. Handbook on Empowerment and Entrepreneurship. Agrotech Public Academy.
5. Khanka SS. 1999. Entrepreneurial Development. S. Chand & Co.
6. Mehra P., 2016, Business Communication for Managers. Pearson India, New Delhi.
7. Pandey M. and Tewari D., 2010, The Agribusiness Book. IBDC Publishers, Lucknow.
8. Singh D. 1995. Effective Managerial Leadership. Deep & Deep Publ.
9. Singhal R.K., 2013, Entrepreneurship Development & Management, Katson Books.
10. Tripathi PC & Reddy PN. 1991. Principles of Management. Tata McGraw Hill.
11. Vasant Desai, 1997. Small Scale Industries and Entrepreneurship. Himalaya Publ. House

## **ESDM-121 Environmental Studies & Disaster Management 3(2+1)**

### Objective

- To expose and acquire knowledge on the environment and to gain the state-of-the-art - skill and expertise on management of disasters.

## Theory

S.No.	Topic	No. of Lectures
1.	Introduction to Environment - Environmental studies - Definition, scope and importance	2
2.	Multidisciplinary nature of environmental studies - Segments of Environment - Spheres of Earth - Lithosphere - Hydrosphere - Atmosphere - Different layers of atmosphere	2
3.	Natural Resources: Classification - Forest resources. Water resources. Mineral resources Food resources. Energy resources. Land resources. Soil resources. Ecosystems - Concept of an ecosystem - Structure and function of an ecosystem -	2
4.	Energy flow in the ecosystem. Types of ecosystem. Biodiversity and its conservation	2
5.	Introduction, definition, types. Biogeographical classification of India. Importance and Value of biodiversity. Biodiversity hot spots. Threats and Conservation of biodiversity	2
6.	Environmental Pollution: Definition, cause, effects and control measures of: a. Air pollution. b. Water pollution. c. Soil pollution. d. Marine pollution. e. Noise pollution. f. Thermal pollution h. light pollution	2
7.	Solid Waste Management: Classification of solid wastes and management methods, Composting, Incineration, Pyrolysis, Biogas production, Causes, effects and control measures of urban and industrial wastes. Social issues and the Environment	2
8.	Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Environmental ethics: Issues and possible solutions, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.	3
9.	Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act.	3
10.	Human Population and the Environment: Environment and human health: Human Rights, Value Education. Women and Child Welfare. Role of Information	2
11.	Technology in Environment and human health.	2
12.	Disaster management - Disaster definition - Types - Natural Disasters - Floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, Heat and cold waves. Man Made Disasters - Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, road accidents, rail accidents, air accidents, sea accidents. International and National strategy for disaster reduction.	2 2

S.No.	Topic	No. of Lectures
13.	Concept of disaster management, national disaster management framework; financial arrangements; role of NGOs, community-based organizations and media in disaster management. Central, state, district and local administration in disaster control; Armed forces in disaster response; Police and other organizations in disaster management.	2 2
	<b>Total</b>	<b>32</b>

### Practical

S. No.	Practical	No. of Practicals
1.	Visit to a local area to document environmental assets river/ forest/grassland/ hill/ mountain. Energy: Biogas production from organic wastes. Visit to wind mill / hydro power / solar power generation units	2 1
2.	Biodiversity assessment in farming system. Floral and faunal diversity assessment in polluted and un polluted system. Visit to local polluted site - Urban/Rural/Industrial/Agricultural to study of common plants, insects and birds.	2 1
3.	Environmental sampling and preservation.	2
4.	Water quality analysis: pH, EC and TDS. Estimation of Acidity, Alkalinity.	2
5.	Estimation of water hardness. Estimation of DO and BOD in water samples. Estimation of COD in water samples.	2
6.	Enumeration of <i>E. coli</i> in water sample. Assessment of Suspended Particulate Matter (SPM). Study of simple ecosystem –	2
7.	Visit to pond/river/hills. Visit to areas affected by natural disaster	2

### Suggested Readings

1. De. A.K. 2010. Environmental chemistry. Published by New Age International Publishers, New Delhi. ISBN: 13–978 81 224 2617 5. 384 pp
2. Dhar Chakrabarti. P.G. 2011. Disaster management - India's risk management policy frameworks and key challenges. Published by Centre for Social Markets (India), Bangalore. 36 pp.
3. Erach Bharucha, Text book for Environmental studies. University Grants Commission, New Delhi
4. Parthiban, K.T. Vennila, S. Prasanthrajan, M. Umesh Kanna, S. 2023. Forest, Environment, Biodiversity and Sustainable development. Narendra Publishing House, New Delhi

5. Prasanthrajan M, P.P. Mahendran., 2008. A text book on Ecology and Environmental Science. ISBN 81-8321-104-6. Agrotech Publishing Academy, Udaipur
6. Sharma, P.D. 2009, Ecology and Environment, Rastogi Publications, Meerat, India
7. Tyler Miller and Scot Spoolman. 2009. Living in the Environment (Concepts, Connections, and Solutions). Brooks/cole, Cengage learning publication, Belmont, USA

### **Skill Enhancement Courses**

**(Choose any two from SEC-FND 121 To SEC-FND 125)\***

#### **SEC-FND-121**

#### **Ready to Eat Snacks**

**(0+2)**

#### **Practical**

<b>S. No.</b>	<b>Topic</b>	<b>No. of Practical</b>
1.	Introduction to convenience foods based on various food groups; Selection of raw materials	1
2.	Overview of various food additives used for snacks	2
3.	Preparation of Grain/pulse based snacks: whole grains –roasted, toasted, puffed, popped and flakes Coated grains-salted, spiced and sweetened	3
4.	Flour based snack–batter and dough based products; savoury and farsans; formulated chips and wafers, papads	2
5.	Preparation of fruit and vegetable based snacks chips, wafers, papads etc.	3
6.	ready to eat fruits and vegetable based food products like, sauces, fruit bars, glazed candy etc.	2
7.	ready to eat canned value added fruits/vegetables and mixes and ready to serve beverages etc.	2
8.	Preparation of Dairy based convenience foods	2
9.	Preparation of ready-to-eat baked food products	2
10.	drying, toasting roasting and flaking, coating, chipping	2
11.	Preparation of coated nuts – salted, spiced and sweetened products-chikkis, Sing bhujia	3
12.	Extruded snack foods: Formulation of cold and hot extruded snacks	3
13.	assessment of quality; Food packaging material for snack foods	2
14.	Food labels	1
15.	Visit to snack making plant	2
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Edmund, B.B. and James, Steward. Cake making.G.S.T. Bamford, Leonard Hill Book, London.
2. Fance, W.J and Wragg. BH.Up-to-date braed making. Macleran and Sons. London.

## SEC-FND -122      Hygiene Management in Food Service Units      2(0+2)

### Practical

S. No.	Topic	No. of lectures
1.	Introduction, importance and need of food hygiene and sanitation in food service establishments	2
2.	Identification of microorganism, preparation of slides, preparation of media	3
3.	Collection of water samples, Testing of water for: (i) Physical quality (ii) Bacteriological quality (iii) water hardness	3
4.	Food Borne Diseases- Define Food Borne illness	2
5.	Food Infections – Food Poisoning- Bacterial infections	2
6.	Types of Food Inspections	2
7.	Sanitary Procedures in Catering Industry- Sanitary Procedures for purchasing foods	3
8.	categories of commodities – Storage areas Temperature Zones	2
9.	Thawing, Blanching, maceration, Blast, Freezing, Pasteurization	3
10.	Introduction to Daily Cleaning Procedures in Commercial Kitchen	2
11.	Visit to food service establishments	3
12.	Survey of food service establishments	3
13.	data collection, tabulation, report writing and presentation	2
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Park, K. 2000. Text book of Preventive and Social Medicine- A Treatise on Community Health 16<sup>th</sup> ed. M/SBanarasidas Bhanot Publication, Jabalpur.
2. Bedi, Y.P. 1970. A Handbook of Hygiene and Public Health. Atma Ram and Sons Publication, New Delhi.
3. Frazier, W.C. and West Hoff, D. C. 1988 4<sup>th</sup>ed, Food Microbiology, Tata McGraw Hill Inc., New Delhi.

4. Jacob, M.1989 Safe Food Handling: A Training Guide for Managers of Food Service Establishment, WHO,Geneva.
5. Marriott, N. G. 1985. Principles of Food Sanitation AVI book, Van Nostrand Reinhold Publication, NewYork.

## SEC-FND-123

## Candy Making

2 (0+2)

### Objectives

- Students will learn to develop basic skills of preparation of candies. This will build confidence among students to start new venture.
- To impart knowledge of various types of preparations of candies.
- To enable the students to develop skill of preparing candies.

### Practical

S. No.	Course outline	No. of practical's
1.	Introduction to candy making; Basic ingredients and their role in preparation different types of candies.	2
2.	Basic tools and equipment used in the preparation of candies	1
3.	Stages of Sugar cookery, caramelization of sugar, crystallization of sugar, invert sugar, corn syrup.	2
4.	Preparation of: Ganache- Ganache techniques & uses, -Various types of ganache, how to work with ganache.	3
5.	Piped & Filled Truffles- Making various recipes of ganache used for piped truffles and filled truffles; Tempering chocolate, Slab Ganache, finishing truffles - Tempering white, milk & dark chocolate. Molded Truffles- Producing chocolates using shell molds and slabbing with metal bars.	3 2
6.	Learn how to prepare & decoratively color molds before filling, cut ganache slabs with use of guitar, proper dipping and finishing technique with tempered chocolate, including use of transfer sheets. Finish all Truffles- How to store & freeze finished Truffles.	3 2
7.	Candy Bars- Discussion of different characteristics of a candy bar, History and popularity of the Candy bar, How to Assemble a candy bar.	3 2
8.	Jellies & Pate de Fruit- Learn the differences between the use of gelatin and pectin in gummy candies, Preparation of jellies and Pate de fruit.	3
9.	Crystalline Confections- Learn how the crystallization of sugar creates candy, Preparation of different Fondants and Fudges.	2
10.	Crystalline Confections- Learn how the crystallization of sugar creates candy, Preparation of different Fondants and Fudges	2
11.	Waste Management and up keeping of work place	2
	<b>Total</b>	<b>32</b>

**Suggested Readings**

1. Chocolates & Confections, 2nd Ed by Greweling Publisher: Wiley, ISBN: 9780470424414

**SEC-FND-124****Savory Snack Preparation****2(0+2)****Practical**

S.No.	Topic	No. of lectures
1.	Market survey for availability of different types of savory snacks	3
2.	Preparation of snacks with some shelf life	3
3.	Types of Namkeen	2
4.	Preparation of Chiwda; Chakli preparation and its variations; Preparation of mathri in different flavours; Gathiya preparation	3
5.	Preparation of snacks eaten when prepared: Khaman and Dhokla with chutnies	3
6.	Preparation of Dahi Vada and its chutnies	2
7.	Making types of bhelpuri; Making Corn bhel/Chat	2
8.	Preparations of Sago: Sago Vada and Sago Khichadi	2
9.	Frying skills by preparing types of fritters and potatotwisters	3
10.	Cutlet preparation with various variations	3
11.	Preparing Sprout Chat and Masala Peanut	2
12.	Preparation of Garlic bread , Focaccia and Bruschetta	2
13.	Project writing of small scale savory snack production unit	2
	<b>Total</b>	<b>32</b>

**Suggested Readings**

1. Brown, A. (2018). Understanding Food: Principles and Preparation. Wadsworth Publishing Co Inc.
2. Sethi, M. (2007). Catering Management – An Integrated approach. New age International (P) Limited Publishers, New Delhi.
3. Pant P (2007) Cuisines – Incredible India. Wisdom Tree, India.
4. Richard E. Martland., Derek A. Eelsy. (1998). Text book of Basic cookery, Fundamental recipes and variations.

**Practical**

S. No.	Title	No. of Practicals
1.	Introduction to sugar.	2
2.	Composition and nutritional composition of sugar.	3
3.	Types, properties and functions of Sugars.	3
4.	Identification and description of different stages of sugar.	3
5.	Demonstration of 1 thread, 1.5 thread, 2 thread consistency of sugar and caramelization	3
6.	Preparation of sweets using 1 thread sugar syrup ( gulab jamun, makhanvada, jalebi, besan chakki, ghewar )	3
7.	Preparation of 1.5 and 2 thread sugar syrup ( kaju katli, shakkarpore, mava petha, gujia)	3
8.	Preparation of fondant and fudge( cake, chocolate fudge)	3
9.	Preparation of toffee ( milk toffee, chocolate, stick jaws, liquor chocolate)	3
10.	Basics of labeling, packaging and presentation of sweets and confectionery products.	3
11.	Storage and preservation of sweets and confectionery products.	3
	<b>Total</b>	<b>32</b>

**NCC-II****National Cadet Corps****1(0+1)****Objective**

1. To develop qualities of character, courage, comradeship, discipline, leadership, secular outlook, spirit of adventure and sportsmanship and the ideals of selfless service among the youth to make them useful citizen.
2. To create a human resource of organized trained and motivated youth to provide leadership in all walks of life including the Armed Forces and be always available for the service of the nation.

**Practical/ Awareness programmes**

S. No.	Topic	Class
1.	Arms Drill- Attention, stand at ease, stand easy. Getting on parade. Dismissing and falling out. Ground/take up arms, examine arms. Shoulder from the order and vice-versa, present from the order and vice-versa. Saluting at the shoulder at the halt and on the march. Short/long trail from the order and vice- versa. Guard mounting, guard of honor, Platoon/Coy Drill	2



S. No.	Topic	Class
2.	Characteristics of rifle (.22/.303/SLR), ammunition, fire power, stripping, assembling, care, cleaning, and sight setting. Loading, cocking, and unloading. The lying position and holding.	2
3.	Trigger control and firing a shot. Range Procedure and safety precautions. Aiming and alteration of sight. Theory of groups and snap shooting. Firing at moving targets. Miniature range firing. Characteristics of Carbine and LMG	3
4.	Introduction to map, scales, and conventional signs. Topographical forms and technical terms.	3
5.	The grid system. Relief, contours, and gradients. Cardinal points and finding north. Types of bearings and use of service protractor. Prismatic compass and its use. Setting a map, finding north and own position. Map to ground and ground to map. Knots and lashings, Camouflage and concealment, Explosives and IEDs	3
6.	Field defenses obstacles, mines and mine lying. Bridging, waterman ship. Field water supplies, tracks and their construction. Judging distance. Description of ground and indication of landmarks. Recognition and description of target. Observation and concealment. Field signals. Section formations. Fire control orders. Fire and movement. Movement with/without arms. Section battle drill. Types of communication, media, latest trends and developments.	3

## NSS-II

## National Service Scheme

1(0+1)

### Objectives

1. To evoke social consciousness among students through various activities viz., working together, constructive, and creative social work
2. to be skillful in executing democratic leadership, developing skill in programme,
3. to be able to seek self-employment, reducing gap between educated and uneducated, increasing awareness and desire to help sections of society.

### Practical

S.No.	Topic	Class
1.	Importance and role of youth leadership; Meaning, types and traits of leadership, qualities of good leaders; importance and roles of youth leadership	3
2.	Life competencies; Definition and importance of life competencies, problem-solving and decision-making, interpersonal communication	3
3.	Youth development programs; Development of youth programs and policy at the national level, state level and voluntary sector	3

S.No.	Topic	Class
4.	Youth-focused and youth-led organizations	3
5.	Health, hygiene and sanitation. Definition needs and scope of health education	3
6.	Role of food, nutrition, safe drinking water, water borne diseases and sanitation (Swachh Bharat Abhiyan) for health	3
7.	National health programs and reproductive health. Youth health, lifestyle, HIV AIDS and first aid	3
8.	Healthy lifestyles, HIV AIDS, drugs and substance abuse, home nursing and first aid	3
9.	Youth and yoga. History, philosophy, concept, myths, and misconceptions about yoga	3
10.	Yoga traditions and its impacts, yoga as a tool for healthy lifestyle, preventive and curative method	3

## Rangers and Rovers II

1(0+1)

### Objectives

- The development of youth in achieving their full physical, intellectual, social and spiritual potentials as responsible citizens and members of local, national and international community.

### Practical

S. No.	Topic	No. of Class
1.	<b>NIPUN Testing Camp</b> <ul style="list-style-type: none"> <li>Introduction of the origin of scouting</li> <li>Scout Law and Promise</li> <li>Scout Motto, Sign, Salute and left hand shake</li> <li>Training to wear Uniform</li> <li>Composition and significance of the National flag, the Bharat Scouts &amp; Guides Flag and the World Scout Flag, Patrol and its Flag</li> <li>Scout prayer and Scout Flag Song</li> <li>General rules of health</li> <li>Hand signals and whistle Signals</li> <li>Wood craft signs and follow a track</li> <li>Whip the ends of a rope</li> <li>Tie and knots Troop Games</li> <li>Personality development activities</li> <li>Nature study project</li> </ul>	12
2.	Community Services/ Camp/ Fair/visit etc.	4
	<b>Total</b>	<b>16</b>

**NSO-II****National Sports Organisation****1(0 + 1)****Objectives**

- To develop competence among students regarding indoor and outdoor games

**Practical**

S. No.	Course Title	No of Classes
1.	Practice of indoor games- Table Tennis, Badminton, Chess	5
2.	Practice of outdoor games- Volley ball, Basket ball, cricket, Javelin throw, Discus throw, Long jump, High jump etc	7
3.	Practice of Traditional games- Kho Kho, Kabbadi, skipping, etc.	4
	<b>Total</b>	<b>16</b>

**Post- Semester II**  
(Only for exit option for UG-Certificate)

S. No.	Course Title	Credit Hours
1.	Internship*(10 weeks)	<b>10(0+10)*</b>

\*Internship (only for exit option for award of UG-Certificate) 10 weeks

**Objectives**

To provide students with an opportunity to put into practice the skills they have learned while in the institute, so that in case they exit with UG-certificate, they will be able to get proper engagement/ employment and consider having their own startups.

1. Integrate theory and practice
2. Assess interests and abilities in their field of study.
3. Develop work habits and attitudes necessary for job success.
4. Develop communication, interpersonal and other critical skills in the job interview process.
5. Explore career alternatives prior to graduation.

**Activity**

The students will have internship/ training for 10 weeks' duration either in the parent institute (attaching the students to facilities such as farm machinery testing centre, incubation centres, prototype production facilities, etc.) or in associated industry, food service centres, etc. The College/ University will facilitate attaching the students to the organisations.

After completion of internship, the students will have to submit a report of their learnings and also present in form of a seminar before nominated faculty members and other students.

The assessment will be based on the report / assessment received from the industry/ organisation and the report and the presentation made at the University. Ideally the weightage will be 50% each for both internal and external. The SAUs may modify the weightage and breakups.

## **SEMESTER III**

**FND-211**

**Principles of Human Nutrition**

**3(2+1)**

### **Objective**

At the end of the course, the student will have knowledge of

- Different types of carbohydrates, lipids and fatty acids and proteins and amino acids required for human nutrition.
- The energy requirement and expenditure in the human body during rest and physical activity.
- The physiological and biochemical role of water, minerals and vitamins and their metabolism in the human body.
- The diseases and symptoms resulting from deficiency of major and minor nutrients.
- The biochemical monitors used to assess the nutritional status of different nutrients.

### **Theory**

<b>S. No.</b>	<b>Topic</b>	<b>No. of Lectures</b>
1.	Historical development and the relationship of nutrition to health, growth and human welfare.	1
2.	Definitions of terms used in nutrition- Recommended dietary allowances, balanced diet, health foods, functional foods, phytochemicals, Nutraceuticals, dietary supplements, ethnic foods, organic foods, fabricated foods, extruded foods, convenience foods, junk foods, GM foods and proprietary foods.	3
3.	Food groups (Four, Five, Seven, Nine, Eleven) Food pyramid, my plate concept, Bioavailability, enrichment, fortification and restoration of nutrients.	1 1

S. No.	Topic	No. of Lectures
4.	Energy units, sources and requirements, fuel value of foods, Methods of measuring energy value of food, energy requirement of body, physical activity and thermogenic effect of food, Respiratory Quotient, SDA BMR- methods of measurement, factors affecting BMR Energy expenditure in different activities, Energy balance.	1 2 1 2
5.	Carbohydrates- Types, functions, sources, requirement, Digestion and absorption of carbohydrates, health conditions affected by carbohydrates Dietary Fiber-Classification,sources, composition, properties & nutritional significance	2 1
6.	Lipids- Types, functions, sources, requirement,Digestion and absorption of lipids health problems associated with lipids.	3
7.	Proteins- Types, functions, sources, requirement, Digestion and absorption of proteins, Quality evaluation, improvement and deficiency and protein energy malnutrition.	2 2
8.	Vitamins- Classification, functions, sources, requirement, deficiency and toxicity of fat soluble-(A, D, E, K) Water soluble – C, B Complex (thiamine, riboflavin, niacin, B6, Pantothenic acid, B12 and folic acid).	2 2
9.	Minerals-Classification, functions, sources, requirements, deficiency and toxicity of calcium, phosphorus, iodine, fluorine, iron, sodium, potassium, chloride, copper and zinc, Factors affecting bio availability of calcium and iron and other minerals.	3 1
10.	Water- functions, sources, distribution in body Water balance and electrolyte balance	1 1
	<b>Total</b>	<b>32</b>

### Practical

S. No.	Experiment	No .of practicals
1.	Serving size of common dishes	2
2.	a. Planning and preparation of nutrient rich dishes: protein, calcium, iron, vitamin A, thiamine, riboflavin, niacin and ascorbic acid b. Calculate calorie and cost of dishes prepared for above nutrients	6
3.	Evaluation of three days energy balance	2

S. No.	Experiment	No .of practicals
4.	Planning and preparation of dishes based on simple processing techniques to improve bioavailability of nutrients.	
	Germination	1
	Fermentation	1
	Mutual supplementation	1
	Malting and others	1
5.	Planning and preparation of low cost nutritious recipes	1
6.	Study of common deficiency diseases through audio visual aids	1
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Mogra, R. and Joshi, P. (2023), Principles of Human Nutrition, 1<sup>st</sup> Edition, Agrotech Publishing Academy, Udaipur.
2. Agrawal, A. and Udipi, A.S. 2022. Textbook of Human Nutrition. Jaypee Brothers Medical Publishers.
3. Recommended dietary allowances and estimated average requirements nutrient requirements for Indians – 2020- A Report of the Expert Group Indian Council of Medical Research, National Institute of Nutrition
4. Raghuvanshi, R. S., Mittal, M. 2014. Food Nutrition and Diet Therapy. India: Westville Publishing House New Delhi
5. Bamji, M.S., Krishnaswamy, K. and Brahmam, G.N.V. 2009. Text book of Human Nutrition. Oxford & IBH Publishing Company Pvt. Ltd.
6. Sehgal, S. and Raghuvanshi, R.S. 2007. Text Book of Community Nutrition. ICAR Publication.
7. Wilson, E.D.; Fisher, K.H. and Garcia P.A. 1980. Principles of Nutrition. John Wiley & Sons, New York.
8. Longvah, T., Ananthan, R., Bhaskarachary, K. and Venkaiah, K. 2017. Indian Food Composition Tables. National Institute of Nutrition, ICMR, New Delhi
9. Shakuntala Manay N, Shadaksharaswamy M. 1998. Foods, Facts and Principles, New Age International Publishers, New Delhi

## Objectives

## Theory

S. No.	Topic	No .of Lectures
1.	Cooking- Objectives, cooking methods, their types, merits and demerits.	2
2.	Cereals and millets - Structure, composition, processing techniques, effect of heat and acid, functions of starch in the cookery, retrogradation of starch.	3
3.	Legumes, nuts and oil seeds - Composition, processing techniques, effect of heat, acid and alkali.	3
4.	Fruits and vegetables - Types, composition, pigments, changes caused by heat, acid and alkali.	3
5.	Milk and milk products – Composition, types, products, effect of acid on milk cookery, uses and functions.	3
6.	Egg - Structure, composition, grading of egg, function and changes during cooking.	3
7.	Meat, poultry and fish- Types, structure, composition, pigments, factors affecting tenderness, post-mortem changes and changes during cooking.	3
8.	Sugars- Types, composition, manufacturing process, Effect of heat and acid, crystallization factors affecting crystallization, functions of sugar in cookery, fondants and fudge.	2 2
9.	Fats and oils - kinds, composition, effect of heat, functions in cookery, processing techniques, Rancidity of fats;	3 1
10.	Methods of improving nutritive value of foods – germination, fermentation, malting, mutual supplementation etc.	2
11.	Brief overview of beverages; Condiments and spices, importance in daily life.	2
	<b>Total</b>	<b>32</b>

## Practical

S. No.	Experiment	No .of practical's
1.	Orientation to kitchen equipment and their uses,	1
2.	Weighing and measuring food items, condiments and spices.	1
3.	Cooking of foods using different methods.	1

S. No.	Experiment	No .of practical's
4.	Cereal cookery– Practical exercise on dextrinization and gelatinization of rice starch, gluten formation in wheat.	1
5.	Legumes – Identification and cooking methods.	1
6.	Nuts and oilseeds- Use in food preparations. Preparations using Germination, fermentation, mutual supplementation.	1
7.	Vegetable cookery- Different preparations with vegetables and effect of heat and alkali on pigments.	2
8.	Preparation of soups, salads and beverages.	1
9.	Milk and milk products- Maillard reaction, Use in various preparations.	1
10.	Egg cookery - Preparations showing functions of egg as binding, coating agent: poached egg, boiled egg, scrambled egg, omelet, egg curry.	1
11.	Meat, poultry and fish cookery – Preparations involving various methods of cooking.	1
12.	Sugar – Preparations showing functions of sugar in cooker- caramelization, coating agent, crystallization, syrups of different consistencies, sweets, chocolates, candies.	2
13.	Fats and oils – Demonstration of smoking point, use in various preparations like deep fat frying, shallow fat frying, shortening effects of oil, factors affecting absorption of oil.	2
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Sharma, A. 2017. Textbook of Food Science and Technology. CBS Publication.
2. Fox, B. F. and Cameron, A. G. 1970. Food Science - a Chemical Approach. University Press, London
3. Swaminathan, M. 1988. Handbook of Food Science and Experimental Foods BAPPCO, Bangalore.
4. Raghuvanshi, R.S. and Bisht, K. 2010. Uses of Soybean: Products and Preparation. Guriqbal Singh(Ed.). In: Soybean: Botany, Production and Uses, CAB International, U.K.
5. Raghuvanshi, R.S. and Singh, D.P. 2009. Food preparations and use. William Erskina *et al.* (Eds.). In: The Lentil: Botany Production and Uses. CAB International, U.K.
6. Shakuntala Manay N, Shadaksharaswamy M. 1998. Foods, Facts and Principles, New AgeInternational Publishers, New Delhi



**Objectives**

At the end of the course, the student will have knowledge of

- Causes, prevalence and consequences of the major nutritional problems existing in India and its control measures.
- Methods of nutritional status assessment of individual and group both directly and indirectly.
- To inculcate concept of food and nutrition security and government and international program running in the field of community nutrition for ameliorating nutritional status of population.
- To enable students to assess nutritional status and impart nutrition education among rural and needy people.

**Theory**

<b>S. No.</b>	Basic concept of community nutrition role of nutritionist in improving nutrition in community.	1
1.	Food habits and influencing factors, Food taboos, Mortality and morbidity pattern of vulnerable groups and their causes.	2
2.	Nutritional needs of normal infants, prelacteal feeding, exclusive breast feeding, feeding of full term and premature infants.	2
3.	Importance of breast feeding and supplementary foods in combating malnutrition in infants and young children.	2
4.	Growth monitoring	2
5.	Malnutrition. Definition and causes, classification of grades of malnutrition.	2
6.	Assessment of nutritional status- Nutritional Anthropometry-Need and importance, standard for reference, techniques of measuring Length/ height, weight, head, chest and arm circumference, skinfold thickness, interpretation of these measurements.	3
7.	Use of growth chart	1
8.	Clinical signs of deficiencies specially PEM (Kwashiorkor, marasmus), vitamin A deficiencies, Anemia, Rickets, B-Complex deficiencies.	3
9.	Bio chemical and biophysical assessment.	2
10.	Diet survey: Need and importance, methods of dietary survey, Interpretation - concept of consumption unit, individual and total distribution of food in family, adequacy of diet in respect to RDA, concept of family food security.	2

11.	Major nutritional problems in community.	2
12.	National programmes and policies for improving nutritional status of community.	2
13.	Role of national and international agencies in improving nutritional status of the community.	2
14.	Nutrition education: objectives, methods, channels and its role in control of malnutrition in community	2
15.	Nutritional survey – NFHS.	2
	<b>Total</b>	<b>32</b>

### Practical

<b>S.No.</b>	Assessing nutritional status of hostel inmates and local community dwellers.	3
1.	Assessing nutritional status of community as per socio-economic status.	3
2.	Visit to local health centres to identify clinical signs and symptoms of nutritional problems.	3
3.	Visit to Anganwadi centres, MDM and evaluation of feeding provided at these centres.	3
4.	Community survey for nutritional deficiency disorders -Data collection, tabulation, analysis, interpretation report writing.	2
5.	Development of audio- visual aids. Planning, implementation and evaluation of nutrition education programme for a target group.	2
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Das, S. 2022. Textbook of Community Nutrition. Academic Publishers.
2. Sehgal, S. and Raghuvanshi, R.S. 2007. Textbook of community nutrition, Directorate of Information and Publications of Agriculture, Indian Council of Agricultural Research, New Delhi.
3. Latham, M.C. 1997. Human nutrition in the developing world. Food and agricultural organization of United Nations.
4. Dahiya, S., Boora, P. and Rani, V. 2013. A manual on Community nutrition, Dept. of Foods and Nutrition, published under ICAR, Assistance scheme.
5. Bamji, S.M., Rao, N.P., Reddy, V. 1996. Textbook of human nutrition. Oxford and IBH publishing Co. Pvt. Ltd., New Delhi.

**Objective**

- An overall goal of this course is to enable students to understand the role of molecules, cells, tissues, organs, and organ systems (endocrine, nervous, muscular and immune systems) in human health and disease.
- This course focuses on understanding physiology—the functioning of a living organism and its component parts.
- This requires going beyond memorization of facts to acquire an understanding of how and why the body functions the way it does, and what happens when it does not function properly.

**Theory**

<b>S.No.</b>	<b>Topic</b>	<b>No .of Lectures</b>
1.	Introduction to anatomy and physiology and structural organization of body.	1
2.	The cell – Structure, its organelles, functions and multiplications, different types of cells and their functions, movement of particles across cell membrane - Active transport and passive transport	3
3.	Body fluids and its compartments and functions ,Water output and input into the body and maintenance of water balance in human body	2
4.	The tissues – Types, structure and their functions	3
5.	the skeletal system - Anatomy and functions, structure, formation and development of bones, different types of bones and types of joints and their movements	3
6.	Circulatory system - The blood - Composition and function, blood clotting and blood grouping	2
7.	Heart –Structure, functions, types of circulatory systems, blood pressure and heart rate and factors affecting it, electrocardiogram	2
8.	The respiratory system - anatomy, functions, mechanism of breathing and respiratory volumes, gas transport and respiratory adaptation	2
9.	The digestive system-anatomy and functions of alimentary tract and accessory organs, process of digestion of food, absorption and assimilation of digested food, enzymes involved in digestion of food, liver - Structure and functions, Pancreas – Structure and functions	3
10.	The urinary system - Anatomy and functions, formation and composition of urine	2

S.No.	Topic	No .of Lectures
11.	The endocrine system – important ductless glands of the body and their functions	2
12.	The reproductive system- Male reproductive system – Anatomy and functions, female reproductive system – Anatomy and functions, menstrual cycle	2
13	The nervous system - elementary study of (anatomy and functions)	2
14.	Sensory organs –(anatomy and functions).	2
15.	Glossary of terms used in physiology.	1
	<b>Total</b>	<b>32</b>

### Practical

S.No.	Experiment	No .of practicals
1.	Study of a compound microscope, microscopic structure of epithelial, muscular and connective tissue, bone and cartilage	3
2.	Measurement of body temperature, Basal Metabolic Rate, Recording of systemic arterial blood pressure	3
3.	Pulmonary function test, Pulse rate and respiratory rate, Effect of posture and exercise on blood pressure.	3
4.	Visit to anatomy and physiology lab,	1
5.	Estimation of hemoglobin, red blood corpuscles, estimation of white blood corpuscles, determination of blood groups assessment of blood group, determination of bleeding time(bt) and clotting time	3
6.	Determination of blood glucose qualitative tests with urine samples-urine sugar and albumin.	3
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Arthur J.V. Human physiology-The mechanisms of body function, Tata McGraw Hill Publishing Company, New Delhi.
2. Samson, applied physiology 10<sup>th</sup> ed. Revised by Keele, C.A. and Neil, B. Oxford University Press, New York.
3. Guyton C. Text Book of medical physiology 5 the d. W.B. Saunders Company- Philadelphia, London

**Objectives**

- Students will study food from a scientific perspective and the food industry from a business point of view.
- Students will have opportunities to create new food products and develop new ways to manufacture, preserve, and package food products.
- Students will take courses in food production, development, and commercialization.

**Theory**

<b>S. No.</b>	<b>Title</b>	<b>No. of Lectures</b>
1.	Economics definition and key concepts; business economics.	3
2.	The working of competitive markets: business in a competitive market; demand and supply population and growth food production availability	3
3.	Price and output determination; elasticity of demand and supply; Government intervention in competitive markets (FCI, Food Subsidies).	3
4.	Background to demand: marginal utility theory and demand and the firm.	3
5.	Background to supply: cost and production; short vs long-run.	3
6.	Revenue and profit maximization.	2
7.	Market Structures: Perfect competition, monopoly, monopolistic competition.	3
8.	Business in an international environment: globalization (key concepts)	2
9.	Business Management- Definitions, management principles, scientific principles, administrative principles	3
10.	Maslow's Hierarchy of needs theory; Functions of management: Planning, organizing, staffing, directing, controlling	3
11.	Organizational structures, principles of organization; Types of organization	2
12.	Formal and informal, line and staff, matrix, hybrid	2
	<b>Total</b>	<b>32</b>

**Suggested Readings**

1. L.M. Prasad. 2001. Principles and Practices of Management, 9th Ed. S. Chand & Sons, New Delhi.
2. Koontz Harold. Principles of Management. Tata McGraw-Hill Education Private Limited, New Delhi.

3. P.C. Thomas. Managerial Economics, 9th Ed. Kalyani Publishers.
4. K.K. Dewett and M.H. Navalur. Modern Economic Theory. S. Chand & Sons, New Delhi.
5. P. Subba Rao. Human Resource Management. Himalaya Publications.
6. S.P. Jain. Financial Accounting. Kalyani Publications, Ludhiana.
7. Dorfman, Jeffrey H. 2013. Economics and Management of the Food Industry. Taylor & Francis.

## **FND-216**

## **Food Psychology**

**2(2+0)**

### **Objectives**

- To gain a understanding of the psychological factors that influence food choices, eating behaviors, and our relationship with food.
- To explore the impact of sensory experiences (taste, smell, sight, touch) on food perception and preference.
- To examine the psychology behind food marketing and advertising strategies.
- To develop practical strategies to cultivate a mindful and healthy relationship with food.

### **Theory**

<b>S.No.</b>	<b>Topic</b>	<b>No .of Lectures</b>
1.	Introduction to food psychology, Interaction of hunger and satiety, Sensory perception and food preferences.	2 2 2
2.	Role of positive and negative emotions on selection/ choice of food eating behavior.	3
3.	Meal composition and effect of specific nutrients on stress/ mood, Understanding and managing cravings, Anorexia nervosa.	2 1 1
4.	Binge eating behaviour, Mindful eating practices, Social cues and dinner environment.	1 1 2
5.	Psychological influence of food marketing and advertisement, digital food marketing.	3
6.	Public health challenge, Cultural food tradition and practices, Food and mental well being	2 2 2
7.	Application of food psychology, Overeating, Disordered eating and body image concerns	1 1 2
8.	Strategies for individual and community health.	2
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. "Food: A Guide to Understanding Eating Behavior" by Jane Ogden (2017)
2. "The Psychology of Food" by Paul Rozin (2017)
3. "Food, Culture, and Society: A Reader" by Carole Counihan and Penny Van Esterik (2018)
4. "The Oxford Handbook of Food and Foodways" edited by Jeffrey M. Pilcher (2017)
5. "Food Choice, Acceptance and Consumption" by H. L. Meiselman (2018)
6. "The Psychology of Eating: From Healthy to Disordered Behavior" by Jane Ogden (2018)
7. "Food and Emotions" by Alexandra Watkins and David A. Booth (2017)
8. "The Food Psychology Handbook" by Brian Wansink (2019)
9. "Mindless Eating: Why We Eat More Than We Think" by Brian Wansink (2016)
10. "Slim by Design: Mindless Eating Solutions for Everyday Life" by Brian Wansink (2014)

### Skill Enhancement Courses

(Choose any ONE course from SEC –FND 211 To SEC –FND 214)\*

**SEC-FND 211      Quality Control in Food Processing Unit      (0+2)**

#### Practical

S.No.	Topic	No. of lectures
1.	Concept of quality control and quality assurance in food processing industry	3
2.	Food and nutrition labelling on foods as per FSSAI regulations and international standards	3
3.	Food safety management systems- GMP/GHP, HACCP, GLP, GAP,	4
4.	The Kosher and Halal Food Laws Food packaging	2
5.	packaging material	3
6.	Evaluation of food quality – Assessment of quality of some finished foods through objective and subjectivemethods	3
7.	Market survey and quality analysis of street foods	4
8.	Visit to food processing Units to understand the quality control methods used while processing food	4
9.	Simple physical and chemical tests to determine quality and detect adulterants in Oil and Fats, Spices and Condiments (any five), Food Grains, Pulses and Oilseeds, Flours – Wheat, Canned foods – Drained wt., Sugar and Honey, Milk & Milk products, Tea, Coffee	2
10.	Report writing	4
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Impact WTO and Codex.
2. McWilliams, M. (2000) Foods Experimental Perspectives, 4th edition, Prentice-Hall, Inc New Jersey.
3. [https://www.fssai.gov.in/https://agriexchange.apeda.gov.in/IR\\_Standards/Import\\_Regulation/Food and A gricultural Import Regulations and Standards Report New Delhi India 352019.pdf](https://www.fssai.gov.in/https://agriexchange.apeda.gov.in/IR_Standards/Import_Regulation/Food_and_Agricultural_Import_Regulations_and_Standards_Report_New_Delhi_India_352019.pdf)

### SEC-FND-212 Web Designing and Multimedia Production

2(0+2)

#### Practical

S.No.	Topic	No. of lectures
1.	Study of creating Webpages using HTML elements like <html>, <head>, <title>, <body>, <u>, <b>, <i>,<p>, <marquee>,  , <ol>, <ul> with all its attributes.	2
2.	Familiarization with different types of websites. writing for construction of website	3
3.	Hands-on-experience with Adobe photoshop for designing of website. Hands-on-experience with HTML	3
4.	Hands-on-experience with Dreamweaver for construction of website. Hands-on-experience with flash for animations of website, Familiarization with cascading sheet styles	4
5.	Familiarization with web analytics, Practical orientation to Multimedia application	3
6.	Exposure to multimedia hardware and maintenance-parts and connection, peripheral.	4
7.	Handling multimedia-parts, connections and peripheral. Scanning, retrieval, capturing and navigating skills	3 3
8.	Planning and Production of multimedia package, Multimedia authoring tools - CD and DVD writing techniques	2 3
9.	Presentation of the prepared Multimedia kit by using LCD Projector	2
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Jennifer Niederst Robbins. Developing web design latest edition.
2. Frain and Ben. Responsive Web Design with HTML5.



**Objectives**

- Students will learn to develop basic skills of preparation of Jam and jellies. This will build confidence among students to start new venture.
- To impart knowledge of various types of preparations of jam and jellies.
- To enable the students to develop skill of preparing jam and jellies.

**Practical**

S. No.	Course outline	No. of practical's
1.	Nutritional aspect of Fruits; Basic characteristics of jams, jellies, marmalades, fruit preserves, glazed and crystallized fruits.	2
2.	Role of sugar and other ingredients in fruit preservation. Introduction to various food additives used in jams, jellies and other fruit preserves	3 2
3.	Basic tools and equipment used in the preparation of jams, jellies and crystallized fruits such as pulper, sealers, juice extracting machines, autoclaves, steam jacketed kettle, etc.	3
4.	Introduction to different types of packaging materials used. Identification of different types of spoilage occurring in fruits; Selection and grading of raw and ripe fruits for preservation.	3 2
5.	Preparation of Jam, jelly and marmalades - ripe mango, green mango, pineapple, apple, guava, orange, mixed fruits, etc.	3
6.	Preparation of glazed and crystallized fruit preserves- ginger, orange, apple, etc.	3
7.	Analysis of the raw material and finished product - Pectin grade, Acidity of fruit juice and pickle, Total Solid content, Brix measurement, Moisture content, Ash content, reducing and non-reducing sugar content.	3 2
8.	Study on the shelf life of the finished product.; Basics of labeling, packaging and presentation of sweets	3
9.	Waste Management and up keeping of work place	3
	<b>Total</b>	<b>32</b>

**Suggested Readings**

1. Potter, N.N. (1996). Food Science. The AVI Publishing Company, Inc., Westport, Connecticut.
2. Sehgal, S., Grewal, R.B., Kawatra, A. and Kaur, Y. (1997). Practical Aspects of Food Preservation. Directorate of Publications. Haryana Agricultural University, Hisar.

3. Vijay K., (1999), Text book of Food, Storage and Preservation, Kalyani Publishers, New Dehi.
4. Kalia, M. and Sood, S. (2010). Food Preservation and Processing. Revised Edition, Kalyani Publishers, New Delhi.
5. Jood, S. and Khetarpaul, N. (2002). Food Preservation. Geeta Somani Agrotech Publishing Academy, Udaipur.

## **SEC-FND-214**

## **Development of Audio- Visual Aid**

**2(0+2)**

### **Practical**

<b>S. No.</b>	<b>Title</b>	<b>No. of practical</b>
1.	Introduction, need, importance of audio- visual aids.	3
2.	Classification of AV aids.	3
3.	Advantages of different types of AV aids.	2
4.	Disadvantages of different types of AV aids.	2
5.	Characteristics of AV aids.	2
6.	Principles to be followed for the effective use of AV aids.	2
	Development of various types of AV aids (digital/ non digital) – flash cards	2
	Posters	2
	Charts	2
	Puppets	2
	Video spots	2
	Podcasts	2
	Role plays	2
	Cultural programmes	2
7.	Field testing of the developed AV aids.	2
	<b>Total</b>	<b>32</b>

### **Suggested Readings**

1. G L Ray (2017): Extension Communication and Management, 8<sup>th</sup> edition, Kalyani Publishers, Ludhiana.
2. Adivi Reddy (2007): Extension Education, 7 edition, Sree Lakshmi Press, Guntur.
3. O.P. Dahama & O.P. Bhatnagar (2012): Education and Communication for Development, 2 edition, Oxford & IBH Publishing Co. Pvt. Ltd.
4. V.K. Dubey & Indira Bishnoi (2009): Extension Education and Communication, First edition, New Age International Publishers, New Delhi.

5. Indu Grover, Lali Yadav, Sushma Kaushik & ShashiKanta Varma (2002): Communication and Instructional Technology, Agrotech Publishing Academy, Udaipur.
6. Prof. Harmesh Lal, Dr. Shailendra Bhushan, Dr. Meenu Kumar (2018): Audio-Visual Aids to Educational Technology
7. AS Sandhu, Anoop Singh Sandhu (2019): Textbook on Agricultural Communication (Process And Methods), CBS Publishers and Distributors Pvt. Ltd.
8. Dr. Jitendra Chauhan (2016): Communication and Extension Management, 2<sup>nd</sup> Edition, Kushal Publications and Distributors.

**PE-211                      Physical Education, First Aid and Yoga                      2(0+2)**

**Objective**

- To make the students aware about Physical Education, First Aid and Yoga Practices.
- To disseminate the knowledge and skill how to perform physical training, perform firstaid and increase stamina and general wellbeing through yoga.

**Practical**

S.No.	Experiment	No .of practical's
1.	Physical education; Training and Coaching - Meaning & Concept	1
2.	Methods of Training; aerobic and aerobic exercises; Calisthenics, weight training, circuit training, interval training, Fartlek training	1
3.	Effects of Exercise on Muscular, Respiratory, Circulatory & Digestive systems	2
4.	Balanced Diet and Nutrition: Effects of Diet on Performance; Physiological changes due to ageing and role of regular exercise on ageing process	2
5.	Personality, its dimensions and types; Role of sports in personality development; Motivation and Achievements in Sports	2
6.	Learning and Theories of learning; Adolescent Problems & its Management; Posture; Postural Deformities; Exercises for good posture	2
7.	Yoga; History of Yog, Types of Yog, Introduction to Yog,	1
8.	Asanas (Definition and Importance) <ul style="list-style-type: none"> <li>• Padmasan, Gaumukhasan, Bhadrasan, Vajrajasan, Shashankasan, Pashchimotasan, Ushtrasan, Tadasan, Padhastasan, Ardhchandrasan, Bhujangasan,</li> <li>• Utanpadasan, Sarvangasan, Parvatasan, Patangasan, Shishupalanasan – left leg-right leg, Pavanmuktasan, Halasan, Sarpasan, Ardhdhanurasan, Sawasan</li> </ul>	1 1 1

S.No.	Experiment	No .of practical's
9.	Suryanamskar Pranayama (Definition and Importance)Omkar, Suryabhedan, Chandrabhedan, Anulom Vilom, Shitali, Shitkari, Bhastrika, Bhramari	2
10.	Meditation (Definition and Importance), Yogic Kriyas (Kapalbhati), Tratak, Jalneti and Tribandh	2
11.	Mudras (Definition and Importance) Gyanmudra, Dhyanmudra, Vayumudra, Akashmudra, Pruthvimudra, Shunyamudra, Suryamudra, Varunmudra, Pranmudra, Apanmudra, Vyanmudra, Uddanmudra	2
12.	Role of yoga in sports	1
13.	Teaching of Asanas – demonstration, practice, correction and practice	1
14.	History of sports and ancient games	1
15.	Governance of sports in India; Important national sporting events; Awards in Sports	1
16.	History, latest rules, measurements of playfield, specifications of equipment, skill, technique, style	1
17.	Coaching of major games (Cricket, football, table Tennis, Badminton, Volleyball, Basketball, Kabaddi and Kho-Kho) and Athletics	1
18.	Need and requirement of first aid. First Aid equipment and upkeep	1
19.	First AID Techniques <ul style="list-style-type: none"> <li>First aid related with respiratory system. First aid related with Heart, Blood and Circulation. First aid related with Wounds and Injuries. First aid related with Bones, Joints Muscle related injuries.</li> <li>First aid related with Nervous system and Unconsciousness. First aid related with Gastrointestinal Tract. First aid related with Skin, Burns. First aid related with Poisoning. Firstaid related with Bites and Stings. First aid related with Sense organs</li> </ul>	2 2
20.	Handling and transportof injured traumatized persons. Sports injuries and their treatments.	1
	<b>Total</b>	<b>32</b>

## FND-217

## Food Nutrition and Agriculture

2(2+0)

### Objectives

- Develop skills to apply and evaluate innovative solutions that place nutrition at the heart of a sustainable food system.
- Students will learn about the components of the food system and their link to nutrition and acquire the skills to implement and evaluate nutrition-sensitive interventions.

## Theory

S.No.	Topic	No .of Lectures
1.	Food production and consumption situation in India and in the world; Food production and consumption trends, food balance sheets;	1 1 2
2.	Role of nutrition in agricultural planning and national development.	2
3.	Linkages between agricultural practices, food production, food distribution and nutritional status.	3
4.	Factors affecting food distribution at macro and micro level, per capita food availability and consumption; Food and nutrition security at national and household level; Role of agriculture in enhancing food security; Urbanization and food security.	2 2 2 1
5.	Sustainable food systems; Food crop failure and malnutrition, poverty and vicious cycle of low food production.	2
6.	Innovative approaches to enhance local food production and improve food distribution systems.	2
7.	Effect of food production and economic policies on food availability;	1
8.	Impact of physical resources, farming systems, cropping system, inputs and manipulation	1
9.	agricultural marketing system,	1
10.	post-harvest processing of foods on food and nutrition situation;	1
11.	Nutritional composition of commonly consumed foods.	1
12.	Implementation of nutrition policy, agricultural programmes; nutritional impact of agricultural programmes, food price control and consumer subsidy;	2 1 2
13.	Contribution of National and International organization in agricultural development.	2
	<b>Total</b>	<b>32</b>

## Suggested Readings

1. FAO. 2017. The State of Food and Agriculture - Leveraging Food Systems for Inclusive Rural Transformation. Food and Agriculture Organization, Rome.

2. FAO. 2017. The State of Food Security and Nutrition in the World. Food and Agriculture Organization, Rome.( latest publications of FAO)
3. GOI. 2017. Agriculture - Statistical Year Book India. Ministry of Statistics and Programme Implementation, Government of India. (latest publications of GOI)
4. Raghuvanshi R.S. 2013 Nutritional Security through Diversified Food Production. in Agrarian Change and Small Farmers, Super markets, Viability and Food Policy. Ed. by K.N. Bhatt and Pradeep Bhargava, Concept Publishing Company PVT. LTD., New Delhi
5. GOI. 2011. Census of India. Government of India. (New Census Report)
6. GOI. 2018. A Reference Manual by Publication Division. Ministry of Information about Broadcasting, Govt. of India.
7. Albert, J.L. (Eds.) 2000. Food, nutrition and agriculture. FAO Publication.
8. India 2001. A Reference Annual. Publication Division, Ministry of Information and Broad casting, Govt. of India.
9. National Family Health Survey (rchiips.org)
10. Home - Global Nutrition Report
11. Global Food Security Index (GFSI) (economist.com)
12. <https://www.who.in>

## SEMESTER IV

**FND-221                      Normal Nutrition and Meal Planning                      3 (2+1)**

### Objectives

- To acquire basic knowledge of nutrient requirements, recommended dietary allowances, and dietary modification under different physiological conditions and disease conditions.
- To develop practical skills in planning and management of diets for the different age groups under normal/ physiological conditions keeping in mind the dietary guidelines and to modify the diet plans to suit the disease conditions.

### Theory

S. No.	Topic	No. of lectures
1.	Determination of nutritional requirements- Basic principles of menu planning, factors affecting planning menus for individual and family. Steps involved in meal planning.	1
2.	Concept of calorie consumption unit. Factors (physiological and psychological) affecting food requirements of individuals, families and different groups of people.	2

S. No.	Topic	No. of lectures
3.	Classification of vegetarianism. Importance of balanced diets. Food exchange list. Use of food exchangelist in diet planning. Introduction to normal nutrition- Food, nutrient requirement and menu planning of adults (male and female of all activities level), pregnant women, lactating women, Infants. Breast feeding, advantages of breast feeding, breast feeding during illness, feeding of pre-term baby, feeding problems	3
4.	Weaning and complementary feeding. Food and nutrient requirement of pre-school children, school age children, adolescents, old age people Physiological and psychological changes during old age.	3
5.	Introduction to therapeutic nutrition- Definition of therapeutic nutrition/ Diet therapy, objectives of therapeutic diet. Principles of diet therapy and Importance and modification of normal diet to therapeutic diets. Routine Hospital Diet-clear liquid diet, liquid diet, semi-solid diet, soft diet, normal diet, bland diet, high and low calorie diet, high and low protein diet, high and low fiber diet, low cholesterol diet etc	3
6.	Therapeutic adaption- change in consistency, change in energy intake, change in nutrient, change in fiber, change in frequency of feeding, change in elimination of food	3
7.	Methods of feeding- enteral feeding, parenteral feeding, advantages and disadvantages of these methods	2
8.	Aetiology, symptoms and dietary management in acute and chronic fevers. Typhoid, influenza, tuberculosis. Viral and auto immune diseases- causes, symptoms and diet management. Allergy – causes, symptoms and diet management.	2
9.	etiology, symptoms and dietary management in gastrointestinal disorders- Diarrhoea, constipation, peptic ulcer, diverticular disease, inflammatory bowel disease, celiac disease, lactose intolerance etc. and other disorders	3
10.	Aetiology, symptoms and dietary management in liver diseases- fatty liver, hepatitis, jaundice, cirrhosis of liver.	2
11.	Aetiology, symptoms and dietary management in cardiovascular disease, atherosclerosis and hypertension.	2
12.	Aetiology, symptoms and dietary management in diabetes mellitus. Aetiology, symptoms and dietary management in overweight and obesity and underweight.	2
13.	Aetiology, symptoms and dietary management in renal disease- nephritis, nephrotic syndrome acute renal failure, chronic renal failure etc	2
14.	Aetiology, symptoms and dietary management in cancer.	2
	<b>Total</b>	<b>32</b>

## Practical

S.No.	Topic	No. of practical
1.	Standardization of serving size portions	3
2.	Planning, preparation and calculation of diets for different age groups- Infancy, preschool age, school age, Adolescent, adult, old age	3 3
3.	Planning, preparation and calculation of diets for pregnant and lactating women.	2
4.	Planning, preparation and calculation of packed lunches, clear liquid diet, full fluid diet, soft diet, tube feeding diet, high calorie/ fiber diet etc.	2
5.	Planning, preparation and calculation of diets for following diseased condition- diarrhea, constipation, peptic ulcer, hepatitis, hypertension, atherosclerosis, diabetes, mellitus, overweight/ obesity.	3
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Raghuvanshi, R.S. and Mittal, M. (2014). Food Nutrition and Diet Therapy. Westvills Publication Delhi.
2. Agarwal, A and Udipi, S. (2014). Text Book of Human Nutrition. Jaypee Medical Publication Delhi.
3. Antia, P. (1986). Clinical dietetics and nutrition. Oxford univ. Bombay
4. Srilakshmi, B. (1995). Dietetics. Newage international publishers, New Delhi.
5. Agarwal, A and Udipi, S. (2014). Text Book of Human Nutrition. Jaypee Medical Publication Delhi.
6. Antia, P. (1986). Clinical dietetics and nutrition. Oxford univ. Bombay
7. Srilakshmi, B. (1995). Dietetics. Newage international publishers, New Delhi.

## FND-222

## Public Health Nutrition

3(2+1)

### Objectives

- Public Health Nutrition (PHN) course aims to equip students with the knowledge of community nutrition, national and international nutrition programmes and interventions.
- The programme strengthens student's skills to develop, implement and evaluate the nutrition programmes and policies to address the different nutritional problems with greater impact and efficiency.



- The course envisages to develop an evidence-based approach to address the nutritional problems and to reduce the risk for malnutrition in different populations.

### Theory

S.No.	Topic	No. of Lectures
1.	Concept of Health, Public health, Public Health Nutrition, Nutritional Epidemiology and Community nutrition- Demography, demographic cycle	1 1
2.	Health Indicators and their significance – Birth and death rates, IMR, MMR, TFR, U5MR etc.	2
3.	Health Care System in India – Primary, Secondary and Tertiary, National Health Policy, National Nutrition Policy and National Nutrition Mission-An overview	2 1 1 1
4.	Public health problems of India, nutrient deficiency diseases and other diseases, their etiology, prevalence, prevention and monitoring.	2
5.	Indicators and data sources from existing macro and micro systems of information in India (NFHS, NSSO, ICDS, NSS, CENSUS).	2
6.	National programmes relevant for public health. Vitamin A deficiency disorder control programme, National diarrhoeal disease programme, national iodine deficiency disorder control programme, iron deficiency anemia prophylaxis programme, National malaria eradication programme, national immunization programme, national programme for control of tuberculosis, national AIDS control programme, other health and nutrition programmes.	1 1 1 1 1 1 1 1
7.	Communicable and infective disease control: Nature of communicable diseases, infections, contamination, transmission, vector borne diseases, environmental agents, control and prevention.	2 1
8.	National Malaria Eradication Programme, National Filarial control programme, National Leprosy Eradication programme, Japanese Encephalitis control and Other national control programmes (Blindness, Mental Health, etc) National Mental Health Programme (NMHP).	2 2
9.	Universal Immunization Programme and child survival and safe motherhood programme.	2
10.	COVID-19, its origin, life cycle of virus, mutation, detection, case tracking, vaccine development, and vaccination program.	1 1
	<b>Total</b>	<b>32</b>

## Practicals

S.No.	Experiment	No. of Practicals
1.	Visit to PHC to study the prevalence of the communicable disease.	3
2.	Epidemiological approach to study individual disease in a community.	4
3.	Analysis of data and report writing.	3
4.	Discussion for preventive and therapeutic strategies.	3
5.	Public health campaign in a village.	3
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Vyas, S. 2021. Public Health Nutrition: A textbook. Vishwagyan Prakashan.
2. McLaren, D.S. 1976. Nutrition in the community. John Wiley and Sons, London.
3. De Maeyer, E.M. 1989. Preventing and controlling iron deficiency anemia through primary health care. A guide for health administrators and programme managers. WHO, Geneva.
4. WHO 2001. Assessment of iodine deficiency disorders and monitoring their elimination. A guide for programme managers 2<sup>nd</sup> Ed.
5. Park, K. (2016). Textbook of Preventive Medicine, New Age international (P) Limited.
6. Sehgal, S. and Raghuvanshi, R.S. 2007. Textbook of community nutrition, Directorate of Information and Publications of Agriculture, Indian Council of Agricultural Research, New Delhi.
7. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>
8. Park, K. (2016). Textbook of Preventive Medicine, New Age International (P) Limited.
9. International Institute for Population Sciences (IIPS) and ICF. 2021. National Family Health Survey (NFHS-5), 2019-21: India. Mumbai: IIPS.
10. Michael J Gibney, Barrie M Margetts, John M Kearney and Lenore Arab. (2004). Public Health Nutrition. Blackwell Science Ltd, UK.

## FND-223

## Nutritional Biochemistry

3(2+1)

### Objective

- To understand the chemical characteristics of different classes of nutrients with reference to their physical properties, and to relate this to their functions in the body.
- To explain the processes of digestion, absorption and metabolism of the macronutrients and micronutrients in the context of different meals.

- To consider the main features of metabolism using the concept of energy flux through metabolic pathways as a focus.
- To explore the integration of pathways for the metabolism for fat, protein and carbohydrate and to examine the mechanisms for the regulation of flux through these pathways.
- To discuss the established functions of micronutrients and to examine the clinical and biochemical effects of depletion.

### Theory

S.No.	Topic	No .of Lectures
1.	Recapitulation of basic chemistry and biology water, pH and buffers, acid-based balance, cellular constituent, structure and function.	3
2.	Amino acids and proteins, carbohydrates, lipids, and bio membrane, Nucleic acids dissolved molecules – vitamins and minerals.	3 3
3.	Enzymes, function, properties, mechanism, metabolism of cellular constituents. Basic concepts of bioenergetics.	3 2
4.	Carbohydrates Metabolism: glycolysis and glycogenolysis, HMP pathway, tca cycle, electron transport chain, photosynthesis, glyconeogenesis.	2 3 2
5.	Lipids metabolism; beta oxidation, ketone bodies, fatty acid synthesis.	3
6.	Amino acid metabolism: general reactions of nitrogen assimilation and excretion.	3
7.	Biosynthesis of DNA, RNA and protein replication, Transcription, translation and genetic code regulation of gene expression.	3 2
	<b>Total</b>	<b>32</b>

### Practical

S.No.	Experiment	No .of practicals
1.	Qualitative analysis of carbohydrates	2
2.	Qualitative analysis of amino acids	2
3.	Qualitative analysis of protein	2
4.	Determination of acid value	2

S.No.	Experiment	No .of practicals
5.	Saponification value and iodine number	2
6.	Determination of Ph	2
7.	Demonstration of estimation of nitrogen by kjeldhal method	2
8.	Demonstration on estimation of fat by soxhlet method	2
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Conn, E.E. and Stumpf, P.K. 1976 / 2002 Outlines of Biochemistry. John Wiley and Sons, New Delhi.
2. Deb.A.C. 1996. Fundamentals of Biochemistry, New Central Book Agency Pvt. Ltd. Calcutta.
3. Murray, R.A. Grammer, D.K. Mayes, P.A. and Rodwell, W. 1996/ Harper's Biochemistry, Prentice Hall of India Pvt. Ltd, New Delhi.
4. Rao Ranganathan, K. 1975 Text book of Biochemistry. Prentice Hall of India Pvt. Ltd., New Delhi.
5. Plummer, D.T, 1971. Introduction to Practical Biochemistry. Tata Mc-Graw Hill.

## **FND-224                      Food Standards and Quality Control                      3(2+1)**

### Objectives

- To develop qualified and competent human resource in the field of the food standards and quality management for regulators, industry, academic/research institutions, certifying and accreditation bodies, food trade, food testing and training
- To delve in depth on various aspects of food standards and quality management *i.e.* food standards, harmonization with global benchmarks, quality management systems, food analysis, instrumentation, risk analysis /management, traceability and auditing to transform the food ecosystem
- To nurture a positive and disciplined food standard and quality culture among the professionals
- To conduct research studies on emerging food standard issues and formulation of science based regulatory framework.

## Theory

S.No.	Topic	No. of lectures
1.	Importance of food quality control and assurance.	2
2.	Food additives, preservatives, coloring agents, antioxidants, emulsifying agents, leavening agents and stabilizing agents.	3
3.	Food Standards and Regulations in India: FSSAI, Prevention of Food Adulteration Act, Fruit Product Order, AGMARK, Essential Commodity Act, Consumer Protection Act, Bureau of Indian Standards, Codex Standards, Food and Drug Administration (FDA)	3 3
4.	Various methods for the assessment of quality of different foods	3
5.	Food safety management systems-GMP/GHP, HACCP, GLP, GAP, The Kosher and Halal Food Laws.	3
6.	Food packaging, packaging material	3
7.	Adulteration, Food adulteration – common adulterants – health hazards, heavy metals. Tests to detect adulterants in food.	3
8.	Quality criteria of foods – food grains, fruits, vegetables and animal foods	3
9.	Quality criteria of processed foods. Physical, chemical and microbial contamination of foods	3
10.	Pesticides- Mechanisms of Toxicity-Residues in Food, Acceptable daily limits	3
	<b>Total</b>	<b>32</b>

## Practical

S.No.	Topic	No. of lectures
1.	Sensory and nutritional evaluation of some finished products.	2
2.	Detection of adulterants and preservatives in products	1
3.	Identification of critical control points in a product line	1
4.	Sensory evaluation of different food samples	2
5.	Visit to quality control laboratory/food processing industries and note the procedures and parameters used for quality assessment.	2
6.	Estimation of quality parameters- cereals, pulses, fruits and veg.	2
7.	Market survey and quality analysis of street foods	1
8.	Evaluation of food quality – objective and subjective methods	2
9.	Market survey and quality analysis of street foods -	1
10.	Study of food labelling	1
11.	Identification of food logos.	1
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Potter, N.N. 1996. Food Science. The AVI Publishing Company Inc., Westport, Connecticut.
2. Jellinek, G. 1985. Sensory Evaluation of Foods: Theory and Practice. Ellis Horwood Ltd. Chichester, England.
3. Manual of Food Standards and Quality Control. 2014. Dept. of Foods and Nutrition, CCS HAU, Hisar.
4. Detect Adulteration with Rapid Test (DART) booklet fssai [https:// www.fssai.gov.in/flipbook.php?bookid=201#book2/7](https://www.fssai.gov.in/flipbook.php?bookid=201#book2/7)
5. Radonit Lassztity. 2008. Food Quality and Standards. Encyclopedia of Life effort systems. USA.
6. Patricia and Cuuring A. An operational Text book, guide to Food Laws and Regulations.
7. Food Safety and Standards (Food Products Standards and Food Additives) Regulation, 2011.
8. Kalia, M. and Sood, S. 2010. Food Preservation and Processing. Revised edn. Kalyani Publishers, New Delhi.

### Skill Enhancement Courses

(Choose any ONE course from SEC-FND 221 To 224)

**SEC-FND-221**

**Indian Traditional Sweets**

**2 (0+2)**

#### Objectives

- Students will learn to develop basic skills of preparation of traditional sweets of India. This will build confidence among students to start new venture in traditional Indian sweets.
- To impart knowledge of various types of traditional Indian sweets.
- To enable the students to develop skill of preparing traditional sweets of India.

#### Practical

S. No.	Course outline	No. of practical's
1.	Basic ingredients and their role in preparation different types of traditional sweets	2
2.	Basic tools and equipment used in the preparation sweets	2
3.	Stages of Sugar cookery	2

S. No.	Course outline	No. of practical's
4.	Preparation of Bengali sweets like-Rasogolla, Rajbhog, Rasbhari, Chamcham, Rasmalai, Sandesh Raskadam, Mohanbhog, Kheer Mohan & Channa Toast.	3 3
5.	Preparation of milk and khoya based sweets like- khoa Burfi, chocolate burfi, khoa peda, kesar peda, pista burfi, Badaam pista burfi , kesar khoa burfi, kalakand, milk cake, khoa roll, kheer kadam, coconut burfi, meva bati etc.	3 3
6.	Preparation of ghee based sweets -Patisa, Gulab Jamun, Soan Papdi, Gujia, Imarti, Motipak, Balushahi, Laddu	3
7.	Preparation of khaju and dry fruits based sweets like-Kaju Burfi, Kaju Roll, Kaju Laddu, Badam Burfi, Pista Lauj & Anjeer Burfi etc.	3 2
8.	Basics of labeling, packaging and presentation of sweets	3
9.	Waste Management and up keeping of work place	3
	<b>Total</b>	<b>32</b>

## SEC-FND-222

## Development of Project Proposals

2(0+2)

### Practical

It will be a group activity of 3-5 students in each group-

S. No.	Title	No. of practical
1.	The students will do the background research on the project, will present an oral report, Write and submit a formal project proposal on related aspects of food processing, dietetics, community nutrition, nutrition education etc.	2 2
2.	The students are expected to: identify an appropriate and manageable topic.	3
3.	A concise statement of objectives and what you intend to design and build will be one of the outcomes of the course.	3
4.	Conduct a background history of the topic and a current literature search of the topic.	3
5.	Students are expected to search in journals, magazine and internet. This background report will be submitted with the project proposal.	3
6.	Budget development	3

S. No.	Title	No. of practical
7.	Project work plan and timeframe ( including GANTT charts)	3
8.	Monitoring and evaluation plan	3
9.	Management plan and institution capability.	3
10.	Prepare the proposal appropriate to the objectives of the project with budgetary details, Submit a complete written proposal	2
	<b>Total</b>	<b>32</b>

**SEC-FND-223**

**Laboratory Analysis**

**2(0+2)**

**Practical**

S. No.	Title	No. of Practicals
1.	General introduction to laboratory glass wares. General introduction to laboratory instruments.	1
2.	Preparation of samples and buffer solutions.	1
3	Qualitative analysis of – Carbohydrates	1
	Amino acids	1
	Protein	1
	Fat	1
4.	Determination of milk quality by MBRT test.	1
5.	Estimation of bulky density of food stuffs.	2
6.	Estimation of Color by spectroscopy.	1
7.	Physical analysis – specific gravity.	1
8.	Determination of food quality by standard plate count method .	2
9.	Estimation of reducing and non-reducing sugar.	1
10.	Estimation of starch digestibility.	1
11.	Estimation of minerals by UV spectrophotometer.	2
12.	Determination of acid values.	1
13.	Quantitative estimation of proximate principles- Estimation of moisture in food stuffs, ash minerals.	2
14.	Estimation of nitrogen by khjeldal method.	2
15.	Estimation of fat by soxhlet method.	2
16.	Estimation of carbohydrates by difference.	1



S. No.	Title	No. of Practicals
17.	Saponification and iodine number.	1
18.	Preparation of culture media.	1
19.	Isolation and enrichment of microorganisms.	2
20.	Isolation of moulds from different food samples. Microbial examination of – milk products, cereal and pulses, vegetables and fruits.	3
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. “Food Analysis” by S. Suzanne Nielsen (2017)
2. “Laboratory Manual for Food Analysis” by Patricia A. Williams (2018)
3. “Food Laboratory Manual” by Michael H. Tunick (2018)
4. “Analytical Techniques for Food Safety” by edited by Peter F. Carpenter (2019)
5. “Food Analysis: Theory and Practice” by Yogesh Bhargava (2020)
6. “Laboratory Methods in Food Microbiology” by W. F. Harrigan (2018)
7. “Food Chemistry: Laboratory Manual” by Jose M. Aguilera (2018)

## SEC-FND-224 Practical Skills in Writing and Speaking 2(0+2)

### Practical

S. No.	Title	No. of Practicals
1.	Reading and comprehension: unseen passage and unseen poems	3
2.	Assessment of basic grammar: Worksheets on articles Verbs Punctuation Preposition Conjunction	1 1 1 1 1
3.	Worksheets on tenses: simple present tense, present continuous tense, present perfect tense, present perfect continuous tense.	3
4.	Worksheets on past tense: simple past tense, past continuous tense, past perfect tense, past perfect continuous tense.	3

S. No.	Title	No. of Practicals
5.	Future tense: simple future tense, future continuous tense, future perfect tense, future perfect continuous tense.	3
6.	Writing of letters – informal letters, formal letters, emails.	3
7.	Notice writing / advertisement	1
	Essay writing	1
	Story writing	1
	Dairy Entry/ CV writing	1
	Writing of blogs	1
	Technical articles.	1
8.	Oral presentation skills	1
	Extempore	1
	Note taking	1
	Summarizing	1
	Individual presentation/ radio talks	1
	Group presentation and discussion	1
	<b>Total</b>	<b>32</b>

**AMT-221**

**Agriculture Marketing and Trade**

**3(2+1)**

### **Objective**

1. To understand the fundamentals of agricultural marketing and trade.
2. To analyze the factors influencing supply and demand in agricultural markets.
3. To explore different marketing channels and strategies in agriculture.
4. To examine the role of government policies and regulations in agricultural markets.

### **Theory**

S. No.	Topic	Class
1.	Agricultural Marketing: Concepts and definitions of market, marketing, agricultural marketing, market structure, marketing mix and market segmentation	2
2.	Classification and characteristics of agricultural markets	1
3.	Demand, supply and producer's surplus of agri commodities: nature and determinants of demand and supply of farm products	2
4.	Producer's surplus – meaning and its types, marketable and marketed surplus, factors affecting marketable surplus of agri- commodities	2

S. No.	Topic	Class
5.	Pricing and promotion strategies: pricing considerations and approaches – cost based and competition based pricing	2
6.	Market promotion – advertising, personal selling, sales promotion and publicity – meaning, merits and demerits	2
7.	Marketing process and functions: exchange functions – buying and selling; physical functions – storage, transport and processing; facilitating functions – packaging, branding, grading, quality control and labelling (Agmark);	3
8.	Market functionaries and marketing channels: Types and importance of agencies involved in agricultural marketing	2
9.	Meaning and definition of marketing channel; number of channel levels; marketing channels for different farm products	2
10.	Marketing efficiency; marketing costs, margins and price spread; factors affecting cost of marketing; reasons for higher marketing costs of farm commodities; ways of reducing marketing costs	2
11.	Role of Govt. in agricultural marketing: Public sector institutions- CWC, SWC, FCI, CACP & DMI – their objectives and functions	2
12.	cooperative marketing in India	1
13.	Risk in marketing: Types of risk in marketing; speculation & hedging; an overview of futures trading	2
14.	Agricultural prices and policy: Meaning and functions of price; administered prices; need for innovations in agricultural price policy	2
15.	Trade: Concept of International Trade and its need	1
16.	WTO; Agreement on Agriculture (AoA) and its implications on Indian agriculture	1
17.	IPR, Role of government in agricultural marketing.	2
18.	Role of APMC and its relevance in the present day context	1

### Practical

S. No.	Topic	Class
1.	Plotting and study of demand and supply curves and calculation of elasticities	2
2.	Study of relationship between market arrivals and prices of some selected commodities	1
3.	Computation of marketable and marketed surplus of important commodities	1

S. No.	Topic	Class
4.	Study of price behaviour over time for some selected commodities	2
5.	Construction of index numbers	1
6.	Visit to a local market to study various marketing functions performed by different agencies	2
7.	Identification of marketing channels for selected commodity	1
8.	Collection of data regarding marketing costs, margins and price spread and presentation of report in the class	3
9.	Visit to market institutions –NAFED, SWC, CWC, cooperative marketing society, etc. to study their organization and functioning	2
10.	Application of principles of comparative advantage of international trade	1

### Suggested Readings

1. Acharya, S.S. and Agarwal, N.L., 2006, Agricultural Marketing in India, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
2. Chinna, S.S., 2005, Agricultural Economics and Indian Agriculture. Kalyani Pub, N Delhi.
3. Dominic Salvatore, Micro Economic Theory.
4. Kohls Richard, L. and Uhl Josheph, N., 2002, Marketing of Agricultural Products, Prentice-Hall of India Private Ltd., New Delhi.
5. Kotler and Armstrong, 2005, Principles of Marketing, Pearson Prentice-Hall.
6. Lekhi, R. K. and Jogindr Singh, 2006, Agricultural Economics. Kalyani Publishers, Delhi.
7. Memoria, C.B., Joshi, R.L. and Mulla, N.I., 2003, Principles and Practice of Marketing in India, Kitab Mahal, New Delhi.
8. Pandey Mukesh and Tewari, Deepali, 2004, Rural and Agricultural Marketing, International Book Distributing Co. Ltd, New Delhi.
9. Sharma, R., 2005, Export Management, Laxmi Narain Agarwal, Agra.

## **COMP-222 Agricultural Informatics and Artificial Intelligence 3(2+1)**

### Objectives

- To acquaint students with the basics of computer applications in agriculture, multimedia, database management, application of mobile app and decision- making processes, etc.

- To provide basic knowledge of computer with applications in Agriculture.
- To make the students familiar with Agricultural-Informatics, its components and applications in agriculture.

### Theory

S.No.	Topic	No. of Lectures
1.	Introduction to Computers, Anatomy of Computers, Memory Concepts, Units of Memory,	3
2.	Operating System: Definition and types, Applications of MS-Office for creating, Editing and Formatting a document, Data presentation, Tabulation and graph creation.	3
3.	Statistical analysis, Mathematical expressions, Database, concepts and types, creating database, Uses of DBMS in Agriculture, Internet and World Wide Web (WWW): Concepts and components	3
4.	Computer programming: General concepts, Introduction to Visual Basic, Java, Fortran, C/ C++, etc. concepts and standard input/output operations.	3
5.	Agriculture, Concepts, design and development, Application of innovative ways to use information and communication technologies (IT) in Agriculture,	3
6.	Computer Models in Agriculture: Statistical, weather analysis and crop simulation models, concepts, structure, inputs-outputs files, limitation, advantages and application of models for understanding plant processes, sensitivity, verification, calibration and validation,	3
7.	IT applications for computation of water and nutrient requirement of crops, Computer-controlled devices (automated systems) for Agri-input management,	3
8.	Smartphone mobile apps in agriculture for farm advice: Market price, postharvest management etc.,	3
9.	Geospatial technology: Concepts, techniques, components and uses for generating valuable agri-information,	3
10.	Decision support systems: Concepts, components and applications in Agriculture, Agriculture Expert System, Soil Information Systems etc. for supporting farm decisions.	3
11.	Preparation of contingent crop- planning and crop calendars using IT tools, Digital India and schemes to promote digitalization of agriculture in India.	3

## Practical

S.No.	Topic	No. of Lectures
1.	Study of computer components, accessories, practice of important DoS Commands,	2
2.	Introduction of different operating systems such as Windows, Unix/ Linux, creating files & folders, File Management. Use of MS- Word and MS Power-point for creating, editing and presenting a scientific documents, MS- EXCEL - Creating a spreadsheet, Use of statistical tools, Writing expressions, Creating graphs, Analysis of scientific data, Handling macros.	2 1
3.	MS-ACCESS: Creating Database, preparing queries and reports, Demonstration of Agri- information system, Introduction to World Wide Web (WWW) and its components,	2
4.	Introduction of programming languages such as Visual Basic, Java, Fortran, C, C++, Hands on practice on Crop Simulation Models (CSM), DSSAT/Crop-Info/Crop Syst/ Wofost,	2
5.	Preparation of inputs file for CSM and study of model outputs, computation of water and nutrient requirements of crop using CSM and IT tools,	2
6.	Use of smart phones and other devices in agro-advisory and dissemination of market information	2
7.	Introduction of Geospatial Technology, Hands on practice on preparation of Decision Support System, Preparation of contingent crop planning, India Digital Ecosystem of Agriculture (IDEA)	3

## Suggested Readings

1. Fundamentals of Computer by V. Rajaroman.
2. Introduction to Information Technology by Pearson.
3. Introduction to Database Management System by C. J. Date.
4. Concepts and Techniques of Programming in C by Dhabal Prasad Sethi and Manoranjan, Wiley

## Post- Semester IV (Only for exit option for UG- Diploma)

S. No.	Course Title	Credit Hours
1.	Internship (10 weeks)	10(0+10)*

\*Mandatory requirement for UG-Diploma.

## SEMESTER V

**FND-311**

**Therapeutic Nutrition**

**4(3+1)**

### Objectives

By the end of the course the students will be able to

- To acquire basic knowledge of nutrient requirements, recommended dietary allowances, and dietary modification under different physiological conditions.
- To acquire basic knowledge of food groups, food exchange system and their nutritional significance, and application of knowledge acquired for healthy eating.
- To develop practical skills in planning and management of diets for the different age groups under normal/ physiological conditions keeping in mind the dietary guidelines.
- To gain knowledge on the nature and scope of therapeutic nutrition; and understand the principles of dietary modification and apply in planning.
- To understand nutrition-related diseases of the: gut, liver, gallbladder, pancreas, and heart.
- To know the etiology, incidence, nature, clinical symptoms, diagnosis, and medical and dietary management of disease.
- To modify the diet plans to suit the disease condition

### Theory

S.No.	Topic	No. of lectures
1.	Terminologies used in the therapeutic nutrition	2
2.	Use of food groups and food pyramid	2
3.	Importance and components of diet history	2
4.	Different principle of therapeutic diets	3
5.	Therapeutic modifications of normal diet in terms of consistency and nutrients	2
6.	Normal and artificial feeding methods	2
7.	Role of Dietician in medical nutrition therapy	2
8.	Diet during malnutrition- undernutrition and over nutrition	3
9.	Diet during infection and fever	2
10.	Diet during Gastro intestinal disorder- esophagitis, diarrhea, constipation, peptic ulcers, IBD/IBS	3
11.	Liver and gall bladder disorders- dietary management of jaundice hepatitis, liver cirrhosis, cholelithiasis	3

<b>S.No.</b>	<b>Topic</b>	<b>No. of lectures</b>
12.	Kidney disorders- dietary management of nephrosis, nephritis, renal failure, renal calculi and dialysis.	3
13.	Arthritis and gout, Cardiovascular disorders- dietary management of atherosclerosis, hypertension and stroke and congestive heart failure.	3
14.	Diabetes mellitus- dietary management during diabetes mellitus and complications	3
15.	glycaemic index and glycaemic load of food items.	2
16.	PCOD/PCOS: aetiology, signs & symptoms, types, risk factors and dietary management	2
17.	Cancer- dietary management	2
18.	Inborn errors of metabolism	2
19.	allergies and intolerance	2
20.	burns and trauma	1
21.	Common auto immune diseases/disorders.	2
	<b>Total</b>	<b>48</b>

### **Practical**

<b>S. No.</b>	<b>Topic</b>	<b>No. of lectures</b>
1.	Planning of food exchange list	1
2.	taking diet history	1
3.	Planning and preparation of diet modified in consistency	1
4.	Planning and preparation of diet modified in nutrients for severely ill patients	1
5.	Plan a diet for artificial feeding patients	1
6.	Plan a diet for patient with malnutrition, infections and fevers - PEM	1
7.	Plan a diet for patient with typhoid, tuberculosis, influenza	1
8.	Plan a diet for a patient with during atherosclerosis, hypertension.	1
9.	Plan a diet for patient with diarrhoea and constipation	1
10.	Plan a diet for peptic ulcers and esophagitis	1
11.	Plan a diet for a patient suffering from liver cirrhosis, jaundice	1
12.	Plan a diet for a patient with hepatitis and cholelithiasis	1



S. No.	Topic	No. of lectures
13.	Plandiet for a diabetic patient	1
14.	Plan a diet of a patient renal failure, renal calculi	1
15.	Plan a diet for a patient with cancer	1
16.	Plan a diet for patient with lactose intolerance and celiac diseases	1
	<b>Total</b>	<b>16</b>

### Suggested Readings

- Sharma, A. 2017. Principles of Therapeutic Nutrition & Dietetics. CBS.
- Mahan, L.K. and Escott-Stump, S. 2000. Krause's Food, Nutrition and Diet Therapy, W.B. Sanders Company, Philadelphia.
- Corinne H. Robinson, Marilyn, R. Lawler, Wanda L. Chenoweth, Ann E. Garwick. (2013) Normal and therapeutic Nutrition (pp-1-16). New York, Macmillan Publishing Company.
- Raghuvanshi, R. S., Mittal, M. 2014. Food Nutrition and Diet Therapy. India: Westville PublishingHouse New Delhi.
- National Institutes of Health Diet History Questionnaire. Diet History Questionnaire (nih.gov)
- Raghuvanshi R.S. and Mittal M. 2016. Clinical Nutrition *Chikitskeey Poshan*. Vikas Publishing House Pvt. Ltd. New Delhi.

## FND-312

## Food Analysis

3(2+1)

### Objectives

The objective of the course is to impart knowledge to students on principles and techniques of food analysis by using physical, chemical, biological methods and to apply their knowledge and skills acquired to solve real-world problems associated with food analysis.

### Theory

S.No.	Topic	No .of Lectures
1.	Terminologies associated with food analysis, Rules and regulation of food analysis. Different official methods of analysis.	3
2.	Familiarization to terms and calculations used in preparation of various standard solutions.	2
3.	Sample and sampling techniques.	1

S.No.	Topic	No .of Lectures
4.	Principles, techniques and applications of: spectrophotometer, colorimeter, pH meter, refractometer, electrophoresis, centrifuge, HPLC, GLC, TLC, GCMS, UPLC, AAS, AES.	2 2 3
5.	Proximate composition analysis methods	2
6.	Moisture analysis- direct and indirect methods of analysis	3
7.	Protein analysis method – dumas, Biuret, Lowry's, dye binding and Spectroscopy method, amino acid analyzer	2
8.	Mineral analysis- dry ashing, wet ashing, titrimetric, gravimetric, colorimetric and instrumental methods-AAS, AES.	2
9.	Physical characteristic of foods, rheological properties of food.	2
10.	Anti-nutrients in foods: phytate, tannins, oxalates, saponins, trypsin and chymotrypsin.	3
11.	Animal assay: Principles, techniques and applications.	2
12.	Principles for estimation of water- and fat-soluble vitamins	3
	<b>Total</b>	<b>32</b>

### Practicals

S.No.	Experiment	No .of practical's
1.	Orientation of food analysis laboratory	1
2.	Calculation and preparation of various standard solution. Preparation of sample for food analysis.	1
3.	Proximate composition of analysis- moisture, kjeldahl method of protein analysis, Fat analysis – soxhlet, soxplus, estimation of free fatty acid (FFA), Ashing and CHO by difference.	2 2 1
4.	Estimation of sugar, reducing and non-reducing sugars and starch.	1
5.	Mineral analysis- iron, calcium.	2
6.	Testing acidity of foods	1
7.	Estimation of anti-nutrients: phytate/ tannins/oxalates/saponins.	2
8.	Estimation of rancidity in foods and peroxide values.	1
9.	Functioning and use of HPLC, GLC and pH meter, GCMS, UPLC	1
10.	Visit to food quality control lab	1
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Pearson, D. (1973). Laboratory Techniques in Food Analysis. United States: Wiley.
2. Pomeranz, Y. (2013). Food Analysis: Theory and Practice. United States: Springer US.
3. N. Raghuramulu, K. Madhavan Nair, S. Kalyanasundaram. 2003. A manual of laboratory techniques. National Institute of Nutrition (India).
4. Oser, B.L. 1979. Hawk's physiological chemistry. Tata Mc Graw Hill Pub. Co. Ltd., New Delhi.
5. AOAC (2012). Association of official analytical chemists. Washington, DC.
6. Ranganna, S. (2000). Handbook of Analysis and Quality Control for Fruit and Vegetable Products. India: Tata McGraw-Hill.
7. Nielsen. S. (2010). Food Analysis, Springer Science and Business Media Pub.

### FND-313

### Current Food Processing Technologies

3(2+1)

#### Objectives

- To explain major food preservation techniques and underlying principles.
- To understand the technology available for food processing.
- To determine suitable methods of processing techniques for a chosen food.
- To understand novel food processing methods including non-thermal food processing techniques.
- To understand the purpose and principles of food packaging.
- To develop an understanding of major packaging materials used in food packaging.
- To evaluate the suitability of packaging material for a particular type of food.
- To understand the operations involved in packaging material manufacture.
- To gain knowledge of the legal, environmental and quality aspects associated with packaging materials and operations used in the food industry.

#### Theory

S.No.	Topic	No. of Lectures
1.	Current scenario in food processing industry, post-harvest loss and losses in post-harvest operation	3
2.	Upcoming trends in food processing-thermal treatment, ultrasound, freezing, pulse electric field, shock wave technology	3

S.No.	Topic	No. of Lectures
3.	Minimal processing-application of Ultra sonic food processing techniques–membrane processing – applications in food processing industries – robotics – applications and opportunities – issues and obstacles	3
4.	Food preservation using chemicals, radiation and hurdle technology.	3
5.	Nanotechnology in food preservation, food processing, agriculture and in packaging	2
6.	Processing of convenient cereals and millets, processing of pulses and legumes, oil seed processing	3
7.	Principle and method of preservation by-pasteurization, canning, bottling, sterilization	3
8.	Advance dehydration technologies Freeze drying, microwave dehydration, electric dehydrator, osmotic dehydration, hybrid drying technologies, vacuum drying methods, spray drying methods	3
9.	High pressure processing- principle, safety and stability of high-pressured processed food.	3
10.	Encapsulation technology–principle, mechanism involved encapsulation agents and uses. 3 D printing and application in food manufacture	3
11.	Government policy on import and export of processed fruits and vegetables	3
	<b>Total</b>	<b>32</b>

### Practical

S.No.	Experiment	No. of practicals
1.	Processing of breakfast cereals, Processing of pulses into flour, flakes and fermented	3
2.	Demonstration of dehydration of foods via- freeze drying, osmotic dehydration, spray drying, vacuum drying, microwave dehydration	3
3.	Processing of fruits and vegetables via canning using brine and syrup	3
4.	Blanching in food items. 3 D printed foods.	3
5.	Preservation using pasteurization and sterilization.	2
6.	Visit to food processing unit and nano technology lab	2
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Chakraverty (1995). Post harvest technology of cereal, pulses and oil seeds, III Edn. Oxford and IBH Publishing Co., Pvt. Ltd.,
2. Fellows, PJ (2017). Food Processing Technology, Principles and Practice. 4<sup>th</sup> Edition, Wood head Publishing Ltd. Cambridge.
3. Hartel R W and Heldman D (2012). Principles of Food Processing. Aspen Publishers Inc. New York.
4. Potter, N.N. (2003). Food Science, A VI publishing company, INC, West Port, Connecticut.
5. Shafiur Rahman. M. (2007). Hand book of food preservation. Second edition. Published by CRC Press, London.
6. Sivshankar, B (2002). Food Processing and Preservation. Prentice-Hall of India Pvt. Ltd. Delhi.
7. Srivastava, R.P. and Sanjeev Kumar. (1994). Fruit and vegetable preservation, International book distributing Co. Lucknow.

### FND-314

### Diet and Nutrition Counselling

2(0+2)

#### Objectives

- Understanding, critically assessing and knowing how to use and apply information sources related to nutrition, food, life style and health.
- Able to provide nutrition Counseling and education to individuals, groups, and communities throughout the life span using a variety of communication strategies

#### Practical

S.No.	Experiment	No. of practical
1.	Qualities of counselor (confidence, knowledge, communication skills, patient listener, empathetic. Self-assessment of role as a dietitian – Pre-test on role, summary of competencies.	2
2.	Developing diet history questionnaire and taking diet history	3
3.	Preparation of standard protocol based on case studies and group discussion.	3
4.	Preparation of overweight and underweight fact list handout and development of counseling guidelines for weight loss and weight gain. Weight loss counseling– Use of role play technique, counseling on diet, exercise and life style	3
5.	Visit to hospitals with therapeutic kitchen setup.	1
6.	Diabetic diet Counseling development of dietary fat facts list, cholesterol facts list, sodium facts list.	3

S.No.	Experiment	No. of practical
7.	Development of dietary Counseling tips for different cardiovascular disorder and Counseling; cardiac patients using role play technique, presentation in gathering. Diet exhibition cardio vascular disorders in a specialty hospital/general hospital,	3
8.	Preparation of handouts on ulcer facts list, high fibre facts list, low residue facts list, low lactose facts list, Counseling for patients suffering from constipation, gastro- oesophageal reflex (GERD, colitis, diverticulitis and ulcer.	3
9.	Preparation of SOAP notes and gall bladder facts list hand out and Counseling a patient of gall stones. Preparation of liver disease facts list handout, collection of case history of patient suffering from hepatitis, cirrhosis of liver, alcoholics. Counselling the patient and conducting group discussion.	3
10.	Preparation of kidney disease facts list handout and development of Counseling tips for kidney disorders, dietary Counseling in a specialty hospital/diet and nutrition Counseling centre for kidney disorder and diet exhibition for kidney disorder	3
11.	Preparation of cancer facts list handout, Preparation of list of parenteral and enteral products available in the market for use during Counseling.	3
12.	Setting up a unit for nutrition Counseling. Role play exercises for Counseling .Supervised Counseling of patients /clients.	2
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Anita, P.1986.Clinical dietetics and nutrition. Oxford univ. Bombay.
2. Moris, E.S.1994. Modern nutrition in health and disease. Leaned feigner, USA.
3. Corinne H. Robinson, Marilyn R. Lawler, Wanda L. Chenoweth, Ann E. Garwick. 1982. Norma land Therapeutic Nutrition. (Pp-1-16). New York, Macmillan Publishing Company
4. ICMR, 2020.Recommended Dietary allowance for Indians, ICMR, Delhi.
5. Park, K. 1997. Textbook of Preventive and Social Medicine.1<sup>st</sup> Ed. Jabalpur: Banarsidas Bhanot.
6. Raghuvanshi, R. S., Mittal, M. 2014. Food Nutrition and Diet Therapy. India: Westville Publishing House, New Delhi.
7. Raghuvanshi R.S. and Mittal M. 2016. Clinical Nutrition *Chikitskeey Poshan*. Vikas Publishing House Pvt. Ltd. New Delhi.
8. <https://aghealth.nih.gov/collaboration/qx/dhq.pdf>
9. Dietary Guidelines for NIN website.pdf

**Objectives**

- The objectives of this course are to provide students with an overview of the field of functional foods, nutraceuticals and natural health products.
- The course enables students to understand the functional food concept as related to ingredient efficacy and safety.
- In addition, it familiarizes students with: examples of bioactive ingredient-disease relationships and the importance of clinical study support; regulatory aspects of functional foods; and requirements for standards of evidence of efficacy for health claims; and market determinants of the functional food industry.

**Theory**

S. No.	Topic	No. of Lectures
1.	Nutraceuticals & functional food definition, synonymous terms, basis of claims for a compound as a nutraceutical, regulatory issues including CODEX, FSSAI Regulation.	2
2.	Mental health, immune enhancement, age-related macular degeneration, endurance performance and mood disorders.;	2
	adverse effects and toxicity aspects of nutraceuticals;	2
3.	Classification of nutraceutical substances based on food sources and based on mechanism of action, and based on chemical nature.	3
4.	Nutrition claims by FSSAI	2
5.	Regulatory issues for nutraceuticals including national and international standards.	3
6.	Potential health benefits of major nutraceuticals, omega-3, lycopene, isoflavonoids, prebiotics and probiotics, glucosamine, phytosterols etc.,	2
	Metabolism, bioavailability and pharmacokinetics of nutraceuticals	2
7.	Concept of angiogenesis, nutraceuticals for joint health, cardiovascular diseases, eye health, cholesterol management.	3
	Concept of angiogenesis, nutraceuticals for cancer, diabetes, obesity,	2
	Concept of angiogenesis, nutraceuticals for eye health, cholesterol management	2
8.	Clinical testing of nutraceuticals and health foods – interactions of prescribed drugs and nutraceuticals	3
9.	Nutrigenomics – an introduction and its relation to nutraceuticals.	2
10.	Current research in functional foods.	2
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Robert EC. 2013. Handbook of Nutraceuticals and Functional Foods. 2<sup>nd</sup> Ed. Wildman. CRC Press.
2. Rotime E. Aluko. 2012. Functional Foods and Nutraceuticals. Springer Publ.
3. Saarela, M. 2011. Functional Foods. 2<sup>nd</sup> Eds. Elsevier Publ.
4. Food Safety and Standards (Health Supplements, Nutraceuticals, Food for Special Dietary Use, Food for Special Medical Purpose, Functional Food and Novel Food) Regulations, 2016.
5. Sarkate, A.P., Patil, M.A. and Aghar de P.V. 2021. Nutraceuticals and Human Health. Brillion Publishing.  
Microsoft Word – 5925gi.doc (fssai.gov.in).

### FND-316

### Introduction to Clinical Nutrition

3(2+1)

#### Objectives

By the end of the course the students will be able to

- To acquire a basic understanding of the various clinical changes related to nutrition, which are seen indifferent diseases, both deficiency and otherwise.
- To understand the etiology, prevalence, clinical signs and symptoms of nutritional deficiency diseases(Vitamin A deficiency, anemia, IDD, PEM etc).
- To gain understanding of physiology in health and pathophysiology in disease.
- Complications occurring in various conditions and the inter relationships thereon

#### Theory

S.No.	Topic	No. of Lectures
1.	Metabolic changes and clinical diagnosis in various diseases: Nutrient deficiency diseases like Anemia, vitamin B complex deficiencies,	2
2.	Vitamin A deficiency disease, Iodine deficiency disorders, Calcium and vitamin D deficiency diseases, ascorbic acid deficiency.	2
3.	Metabolic changes and clinical diagnosis in degenerative diseases: Diabetes, Cardiovascular diseases,	3
4.	Metabolic changes and clinical diagnosis in renal disorder, liver diseases, cancer.	3
5.	Normal cut-off values for blood and urine parameters.	2



S.No.	Topic	No. of Lectures
6.	Interpretation of report of blood and urine in different disease conditions	3
	Drug and nutrient interaction, effect of drugs on nutritional status.	2
7.	Effect of diet and nutritional status on drug effectiveness.	2
	Depletion and repletion studies; Nutrient balance studies;	2
8.	Use of isotopically labelled nutrients	2
9.	Nutrition screening and assessment methods (Mini Nutritional Assessment (MNA), Subjective Global Assessment (SGA),	3
10.	Patient-Generated Subjective Global Assessment (PG-SGA), Malnutrition Universal Screening tool (MUST), disease specific tools.	3
11.	Nutrition care process- Assessment, Diagnosis, Interpretation, Monitoring, and Evaluation (ADIME).	3
	<b>Total</b>	<b>32</b>

### Practical

S.No.	Topic	No. of Practicals
1.	Identification and interpretation of clinical signs of nutritional deficiency diseases-, estimation of 361aemoglobin.	3
2.	sampling of blood and urine for nutritional status	3
3.	Estimation of glucose in blood and urine in normal and diabetic persons.	2
4.	Estimation of lipid profile in normal and heart patients	2
5.	Estimation of Glycosylated Hemoglobin,	1
6.	Estimation of serum total protein and serum albumin	3
7.	Visit to a clinical laboratory	2
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Connie WB and Christine SR (2016). Handbook of Clinical Nutrition and Ageing. Humana Press.
2. Gibney MJ, Elia M, Ljungqvist O and Dowsett J (2013). Clinical Nutrition. Wiley Blackwell Publishing Company, Boston.

3. Gibney MJ, Macdonald IA and Roche HM (2011). Nutrition and Metabolism. WileyBlackwellPublishing Company, Boston.
4. Width M and Reinhard T (2017). The Essential Pocket Guide for Clinical Nutrition. LWW Pub.
5. Gopalan C. and Krishnaswamy K. 2000. Nutrition in Major Metabolic Disease. Oxford University Press, New Delhi
6. Joshi, Y.K. 2004. Basics Of Clinical Nutrition. Jaypee Brothers
7. Lee, R.D. and Nieman, D.C. 1993. Nutritional assessment. Pub. Brown and Benchmark, USA.

## **STAT-311**

## **Statistical Methods**

**3(2+1)**

### **Objectives**

To develop understanding among students about sampling and data analysis techniques, methods of data analysis using various statistics.

### **Theory**

<b>S.No.</b>	<b>Topic</b>	<b>No. of Lectures</b>
1.	Introduction to Statistics and its Applications in Agriculture	2
2.	Graphical Representation of Data, Measures of Central Tendency & Dispersion	3
3.	Definition of Probability, Addition and Multiplication Theorem (without proof).	3
4.	Simple Problems Based on Probability. Binomial & Poisson Distributions,	3
5.	Definition of Correlation, Scatter Diagram.	2
6.	Karl Pearson's Coefficient of Correlation. Linear Regression Equations.	2
7.	Introduction to Test of Significance, One sample & two sample test t for Means, Chi-Square Test of Independence of Attributes in $2 \times 2$ Contingency Table.	1 2 2
8.	Introduction to Analysis of Variance, Analysis of One-Way Classification.	3

S.No.	Topic	No. of Lectures
9.	Introduction to Sampling Methods, Sampling versus Complete Enumeration, Simple Random Sampling with and without replacement, Use of Random Number Tables for selection of Simple Random Sample.	3 2 2
10.	Introduction to various statistical packages.	2
	<b>Total</b>	32

### Practical

S.No.	Practical	No. of Practicals
1.	Graphical Representation of Data. Measures of Central Tendency (Ungrouped data) with Calculation of Quartiles, Deciles & Percentiles.	2
2.	Measures of Central Tendency (Grouped data) with Calculation of Quartiles, Deciles & Percentiles.	1
3.	Measures of Dispersion (Ungrouped Data). Measures of Dispersion (Grouped Data). Moments, Measures of Skewness & Kurtosis (Ungrouped Data). Moments, Measures of Skewness & Kurtosis (Grouped Data).	2
4.	Correlation & Regression Analysis.	1
5.	Application of One Sample t-test.	2
6.	Application of Two Sample Fisher's t-test.	2
7.	Chi-Square test of Goodness of Fit. Chi-Square test of Independence of Attributes for $2 \times 2$ contingency table.	2
8.	Analysis of Variance One Way Classification. Analysis of Variance Two Way Classification.	2
9.	Selection of random sample using Simple Random Sampling. Use of software packages.	2

### Suggested Readings

1. Agarwal, B. L. 2006. Basic Statistics. New Age International Publisher.
2. Gupta SC. 2006. *Fundamentals of Statistics*. Himalaya Publ. House.
3. Panse VG & Sukhatme PV. 1985. *Statistical Methods for Agricultural Workers*. ICAR.  
Rao GN. 2007. *Statistics for Agricultural Science*. Oxford & IBH.
4. Snedecor GW & Cochran WG. 1968. *Statistical Methods*. Oxford & IBH.

5. Sprent P. 1993. Applied Non-parametric Statistical Methods. 2<sup>nd</sup>Ed. Chapman & Hall.
6. Sukthame & Ashok C. 1984. *Sampling Theories and Surveys with Application*. 3<sup>rd</sup> Ed. ICAR.
7. Wetherill GB. 1982. Elementary Statistical Methods. Chapman & Hall.
8. William S. Cleveland (1994) The Elements of Graphing Data, 2ndEd., Chapman & Hall.

## SEMESTER VI

### FND-321

### Food and Nutrition Security

2(1+1)

#### Objectives

- This course explains the concepts of food and nutrition, malnutrition, food security and livelihoods. Understanding these concepts is important to assess the nutrition situation, design and implement programmes, investments and policies that address nutrition problems (also called “nutrition-sensitive”), and evaluate the nutritional outcomes of programmes, investments and policies.
- This course introduces the concepts and tools used in food security analysis. It defines food security and its relationship to the concepts of vulnerability, hunger, malnutrition and poverty.
- The course also provides guidelines on how to interpret and use conceptual frameworks for analyzing food security.

#### Theory

S.No.	Topic	No. of Lectures
1.	Food Security: Concept & definition, pillars and determinants.	1
2.	Global Food Security Index. Global hunger index and its indicator and how they measured. Global challenges to food & nutrition security.	1
3.	Inter- relationship between hunger and food insecurity. Strategy to achieve food security at household, national and global level.	1
4.	Role of nutrition in human health and sustainable development. Relationship between nutrition, diet and lifestyle.	1
5.	Growing global concern for non-communicable diseases.	1
6.	Opportunities and challenges of nutrition and food preferences as a means of preventing the spread of chronic and non- infectious diseases.	2
7.	Impact of social, cultural and economic factors on the food and nutrition security.	1

S.No.	Topic	No. of Lectures
8.	Nutrition security: Concept & definition, pillars and determinants.	1
	Nutrition sensitive approaches to combat malnutrition.	1
9.	Dietary diversity for nutrition security. Dietary diversification through utilization of bio- fortified crops, indigenous and under-utilized foods.	1
10.	Millennium Development Goals, Sustainable Development Goals (SDG) II and way ahead.	1
11.	National and international policies and programs related to food and nutrition security: POSHAN Abhiyan, NARI (Nutri-sensitive Agricultural Resources and Innovations), NFSA (National Food Security Act), NFSM (National Food Security Mission), NNM (National Nutrition Mission), WFP (World Food Programme), FAO (Food and Agricultural Organization).	1 1 1
12.	Public distribution system in context to food and nutrition security, International Fund for Agriculture Development (IFAD) etc.	1
	<b>Total</b>	<b>16</b>

### Practical

S.No.	Experiment	No. of Practicals
1.	Household survey for assessment of indicators of Food insecurity. Proforma dev, survey, report writing, validation.	2 2
2.	Assessment of dietary diversity, quality, food security, nutrition security.	3
3.	Food product development and formulation for intervention of 365utria-sensitive approaches and strategies to eradicate poverty and malnutrition.	2 2
4.	Impact of nutritional policies and programmes on the nutritional status of the vulnerable group. Framing questionnaire to conduct dietary survey – using Food Frequency Questionnaire.	2 3
	<b>Total</b>	<b>16</b>

### Suggested Readings

- Sunderland, T., Powell, B., Ickowitz, A., Foli, S., Pinedo-Vasquez, M., Nasi, R., & Padoch, C. 2013. Food security and nutrition. Center for International Forestry Research (CIFOR), Bogor, Indonesia.
- Ruel, M. T., Garrett, J., Yosef, S., & Olivier, M. 2017. Urbanization, food security and nutrition. Nutrition and health in a developing world, 705-735.
- Pingali, P., Alinovi, L., & Sutton, J. 2005. Food security in complex emergencies: enhancing food system resilience. Disasters, 29(s1), 5-24.
- Coates et al, (2007). “Household Food Insecurity Access Scale (HFIAS) for Measurement of Food Access: Indicator Guide. Version 3”
- Willett W. Nutritional Epidemiology, Oxford University Press. 2013.
- Raghuvanshi R.S. 2013 Nutritional Security through Diversified Food Production. In Agrarian Change and Small Farmers, Super markets, Viability and Food Policy. Ed. By K.N. Bhatt and Pradeep Bhargava, Concept Publishing Company PVT. LTD., New Delhi
- Swindale, A., and P. Bilinsky. 2006. Household Dietary Diversity Score (HDDS) for Measurement of Household Food Access: Indicator Guide. Vol. 2. Washington, D.C.: FHI 360/FANTA.

### **FND-322      Nutrition, Body Composition & Physical Fitness      3(2+1)**

#### **Objectives**

- This course provides an understanding of the interactions between nutrition and exercise by integrating metabolism and physiology concepts in the context of recreational physical fitness training
- Identify and describe disordered eating and exercise patterns.
- Gain an understanding of the training and experience necessary to obtain various nutrition and exercise credentials.

#### **Theory**

S.No.	Topic	No. of Lectures
1.	Body composition, methods of assessment- tools and techniques, changes in Body composition with age and fitness.	3
2.	Inter relationship between physical fitness and performance.	2
3.	Basic structure of a muscle with the help of a diagram – Functions and locations of muscles in the body – muscle groups –Major skeletal muscles.	3
4.	Basics of exercise regime – FITT formula – Frequency, Intensity, Time & Type of exercises for fitness.	3

S.No.	Topic	No. of Lectures
5.	Warm up exercises – Cool down exercises: Exercises – Benefits of regular and adequate exercise – Types of exercises and health benefits with suitable examples. Anaerobic exercises Flexibility exercises Effect of nutrition in physical fitness and sports performance and athletics.	3
6.	Concept of energy balance- factors affecting energy – equations to assess BMR. . Aerobic exercise to increase cardiovascular endurance – benefits and examples –Treadmill, Elliptical cycle, Stationary cycle and Aerobics workouts.	3
7.	Macro nutrients metabolism in exercise – Carbohydrates: lactose intolerance, Diabetes, hypoglycemia; Lipids & Oils, Fatty Acids, Triglycerides, Phospholipids, Sterols. Functions of fats, needs, deficiencies role of water and electrolytes in performance.	3
8.	Vitamins metabolism in sports- Free radicals in exercise role of anti-oxidants in exercise – Minerals and trace minerals metabolism in exercise and essential minerals and trace minerals in sports.	3
9	Sports nutrition products-supplements related to energy metabolism-weight reduction and botanical and herbal supplements – sports nutrition theory to practice –, Special consideration in sports nutrition-Women, young, diabetic, vegetarian athletes – Sport specific nutrition – Gymnastics, weight lifters, skiers, cyclists, swimming, skating, Winning recipes for peak performance.	3
10.	Assessment of Physical fitness Functional tests: Cardiorespiratory and muscular assessment; Type of measurement and protocol for evaluation and interpretation of performance; Aerobic Power or VO <sub>2</sub> max; Anaerobic Threshold; Economy of Movement. Fitness assessment: Types of exercise, Components of physical fitness and its evaluation in health and performance.	3
11.	Activity Recording: Self-reporting of activities vs. Direct monitoring of activities. Techniques to measure energy expenditure and energy intake. Techniques to assess physical fitness. Aging theories, physiology, mechanism and role of nutrients in arresting aging process.	3
	<b>Total</b>	<b>32</b>

### Practical

S.No.	Experiment	No. of Practicals
1.	Recording of Dietary intake by 24-hour recall method for 3 consecutive days.	3
2.	Recording of energy expenditure by 24-hour recall method by using multipliers for 3 consecutive days.	3
3.	Calculation of energy balance by using above data.	1

4.	Demonstration and use of body composition analyzer calculation of total fat and fat free muscle mass.	3
5.	Calculation of fat % and BC of adults, equations to assess BMR.	2
6.	Physical tests: Harvard STEP test, Treadmill test to assess hearth health, muscular grip test.	3
7.	Visit to established fitness centre.	1
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Srilakshmi, B., Suganthi, V., Ashok and Kalaivani, C. 2017. Exercise Physiology Fitness and Sports Nutrition. 1<sup>st</sup>Edn. New Age International (P) Ltd. Publishers, New Delhi.
2. Falkner F & Tanner JM.1978. Human Growth-Principles and Prenatal Growth. Vol . I. Bailliere
3. Tindall, Falkner F & Tarnner, JM. 1980. Human Growth Methodology.
4. <https://egyankosh.ac.in/bitstream/123456789/42208/3/Unit-3.pdf>
5. Falkner, F. and Tanner JM.1978. Human growth-Principles and prenatal growth.Vol. I.
6. Falkner, F. and Tarnner JM.1980. Human growth methodology. Ecological, genetic, and nutritional effects on growth. Vol. III. Plenum Press.
7. Dunford M and Andrew Dogle J.2008. Nutrition for Sports and Exercise. Peter Adams.ThomsonHigher Education, USA
8. Heather Hedrick Fik and Alan E. Mikesky. 2015. Practical Application in Sports and Nutrition. Fourth Edition Jones & Bartlett Learning, Burlington, MA01803.

### FND-323

### Food microbiology

3(2+1)

### Objectives

Learner will acquire the knowledge about:

- Scope of food microbiology and food safety
- Important genera associated with food
- Techniques for enumeration of microbes and methods (traditional to advanced) for preserving food
- Role of different microorganisms in food spoilage, food fermentation and food-borne diseases
- Microbiological quality control and food-borne illnesses investigation procedures for ensuring food safety & hygiene
- The food safety rules and regulations, Food Safety Management System (FSMS), and Microbiological Risk Assessment



## Theory

S.No.	Topic	No. of Lectures
1.	The discovery of microorganism, spontaneous generation conflict, germ theory of diseases, microbial effect on organic and inorganic matter.	2
2.	Development of microbiology in India and composition of microbial world.	2
3.	Difference between prokaryotic and eukaryotic cells. Basic aspects and scope of food microbiology; intrinsic and extrinsic factors that affect microbial growth in foods	1 2
4.	Food preservation: physical methods. Chemical preservatives and natural antimicrobial compounds, biology based preservation system.	3
6.	Importance and scope of microorganisms in food. Primary sources of microorganisms in food. Assessment of microbial load in foods- microscopic, cultural, immunological and DNA based methods.	2 2
7.	Fermentation; methods, applications, fermented foods. Lactic acid bacteria- production of cultures for food fermentation.	2
8.	Fermented foods – cereals, dairy products, vegetables and fruits, bread, beer, yogurt, butter, cheese, kefir, kumiss, sauerkraut, olives, pickles, wine and vinegar.	3
9.	Control of microorganisms by use of low and high temperature, asepsis, water activity, drying, preservatives, radiation and pressure for control of microorganisms.	3
10.	Microbiology of milk and milk products; Sources of contamination, spoilage and prevention.	3
11.	Microbiology of fruits and vegetables; cereal and cereal products; salt and spices; contamination, spoilage and prevention.	3
12.	Microbial spoilage of fruits, fruit juices, vegetables, cereals, meat, poultry, sea foods, carbonated soft drinks, canned foods.	2
13.	Chemical changes caused by microorganisms; control of spoilage.	1
14.	Food borne diseases and safety measures.	1
	<b>Total</b>	<b>32</b>

## Practical

S.No.	Experiment	No. of Practicals
1.	General laboratory practices in microbiology laboratory. Equipment used in food microbiology laboratory.	1
2.	Aseptic methods	1
3.	Sterilization methods	1
4.	Morphological studies.	1
5.	Preparation of media.	1
6.	Isolation and enrichment of microorganisms.	2
7.	Microbial analysis of food products and water.	2
8.	Isolation of molds from foods	2
9.	Microbial examination of cereal and cereal products, vegetables and fruits, meat and meat products, fish and other sea foods, eggs and poultry, milk and milk products, sugar, salts and spices.	3
10.	Preparation of fermented whey beverages.	2
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. “Food Microbiology: An Introduction” by Monica P. Doyle and Larry R. Beuchat (2018)
2. “Microbiology of Food” by A. H. Rose (2001)
3. “Food Microbiology: Fundamentals and Frontiers” by Michael P. Doyle, Robert L. Buchanan, and Rita M. Montville (2013)
4. “The Microbiology of Food” by R. K. Robinson (2000)
5. “Food Microbiology: A Laboratory Manual” by Arun K. Bhunia (2018)
6. “Microbial Food Safety: An Introduction” by Michael P. Doyle and Larry R. Beuchat (2007)
7. “Foodborne Microbes: Shaping the Host Ecosystem” by David A. Relman (2017)
8. “Microbiology of Fermented Foods” by R. F. McFeeters (2017)
9. “Food Microbiology and Laboratory Practice” by Ian C. Shaw and Gavin H. Baxter (2015)
10. “Microbial Ecology of Food” by J. L. Steele (2017)

**Objectives**

- To introduce students to an understanding of the chemistry of milk constituents. Milk and various dairy products are discussed from the perspective of the chemical, physical and biological changes that occur during processing.
- Students will be able to describe the composition of milk, identify the approximate content of individual types present, and describe physicochemical characteristics of the main components.
- Students will integrate their knowledge of food chemistry/engineering/microbiology and physical properties of foods to understand the processing of dairy products.
- Student will be able to explain how dairy products (such as fluid milk, yogurt, butter, powder, cheese) are made and the key functions of the processing steps involved.

**Theory**

<b>S.No.</b>	<b>Topic</b>	<b>No. of Lectures</b>
1.	Introduction, importance and scope of fluid milk industry in India and abroad: brief history and present status.	2
2.	Composition of milk, nutritive value of milk of cow and buffalo.	2
3.	Physico chemical properties of milk and milk constituents: physical state, acidity, pH density, and specific gravity, freezing point, color and flavor.	3 2
4.	Microbiology of milk: types of microorganisms, their production and consequent results in milk production.	3
5.	Types of milk: sterilized milk, homogenized milk, flavor milks, reconstituted milk, recombined milk, toned milk.	3
6.	Milk products: traditional products – butter, ghee, khoa, cheese in theory.	2
7.	Steps of milk processing: collection, chilling, standardization, pasteurization, homogenization, bactofugation and principle of dehydration.	3
8.	Management of processing plant: various kinds of design and layouts of plants value addition for fluid milk.	3
9.	Fortification of milk waste management, quality control aspects of milk: status of antibiotics, pesticides, heavy metals etc.	3
10.	Good manufacturing practices, implementation of HACCP standards, cleaning and sanitation of fluid plant.	2
11.	Indian standards for milk and milk products as per PFA, BIS, AGMARK etc., cleaning and sanitization procedures.	2
12.	Judging and grading of milk, defects in milk, their causes and prevention.	2
	<b>Total</b>	<b>32</b>

## Practical

S.No.	Experiment	No. of Practicals
1.	Platform test of raw milk (COB test, alcohol test)	2
2.	Adulteration in milk and its detection.	2
3.	Sampling of milk. Cream separation.	2
4.	Estimation of fat, SNF, TS platform tests.	2
5.	Detection of adulterants microbiological quality	3
6.	Evaluation of milk and milk products	3
7.	Preparation of milk and milk products – Paneer, chenna, ice cream, khoa, burfi, flavoured milk rasgulla	2
	Visit to modern milk processing and manufacturing plants	2
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. “Microbiology of Milk and Milk Products” by A. Y. Tamime (2017)
2. “Dairy Microbiology” by R. K. Robinson and A. Y. Tamime (2017)
3. “Microbiology of Fermented Milk Products” by J. A. Kurmann, J. L. Rasic, and M. Kroger (2017)
4. “Food Microbiology: An Introduction” by Monica P. Doyle and Larry R. Beuchat (2018)
5. “Microbiology of Food” by A. H. Rose (2001)
6. “Milk and Milk Products: Microbiology, Chemistry, and Technology” by R. K. Robinson (2017)
7. “Microbial Food Safety: An Introduction” by Michael P. Doyle and Larry R. Beuchat (2007)
8. “Microbiology of Cheese and Fermented Milks” by P. L. H. McSweeney (2017)
9. “Microbiology of Yogurt and Fermented Milks” by A. Y. Tamime (2017)
10. “Dairy Microbiology and Biochemistry: Recent Developments” by B. M. McKellar and D. D. Muir (2017)

## **FND-325                      Cereals & Millets: Processing & Technology                      3(2+1)**

### Objectives

- To create understanding about the processing of major cereals like paddy, maize etc.
- To study the storage and handling techniques of cereals.
- To study about the byproducts obtained during processing along with their uses.
- To gain knowledge on processing and milling of pulses.

## Theory

S.No.	Topic	No. of Lectures
1.	Production and consumption scenario of cereals and millets;	1
2.	Structure, Chemical composition and nutritive value of cereals and millets.	1
3.	General unit operations in agricultural process engineering and importance of these unit operations in grain processing	2
4.	Morphology, 373hysic-chemical properties of cereals, major and minor millets, Chemical tests- sedimentation test, flour swelling volume.	1 1
5.	Conventional and modern milling technology of paddy processing, estimation of milling efficiency, quality characteristics of milled cereals and millets.	2 1
6.	Parboiling of rice, bran stabilization methods.	1
7.	Wheat milling and processing: purification and reduction system.	2
8.	Different types of wheat flour, Quality characteristics of flour. Characteristics of wheat flour suitable for baking.	2 1
9.	Milling and processing of oats, corn, barley, sorghum	2
10.	Primary and secondary products of cereal processing. Processing of breakfast cereals: flaked, puffed, expanded, extruded and shredded. Malted cereals and cereal products By-products of cereals and millets processing	1 1 1 1
11.	Structure and composition of major millets – maize, sorghum – wet and dry milling methods – processing and by products	2
12.	Composition of minor millets – pearl millet, finger millet, little millet, kodo millet, foxtail millet and barnyard millet.	2 1
13.	Processing of minor millets.	1
14.	Structure, composition and processing of oats and barley.	2
15.	Malting of cereals and millets – production of weaning and supplementary foods, nutrient dense foods – amylase rich foods (ARF).	3
	<b>Total</b>	<b>32</b>

## Practicals

S.No.	Experiment	No. of practicals
1.	Study of physicochemical properties of cereals; Parboiling of paddy; Cooking quality of rice, milling of rice;	2 1
2.	Conditioning and milling of wheat; Production of cereal flakes; Production of popcorns, flaked rice, puffed rice, noodles; Preparation of cereal malt.	2 2 1
3.	Determination of gelatinization temperature by amylograph; Processing of value-added products from millets.	1 1
4.	Estimation of gluten content in wheat flour	1
5.	Preparation of snacks based on cereals and millets (roasting, popping, pearling, flaking, malting).	1 1
6.	Study of different unit operations and machineries in rice mills; wheat/ flour mills;	2
7.	Study of extrusion process	1
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Chakraverty A and Singh R.P, 2014. Post-Harvest Technology and Food Process Engineering. CRC Press, Boca Raton, FL, USA.
2. Dash S K, Bebartta J P, Kar A. 2012. Rice Processing and Allied Activities. Kalyani Publishers, New Delhi
3. Khan, K and Shewry P.R., 2009. Wheat: Chemistry and Technology, 4<sup>th</sup> Ed., AACC International, Inc., St. Paul, MN, USA.
4. Chakraverty A, Arun S. Mujumdar, G.S. Vijaya Raghavan and Hosahalli S. Ramaswamy. 2003. Handbook of Post-Harvest Technology: Cereals, Fruits, Vegetables, Tea, and Spices. Marcel Dekker, Inc., NY, USA.
5. David A.V. Dendy and Bogdan J. Dobraszczyk. 2001. Cereal and Cereal Products: Technology and Chemistry. Springer-Verlag, US.
6. Khader, V. 2001. Text book of Food Science and Technology. Directorate of Information and Publications of Agriculture, ICAR, Krishi Anusandhan Bhawan, Pusa, New Delhi
7. Pillayar P. 1988. Rice: Post Production Manual. Wiley Eastern Limited.
8. Manay N.S and Shadakshara swamy, M. (2001). Foods facts and principles. Wiley Eastern Ltd. New Delhi.

**Objectives**

- To explore the relationship between health, nutrition, environment and sustainability
- To investigate the potential causes of unhealthy eating patterns
- To discover the importance of a sustainable diet

**Theory**

<b>S.No.</b>	<b>Topic</b>	<b>No. of Lectures</b>
1.	Sustainable development goals and sustainable nutrition.	1
	Definition of sustainable diets, dimensions of sustainable diets.	1
	Aims and guiding principles of sustainable diets.	1
2.	Climate change and sustainable and healthy diets.	2
	Indicators and measures of sustainable diets.	1
3.	Assessing the environmental impact of diet. Nutritional indicators of sustainability.	2
4.	Sustainable diet: Social and cultural perspective.	2
	Sustainable diets and food-based dietary guidelines.	1
5.	Traditional food at the epicenter of the sustainable food system.	2
6.	Determinants of food choice and dietary change. Organic food and sustainable nutrition	2
7.	Indian diets and sustainability. Attaining healthy and sustainable diets.	2
8.	Economics, food waste, biodiversity,	2
	The environmental impact and sustainability of existing food systems.	2
9.	Sustainable Healthy Diets: Models and Measures – the dietary dimension,	2
	the economic dimension,	1
	the sociocultural domain,	1
	the environmental domain.	1
10.	Metrics for Characterizing Sustainable Nutrition Security: Nutrient Adequacy of Foods, Diets and the Food Supply, Ecosystem Stability,	1
	Food Affordability and Availability,	1
	Sociocultural Wellbeing,	1
	Resilience, Food Safety,	1
	Waste and Loss Reduction.	1
	<b>Total</b>	<b>32</b>

## Practical

S.No.	Experiment	No. of Practicals
1.	Develop a meal plan for nutritional adequacy and sustainability.	4
2.	Undertake a market survey of food products with sustainable or climate-friendly labels.	4
3.	Assess the 7-day food menu served in university hostels in terms of sustainability.	4
4.	Pilot study on assessment of food choice motives of university students.	4
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Burlingame, B. and Dernini, S. (Ed.). 2019. Sustainable diets linking nutrition and food systems. Wallingford, Oxfordshire; Boston, MA: CABI.
2. Sarilo, S. 2018. Towards Healthy and Sustainable Diets: Perspectives and Policy to Promote the Health of People and the Planet. Springer Briefs in Public Health. Switzerland.
3. Contento, I. R. 2011. Overview of Determinants of Food Choice and Dietary Change: Implications for Nutrition Education. In Nutrition education: Linking research, theory, and practice (2<sup>nd</sup> ed., pp. 26–42). Jones and Bartlett Publishers.
4. FAO. 2012. Sustainable Diets and Biodiversity—Directions and solutions for policy, research and actions (Proceedings of the International Scientific Symposium BIODIVERSITY AND SUSTAINABLE DIETS UNITED AGAINST HUNGER). Food and Agriculture Organization of the United Nations. [www.fao.org/3/i3004e/i3004e00.htm](http://www.fao.org/3/i3004e/i3004e00.htm)
5. FAO & WHO (2019) Sustainable healthy diets Guiding principles. [www.fao.org/3/ca6640en/ca6640en.pdf](http://www.fao.org/3/ca6640en/ca6640en.pdf)
6. <https://www.kerry.com/content/dam/376erry/sustainability/people/nutrition-health/Sustainable-Nutrition-Profiling-Whitepaper.pdf>

**FND-327**

**Hospitality Management**

**2(1+1)**

## Objectives

- To develop industry-ready professionals for the hospitality sector.
- Gear students for operational and supervisory roles in all sectors.
- Prepare students for each food production and service roles.



## Theory

S. No.	Title	No. of lectures
1.	Principles of food purchasing, Methods of food purchasing; Storages of foods	1
2.	Different kitchen equipment- Heavy and Light equipment, Care & maintenance, and their use	1
3.	Management- Principles of management, Steps of effective management, techniques of effective management	2
4.	Attitude towards work, behaviour & personal hygiene , Do's and don'ts while working in the kitchen	2
5.	Understanding the functioning of Food Production Dept.in any catering establishment / setup	2
6.	Organizational structure, layout, Duties & responsibilities	1
7.	Menu planning- Definition and Principles of menu planning, Types of menus	2
8.	Financial management- Introduction, Principles, Costing, Budgeting. Accounting. Food cost control methods, Factors affecting food cost, labour cost, operating cost and overhead cost	2
9.	Standardization of recipe- Definition of standardization of recipe, Standard recipe format and uses, portioning equipment, portion control	2
10.	Personnel management- Introduction, Personal management concepts. Staff employment, Employee benefits, Methods of selection, Orientation, Training & development, Supervision, Motivation of employees	1
	<b>Total</b>	<b>16</b>

## Practical

S.No.	Title	No. of Practicals
1.	Menu planning for industrial canteen/ hospital canteen/ cafeteria/ snack bar/ residential hostel.	2
2.	Standardization of recipes suitable for fast food outlet/ industrial canteen/ hospitals/ college hostel.	2
3.	Multiplication of standard recipes for quantity food production	1
4.	Quantity food management	1

S.No.	Title	No. of Practicals
5.	Portioning and fixing of cost	1
6.	Visit to any one canteen attached to hospital and dietary department cafeteria, 3-star hotel/restaurant, 5-star hotel / restaurant, industrial canteen.	3
7.	Presentation of report on hospital canteen, cafeteria, 3-star hotel / restaurant, 5-star hotel / restaurant in terms of organizational set up, production, preparation and service.	2 2
8.	Calculate food cost, labour cost, operating cost and overhead cost of any standardized recipe.	2
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Sethi and Malhan. 1993. Catering Management: An Integrated Approach. Wiley Eastern.
2. Gregoire, MB. 2017. Foodservice Organizations: A Managerial and Systems Approach, 9<sup>th</sup> ed. FoodService in Institutions. John Wiley.

### FND-328

### Food Hygiene and Sanitation

2(1+1)

### Objectives

This course is designed to:

- Present the rules of personal hygiene and the importance of adhering to safety rules and regulations.
- Introduce the causes and prevention of food poisoning and to introduce the requirements of safety in the workplace.
- Introduce local legislation relating to the food service industry

### Theory

S.No.	Topic	No. of Lectures
1.	Meaning and principle of food hygiene. Interrelationship of health, hygiene and sanitation Food Hazards. Personal hygiene.	2
2.	Water Requirement and use, sources of water supply, water pollution, purification of water, portable water and its quality Criteria and standards, hardness of water and its treatment, defluorination of water	2
3.	Food hygiene: Contamination of foods from various sources. Green plants and fruits, animals, sewage, soil, air and water and their health hazards.	2

S.No.	Topic	No. of Lectures
4.	Food spoilage. Perishable, semi perishable and non-perishable foods. Sanitary procedures for preparation, handling and storage of food, Food borne infection and intoxication.	2
5.	Food poisoning caused by bacteria: <i>Salmonella</i> , <i>Staphylococcal poisoning</i> , <i>Botulinum</i> , <i>Clostridium perfringens</i> and <i>B.cerus</i> . Sources, incubation period, mechanism of action.	2
6.	Investigation of Food Poisoning, prevention and control. Food Poisoning caused by agents other than microorganism. Poisonous plants, animals, chemicals, metals and pesticides etc. Pests and Rodent Control.	2
7.	Hygiene Requirements for Licensing and sale. Health status of Food Handlers. Cross-contamination and its prevention methods.	2
8.	Introduction to HACCP principles and their application. Concept of TQM, GMP and Risk Assessment.	2
	<b>Total</b>	<b>16</b>

### Practical

S.No.	Experiment	No. of Practicals
1.	Identification of microorganism	2
2.	Preparation of slides	2
3.	Preparation of media	2
4.	Collection of water samples. Testing of water for: (i) Physical quality	2
5.	(ii) Bacteriological quality	2
6.	Survey of hygienic and sanitary condition in food shops/food vendors/ canteens.	3
7.	Report writing.	3
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Adams M.K. and Moss M.O. 2000. Food Microbiology, New Delhi: Panima Corp.
2. Longree K.L. and Blaker G.C. 1982. Sanitary Techniques in Food Service. New York: John Wiley and Sons.
3. Park, K. 1997. Textbook of Preventive and Social Medicine. 1<sup>st</sup> Ed. Jabalpur: Banarsidas Bhanot.
4. Srivastava, A. 2013. Food Hygiene and Sanitation, Neha Publishers and Distributors.
5. Yadav, S. 1997. Food Hazards and Food Hygiene 1<sup>st</sup>, Ed. Annual Publication Ltd., New Delhi.

6. William, C., Frazierad Dennie. C Westheff. 1996. Food Microbiology, 4th Editions, Tata McGraw
7. Hill Company Limited.

## SEMESTER VII

S. No.	Course Title	Course Number	Credit Hours
1.	Elective courses (totaling credit hours of 18)*	ND /FS/IFSM 411-419	18
2.	Ethics in Human Research	EHR 411	1(1+0)
3.	Seminar	SEM 411	1(0+1)
		<b>Total</b>	<b>20</b>

### HER-411

### Ethics in Human Research

**1(1+0)**

**Objectives:** The students will be able to:

- Explain key principles of ethics,
- Analyze the ethical implications of various research methods and designs.
- Critically evaluate the ethical aspects of research proposals and publications.
- Apply ethical principles to real-world research scenarios and make informed ethical decisions.

### Theory

S.No.	Topic	Lectures no.
1.	Definition of ethics and its relevance in research	1
2.	Key ethical principles and their application in research	2
3.	Informed consent process: elements, challenges, and best practices, Vulnerable populations and ethical considerations	2
4.	Institutional Review Boards (IRBs) and their role in ethical review Ethical issues in data collection and management	2
5.	Ethics with respect to science and research, honesty; scientific misconduct; fabrication, plagiarism, duplicate and overlapping publications, falsification	2
6.	Ethical considerations in Clinical trials, Behavioral research, Social science research, Biomedical research	3
7.	Ethical dilemmas in research: conflicts of interest, authorship disputes, and misconduct, complaints and appeals	2
8.	Predatory publishers and journals	2
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Beauchamp, T. L., & Childress, J. F. (2019). Principles of biomedical ethics (8th ed.). Oxford University Press.
2. Emanuel, E. J., & Beauchamp, T. L. (2012). The ethics of clinical research: A guide for investigators. Oxford University Press.
3. Resnik, D. B. (2015). The ethics of science and technology: An introduction. Routledge.
4. Lorella Congiunti, Francesco Lo Piccolo, Antonio Russo, Mario Serio. 2023. Ethics in Research: Principles and Practical Considerations. Springer Nature
5. Nimit Chowdhary, Sunayana, Monika Prakash. 2024. Research and Publication Ethics - An Introduction. Routledge, Taylor and Francis group.

## ELECTIVE MODULE - I

### Nutrition and Dietetics

#### ND-411 Diet Therapy for Hospitalized Cases

4(1+3)

#### Objectives

- To learn about specialized dietary regimes or meal plans
- Nutritional requirement of hospitalized cases
- Learning to apply of principles of therapeutic nutrition in hospital settings

#### Theory

S.No.	Topic	No .of Lectures
1.	Enteral and parenteral feeding, feed formulation, diseases antagonism and synergism	3
2.	Use of nutraceuticals and supplements for hospital cases, diet for bariatric surgery	3
3.	Reading prescription, interaction with drug, taking diet and medical history	2
4.	Duration hospitalization in following conditions: GIT disorders, surgery (liver, kidney, CVD), cancer, ICU patients, burns, injury, sepsis, trauma, pre- and post-operative conditions	3
5.	Hospitalization due to diabetes, malnourished neonates, premature infants, multiple organ problems	3
6.	Neoplastic diseases – goals of nutritional care for cancer patients.	2
	<b>Total</b>	<b>16</b>

## Practical

S.No.	Experiment	No .of practicals
1.	Planning and preparation of a clear fluid, full fluid diet, soft diets and tube feeding formula for prep and post-operative patients.	3
2.	Diet plan and nutrient calculation for peptic ulcer, dysentery, diarrhea and constipation.	3
3.	Preparation of SOAP for liver disorders.	2
4.	Diet plan and nutrient calculation for fatty liver, hepatitis cirrhosis, cholecystitis and cholelithiasis of liver	3
5.	Preparation of SOAP for obesity. Diet planning for obese patients and bariatric patients	3
6.	Preparation of SOAP for underweight and diet planning	3
7.	Preparation of SOAP for diabetes mellitus and dietary modification.	2
8.	Formulation of carbohydrate, protein, fat, fiber and sodium exchange list	3
9.	Preparation of SOAP for Cardiovascular diseases. Diet planning for atherosclerotic, and congestive heart failure	3
10.	Preparation of SOAP for hyper tension and diet planning.	3
11.	Preparation of SOAP for kidney diseases.	2
12.	Diet planning for glomerulonephritis, nephrotic syndrome, nephrosclerosis syndrome, renal calculi, dialysis and renal failure.	3
13.	Diet planning for febrile conditions, AIDS, tuberculosis and burns.	3
14.	Preparation of SOAP for allergy and diet planning.	3
15.	Diet planning for inborn errors of metabolism.	3
16.	Diet planning for cancer patient.	3
17.	Diet planning for protein energy malnutrition.	3
	<b>Total</b>	<b>48</b>

## Suggested Readings

1. Eastwood. M. 2000. Principles of Human Nutrition, Chapman and Hall, London
2. Raghuvanshi, R.S. and Mittal M 2014 Food Nutrition and Diet therapy. Westvill Publication New
3. Delhi.
4. Mahan. L.K. and Escott-Stump. S. 2000. Krause's Food, Nutrition and Diet Therapy. W.B. Sanders

5. Company. Philadelphia.
6. Suitor, C.W. and Crowley, M.F, 2000. Nutrition-Principles and Application in Health promotion.
7. J.B.Lippincott, Company. Philadelphia.
8. Townsend, C.E and Roth, R.A. 2000. Nutrition and Diet Therapy. Delmar Publishers. New York.
9. Peckenpaugh, N.J and Poleman, C.M., 1999. Nutrition Essentials and Diet Therapy. W.B. Saunders Company, Philadelphia.

### Web Resources

1. [www.cellinteractive.com](http://www.cellinteractive.com)
2. [www.nutrition.org.uk](http://www.nutrition.org.uk)
3. [www.fnic.nal.usda.gov](http://www.fnic.nal.usda.gov)

## ND- 412

## E-Applications for Dietetics

4(1+3)

### Objectives

- Introducing the concept AI among students
- Understanding the role of nutrition applications as the means for automatic dietary intake and energy expenditure measurements

### Theory

S.No.	Topic	No .of Lectures
1.	Basic principles in developing a e-applications, Planning process, rules of web designing	2
2.	Designing navigation bar, Page design, Home Page Layout, Design Concept	2
3.	Audience requirement. Audience requirement, Idea creation – Sketching – Wire framing	2
4.	Graphic designing - Coding and programming, Importance of e-applications in Dietetics-	2
5.	Role of AI. Diet and nutrition tracking App – Calorie calculating app – app for calculating energy expenditure – app for calculating energy requirement – Stages of developing nutri App for dieting.	2
6.	Six types of technology assisted instruments for dietary assessment -: interactive computer-based technologies - Personal Digital Assistants (PDAs) - web-based technologies – mobile devices, specialized cameras and tape recorders- scan and sensor technologies.	3

S.No.	Topic	No .of Lectures
7.	Integration of e-Dietary Assessment tools into the care process. Food atlas -artificial intelligence in dieting.	2
8.	Advantages and disadvantages of e-dietary assessment methods. e-courses on nutrition and available platforms.	1
	<b>Total</b>	<b>16</b>

### Practical

S.No.	Experiment	No .of Practicals
1.	Apps listing- Commercially available AI Based food and nutrient assessment system-	3
2.	Nutrition facts, CRON-O-METER,	3
3.	Diet organizer, e-fit, Easy menu balanced meal planner, food file, Nutrition info.	3
4.	Software for nutrient intake calculation and Dietary assessment software	3
5.	e-portals of NIN such as Count What you Eat, ICMR-NIN TATA Dashboard center, NUTRIFY INDIA NOW	3
6.	Tracking commercial apps and developing inventory of available apps related to health and nutrition tracking.	3
7.	Diet history- Google forms, photography method, electronic household weighing, sensor based health assessment for apps for tracking and measuring BP, blood sugar, hemoglobin, smart watches, fitness tracker,	3
8.	Online survey design for nutritional and dietary assessment for understanding current trends in dietary intake in particular group	3
9.	Developing messages for public masses.	3
10.	Developing web page/blog/e-course. Info.	3
11.	Graphic designing/posters/pamphlets.	3
12.	Attending training and workshops related to e-application/AI/coding or programming.	2
13.	Generating awareness using e-application.	2
14.	Organizing awareness camps among general public on use of nutrition related online platforms and application for tracking their dietary intake.	3
15.	Application based assignment- nutrient analysis/estimation, data collection – 24-h recall, diet history, food record, menu planning,	3
16.	Application based assignment nutrition counselling, food portion size estimation, standardized recipe formulation.	3
17.	Project to be submitted by student using any e-tool	2
	<b>Total</b>	<b>48</b>



## Suggested Readings

1. Emma Tonkin, Julie Brimblecombe, Thomas Philip Wycherley, Characteristics of Smartphone Applications for Nutrition Improvement in Community Settings: A Scoping Review, *Advances in Nutrition*, Volume 8, Issue 2, March 2017, Pages 308–322 <https://doi.org/10.3945/an.116.013748>
2. Count What You Eat. NIN <http://count-what-you-eat.ninindia.org:8080/CountWhatYouEat/Receipes.do>
3. Tom Taulli. 2019. Artificial Intelligence Basics: A Non-Technical Introduction apress.
4. Wendy Willard. 2010. Web Design: A Beginner's Guide. Second Edition. McGraw-Hill Education.
5. Côté, M., & Lamarche, B. (2021). Artificial intelligence in nutrition research: perspectives on current and future applications. *Applied physiology, nutrition, and metabolism = Physiologie appliquee, nutrition et metabolisme*, 1–8. Advance online publication. <https://doi.org/10.1139/apnm-2021-0448>

## ND-413

## Nutrigenomics

2(2+0)

### Objective

This course aims to understand, in depth, the influence of genetics on micronutrient metabolism, and implications for human diseases including inherited inborn disease, metabolic disease, cancer, neurodevelopment, and neurodegenerative diseases, etc.

### Theory

S.No.	Topic	No .of Lectures
1.	Introduction - role of nutrition in preventing risk of disorders – proposed strategies for management of nutrient disorders – personalized medicine – personalized nutrition;	3
2.	Introduction to genomics and its importance in health care, agriculture and environment	3
3.	Introduction to Nutrigenomics Definition - role of Personalized nutrition in human diseases.	3
4.	Genes – structure – biochemical and molecular nature of genes; Central Dogma of Life; - regulation of gene expression	3

S.No.	Topic	No .of Lectures
5.	Role of diet/nutrition in regulation of gene expression – metabolic programming - Genetic basis of Dietary responses - Diet Vs Gene interactions. Genetic susceptibility to diets.	3
6.	Introduction to methods of developing nutritious foods/diet – intervention of biotechnology/genomics in producing nutritionally important molecules/compounds	3
7.	Production of therapeutic/medicinal proteins/hormones/molecules through genetic engineering –Biotech processes in value addition of dietary foods - fermentation process, and genetic improvement of food grade microorganisms; crop varieties with enhanced nutrition.	3
8.	Introduction to transcriptomics, proteomics, metabolomics; applications in nutrition research	2
9.	Metabolic Syndrome in humans - Nucleotide polymorphisms associated with common/major dietary disorders - inborn errors of metabolism – lactose intolerance, gluten enteropathy and phenylketonuria.	3
10.	Biomarkers – importance, discovery and validation- screening for bioactive nutrients and compounds - Cell line testing – zebrafish model and animal model	3
11.	Scientific, technological and resource constraints on genomics - important factors affecting development in nutrigenomics.	3
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Ferguson R. Lynnette. 2013. Nutrigenomics and Nutrigenetics in Functional Foods and Personalised Nutrition. CRC Press.
2. Carlsberg, C, Ulven, M. S., Molnar, F. 2016. Nutrigenomics. Springer Pub.
3. Nestle M. 2003. Safe Food: Bacteria, Biotechnology & Bioterrorism. Univ. of California Press.
4. Rogers PL and Fleet GH. 1989. Biotechnology and Food Industry. Univ. of Minnesota.

**Journals:** Journal of the American Dietetic Association,

### Web Resources

[https://scholar.google.co.in/scholar?q=\(search\)](https://scholar.google.co.in/scholar?q=(search))

[http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3602567/pdf/13197\\_2012\\_Article\\_775.pdf](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3602567/pdf/13197_2012_Article_775.pdf)

**Objectives**

- To gain basic knowledge on changes occurring in the physiology and metabolism of human body as a result of change in extreme environment.
- To know the nutrition in emergency, nutrition and health problems, food distribution strategies and dietary management.
- To acquire basic knowledge about immune nutrition in acute and chronic inflammation.

**Theory**

S.No.	Topic	No .of Lectures
1.	Nutritional requirements for extreme environments	1
2.	Introduction - General adaptive mechanisms to environmental extremes and role of nutrition in successful acclimatization	2
3.	Decreased oxygen availability at high altitude – nutrition requirements for high altitude	1
4.	Nutrition requirements in cold and polar environment- thermoregulation in cold –dietary guidelines for cold conditions	2
5.	Nutrition requirements in hot environments- effect of heat stress –energy expenditure in hot environment.	2
6.	Nutrition on requirements for astronauts (space missions); Sea and air travel nutrition: introduction, need and scope for space travel, history of space travel; -changes in body composition during space expedition and nutrition requirements.	3
7.	Physiological changes in human body, psychological preparedness, health and nutritional problems, nutrient requirements and dietary management during sea and air travel.	3
8.	Nutrition in Emergencies: need and importance, types of emergency situations such as natural and manmade, nutritional and health problems in emergencies.	3
9.	Control of communicable diseases through sanitation and immunization- Food distribution strategies- nutrient requirement and dietary management during emergency	3
10.	Nutritional requirements during starvation: total starvation – biochemistry of starvation, conditions developing starvation, features of starved body – survival period, effects of starvation/human body adaptation, metabolic alterations and nutrition requirements during starvation.	3

S.No.	Topic	No .of Lectures
11.	Immuno-nutrition: nutrients affecting the immune system at the physiological, cellular and genetic level. Nutrients involved in the inflammatory response, role of specific nutrients in immune suppression and in immune promotion.	3
12.	Acute inflammation-- features, causes, vascular and cellular events, inflammatory cells and mediators.	3
13.	Chronic inflammation- causes, types, classification non-specific and granulomatous with examples, repair, and wound healing by primary and secondary union, factors promoting and delaying the process. Healing in specific site including bone healing.	3
	<b>Total</b>	<b>32</b>

### Practical

S.No.	Experiment	No .of Practicals
1.	Studying the existing ration scale for army personnel in plains/high altitudes	3
2.	Space foods/ emergency ration foods, planning and preparation of diet for army person in the high altitudes, hot environment and cold environment	3
3.	Planning and preparation of diet for space mission, preparation of snacks foods for space, fibre rich foods ,ergogenic foods / bars for high altitude	3
4.	Ready to eat appetizers - juices/candy, high energy foods for starvation, RTE/ RTC foods for emergencies	3
5.	High protein foods, planning and preparation of diet for acute and chronic inflammation condition – Rheumatic arthritis/Asthma	3
6.	Planning and preparation of diet for immunity	1
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Moris, E.S. (1994). Modern nutrition in health and disease. Leaned Febinger, USA
2. Corinne H.R, Marilyn R. L, Wanda L. C and E. Garwick. (1982). Normal and therapeutic nutrition. (Pp-1-16). New York, Macmillan Publishing Company.
3. Kathleen ML and JL Raymond (2016) Krause's Food and the Nutrition Care Process. 14th Edition, Saunders, Philadelphia.
4. WHO. (1997). Applied health research priorities in complex emergencies, Geneva

5. Bharat B. Aggarwal, David Heber, (2014), "Immuno-nutrition: Interactions of Diet, Genetics, and Inflammation", CRC Press.
6. Sehgal S. and Raghuvanshi RS. (2007). Textbook of community nutrition Directorate of Information and Publications of Agriculture, Indian Council of Agricultural Research, New Delhi.
7. <https://www.cdc.gov/ncbddd/adhd/index.html>
8. <https://www.unhcr.org/45fa745b2.pdf>
9. [http://apps.who.int/disasters/repo/13849\\_files/i/nutrition\\_in\\_emergencies\\_ppt.pdf](http://apps.who.int/disasters/repo/13849_files/i/nutrition_in_emergencies_ppt.pdf)
10. <https://www.unicef.org/media>
11. [https://www.nasa.gov/sites/default/files/space\\_nutrition\\_book.pdf](https://www.nasa.gov/sites/default/files/space_nutrition_book.pdf)
12. <http://spacelink.nasa.gov/products>

## **ND-415**

## **Nutrition Through Life Cycle**

**3(2+1)**

### **Objectives**

- Nutrition in the Life Cycle will cover nutritional needs of individuals during critical stages of development.
- Students will learn about the biological basis for nutritional requirements in normal development and maintaining health in adulthood.
- Consequences of over- and under-nutrition and how to identify and address these issues will be discussed.

### **Theory**

<b>S.No.</b>	<b>Topic</b>	<b>No .of Lectures</b>
1.	Infancy- Role of nutrition on physical and mental development, rate of growth-weight as an indicator, assessment of growth, nutrient requirement during infancy, feeding of infants, value of breast feeding on infants, breast feeding versus artificial feeding, types of milk and their use in infant feeding.	3
2.	Weaning and supplementary foods, weaning practices in community, feeding of premature and low-birth-weight infants, Nutritional disorders and common ailments in infancy, feeding the sick child, Immunization schedule and growth charts	3
3.	Preschool age: Physical growth and mental development, prevalence of malnutrition in preschool years and food habits, nutritional requirements during preschool age and supplementary foods	3
4.	School age. Physical growth and mental development, nutritional requirements during school age, specific problems, specific problems in feeding school children	3

<b>S.No.</b>	<b>Topic</b>	<b>No .of Lectures</b>
5.	Adolescence. Physical and physiological changes, nutritional requirements, food preferences and nutritional problems, problems, growth spurt and nutrition, adolescent fads influencing nutrition.	3
6.	Adulthood, Sex, occupation and income, nutritional requirements, biological and nutritional consequences and complications due to pollutants, vegetarianism.	3
7.	Nutrition, work capacity and physical fitness. Nutrition, infection and immunity, nutrients and drugs interaction.	3
8.	Pregnancy. Physiological changes in pregnancy, weight gain during pregnancy, food and nutrient requirements. Complications of pregnancy and their nutritional management, impact of nutrition on the outcome of pregnancy.	3
9.	Nutritional need of fetus during different stages of fetal cell growth and maternal nutritional needs.	2
10.	Psycho-physiology of lactation; milk synthesis and secretion, maternal needs during lactation, composition of colostrums and mature human milk, milk of mothers of pre-term babies. Non-nutritional factors of human milk; immunological factors, enzymes, hormones. Human milk banking.	3
11.	Elderly. Physical and physiological changes, nutritional requirements, problems of old age, nutrients influencing aging process	3
	<b>Total</b>	<b>32</b>

### **Practical**

<b>S.No.</b>	<b>Experiment</b>	<b>No. of Practicals</b>
1.	Grouping of foods based on richness of nutrients and quantifying foods to give uniform content of each nutrient.	2
2.	Planning and formulation of food exchange lists.	1
3.	Planning, preparation and evaluation of diet for adult men and women involved in different activities.	3
4.	Planning, preparation and evaluation of diets for pregnant women, lactating mothers, weaning and supplementary foods for infants	3
5.	Planning, preparation and evaluation of diets for preschool children, school going children, packed lunches for preschoolers and school children	3
6.	Planning, preparation and evaluation of diets for adolescent boys and girls, elderly, preschool children with PEM and vitamin. A deficiency	3
7.	Planning diets for anemic children, adolescents and pregnant women.	1
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Moris, E.S. (1994). Modern nutrition in health and disease. Leaned Febinger, USA
2. Srilakshmi, B. (1995). Dietetics. Newage international publishers, New Delhi.
3. Corinne H.R, Marilyn R. L, Wanda L. C and E. Garwick. (1982). Normal and therapeutic nutrition. (pp- 1-16). New York, Macmillan Publishing Company.
4. Williams, S.R.; Worthington, R.S.; Snehlinka, E.D.; Pipes, P.; Ress, J.M. and Mahal, K.L. (1988).
5. Introduction to nutrition throughout the life cycle. Times Mirroe/Mosby College Publishers.

### ND-416 Fundamentals of Research Methodology & Library Search 2(1+1)

#### Objectives

- Understand some basic concepts of research and its methodologies
- Identify appropriate research topics
- Select and define appropriate research problem and parameters
- Prepare a project proposal (to undertake a project)
- Organize and conduct research (advanced project) in a more appropriate manner
- Write a research report and thesis
- Write a research proposal (grants)

#### Theory

S.No.	Topic	No .of Lectures
1.	Introduction to Research - Research: Meaning, Types, Scope and Significance, Foundations of Research: Meaning, Objectives, Motivation, Utility.	1
2.	Concept of theory, empiricism, deductive and inductive theory.	1
3.	Characteristics of scientific method - Understanding the language of Research - Concept, Construct, Definition, Variable. Research Process.	1
4.	Guiding Principles in Selection of Research Problem; Research Objectives and Approaches, Problem Identification & Formulation, Research Question – Investigation Question Measurement Issues	2
5.	Hypothesis - Qualities of a good Hypothesis, Null Hypothesis & Alternative Hypothesis. Hypothesis Testing - Logic & Importance.	1

S.No.	Topic	No .of Lectures
6.	Research Process and Criteria of Good Research; Research Method ; Research Design – Meaning, Need, Key Components, Data Collection, Survey and Sampling,	2
7.	Data: Meaning, Nature, Types and Sources; Methods of Collecting Secondary Data, Surveys – Definition, Purpose and Scope; Survey Techniques and their Limitations.	2
8.	Questionnaires and Schedules – Definition and Differentiation; Types of Questionnaires; Salient Features of an Effective Questionnaire,	1
9.	Sampling and Sample Designs: Concept, Purpose and Types; Criteria for Selecting appropriate sampling Procedure;	1
10.	Data Analysis – Tools and Techniques, Use of proper statistical procedures, Preparation of Research Report,	2
11.	Impact factor of Journals, When and where to publish? Ethical issues related to publishing, Plagiarism and Self-Plagiarism.	1
12.	Use of Encyclopedias, Research Guides, Handbook etc., Academic Databases for Computer Science Discipline.	1
	<b>Total</b>	<b>16</b>

### Practical

S.No.	Experiment	No .of Practicals
1.	Identifying problem,	1
2.	Formulating research hypothesis,	3
3.	Questionnaire design,	3
4.	Collection of secondary data,	3
5.	Analysis & report writing.	3
6.	Use of reference management software, article writing	3
	<b>Total</b>	<b>16</b>

### ND-417

### Sports Nutrition

**3(2+1)**

### Objectives

- To develop an understanding about the concept of diet planning for exercise and sports.
- To gain knowledge of nutritional requirements for sports persons and making diet plans.
- To understand the current theories on the relationships between diet and performance in sports, exercise, and health.



## Theory

S.No.	Topic	No .of Lectures
1.	Introduction, Nutritional considerations for sports / exercising person as compared to normal active person.	2
2.	Energy substrate for activities of different intensity and duration, aerobic and anaerobic activities.	2
3.	Fluid balance in sports and exercise, importance, symptoms and prevention of dehydration.	1
4.	Sports drink, Energy enhancers and other commercial sports food products.	2
5.	Macro Nutrients-Carbohydrate as an energy source for sport and exercise, Carbohydrate stores, Fuel for aerobic and anaerobic metabolism, Glycogen re- synthesis, CHO Loading, CHO composition for pre exercise, during and recovery period.	2 1 1 1
6.	Role of fat as an energy source for sports and exercise. Fat stores, regulation of fat metabolism. Factors affecting fat oxidation (intensity, duration, training status, CHO feeding), Effect of fasting and fat ingestion.	1 1 1 1
7.	Protein and amino acid requirements, Factors affecting Protein turnover. Protein requirement and metabolism during endurance exercise, resistance exercise and recovery process.	2 1
8.	Important micronutrients for exercise- B complex vitamin and specific minerals.	2
9.	Exercise induced oxidative stress and role of antioxidants.	2
10.	Chronic dieting and eating disorder. Female athletic triad, sports anaemia.	2
11.	Dietary supplements and ergogenic aids (nutritional, pharmacological and physiological).	2
12.	Use of Nutritional supplements in strength/power sports and team sports- Use, effects, efficacy and safety – Creatine monohydrate, Sodium bicarbonates, Nitrates – B-Alanine, Caffeine – Protein supplements – Fat burners.	2 3
	<b>Total</b>	<b>32</b>

## Practical

S.No.	Experiment	No .of practicals
1.	Development of project proposal on nutrition in physical fitness	3
2.	Development of methodology for collection of data, assessment of nutritional status and physical fitness, practice of using anthropometry, clinical and dietary assessment techniques, assessment of body composition of the selected group	2 3
3.	Development and standardization of tool for physical fitness	2
4.	Assessment of physical fitness of the selected group using standard tool	2
5.	Compilation of data of anthropometry and clinical observation	2
6.	Analysis of dietary intake to assess the nutrient intake, interpretation of nutrient intake in comparison with RDA, compilation of data on energy expenditure, analysis of data and Final report writing of the project and presentation	2
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Jeukendrup, A., & Gleeson, M. (2010). Sport nutrition: an introduction to energy production and performance (No. Ed. 2). Human Kinetics.
2. McArdle, W.D., Katch, F.I., & Katch, V.L. (2009). Sports and exercise nutrition. Lippincott Williams & Wilkins.
3. Recommended Dietary Intakes for Indian Sportsman and Women. Satyanarayan, K; Nageshwar Rao. C; Narsinga Rao, B.S.; Malhotra, M.S. (1985)., Hyderabad, National Institute of Nutrition.
4. Banardot, Dan (2000). Nutrition for Serious Athletes. Human Kinetics Energy-Yielding Macronutrients and Energy Metabolism in Sports Nutrition. Edited by Judy ADriskell, Ira Wolinsky, CRC Press 2000.

## ND-418

## Diet and Immunity

3(2+1)

### Objectives

- To gain a comprehensive understanding of the immune system and its role in protecting the body from disease.
- To explore the impact of various nutrients on immune function.
- To understand the potential benefits of specific foods for immune health.

## Theory

S.No.	Topic	No .of Lectures
1.	Introduction to Immune System: Cells, Organs, and Functions, Innate and Adaptive Immunity.	2 2
2.	Immunodeficiency and evaluation of Immune function.	2
3.	The Importance of Gut Microbiome for Immune Health, Nutrient-Immune Interactions -Essential Vitamins and Minerals for Immune Function, Role of Antioxidants in Immune Response, Impact of Macronutrients on Immunity.	1 2 2 2
4.	Indian Diet and Immune System- Benefits, Herbs, Medicinal plants and other Plant-Based Diets for immunity enhancement.	2 2
5.	Role of Hydration in Immune Function,	2
6.	Immunomodulation by Probiotics and Prebiotics Food.	2
7.	Understanding the Role of Dietary Fats and Immune Function.	2
8.	Intolerances and Immune System Response.	2
9.	Immunity Booster Foods.	3
10.	Diets and Autoimmune Conditions.	2
11.	Technology and apps in promoting healthy eating habits for immune support.	2
	<b>Total</b>	<b>32</b>

## Practical

S.No.	Experiment	No .of Practicals
1.	Exploring local herbs and medicinal plants as immunity booster.	4
2.	Study of different pathogenic organism and their interaction with food compounds.	3
3.	Planning of individualized diet plan for different auto immune diseases.	5
4.	Planning of individualized diet plan for different conditions of food intolerances.	4
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Gershwin M E, Nestel P and Keen CL. (2004) Handbook of Nutrition and Immunity. Humana Press, Totowa, New Jersey.
2. Bhaumik, D., & Chattopadhyay, S. (2012). Immunity and Ayurvedic Nutrition. Springer India.
3. Chopra, A., & Singh, V. (2017). Ayurveda for Life. Penguin Random House India Private Limited. Indian Council of Medical Research. (2010). Dietary Guidelines for Indians - A Manual. National Institute of Nutrition (India).
4. Sharma, H. L. (2014). Cooking with Ayurveda. Penguin Random House India Private Limited.
5. National Institute of Nutrition (India). <https://www.nin.res.in/>
6. Indian Dietetic Association. <https://idaindia.com/>

**ND-419**

**Global Nutrition**

**2 (2+0)**

### Objectives

- To analyze the global burden of malnutrition and its various forms (undernutrition, overnutrition, micronutrient deficiencies).
- To explore the ethical considerations in global food systems, including food justice, sustainable practices, and corporate accountability.
- To examine the role of technology and innovation in addressing global nutrition challenges.
- To understand the effectiveness of international nutrition programs and initiatives

### Theory

S.No.	Topic	No .of Lectures
1.	Defining Global Nutrition: Scope and Challenges, Nutritional Transition.	2 2
2.	Global Trends and Regional Differences in Food Systems and Nutrition.	2 2
3.	Sustainable Agriculture and Food Production Practices.	3
4.	Micronutrient Deficiencies.	3
5.	Nutritional Epidemiology.	3
6.	Food Traditions and Dietary Practices in Different Regions.	2

S.No.	Topic	No .of Lectures
7.	Food Waste and Loss: Global Challenges and Solutions.	2
8.	Ethics of Industrial Food Production and Food Justice Issues.	2 2
9.	Global Nutrition Programs and Policies, National Governments and International Collaboration.	2 2
10.	Issues and Trends in Global Food and Nutrition Security.	3
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Branca, F., Lardeux, M., & Leroy, J. (2007). Food security, food safety and the right to adequate food. Agriculture and Human Values, 24(3), 285-294.
2. Fanzo, J., Hawkes, C., & Berry, E. M. (2013). Global food security and the right to food. Public Health Reviews, 35(1), 22-31.
3. Albert, JL. (Eds.) 2000. Food, nutrition and agriculture. FAO Publication.
4. Home - Global Nutrition Report

## ELECTIVE MODULE - II Food Science

**FS-411                      Food processing and packaging                      4(3+1)**

### Objectives

- To impart knowledge of various areas related to food processing and packaging.
- To enable the students to understand food composition and its physic chemical, nutritional, microbiological and sensory aspects.

### Theory

S.No.	Topic	No .of Lectures
1.	Food processing and preservation techniques for cereals, milk, fruits and vegetables, oil seeds, meat, fish and poultry and their impact on physical and chemical characteristics.	3 3 3 3 3 3

S.No.	Topic	No .of Lectures
2.	Physico-chemical characteristics, nutritional quality and shelf-life studies.	3 3 3
3.	Factors effecting quality of processed foods.	3
4.	Food packaging, package functions, requirement and packaging materials.	3 3
5.	Principles in the development of protective packaging.	3
6.	Laws related to packaging.	3
7.	Shelf-life of packed food, special problems in packaging of foodstuffs.	3 3
	<b>Total</b>	<b>48</b>

### Practical

S.No.	Experiment	No .of Practicals
1.	Market survey for packaged processed food stuffs.	3
2.	Cereal cookery. Preparations showing dextrinization and gelatinization, gluten formation and influence factors.	2 2
3.	Vegetable cookery: effect of heat and alkali on pigment, preparation of soups, salads and beverages.	1 2 1 1
4.	Use of milk and milk products and egg in various preparations.	2
5.	Estimation of shelf- life of packaged food stuffs.	2
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Potter, N.N. (1996). Food science. The AVI Publishing Company, Inc., Westport, Connecticut.
2. Kalia, M. and Sood, S. (2010). Food preservation and processing. Revised edition, Kalyani Publishers, New Delhi.
3. Srilakshmi, B. (2010). Food science (Fifth ed.) New Age International Pvt. Limited Pub., New Delhi.
4. Frank, A., and Paine, H.Y. (2003). A Handbook of food packaging. Springer science and business Media, U.K.

**FS-412              Fruits & Vegetables Processing and Technology****4(2+2)****Objectives**

- To acquire a basic knowledge of in the field of fruit and vegetable processing
- To acquire a basic understanding of agriculture sector and processing of fruits and vegetables is of vital importance
- To develop an essential understanding of the scope of fruit and vegetable processing in the country
- To acquire a fundamental background of the methods of fruit and vegetable processing.
- To practice the methods and techniques of fruit and vegetable processing at laboratory scale, and to evaluate the student's produce in each lab.

**Theory**

<b>S.No.</b>	<b>Topic</b>	<b>No .of Lectures</b>
1.	Importance and scope of fruits and vegetables in human diet.	1
2.	Scenario of fruit and vegetable production and processing at national and international level.	2
3.	General principles involved in preservation of fruits and vegetable products.	1
	Tools, equipment, lay out and other requirements of fruit and vegetable processing unit.	1
4.	Processing using sugar - principles and processing of jam, jelly, marmalade, fruit bar, preserves and candies.	2
		1
5.	Unfermented and fermented products - fruit juices, RTS, nectar, cordial, squash, syrup, carbonated beverages, cider and vinegar.	2
		1
6.	Processing using salt - principle – brining. Preservation of horticultural produces - preparation of pickles, ketchup and sauces.	2
7.	Tea, coffee and cocoa products	1
	Wine and fermentation technology.	1
8.	Drying and dehydration: definition, principle, method, suitability – types of driers - solar, cabinet, spray drier, drum drier, fluidized bed drier and freeze drying.	1
		1
		1

S.No.	Topic	No .of Lectures
9.	Methods of concentration - open kettle, flash evaporators, thin film evaporators, vacuum evaporators, freeze concentration, dehydro-freezing, ultrafiltration and reverse osmosis.	1 1 1
10.	Processing of dehydrated fruits, vegetables and spice products and fruit pulp.	2
11.	Canning - principles, methods - preparation of canned products – spoilage of canned foods and its prevention.	2 1
12.	Preservation by low temperature: definition, principle, method, suitability refrigeration, freezing, preparation of frozen foods.	1 1
13.	Preservation by controlled atmosphere, modified atmosphere - definition, principle, method, suitability.	2
14.	Processing by irradiation - definition, principle, method, suitability and application of irradiation in food industry.	2
	<b>Total</b>	<b>32</b>

### Practical

S.No.	Experiment	No .of Practicals
1.	Evaluation of pectin grade;	2
2.	Canning of mango/guava/papaya;	3
3.	Preparation and quality evaluation of fruit jam with fruits of regional importance;	2
4.	Preparation and quality evaluation of fruit jelly with fruits of regional importance;	2
5.	Preparation and quality evaluation of fruit marmalade;	2
6.	Preparation and quality evaluation of fruit preserve and candy;	2
7.	Preparation and quality evaluation of fruit RTS;	2
8.	Preparation and quality evaluation of squash / syrup;	2
9.	Preparation of grape raisin / dried fig / dried banana;	3
10.	Processing of tomato products;	2



S.No.	Experiment	No .of Practicals
11.	Preparation and evaluation of dehydrated vegetables;	2
12.	Preparation and quality evaluation of wafers with vegetables / tubers;	2
13.	Preparation of fruit cheese;	2
14.	Preparation of pickle / mixed pickle;	2
15.	Preparation of dried ginger / mango powder (amchur).	2
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Giridharilal, Sidappa.G.S and Tandon.G.L.1979. Preservation of Fruits and Vegetables. ICAR. New Delhi.
2. Kalia, M. and Sood, S. 2010. Food Preservation and Processing. Revised edition, Kalyani Publishers, New Delhi.
3. Singh, I. S. 2009. Post-harvest handling and processing of fruits and vegetables. Westville Publishing House, New Delhi.
4. Sudheer, K.P and V.Indira. 2007. Post-Harvest Technology of Horticultural Crops. New India Publishing Agency, PitamPura, New Delhi-110088.
5. Verma, L.R. and V.K. Joshi. 2000. Post-Harvest Technology of Fruits and Vegetables. Vol. 1 and 2. Indus Publishing Company. New Delhi.
6. Horticulture at a glance. 2018. Government of India Ministry of Agriculture & Farmers' Welfare Department of Agriculture, Cooperation & Farmers' Welfare Horticulture Statistics Division.

### Web Resources

1. [www.cfs.purdue.edu/class](http://www.cfs.purdue.edu/class)
2. [https://agritech.tnau.ac.in/postharvest/pht\\_intro.html](https://agritech.tnau.ac.in/postharvest/pht_intro.html)

**FS-413                                      Food Safety and Packaging                                      2(1+1)**

### Objectives

- The course objective is to provide students with an insight into advanced packaging (technical and business) topics with a food safety focus.

## Theory

S.No.	Topic	No .of Lectures
1.	Factors affecting shelf life of food material during storage, Interactions of spoilage agents with environmental factors.	1
2.	General principles of control of the spoilage agents; Difference between food infection, food intoxication and allergy.	1
3.	Food safety and standard regulations national and international standards.	1
4.	Food safety, safety hazards and risks, food related hazards, microbiological considerations in food safety, effect of processing and storage on microbial safety, microbiological methodology, HACCP as a method to prevent food borne illness, chemical hazards associated with foods.	1 1
5.	Types of Packaging systems, special solutions and packaging machines.	1
4.	Different types of packaging materials, their key properties and applications, Metal cans, Plastic packaging, different types of polymers used in food packaging and their barrier properties.	2
5.	Glass containers, types of glass used in food packaging, manufacture of glass and glass containers, closures for glass containers.	1
6.	Paper and paper board packaging, paper and paper board manufacture process, modification of barrier properties and characteristics of paper/ boards.	1
7.	Relative advantages and disadvantages of different packaging materials; effect of these materials on packed commodities.	1
8.	Nutritional labelling on packages, CAS and MAP, shrink and cling packaging, vacuum and gas packaging; Active packaging, Smart packaging.	1
9.	Factors affecting the choice of packaging materials,	1
10.	Disposal and recycle of packaging waste, Printing and labelling, Lamination,	1
11.	Package testing: Testing methods for flexible materials, rigid materials and semi rigid materials; Tests for paper plastic film and laminates aluminum foil glass containers (visual defects, color, dimensions, impact strength, etc.), metal containers (pressure test, product compatibility, etc.).	1 1
	<b>Total</b>	<b>16</b>

## Practical

S.No.	Experiment	No .of Practicals
1.	Identification of different types of packaging materials.	1
2.	Determination of tensile/ compressive strength of given material/package.	1
3.	To perform different destructive and non-destructive tests for glass containers.	1
4.	Vacuum packaging of agricultural produces.	1
5.	Determination of tearing strength of paper board.	1
6.	Measurement of thickness of packaging materials.	2
7.	To perform grease-resistance test in plastic pouches.	1
8.	Determination of bursting strength of packaging material.	1
9.	Determination of water-vapors transmission rate.	1
10.	Shrink wrapping of various horticultural produce.	1
11.	Testing of chemical resistance of packaging materials.	2
12.	Determination of drop test of food package and.	1
13.	Visit to relevant industries.	2
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Coles, R., McDowell, D., Kirwan, M.J. 2003. Food Packaging Technology. Blackwell Publishing Co.
2. Gosby, N.T. 2001. Food Packaging Materials. Applied Science Publication
3. John, P.J. 2008. A Handbook on Food Packaging Narendra Publishing House,
4. Mahadevia, M., Gowramma, R.V. 2007. Food Packaging Materials. Tata McGraw Hill
5. Robertson, G. L. 2001. Food Packaging and Shelf life: A Practical Guide. Narendra Publishing House.
6. Robertson, G. L. 2005. Food Packaging: Principles and Practice. Second Edition. Taylor and Francis Pub.
7. Kalia, M. and Sood, S. (2010). Food Preservation and Processing. Revised Edition, Kalyani Publishers, New Delhi.
8. Manay, N.S. and Shadaksharswamy, M. (2001). Food facts and principles, II Ed. New Age International (P) Ltd. Publishers, New Delhi.

9. Roday, S. 2011. Food Hygiene and Sanitation with Case Studies. Tata McGraw-Hill Education. 425p.
10. Adams M.K. and Moss M.O. 200. Food Microbiology, New Delhi: Panima Crop.
11. Longree K.L. and Blaker G.C. 1982. Sanitary Techniques in Food Service. New York: John Wiley and Sons.

**FS-414                      Food Toxicology and Quality Testing                      3(2+1)**

**Objectives**

- The course gives an introduction to possible toxic effects of food additives and naturally occurring environmental toxins in food.
- Student will be able to define toxicology
- Student will be able to define the most important contaminants in food, the toxicology of various additives and environmental toxins, as well as their sources
- Student will be able to explain what food safety is and which substances are of relevance for food safety
- Student will be able to explain what risk analysis, assessment and management in relation to food safety is, and know which organizations are involved in this type of work nationally and internationally

**Theory**

S.No.	Topic	No .of Lectures
1.	Food toxicology – definition, introduction and significance. Classification of toxic constituents.	2
2.	Food poisoning –types, causative factors, signs and symptoms, preventive measures.	2
3.	Natural food toxins – pulses, oil seeds, sea foods, processed animal foods.	2
4.	Anti-nutritional factors, other food toxins, their harmful effects and methods of removal.	2
5.	General characteristics, occurrence, properties and inactivation of protease inhibitors, trypsin inhibitors, haemagglutinins, goitrogens, gossypol.	2
6.	General characteristics, occurrence, properties and inactivation of saponins, lathrogens, avidin and other antimetabolites.	2
7.	Microbial toxins – classification, source of contamination, effect on health, preventive measures, methods of inactivation / destruction.	2

S.No.	Topic	No .of Lectures
8.	General characteristics, occurrence and properties of mycotoxins, aflatoxin, ochratoxin and patulin.	2
9.	Methods to detect and prevention of mycotoxins.	2
10.	Chemical toxins – Pesticides - Pesticide and insecticide residual toxicity – sources and health hazards, insecticides, metallic and others.	2
11.	Mineral toxicity– Chlorine and Fluorine, Heavy metals toxicity – Lead and Chromium, Mercury, Arsenic and Iron, residual effects, preventive measures, methods of removal.	2 2
12.	Food additives – classification, toxicity and effects.	2
13.	Toxins developed during processing.	2
14.	Food packaging material – Potential contaminants from food packaging material.	2
15.	Detection of toxins in food chain.	2
	<b>Total</b>	<b>32</b>

### Practical

S.No.	Experiment	No .of Practicals
1.	Methods of detect aflatoxin and gossypol.	3
2.	Methods of detect trypsin inhibitors and protease inhibitors.	3
3.	Use of AAS for detection of lead, chromium, mercury, arsenic, iron, detection of tannin and phytic acid.	3 3
4.	Visit to toxicology lab and public health laboratory. Visit to Quality Testing Laboratory, food processing industry/ government laboratory.	2 2
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Debasis Bagchi, Anand Swaroop. 2016. Food Toxicology, CRC Press.
2. Takayuki Shibamoto, Leonard F. Bjeldanes. 2012. Introduction to Food Toxicology. Academic Press.
3. Hodgson, Ernest. 2004. A Textbook of Modern Toxicology. John Wiley & Sons, IncI.
4. M.J. Derelanko and M.A. Hollinger. 2002. Handbook of toxicology, 2nd ed., CRC Press.

5. Srinivasan Damodaran, Kirk L. Parkin, Owen R. Fennema. 2007. Fennema's Food Chemistry, Fourth Edition. Taylor & Francis.
6. Gordon L. Robertson, 2006. Food Packaging Principles and Practice, 2nd Edition, CRC press. London.
7. Compendium\_Food\_Additives\_Regulations\_08\_09\_2020-compressed.pdf (fssai.gov.in)
8. <http://www.fda.gov/downloads/Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/UCM297627.pdf>
9. <http://www.fda.gov/>
10. [www.standardsdata.in/](http://www.standardsdata.in/)
11. [www.fssai.gov.in](http://www.fssai.gov.in)
12. <http://www.foodqualitynews.com/>
13. <http://www.cdc.gov/>

## **FS-415**

## **Food Chemistry**

**3(3+0)**

### **Objectives**

- To provide an understanding of the chemical function and properties of major food components.
- To provide an understanding of the chemical interactions of food components and their effects on sensory and nutritional quality, functional properties, and safety of foods

### **Theory**

<b>S.No.</b>	<b>Title</b>	<b>No. of Lectures</b>
1.	Nature, scope and development of food chemistry	2
2.	Properties of foods: Solubility, vapour pressure, boiling point, freezing point, osmotic pressure, viscosity, surface tension, specific gravity, oxidation and reduction	3
3.	Acids, bases, and buffers. Chemical bonding	2
4.	Colloids Water and moisture in foods- Hydrogen bonding, bound water, capillary water, and loosely bound water	3
5.	structure and properties of water molecule Water activity and effects on storage life	3
6.	Carbohydrates - classification, structure and properties of carbohydrates and dietary fiber.	3
7.	Proteins in foods- classification structure and properties of proteins and amino acids	3

S.No.	Title	No. of Lectures
8.	Pure proteins of plant and animal origin - their functional characteristics, physical, chemical and nutritional changes in protein during processing	2
9.	Chemical and enzymatic modification of protein <sup>2</sup>	2
10.	Lipids – introductionclassification, physical and chemical characteristics.	3
11.	Chemistry of fats and oils– processing aspects Changes of lipids / fats during processing and storage	2
12.	Role and use of lipids /fat, physiological effects of lipids - physiochemical aspects of fatty acids in natural foods	2
13.	Crystallization and intensification. Vitamins and minerals	2
14.	Properties of Vitamins and minerals, enrichment, restorations, fortifications, Losses of vitamins and minerals.	2
15.	Structure and properties of chlorophyll, anthocyanin, flavonoid, tannin, betalain, quinone, carotenoid, myoglobin, and hemoglobin	3
16.	Pigments used in food industry	1
17.	Flavor compounds terpenoids, flavonoids, Sulphur compounds and volatile flavor compounds	2
18.	Enzymes, enzyme inhibitors, enzymatic browning, enzymes in food processing.	2
19.	Composition of beverages- hot drinks, tea, coffee, cocoa, cold drinks, soft-drinks, fruit - beverages and alcoholic drinks-beer, wine etc	3
20.	Sugars and sweeteners, reaction of sugars, non-nutritive sweeteners	1
21.	Food additives: Antioxidants, chelating agents, coloring agents, curing agents, emulsions, flavors, and flavor enhancers, humectants and anti-caking agents, leavening agents, nutrient supplements, preservatives, stabilizers, thickeners	2
	<b>Total</b>	<b>48</b>

### Suggested Readings

1. Meyer L.H, (1991) Food Chemistry, AVI Publications, New York
2. Potter, N.N. (1996). Food Science. The AVI Publishing Company Inc., Westport, Connecticut.
3. Vijaya Khader, 2001, Textbook of Food Science and Technology, Indian Council of Agricultural Research, New Delhi.
4. Pieter Walstre. 2001. Physical chemistry of foods, Marcel Dekker, Inc. New York.

5. Manay, N.S. and Shadaksharswamy, M. (2001). Food facts and principles, II Ed. New Age International(P) Ltd. Publishers, New Delhi.
6. Meyer, L.H., Food Chemistry, CBS publishers and distributors private limited, Chennai, 2004.
7. Chopra, H.K., Panesar, P.S. 2010, Food Chemistry, Narosa Publishing House, New Delhi, 2010.
8. [www.fssai.gov.in](http://www.fssai.gov.in)

## **FS-416                      Meat Processing and Technology                      3(2+1)**

### **Objectives**

- To provide knowledge and skills for quality production of meat and meat products
- Develop human resource for meat industry and associated activities
- Train personnel for self-employment.
- Impart knowledge and technical proficiency in:
  - (a) Good slaughter practices
  - (b) Handling of meat on scientific lines
  - (c) Production of quality meat and meat products
  - (d) Testing and quality control of meat and meat products
  - (e) Managing small and medium enterprises.

### **Theory**

<b>S.No.</b>	<b>Title</b>	<b>No. of Lectures</b>
1.	Animal foods – needs – availability – demand and supply of animal foods. Growth and development of Indian meat industry	1
2.	Meat and poultry - pre-slaughter operations - preparation of animals and poultry birds for slaughter. Slaughtering of animals – requirements -stunning methods	2
3.	External treatment of carcasses - skinning, depilation – external and internal treatment of carcasses – evisceration - slaughter lines and systems.	3
4.	Identification of parts of the animal - structure – composition – nutritive value of meat. Post mortem changes of meat – eating quality of meat tissues.	3
5.	Equipment in processing of meat - their design – usage and its application. Meat cutting – types of carcasses - indicators of quality of carcass.	3



S.No.	Title	No. of Lectures
6.	Meat composition – quality and spoilage. Eating quality of meat – color - chemical nature of myoglobin - discoloration of meat - texture and tenderness of meat - pre-slaughter and post slaughter factors effecting tenderness – improvement of tenderness.	3
7.	Spoilage of meat - sources of contamination, growth of microorganisms – identification of spoilage.	2
8.	Meat inspection, sanitation and preservation techniques. Principles of preservation of meat -hurdleconcept.	2
9.	Methods of preservation of meat - chilling and freezing – heating – canning and thermal processing curing and smoking, dehydration - Intermediate moisture foods – freeze drying, irradiation, high pressure treatment.	2
10.	Ohmic heating, High power ultra sound processing technology. Direct microbial inhibition – antibiotics – chemical preservation.	2
11.	Processed meats - formulation of meat products- enrobed meat products– fermented, canned and restructured meat products – restructured steaks, roasts, blocks – portion and sticks.Dried meat – pickled, spiced and marinated meat – prefabricated meat- effect of processing on quality of meat products.	3
12.	Equipment's used in processing of meat. Poultry - dressing - composition - nutritive value - processing and preservation methods - storage, spoilage and preventive measures of poultry meat.	2
13.	Standards and quality control measures adopted for meat and meat products. National and International - HACCP for meat and poultry and processed meat products.	2
14.	Fraudulent substitution of meat - its recognition and impact.Waste utilization of animal foods - edible and non-edible parts. New concept in meat technology: cultured meat, lab-grown meat. Plant-based meat analogues, <i>in-vitro</i> meat	2
	<b>Total</b>	<b>32</b>

### Practical

S. No.	Title	No. of Practicals
1.	Formulation of Questionnaire and conduct of survey on the availability of animal foods in selected areas.	2
2.	Effect of processing on sheep meat (moisture content, color change, shrinkage and sensory quality attributes).	2

S. No.	Title	No. of Practicals
3.	Curing of meat using sugar, salt and nitrite.	1
4.	Effect of tenderizing agents on meat cookery.	1
5.	Quality evaluation of processed meat and chicken products	3
6.	Preparation of battered chicken.	1
7.	Pickling and canning of meat.	2
8.	Microbial quality of stored animal and chicken meat products.	2
9.	Visit to slaughter house and meat cold storage unit	2
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Lawrie, R. A., and Ledward, D.A., Meat Science. 2006. Woodhead Publishing Limited.
2. Ioannis.S. Bozaris. 2013. Seafood Processing Technology: Quality and Safety, 2013, Wiley and Blackwell Ltd.
3. Vikas Nanda. 2014. Meat, Egg and Poultry Science & Technology. I.K. International Publishing House Pvt. Ltd., New Delhi.
4. B.D. Sharma and Kinshuki Sharma. 2011. Outlines of Meat Science and Technology. Jaypee Brothers Medical Publishers Pvt. Ltd., New Delhi.
5. Fidel Toldra, Y. H. Hui, Iciar Astiasaran, Wai-Kit Nip, Joseph G. Sebranek, Expedito-Tadeu
6. Silveira, Louise H. Stahnke, Regine Talon. 2007. Handbook of Fermented Meat and Poultry. Blackwell Publishing Professional, Ames, Iowa, USA.
7. Joseph Kerry, John Kerry and David Ledward. 2005. Meat Processing-Improving Quality. Woodhead Publishing Ltd., Cambridge, England.
8. NIIR Board of Consultants & Engineers. 2005. Preservation of Meat and Poultry. Asia Pacific Business Press, Inc., Delhi.
9. Annual report. Department of Animal Husbandry and Dairying Ministry of Fisheries, Animal Husbandry and Dairying Government of India. Latest issues
10. <https://gfi.org/science/the-science-of-cultivated-meat/>
11. Kyriakopoulou, K., Dekkers, B., & van der Goot, A. J. (2019). Plant-based meat analogues. In *Sustainable meat production and processing* (pp. 103-126). Academic Press.

12. Tziva, M., Negro, S. O., Kalfagianni, A., & Hekkert, M. P. (2020). Understanding the protein transition: The rise of plant-based meat substitutes. *Environmental Innovation and Societal Transitions*, 35, 217- 231.
13. Stephens, N., Di Silvio, L., Dunsford, I., Ellis, M., Glencross, A., & Sexton, A. (2018). Bringing cultured meat to market: Technical, socio-political, and regulatory challenges in cellular agriculture. *Trends in food science & technology*, 78, 155–166. <https://doi.org/10.1016/j.tifs.2018.04.010>

## **FS-417              Pulses and Oilseeds: Processing and Technology              3(2+1)**

### **Objectives**

- This course will impart knowledge to the students on Legume and Oil Seed Processing.
- By the end of the course students will be able to develop good expertise on the technical aspects of dhal milling, oil milling and various legumes and oil seeds-based product preparations.

### **Theory**

<b>S. No.</b>	<b>Title</b>	<b>No. of Lectures</b>
1.	Food uses of major pulses- Bengal gram, green gram, black gram, red gram, lentils etc.	4
2.	Primary processing of pulses- Cleaning, drying, storage, control of storage pests. Secondary processing methods-Dehulling, small scale processing, large scale processing.	4
3.	Traditional dal mills and modern dal mills, nutrient losses during processing.	2
4.	Processing methods of pulses like soaking, germination, cooking, fermentation etc.	4
5.	Major oilseeds produced in India and their utility groundnut, rapeseed/ mustard, soybean, sesame seed, sunflower, safflower, cottonseed, linseed, castor.	3
6.	Pre-treatments and oil extraction from different oilseeds.	4
7.	Refining, bleaching, deodorization, hydrogenation processes of edible oils Anti-nutritional factors and toxic constituents of pulses and oilseeds.	4
8.	Technology of production of oilseed meals/flours, protein concentrates and isolates of pulses and oilseeds and their utilization.	4
9.	By product utilization of pulses and oilseeds.	3
	<b>Total</b>	<b>32</b>

## Practical

S. No.	Title	No. of Practicals
1.	Market survey of pulse and oilseed-based snack foods	2
2.	Preparation of pulses and oilseed-based snack foods.	2
3.	Demonstrations on soaking, dehulling, germination, fermentation methods Analysis of antinutrients- Phyticacid, saponins, trypsin inhibitors etc.	4
4.	Preparation of snacks based on pulses and oilseeds.	2
5.	Preparation of recipes based on germinated and fermented pulses.	4
6.	Visit to traditional dal mills, modern dal mills, oil mills to expose students to dal milling operations and oil extraction operations.	2
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Chakraverty. A. 1995. Post-harvest technology of cereals, pulses and oilseeds, 3<sup>rd</sup> Ed. Oxford and IBHpublishing co., Pvt. Ltd.
2. Vijaya Khader, 2001, Textbook of Food Science and Technology, Indian Council of AgriculturalResearch, New Delhi.
3. Kalia, M. and Sood, S. (2010). Food Preservation and Processing. Revised Edition, Kalyani Publishers, New Delhi.
4. Raghuvarshi, R.S. and Bisht, K. 2010. Uses of Soybean: Products and Preparation. Guriqbal Singh (Ed.). In: Soybean: Botany, Production and Uses, CAB International, U.K.
5. Raghuvarshi, R.S. and Singh, D.P. 2009. Food preparations and use. William Erskina *et al.* (Eds.). In: The Lentil: Botany Production and Uses. CAB International, U.K.
6. Agricultural Statistics at a Glance. 2021. Ministry of Agriculture & Farmers Welfare Department of Agriculture & Farmers Welfare Directorate of Economics & Statistics goi.<http://www.fao.org>
7. <http://ecoursesonline.iasri.res.in/mod/resource/view.php?id=5933>
8. [https://agritech.tnau.ac.in/postharvest/pht\\_pulses\\_processing.html#:~:text=Processing](https://agritech.tnau.ac.in/postharvest/pht_pulses_processing.html#:~:text=Processing)  
A%20Processing%20of%20pulses%20is,of%20preparing%20pulses%20for%20consumption.

**Objectives**

- This course introduces the methodology used in sensory evaluation of food product.
- Students will be exposed to the ability of humans to use their senses to evaluate the quality attributes of food product using sensory evaluation methods such as analytical and effective methods.
- This course will also cover the use of relevant statistics in analyzing sensorial evaluation data.

**Theory**

<b>S. No.</b>	<b>Title</b>	<b>No. of lectures</b>
1.	Sensory quality evaluation - introduction, method, sensory panel;	2
2.	physiological and psychological foundations of sensory evaluation	2
3.	Principles of good practice: the sensory testing environment, test protocol considerations, Factors influencing sensory measurements	2
4.	Basic principles: Senses and sensory perception, Physiology of sensory organs, Sensory and instrumental analysis in quality control	2
5.	Sensory attributes of foods and beverages and their perceptions, appearance, flavor, taste, aroma, texture/mouthfeel	2
6.	trigeminal sensations, Sensory evaluation methodology, threshold measurements, difference tests, scaling procedures, descriptive analytical methods, consumer tests, Instrumental measurements, color texture, flavor, Correlation of sensory and instrumental measures	2
7.	Applications of sensory tests for quality assurance product development product optimization marketing	2
8.	Objective methods of evaluation. Relationship between objective and subjective methods.	2
	<b>Total</b>	<b>16</b>

**Practical**

<b>S. No.</b>	<b>Title</b>	<b>No. of Practicals</b>
1.	Determination of threshold value for basic tastes and odor	3
2.	Odor recognition, difference (PC, Duo trio, triangle)	3
3.	Selection of judging panel; Training of judges for recognition of certain common flavor and texture defects using different types of sensory tests	3

S. No.	Title	No. of Practicals
4.	Descriptive analysis methodology; Texture profile methodology;	2
5.	Sensory evaluation of various food products using different scales, score cards and tests Estimation of color	3
6.	Designing a sensory laboratory	2
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Amerine, M.A., Pangborn, R.M. and Rossles, E.B. 1965. Principles of Sensory Evaluation of Food. Academic Press, London.
2. Early, R. 1995. Guide to Quality Management Systems for Food Industries. Blackie Academic.
3. Lawless, H.T. and Klein, B.P. 1991. Sensory Science Theory and Applications in Foods. Marcel Dekker. y Macrae, R., Rolonson Roles and Sadlu, M.J. 1994. Encyclopedia of Food Science & Technology & Nutrition. Vol. XI. Academic Press.
4. Maslowitz, H. 2000. Applied Sensory Analysis of Foods. Vols. I, II. CRC Press, Boca Raton, FL, USA.
5. Rai, S.C. and Bhatia, V.K. 1988. Sensory Evaluation of Agricultural Products. Indian Agricultural Statistics Research Institute (ICAR), New Delhi.
6. Harry, T. Lawless, Hildegard Heymann. 2010. Sensory Evaluation of Food: Principles and Practices. 2nd Ed., Springer, New York or Dordrecht Heidelberg, London.

## ELECTIVE MODULE - III

### Institutional Food Service Management

**IFSM-411                      Institutional Food Service Management                      3(0+3)**

#### Objectives

- The course includes various topics from designing the kitchen and work space, selection of equipment and maintenance, personal and finance management, food management, hygiene and sanitation to menuplanning and food composition and nutritional values.
- This course will be very useful to those who are interested in establishing a food service industry in making available hygienically prepared, wholesome and nutritious food to the consumers.

## Practical

S. No.	Title	No. of Lectures
1.	Introduction to quantity food production	1
2.	Familiarization to equipment for quantity food production,	2
3.	Weight, measures and conversion, Recipe conversion, Standardization of recipes – procedure	2 2
4.	Practical exercise on standardization of recipe, multiplication of standard recipe	3
5.	Portioning and cost calculation	3
6.	Standardization of recipes suitable for different catering services i.e., cafeterias /canteens, snack bars, industrial canteens, residential hostels	3 2
7.	Costing of recipes planned and fixing the price	3
8.	Exercise on quantity food production for different type of food service establishments	3
9.	Visit to residential hostel, hospital canteen, industrial canteen, star hotel and fast-food centre to observe the organization management and administration	3 3
10.	Making a detailed project report for establishing a food service unit including making purchase documents for equipment purchase and tenders etc.	3 2
11.	Organizing and planning menu for college canteen as a catering enterprise, setting up of a canteen, management of college canteen - procurement of materials	3
12.	Practical exercise on food preparation, pricing and sale	3 2
13.	Preparation and presentation of report on management of canteen.	2
14.	Catering for Birthday party/Mocktail Party/ Convention / Seminar / Conference.	3
	<b>Total</b>	<b>48</b>

## Suggested Readings

1. Sethi M and Malhan S. 1997. Catering Management - An Integral Approach. New Age International.
2. Treat N and Richards. 1997. Quantity Cookery. Little Brown & Co.

3. West BB, Wood L, Harger VF and Shugart GS. 1977. Food Service in Institutions, John Wiley & Sons.
4. Raske L. 2017. Foodservice Management Fundamentals by Lina, Scitus Academics
5. Ratti M. 2000. Food Service Management. Neha Publishers & Distributors.
6. Fuller J. 1966. Chefs Manual and a Kitchen Management. B.T. Badtsford Ltd.

## **IFSM-412**

## **Sensory Evaluation of Foods**

**2(1+1)**

### **Objectives**

- This course introduces the methodology used in sensory evaluation of food product.
- Students will be exposed to the ability of humans to use their senses to evaluate the quality attributes of food product using sensory evaluation methods such as analytical and effective methods.
- This course will also cover the use of relevant statistics in analyzing sensorial evaluation data.

### **Theory**

<b>S. No.</b>	<b>Title</b>	<b>No. of Lectures</b>
1.	Sensory quality evaluation - introduction, method, sensory panel;	<b>2</b>
2.	physiological and psychological foundations of sensory evaluation	<b>2</b>
3.	Principles of good practice: the sensory testing environment, test protocol considerations, Factors influencing sensory measurements	<b>2</b>
4.	Basic principles: Senses and sensory perception, Physiology of sensory organs, Sensory and instrumental analysis in quality control	<b>2</b>
5.	Sensory attributes of foods and beverages and their perceptions, appearance, flavor, taste, aroma, texture/mouthfeel	<b>2</b>
6.	trigeminal sensations, Sensory evaluation methodology, threshold measurements, difference tests, scaling procedures, descriptive analytical methods, consumer tests, Instrumental measurements, color texture, flavor, Correlation of sensory and instrumental measures	<b>2</b>
7.	Applications of sensory tests for quality assurance product development product optimization marketing	<b>2</b>
8.	Objective methods of evaluation. Relationship between objective and subjective methods.	<b>2</b>
	<b>Total</b>	<b>16</b>



## Practical

S. No.	Title	No. of Practicals
1.	Determination of threshold value for basic tastes and odor	3
2.	Odor recognition, difference (PC, Duo trio, triangle)	3
3.	Selection of judging panel; Training of judges for recognition of certain common flavor and texture defects using different types of sensory tests	3
4.	Descriptive analysis methodology; Texture profile methodology;	2
5.	Sensory evaluation of various food products using different scales, score cards and tests Estimation of color	3
6.	Designing a sensory laboratory	2
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Amerine, M.A., Pangborn, R.M. and Rossles, E.B. 1965. Principles of Sensory Evaluation of Food. Academic Press, London.
2. Early, R. 1995. Guide to Quality Management Systems for Food Industries. Blackie Academic.
3. Lawless, H.T. and Klein, B.P. 1991. Sensory Science Theory and Applications in Foods. Marcel Dekker. y Macrae, R., Rolonson Roles and Sadlu, M.J. 1994. Encyclopedia of Food Science & Technology & Nutrition. Vol. XI. Academic Press.
4. Maslowitz, H. 2000. Applied Sensory Analysis of Foods. Vols. I, II. CRC Press, Boca Raton, FL, USA.
5. Rai, S.C. and Bhatia, V.K. 1988. Sensory Evaluation of Agricultural Products. Indian Agricultural Statistics Research Institute (ICAR), New Delhi.
6. Harry, T. Lawless, Hildegarde Heymann. 2010. Sensory Evaluation of Food: Principles and Practices. 2nd Ed., Springer, New York or Dordrecht Heidelberg, London.

## IFSM-413

## Event Management

**3(0+3)**

### Objectives

The course will enable the students to:

- Be aware of event management as a profession.
- Gain basic knowledge about establishing and managing an event.
- Understand and develop soft skills that would help in event management

## Practical

S. No.	Topic	No. of Practical
1.	Identifying practical situations for event management, conceptualizing goal and objectives, Overall show management.	3 2
2.	Exhibit sales and promotion.	3
3.	Festivals (diwali, religious ceremonies). Social gathering. Foodfair/Conference/workshop/seminar/congress programming	2 2
4.	SWOT analysis of event	3
5.	Portfolio preparation; Presentation and projection for work.	3 3
6.	Project report on visit to different types of organizational settings like hotel, guest house, hostel, small offices, clubs, fast food centres for management and organization of events	3 3
7.	Project planning. Programme planning and execution.	3
8.	Project development. Event accountancy. Event communication and sponsorship.	3 3
9.	Event marketing and advertising.	3
10.	Live event management	3
11.	Visit to different organizations/hotels etc.	3
12.	Project preparation and report presentation.	3
	<b>Total</b>	<b>48</b>

## Suggested Readings

1. Aditya, Suvarna. (2003). Event Management Development Institute. I.E.S. Management College. 4th Floor, 791, S.K.Marg, Opp. Lilavati Hospital, Bandra (W), Mumbai - 400 050.
2. Kit, Potions, H.P. Bhuson. (1998). Festival and Special Event Management. IBM Cooperation, 60Renfrew Drive, Suite 105, Markham, Ontario, Canada L3R0E1.
3. National Institute of Event Management. Ground Floor, Nandavan Building, Corner of VallabhbhaiRoad and Ansari Road, Vile Parle (W), Mumbai.
4. Sulekha, Narayna. (2001). International Institute of Event Management. SNDT Women's University, Juhu Campus, Juhu Tara Road, Santacruz (W), Mumbai - 400 049.
5. Anukrati Sharma, Shruti Arora. 2018. Event Management and Marketing: Theory, Practical Approachesand Planning (English, Paperback)

**Objective**

- To impart knowledge of various areas related to food processing and packaging.
- To enable the students to understand food composition and its physic chemical, nutritional, microbiological and sensory aspects.

**Theory**

S. No.	Title	No. of Lectures
1.	Food processing and preservation techniques for and their impact on physical and chemical characteristics:	3
	Cereals	3
	Milk	3
	Fruits and vegetables	3
	Oil seeds	3
	Meat	3
	Fish and Poultry	3
2.	Physico-chemical characteristics	3
3.	Nutritional quality and shelf-life studies	3
4.	Factors effecting quality of processed foods	3
5.	Food packaging, package functions	3
6.	Requirement and packaging materials	3
7.	Principles in the development of protective packaging	3
8.	Laws related to packaging.	3
9.	Shelf-life of packed food	3
10.	Special problems in packaging of foodstuffs.	3
	<b>Total</b>	<b>48</b>

**Practicals**

S. No.	Title	No. of Practicals
1.	Market survey for packaged processed food stuffs.	2
2.	Cereal cookery. Preparations showing dextrinization and gelatinization gluten formation and influence factors	2
3.	Vegetable cookery: effect of heat and alkali on pigment,	2
4.	Preparation of soups	2
5.	Preparation of salads and	2
6.	Preparation of beverages.	2
7.	Use of milk and milk products and egg in various preparations	2
8.	Estimation of shelf- life of packaged food stuffs.	2
	<b>Total</b>	<b>16</b>

### **Suggested Readings**

1. Potter, N.N. (1996). Food science. The AVI Publishing Company, Inc., Westport, Connecticut.
2. Kalia, M. and Sood, S. (2010). Food preservation and processing. Revised edition, Kalyani Publishers,
3. New Delhi.
4. Srilakshmi, B. (2010). Food science (Fifth ed.) New Age International Pvt. Limited Pub., New Delhi.
5. Frank, A., and Paine, H.Y. (2003). A Handbook of food packaging. Springer science and business
6. Media, U.K.

### **IFSM-415**

### **Ergonomics in Food Service**

**2(2+0)**

#### **Objectives**

- To identify the current problems related to ergonomic in food production process,
- To understand and analyze the actual production data by using Rapid Upper Limb Assessment (RULA) and Rapid Entire Body Assessment (REBA)
- To recommend the ergonomic workplace environment based on the condition of the study.

#### **Theory**

<b>S. No.</b>	<b>Title</b>	<b>No. of Lectures</b>
1.	Introduction to Ergonomics, principles, domains significance and applications	2
2.	Functional design, Facility design, Work zones	2
3.	Work flow and travel distance, Work triangle	2
4.	Managing central kitchens, Kitchen layout, kitchen storage, kitchen planning, kitchen forms	2
5.	Equipment selection and cart selection maintenance	2
6.	Material selection and placement	2
7.	Managing human resource issues, Operational issues, food safety and hygiene and service ware	2
8.	Ergonomics for Waiter staff, Cooks, food preparation workers, dishwashers	2
9.	Musculoskeletal disorders – meaning, causative factors	2

S. No.	Title	No. of Lectures
10.	Common MSD in food industry-	2
11.	Awkward posture, repetition, force.	2
12.	Ergonomic injury signs, symptoms and reporting.	2
13.	Ergonomic Risk	2
14.	Factors and safety Trends in accidents, Task Specific Ergonomics.	2
15.	Safety Responsibilities, Safety Responsibilities of Employers, Employees and Health Care Providers	2
16.	Ergonomics Solutions & Stress-Engineering Improvements Administrative Improvements and Personal Protective Equipment	2
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Brudger, R. S. (2003) Introduction to Ergonomics, Taylor and Francis London
2. Grandjean, E. (2000) Fitting the Task to the Man, Taylor and Francis, London
3. California Department of Industrial Relations (2003) Ergonomics in Action: A Guide to Best Practices for the Food-Processing Industry, OSHA.
4. Dan Macleod (2006) The Ergonomics Kit. (Second Edition). Taylor and Francis, London.
5. <https://www.tdi.texas.gov/pubs/videoresource/fsergofood.pdf>

## **IFSM-416                      Food Standards and Quality Control                      3(2+1)**

### Objectives

- To develop qualified and competent human resource in the field of the food standards and quality management for regulators, industry, academic/research institutions, certifying and accreditation bodies, food trade, food testing and training.
- To delve in depth on various aspects of food standards and quality management i.e. food standards, harmonization with global benchmarks, quality management systems, food analysis, instrumentation, risk analysis /management, traceability and auditing to transform the food ecosystem.
- To nurture a positive and disciplined food standard and quality culture among the professionals.
- To conduct research studies on emerging food standard issues and formulation of science based regulatory framework.

## Theory

S. No.	Title	No. of Lectures
1.	Importance of food quality control and assurance.	2
2.	Food Standards and Regulations in India: FSSAI, Prevention of Food Adulteration Act, Fruit Product Order, AGMARK, Essential Commodity Act,	2
3.	Consumer Protection Act, Bureau of Indian Standards, Codex Standards, Food and Drug Administration (FDA).	2
4.	Food additives, preservatives, coloring agents, antioxidants, emulsifying agents, leavening agents and stabilizing agents	2
5.	Sensory Evaluation of Food Quality – Introduction -Panel Screening-Selection of Panel members	2
6.	Objective/Instrumental analysis of Quality Control.	2
7.	Statistical Quality Control of Foods Determination of Sensory thresholds and taste Interactions.	2
8.	Fundamentals of Food regulations-pertaining to Additives and Contaminants.	2
9.	Food safety management systems- GMP/GHP, HACCP, GLP, GAP, The Kosher and Halal Food Laws Food packaging, packaging material.	2
10.	Adulteration, heavy metals.	2
11.	Quality criteria of foods – food	2
12.	grains, fruits, vegetables and animal foods.	2
13.	Quality criteria of processed foods. Physical, chemical and microbial contamination of foods.	2
14.	Food adulteration – common adulterants – health hazards.	2
15.	Tests to detect adulterants in food.	2
16.	Pesticides-Mechanisms of Toxicity-Residues in Food, Acceptable daily limits.	2
	<b>Total</b>	<b>32</b>

## Practical

S. No.	Title	No. of Practicals
1.	Sensory and nutritional evaluation of some finished products.	1
2.	Detection of adulterants and preservatives in products.	2
3.	Identification of food logos. Study of food labelling	1

S. No.	Title	No. of Practicals
4.	Identification of critical control points in a product line	1
5.	Sensory evaluation of different food samples.	2
6.	Visit to quality control laboratory/food processing industries and note the procedures and parameters used for quality assessment.	2
7.	Estimation of quality parameters- cereals, pulses, fruits and veg.	2
8.	Market survey and quality analysis of street foods.	2
9.	Estimation of quality parameters – cereals, pulses, fruits and vegetables - Evaluation of food quality – objective and subjective methods	2
10.	Market survey and quality analysis of street foods	1
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Potter, N.N. 1996. Food Science. The AVI Publishing Company Inc., Westport, Connecticut.
2. Jellinek, G. 1985. Sensory Evaluation of Foods: Theory and Practice. Ellis Horwood Ltd. Chichester, England.
3. Manual of Food Standards and Quality Control. 2014. Dept. of Foods and Nutrition, CCS HAU, Hisar.
4. Detect Adulteration with Rapid Test (DART) booklet fssai
5. <https://www.fssai.gov.in/flipbook.php?bookid=201#book2/7>
6. Radonit Lassztity. 2008. Food Quality and Standards. Encyclopedia of Life effort systems. USA.
7. Patricia and Cuuring A. An operational Text book, guide to Food Laws and Regulations.
8. Food Safety and Standards (Food Products Standards and Food Additives) Regulation, 2011.
9. Kalia, M. and Sood, S. 2010. Food Preservation and Processing. Revised edn. Kalyani Publishers, New Delhi

### IFSM-417

### Food Toxicology and Quality Testing

3(2+1)

#### Objectives

- The course gives an introduction to possible toxic effects of food additives and naturally occurring environmental toxins in food.
- Student will be able to define toxicology.

- Student will be able to define the most important contaminants in food, the toxicology of various additives and environmental toxins, as well as their sources.
- Student will be able to explain what food safety is and which substances are of relevance for food safety.
- Student will be able to explain what risk analysis, assessment and management in relation to food safety is, and know which organizations are involved in this type of work nationally and internationally.

### Theory

S. No.	Title	No. of Lectures
1.	Food toxicology – definition, introduction and significance.	2
2.	Classification of toxic constituents.	2
3.	Food poisoning –types, causative factors, signs and symptoms, preventive measures.	2
4.	Natural food toxins – pulses, oil seeds, sea foods, processed animal foods.	2
5.	Anti-nutritional factors, other food toxins, their harmful effects and methods of removal.	2
6.	General characteristics, occurrence, properties and inactivation of protease inhibitors, trypsin inhibitors, haemagglutinins, goitrogens, gossypol.	3
7.	General characteristics, occurrence, properties and inactivation of saponins, lathyrogens, avidin and other antimetabolites.	3
8.	Microbial toxins – classification, source of contamination, effect on health, preventive measures, methods of inactivation / destruction.	3
9.	General characteristics, occurrence and properties of mycotoxins, aflatoxin, ochratoxin and patulin.	2
10.	Methods to detect and prevention of mycotoxins. Chemical toxins – Pesticides - Pesticide and insecticide residual toxicity – sources and health hazards, insecticides, metallic and others.	3
11.	Mineral toxicity– Chlorine and Fluorine, Heavy metals toxicity – Lead and Chromium, Mercury, Arsenic and Iron, residual effects, preventive measures, methods of removal.	2
12.	Food additives – classification, toxicity and effects.	2
13.	Toxins developed during processing. Food packaging material – Potential contaminants from food packaging material.	2
14.	Antibacterial drugs, hormones and growth promoters of animal origin. Detection of toxins in food chain.	2
	<b>Total</b>	<b>32</b>



## Practical

S. No.	Title	No. of Practicals
1.	Methods of detect aflatoxin and gossypol.	1
2.	Methods of detect trypsin inhibitors and protease inhibitors.	1
3.	Use of AAS for detection of:	2
4.	Lead	
5.	Chromium	
6.	Mercury	
7.	Arsenic	
8.	Iron	2
9.	Detection of tannin and phytic acid.	2
10.	Visit to toxicology lab and public health laboratory.	1
11.	Visit to Quality Testing Laboratory, food processing industry/government laboratory.	1
<b>Total</b>		<b>16</b>

## Suggested Readings

1. Debasis Bagchi, Anand Swaroop. 2016. Food Toxicology, CRC Press.
2. Takayuki Shibamoto, Leonard F. Bjeldanes. 2012. Introduction to Food Toxicology. Academic Press.
3. Hodgson, Ernest. 2004. A Textbook of Modern Toxicology. John Wiley & Sons, Inc.
4. M.J. Derelanko and M.A. Hollinger. 2002. Handbook of toxicology, 2nd ed., CRC Press.
5. Srinivasan Damodaran, Kirk L. Parkin, Owen R. Fennema. 2007. Fennema's Food Chemistry, Fourth Edition. Taylor & Francis.
7. Gordon L. Robertson, 2006. Food Packaging Principles and Practice, 2nd Edition, CRC press. London.
8. Compendium\_Food\_Additives\_Regulations\_08\_09\_2020-compressed.pdf (fssai.gov.in)
9. <http://www.fda.gov/downloads/Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/UCM297627.pdf>
10. <http://www.fda.gov/>
11. [www.standardsdata.in/](http://www.standardsdata.in/)
12. [www.fssai.gov.in](http://www.fssai.gov.in)
13. <http://www.foodqualitynews.com/>
14. <http://www.cdc.gov/>

**Objectives**

- To develop the learner into competent and efficient in the field of reporting news, processing and program production in the field of media.
- The Subject is designed to make the students learn about script, interviews techniques, phone-ins, panel discussion, voice over, live shows and field reporting.

**Practical**

<b>S. No.</b>	<b>Title</b>	<b>No. of Practical</b>
1.	Visit to print and electronic stations for familiarization with equipment's.	2
2.	Interaction with personnel of print and electronic media.	2
3.	Report writing on observations and presentation.	2
4.	Planning a press note/ press release for print media	2
5.	Screening of radio news programmes	3
6.	Screening of TV news programmes	3
7.	Exercises on writing different types of reports for radio.	3
8.	Exercises on writing different types of reports - television formats	3
9.	Hands-on experience with editing.	3
10.	Planning a press note/ press release for electronic media	3
11.	Writing and presentation of radio and television news	3
12.	Orientation to photography/videography and its equipment.	3
13.	Hands on training with different types of professional cameras	3
14.	Writing captions for photographs.	3
15.	Writing and editing photo features for selected photographs and presentation.	2
16.	Familiarization with different online articles.	2
17.	Content creation for online journal.	2
18.	Creating a blog, awareness videos.	3
19.	Using social media channels such as Facebook/Instagram/LinkedIn/Twitter/WhatsApp, to create nutrition related post.	1
	<b>Total</b>	<b>48</b>

**Suggested Readings**

1. Kumar A. (1999). The Electronic Media. Anmol Publications, New Delhi.
2. Bhatt, S.C. (1993) Broadcast Journalism. Basic Principles Har Anand Publications, Delhi.

3. Bhatnagar, R. (2001). Print Media and Broadcast Journalism. Indian Publisher Distributors, Delhi.
4. Katyal, V.P (2007). Fundamentals of Media Ethics. Cyber Tech Publishers, New Delhi.
5. Fernández-Celemín, L., & Jung, A. (2006). What should be the role of the media in nutrition communication? British Journal of Nutrition, 96(S1), S86-S88. doi:10.1079/BJN20061707
6. <http://hosbeg.com.printmedia.an>
7. <https://www.vskills.in> certification
8. <https://www.nyfaedu.print.journal>.

## **IFSM-419                      Tourism and Hospitality Management                      3(1+2)**

### **Objectives**

- The course aims to help the students to gain a basic knowledge of:
- Skills associated with problem solving, creative and critical thinking; related to tourism industry.
- Applying the concepts and skills necessary to achieve guest satisfaction.
- Demonstrating knowledge of multi - cultural perspectives to meet the needs of the guests and employees.
- Leading with the knowledge that the foundation of tourism and hospitality is based on the respect for the host culture with the responsibility to perpetuate unique values, traditions, and practices of that place.
- Demonstrating ability to perform basic and supervisory level job functions in hotel and restaurant careers.

### **Theory**

<b>S. No.</b>	<b>Title</b>	<b>No. of lectures</b>
1.	Tourism Management	1
2.	Introduction to Tourism	1
3.	Growth and development of modern tourism	1
4.	Tourism in India, Heritage/ Cultural, Pilgrimage Tourism, Medical, Hot Spots and Culinary Tourism -Business and Cruise Tourism	1
5.	Eco-tourism/ Rural tourism - Emergence of Eco-tourism / Rural tourism - Concept and definitions	1

S. No.	Title	No. of lectures
6.	Growth and development issues in eco-tourism - Travel Agency and Tour Operation and logistics (Airlines operation and ticketing. Ships cruise services) business in India,	2
7.	Emerging trends of tourism, Impacts of Tourism, Ethics issues in tourism - Introduction to Hospitality Management.	1
8.	Basic Management Principles: planning, organizing, staffing, leading, controlling with specific reference to hospitality.	1
9.	Hotel hierarchy: GM, departmental heads, supervisors, operational employees Soft Skills in	1
10.	Hospitality; personal development, motivation.	1
11.	Communication techniques and skills, Hostess training Services offered to guests such as food and accommodation services and personal services Front Office management.	2
12.	Maintenance of front office records - housekeeping services - cleaning and linen services, bed making	1
13.	Accommodation Operations - Role of accommodation operations in hospitality.	1
14.	Public areas – maintenance and decoration	1
	<b>Total</b>	<b>16</b>

### Practical

S. No.	Title	No. of Practicals
1.	Study of all the activities of a tourism office a	2
2.	Report Planning for a tour –	
3.	Heritage,	1
4.	Eco,	1
5.	Wildlife,	1
6.	Pilgrimage,	1
7.	Medical etc.	1
8.	Planning for Accommodation operations	2
9.	Preparation of a tour package	2

<b>S. No.</b>	<b>Title</b>	<b>No. of Practicals</b>
10.	Visit to different tourist spots	2
11.	Planning layouts of front office of different institutions	2
12.	Mock sessions on front office handling	3
13.	Mock sessions on Communication Techniques and Skill	3
14.	Mock sessions on Handling Complaints and Emergencies	3
15.	Mock sessions on Handling various types of clients	3
16.	Practical sessions on Hostess training Services offered	2
17.	Practical sessions on housekeeping services -	2
18.	Report writing	1
	<b>Total</b>	<b>32</b>

### **Suggested Readings**

1. Dharmarajan.S. and R. Seth, Tourism in India-Trends and Issues, HarAnand Publications Pvt. Ltd. New Delhi, First edition.
2. Gupta. S., World Tourism in New Millennium, ABD Publishers, Jaipur, First edition.
3. Kamra, K.K and M.Chand, Basics of Tourism-Theory, Operation and Practice, Kanishka Publishers, New Delhi. First Edition. 2006
4. Maken. D. Strategies and Planning in Tourism and Industry, Adhyayan Publishers and Distributors, Delhi, First edition.
5. Puri M. and G.Chand, Tourism Management, Pragun Publications, New Delhi. First Edition. 2006.
6. Roday. S, Biwal. A. and Joshi. V., TOURISM Operations and Management, Oxford University press publication, New Delhi, First addition 2009
7. Sharma. R.B., World Tourism in 21st Century, Alfa Publications, New Delhi, First edition.

**Students of other disciplines may choose any elective courses from the list of following minorcourses in Food Nutrition and Dietetics**

<b>Course Number</b>	<b>Course</b>	<b>Course Number</b>	<b>Credit Hours</b>
<b>Elective-1</b>			
<b>Nutrition and Dietetics</b>			
1.	Principles of Human Nutrition	FND 211	4(4+0)
2.	Community Nutrition & Education	FND 213	3(2+1)
3.	Normal Nutrition & Meal Planning	FND 221	3(2+1)
4.	Diet & Nutrition Counselling	FND 314	3(0+3)
5.	E-applications for Dietetics	FND 412	4(1+3)
6.	Nutrition for Special Conditions	FND 414	3(2+1)
7.	Nutrition through life cycle	FND 415	3(2+1)
8.	Fundamentals of research methodology and library search	FND 416	2(1+1)
<b>Elective-2</b>			
<b>Food Science</b>			
1.	Food Preservation and Storage	FND 123	2(1+1)
2.	Principles of Human Nutrition	FND 211	4(4+0)
3.	Fundamentals of Food Science	FND 212	4 (3+1)
4.	Food processing and packaging		2(0+2)
5.	Fruits & Vegetables Processing and Technology	FS 412	4(2+2)
6.	Meat Processing and Technology	FS 416	3(2+1)
7.	Pulses and oilseeds: Processing and Technology	FS 417	3(2+1)
8.	Sensory Evaluation of Foods	FS 418	2(1+1)
<b>Elective-3</b>			
<b>Institutional Food Service Management</b>			
1.	Food Psychology	FND 216	2(2+0)
2.	Principles of Human Nutrition	FND 221	4(4+0)
3.	Fundamentals of Food Science	FND 224	2(1+1)
4.	Normal Nutrition & Meal Planning	FS 411	3(2+1)
5.	Food Standards & Quality Control	IFSM 413	2(1+1)
6.	Food processing and packaging	IFSM 414	4 (3+1)
7.	Event Management	FS 418	3(0+3)
8.	Ergonomics in Food Service	IFSM 415	2(2+0)
9.	Sensory Evaluation of Foods	FS 418	2(1+1)
10.	Print and Electronic Journalism	IFSM 418	2(0+2)

## ELECTIVE - 1

### Nutrition and Dietetics

**FND-211**

**Principles of Human Nutrition**

**3(2+1)**

#### Objective

At the end of the course, the student will have knowledge of

- Different types of carbohydrates, lipids and fatty acids and proteins and amino acids required for human nutrition.
- The energy requirement and expenditure in the human body during rest and physical activity.
- The physiological and biochemical role of water, minerals and vitamins and their metabolism in the human body.
- The diseases and symptoms resulting from deficiency of major and minor nutrients.
- The biochemical monitors used to assess the nutritional status of different nutrients.

#### Theory

S.No.	Topic	No .of Lectures
1.	Historical development and the relationship of nutrition to health, growth and human welfare.	1
2.	Definitions of terms used in nutrition- Recommended dietary allowances, balanced diet, health foods, functional foods, phytochemicals, Nutraceuticals, dietary supplements, ethnic foods, organic foods, fabricated foods, extruded foods, convenience foods, junk foods, GM foods and proprietary foods.	3
3.	Food groups (Four, Five, Seven, Nine, Eleven) Food pyramid, my plate concept, Bioavailability, enrichment, fortification and restoration of nutrients.	1 1
4.	Energy units, sources and requirements, fuel value of foods, Methods of measuring energy value of food, energy requirement of body, physical activity and thermogenic effect of food, Respiratory Quotient, SDA BMR- methods of measurement, factors affecting BMR Energy expenditure in different activities, Energy balance.	1 2 1 2
5.	Carbohydrates- Types, functions, sources, requirement, Digestion and absorption of carbohydrates, health conditions affected by carbohydrates Dietary Fiber-Classification, sources, composition, properties & nutritional significance	2 1

S.No.	Topic	No .of Lectures
6.	Lipids- Types, functions, sources, requirement, Digestion and absorption of lipids health problems associated with lipids.	3
7	Proteins- Types, functions, sources, requirement, Digestion and absorption of proteins, Quality evaluation, improvement and deficiency and protein energy malnutrition.	2 2
8.	Vitamins- Classification, functions, sources, requirement, deficiency and toxicity of fat soluble-(A, D, E, K) Water soluble – C, B Complex (thiamine, riboflavin, niacin, B6, Pantothenic acid, B12 and folic acid).	2 2
9.	Minerals-Classification, functions, sources, requirements, deficiency and toxicity of calcium, phosphorus, iodine, fluorine, iron, sodium, potassium, chloride, copper and zinc, Factors affecting bio availability of calcium and iron and other minerals.	3 1
10.	Water- functions, sources, distribution in body Water balance and electrolyte balance	1 1
	<b>Total</b>	<b>32</b>

### Practical

S.No.	Experiment	No .of practicals
1.	Serving size of common dishes	2
2.	a. Planning and preparation of nutrient rich dishes :protein, calcium, iron, vitamin A, thiamine, riboflavin, niacin and ascorbic acid. b. Calculate calorie and cost of dishes prepared for above nutrients	6
3.	Evaluation of three days energy balance	2
4.	Planning and preparation of dishes based on simple processing techniques to improve bioavailability of nutrients.	
	Germination	1
	Fermentation	1
	Mutual supplementation	1
	Malting and others	1
5.	Planning and preparation of low cost nutritious recipes	1
6.	Study of common deficiency diseases through audio visual aids	1
	<b>Total</b>	<b>16</b>



### **Suggested Readings**

1. Mogra, R. and Joshi, P. (2023), Principles of Human Nutrition, 1<sup>st</sup> Edition, Agrotech Publishing Academy, Udaipur.
2. Agrawal, A. and Udipi, A.S. 2022. Textbook of Human Nutrition. Jaypee Brothers Medical Publishers.
3. Recommended dietary allowances and estimated average requirements nutrient requirements for Indians – 2020- A Report of the Expert Group Indian Council of Medical Research, National Institute of Nutrition
4. Raghuvanshi, R. S., Mittal, M. 2014. Food Nutrition and Diet Therapy. India: Westville Publishing House New Delhi
5. Bamji, M.S., Krishnaswamy, K. and Brahmam, G.N.V. 2009. Text book of Human Nutrition. Oxford & IBH Publishing Company Pvt. Ltd.
6. Sehgal, S. and Raghuvanshi, R.S. 2007. Text Book of Community Nutrition. ICAR Publication.
7. Wilson, E.D.; Fisher, K.H. and Garcia P.A. 1980. Principles of Nutrition. John Wiley & Sons, New York.
8. Longvah, T., Ananthan, R., Bhaskarachary, K. and Venkaiah, K. 2017. Indian Food Composition Tables. National Institute of Nutrition, ICMR, New Delhi
9. Shakuntala Manay N, Shadaksharaswamy M. 1998. Foods, Facts and Principles, New Age International Publishers, New Delhi

### **FND-213**

### **Community Nutrition and Education**

**3(2+1)**

#### **Objectives**

At the end of the course, the student will have knowledge of

- Causes, prevalence and consequences of the major nutritional problems existing in India and its control measures.
- Methods of nutritional status assessment of individual and group both directly and indirectly.
- To inculcate concept of food and nutrition security and government and international program running.
- In the field of community nutrition for ameliorating nutritional status of population.
- To enable students to assess nutritional status and impart nutrition education among rural and needy people.

## Theory

<b>S. No.</b>	Basic concept of community nutrition role of nutritionist in improving nutrition in community.	1
1.	Food habits and influencing factors, Food taboos, Mortality and morbidity pattern of vulnerable groups and their causes.	2
2.	Nutritional needs of normal infants, prelacteal feeding, exclusive breast feeding, feeding of full term and premature infants.	2
3.	Importance of breast feeding and supplementary foods in combating malnutrition in infants and young children.	2
4.	Growth monitoring	2
5.	Malnutrition. Definition and causes, classification of grades of malnutrition.	2
6.	Assessment of nutritional status- Nutritional Anthropometry-Need and importance, standard for reference, techniques of measuring Length/ height, weight, head, chest and arm circumference, skinfold thickness, interpretation of these measurements.	3
7.	Use of growth chart	1
8.	Clinical signs of deficiencies specially PEM (Kwashiorkor, marasmus), vitamin A deficiencies, Anemia, Rickets, B-Complex deficiencies.	3
9.	Bio chemical and biophysical assessment.	2
10.	Diet survey: Need and importance, methods of dietary survey, Interpretation - concept of consumption unit, individual and total distribution of food in family, adequacy of diet in respect to RDA, concept of family food security.	2
11.	Major nutritional problems in community.	2
12.	National programmes and policies for improving nutritional status of community.	2
13.	Role of national and international agencies in improving nutritional status of the community.	2
14.	Nutrition education: objectives, methods, channels and its role in control of malnutrition in community	2
15.	Nutritional survey – NFHS.	2
	<b>Total</b>	<b>32</b>

## Practical

S.No.	Assessing nutritional status of hostel inmates and local community dwellers.	3
1.	Assessing nutritional status of community as per socio-economic status.	3
2.	Visit to local health centres to identify clinical signs and symptoms of nutritional problems.	3
3.	Visit to Anganwadi centres, MDM and evaluation of feeding provided at these centres.	3
4.	Community survey for nutritional deficiency disorders -Data collection, tabulation, analysis, interpretation report writing.	2
5.	Development of audio- visual aids. Planning, implementation and evaluation of nutrition education programme for a target group.	2
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Das, S. 2022. Textbook of Community Nutrition. Academic Publishers.
2. Sehgal, S. and Raghuvanshi, R.S. 2007. Textbook of community nutrition, Directorate of Information and Publications of Agriculture, Indian Council of Agricultural Research, New Delhi.
3. Latham, M.C. 1997. Human nutrition in the developing world. Food and agricultural organization of United Nations.
4. Dahiya, S., Boora, P. and Rani, V. 2013. A manual on Community nutrition, Dept. of Foods and Nutrition, published under ICAR, Assistance scheme.
5. Bamji, S.M., Rao, N.P., Reddy, V. 1996. Textbook of human nutrition. Oxford and IBH publishing Co. Pvt. Ltd., New Delhi.

## FND-221

## Normal Nutrition and Meal Planning

3 (2+1)

## Objectives

- To acquire basic knowledge of nutrient requirements, recommended dietary allowances, and dietary modification under different physiological conditions and disease conditions.
- To develop practical skills in planning and management of diets for the different age groups under normal/ physiological conditions keeping in mind the dietary guidelines and to modify the diet plans to suit the disease conditions.

## Theory

S. No.	Topic	No. of lectures
1.	Determination of nutritional requirements- Basic principles of menu planning, factors affecting planning menus for individual and family. Steps involved in meal planning.	1
2.	Concept of calorie consumption unit. Factors (physiological and psychological) affecting food requirements of individuals, families and different groups of people.	2
3.	Classification of vegetarianism. Importance of balanced diets. Food exchange list. Use of food exchangelist in diet planning. Introduction to normal nutrition- Food, nutrient requirement and menu planning of adults (male and female of all activities level), pregnant women, lactating women, Infants. Breast feeding, advantages of breast feeding, breast feeding during illness, feeding of pre-term baby, feeding problems	3
4.	Weaning and complementary feeding. Food and nutrient requirement of pre-school children, school age children, adolescents, old age people Physiological and psychological changes during old age.	3
5.	Introduction to therapeutic nutrition- Definition of therapeutic nutrition/ Diet therapy, objectives of therapeutic diet. Principles of diet therapy and Importance and modification of normal diet to therapeutic diets. Routine Hospital Diet-clear liquid diet, liquid diet, semi-solid diet, soft diet, normal diet, bland diet, high and low calorie diet, high and low protein diet, high and low fiber diet, low cholesterol diet etc	3
6.	Therapeutic adaption- change in consistency, change in energy intake, change in nutrient, change in fiber, change in frequency of feeding, change in elimination of food	3
7.	Methods of feeding- enteral feeding, parenteral feeding, advantages and disadvantages of these methods	2
8.	Aetiology, symptoms and dietary management in acute and chronic fevers. Typhoid, influenza, tuberculosis. Viral and auto immune diseases- causes, symptoms and diet management. Allergy – causes, symptoms and diet management.	2
9.	etiology, symptoms and dietary management in gastrointestinal disorders- Diarrhoea, constipation, peptic ulcer, diverticular disease, inflammatory bowel disease, celiac disease, lactose intolerance etc. and other disorders	3
10.	Aetiology, symptoms and dietary management in liver diseases- fatty liver, hepatitis, jaundice, cirrhosis of liver.	2
11.	Aetiology, symptoms and dietary management in cardiovascular disease, atherosclerosis and hypertension.	2

S. No.	Topic	No. of lectures
12.	Aetiology, symptoms and dietary management in diabetes mellitus. Aetiology, symptoms and dietary management in overweight and obesity and underweight.	2
13.	Aetiology, symptoms and dietary management in renal disease- nephritis, nephrotic syndrome acute renal failure, chronic renal failure etc	2
14.	Aetiology, symptoms and dietary management in cancer.	2
	<b>Total</b>	<b>32</b>

### Practical

S.No.	Topic	No. of lectures
1.	Standardization of serving size portions	3
2.	Planning, preparation and calculation of diets for different age groups- Infancy, preschool age, school age, Adolescent, adult, old age	3
3.	Planning, preparation and calculation of diets for pregnant and lactating women.	2
4.	Planning, preparation and calculation of packed lunches, clear liquid diet, full fluid diet, soft diet, tube feeding diet, high calorie/ fiber diet etc.	2
5.	Planning, preparation and calculation of diets for following diseased condition- diarrhea, constipation, peptic ulcer, hepatitis, hypertension, atherosclerosis, diabetes, mellitus, overweight/ obesity.	3
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Raghuvanshi, R.S. and Mittal, M. (2014). Food Nutrition and Diet Therapy. Westvills Publication Delhi.
2. Agarwal, A and Udipi, S. (2014). Text Book of Human Nutrition. Jaypee Medical Publication Delhi.
3. Antia, P. (1986). Clinical dietetics and nutrition. Oxford univ. Bombay
4. Srilakshmi, B. (1995). Dietetics. Newage international publishers, New Delhi.
5. Agarwal, A and Udipi, S. (2014). Text Book of Human Nutrition. Jaypee Medical Publication Delhi.
6. Antia, P. (1986). Clinical dietetics and nutrition. Oxford univ. Bombay
7. Srilakshmi, B. (1995). Dietetics. Newage international publishers, New Delhi.

**Objectives**

- Understanding, critically assessing and knowing how to use and apply information sources related to nutrition, food, life style and health.
- Able to provide nutrition Counseling and education to individuals, groups, and communities throughout the life span using a variety of communication strategies.

**Practical**

S.No.	Experiment	No. of practical
1.	Qualities of counselor (confidence, knowledge, communication skills, patient listener, empathetic. Self-assessment of role as a dietitian – Pre-test on role, summary of competencies.	2
2.	Developing diet history questionnaire and taking diet history	3
3.	Preparation of standard protocol based on case studies and group discussion.	3
4.	Preparation of overweight and underweight fact list handout and development of counseling guidelines for weight loss and weight gain. Weight loss counseling– Use of role play technique, counseling on diet, exercise and life style	3
5.	Visit to hospitals with therapeutic kitchen setup.	1
6.	Diabetic diet Counseling development of dietary fat facts list, cholesterol facts list, sodium facts list.	3
7.	Development of dietary Counseling tips for different cardiovascular disorder and Counseling; cardiac patients using role play technique, presentation in gathering. Diet exhibition cardio vascular disorders in a specialty hospital/general hospital,	3
8.	Preparation of handouts on ulcer facts list, high fibre facts list, low residue facts list, low lactose facts list, Counseling for patients suffering from constipation, gastro- oesophageal reflex (GERD, colitis, diverticulitis and ulcer.	3
9.	Preparation of SOAP notes and gall bladder facts list hand out and Counseling a patient of gall stones. Preparation of liver disease facts list handout, collection of case history of patient suffering from hepatitis, cirrhosis of liver, alcoholics. Counselling the patient and conducting group discussion.	3
10.	Preparation of kidney disease facts list handout and development of Counseling tips for kidney disorders, dietary Counseling in a specialty hospital/diet and nutrition Counseling centre for kidney disorder and diet exhibition for kidney disorder	3
11.	Preparation of cancer facts list handout, Preparation of list of parenteral and enteral products available in the market for use during Counseling.	3
12.	Setting up a unit for nutrition Counseling. Role play exercises for Counseling .Supervised Counseling of patients /clients.	2
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Anita, P.1986.Clinical dietetics and nutrition. Oxford univ. Bombay.
2. Moris, E.S.1994. Modern nutrition in health and disease. Leaned feigner, USA.
3. Corinne H. Robinson, Marilyn R. Lawler, Wanda L. Chenoweth, Ann E. Garwick. 1982. Norma land Therapeutic Nutrition.(Pp-1-16).New York, Macmillan Publishing Company
4. ICMR, 2020.Recommended Dietary allowance for Indians, ICMR, Delhi.
5. Park, K.1997. Textbook of Preventive and Social Medicine.1st Ed.Jabalpur: Banarsidas Bhanot.
6. Raghuvanshi, R. S., Mittal, M. 2014. Food Nutrition and Diet Therapy. India: Westville Publishing House, New Delhi.
7. Raghuvanshi R.S.and Mittal M.2016.Clinical Nutrition *Chikitskeey Poshan*. Vikas Publishing House Pvt. Ltd. New Delhi.
8. <https://aghealth.nih.gov/collaboration/qx/dhq.pdf>
9. Dietary Guidelines for NIN website.pdf

### ND-412

### E-Applications for Dietetics

4(1+3)

#### Objectives

- Introducing the concept AI among students
- Understanding the role of nutrition applications as the means for automatic dietary intake and energy expenditure measurements

#### Theory

S.No.	Topic	No .of Lectures
1.	Basic principles in developing a e-applications, Planning process, rules of web designing	2
2.	Designing navigation bar, Page design, Home Page Layout, Design Concept	2
3.	Audience requirement. Audience requirement, Idea creation – Sketching – Wire framing	2
4.	Graphic designing - Coding and programming, Importance of e-applications in Dietetics-	2
5.	Role of AI. Diet and nutrition tracking App – Calorie calculating app – app for calculating energy expenditure – app for calculating energy requirement – Stages of developing nutri App for dieting.	2

S.No.	Topic	No .of Lectures
6.	Six types of technology assisted instruments for dietary assessment -: interactive Computer-based technologies - Personal Digital Assistants (PDAs) - web-based technologies – mobile devices, specialized cameras and tape recorders- scan and sensor technologies.	3
7.	Integration of e-Dietary Assessment tools into the care process. Food atlas -artificial intelligence in dieting.	2
8.	Advantages and disadvantages of e-dietary assessment methods. e-courses on nutrition and available platforms.	1
	<b>Total</b>	<b>16</b>

### Practical

S.No.	Experiment	No .of practicals
1.	Apps listing- Commercially available AI Based food and nutrient assessment system-	3
2.	Nutrition facts, CRON-O-METER,	3
3.	Diet organizer, e-fit, Easy menu balanced meal planner, food file, Nutrition info.	3
4.	Software for nutrient intake calculation and Dietary assessment software	3
5.	e-portals of NIN such as Count What you Eat, ICMR-NIN TATA Dashboard center, NUTRIFY INDIA NOW	3
6.	Tracking commercial apps and developing inventory of available apps related to health and nutrition tracking.	3
7.	Diet history- Google forms, photography method, electronic household weighing, sensor based health assessment for apps for tracking and measuring BP, blood sugar, hemoglobin, smart watches, fitness tracker,	3
8.	Online survey design for nutritional and dietary assessment for understanding current trends in dietary intake in particular group	3
9.	Developing messages for public masses.	3
10.	Developing web page/blog/e-course. Info.	3
11.	Graphic designing/posters/pamphlets.	3
12.	Attending training and workshops related to e-application/AI/coding or programming.	2
13.	Generating awareness using e-application.	2



S.No.	Experiment	No .of practicals
14.	Organizing awareness camps among general public on use of nutrition related online platforms and application for tracking their dietary intake.	3
15.	Application based assignment- nutrient analysis/estimation, data collection – 24-h recall, diet history, food record, menu planning,	3
16.	Application based assignment nutrition counselling, food portion size estimation, standardized recipe formulation.	3
17.	Project to be submitted by student using any e-tool	2
	<b>Total</b>	<b>48</b>

### Suggested Readings

1. Emma Tonkin, Julie Brimblecombe, Thomas Philip Wycherley, Characteristics of Smartphone
2. Applications for Nutrition Improvement in Community Settings: A Scoping Review, *Advances in Nutrition*, Volume 8, Issue 2, March 2017, Pages 308–322 <https://doi.org/10.3945/an.116.013748>
3. Count What You Eat. NIN <http://count-what-you-eat.ninindia.org:8080/CountWhatYouEat/Receipes.do>
4. Tom Taulli. 2019. Artificial Intelligence Basics: A Non-Technical Introduction apress.
5. Wendy Willard. 2010. Web Design: A Beginner's Guide. Second Edition. McGraw-Hill Education.
6. Côté, M., & Lamarche, B. (2021). Artificial intelligence in nutrition research: perspectives on current and future applications. *Applied physiology, nutrition, and metabolism = Physiologie appliquee, nutrition et metabolisme*, 1–8. Advance online publication. <https://doi.org/10.1139/apnm-2021-0448>

## ND-414                      Nutrition for Special Conditions                      3(2+1)

### Objectives

- To gain basic knowledge on changes occurring in the physiology and metabolism of human body as a result of change in extreme environment.
- To know the nutrition in emergency, nutrition and health problems, food distribution strategies and dietary management.
- To acquire basic knowledge about immune nutrition in acute and chronic inflammation.

## Theory

S.No.	Topic	No .of Lectures
1.	Nutritional requirements for extreme environments	1
2.	Introduction - General adaptive mechanisms to environmental extremes and role of nutrition in successful acclimatization	2
3.	Decreased oxygen availability at high altitude – nutrition requirements for high altitude	1
4.	Nutrition requirements in cold and polar environment- thermoregulation in cold –dietary guidelines for cold conditions	2
5.	Nutrition requirements in hot environments- effect of heat stress –energy expenditure in hot environment.	2
6.	Nutrition on requirements for astronauts (space missions); Sea and air travel nutrition: introduction, need and scope for space travel, history of space travel; -changes in body composition during space expedition and nutrition requirements.	3
7.	Physiological changes in human body, psychological preparedness, health and nutritional problems, nutrient requirements and dietary management during sea and air travel.	3
8.	Nutrition in Emergencies: need and importance, types of emergency situations such as natural and manmade, nutritional and health problems in emergencies.	3
9.	Control of communicable diseases through sanitation and immunization- Food distribution strategies- nutrient requirement and dietary management during emergencie	3
10.	Nutritional requirements during starvation: total starvation – biochemistry of starvation, conditions developing starvation, features of starved body – survival period, effects of starvation/human body adaptation, metabolic alterations and nutrition requirements during starvation.	3
11.	Immuno-nutrition: nutrients affecting the immune system at the physiological, cellular and genetic level. Nutrients involved in the inflammatory response, role of specific nutrients in immune suppression and in immune promotion.	3
12.	Acute inflammation-- features, causes, vascular and cellular events, inflammatory cells and mediators.	3
13.	Chronic inflammation- causes, types, classification non-specific and granulomatous with examples, repair, and wound healing by primary and secondary union, factors promoting and delaying the process. Healing in specific site including bone healing.	3
	<b>Total</b>	<b>32</b>

## Practical

S.No.	Experiment	No .of practicals
1.	Studying the existing ration scale for army personnel in plains/high altitudes	3
2.	Space foods/ emergency ration foods, planning and preparation of diet for army person in the high altitudes, hot environment and cold environment,	3
3.	Planning and preparation of diet for space mission, preparation of snacks foods for space , fibre rich foods ,ergogenic foods / bars for high altitude,	3
4.	Ready to eat appetizers - juices/candy, high energy foods for starvation, RTE/ RTC foods for emergencies	3
5.	High protein foods, planning and preparation of diet for acute and chronic inflammation condition – Rheumatic arthritis/Asthma	3
6.	Planning and preparation of diet for immunity	1
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Moris, E.S. (1994). Modern nutrition in health and disease. Leaned Febinger, USA
2. Corinne H.R, Marilyn R. L, Wanda L. C and E. Garwick. (1982). Normal and therapeutic nutrition. (Pp-1-16). New York, Macmillan Publishing Company.
3. Kathleen ML and JL Raymond (2016) Krause's Food and the Nutrition Care Process. 14th Edition, Saunders, Philadelphia.
4. WHO. (1997). Applied health research priorities in complex emergencies, Geneva
5. Bharat B. Aggarwal, David Heber, (2014), “Immuno-nutrition: Interactions of Diet, Genetics, and
6. Inflammation”, CRC Press.
7. Sehgal S. and Raghuvanshi RS. (2007). Textbook of community nutrition Directorate of Information and Publications of Agriculture, Indian Council of Agricultural Research, New Delhi.
8. <https://www.cdc.gov/ncbddd/adhd/index.html>
9. <https://www.unhcr.org/45fa745b2.pdf>
10. [http://apps.who.int/disasters/repo/13849\\_files/i/nutrition\\_in\\_emergencies\\_ppt.pdf](http://apps.who.int/disasters/repo/13849_files/i/nutrition_in_emergencies_ppt.pdf)
11. <https://www.unicef.org/media>
12. [https://www.nasa.gov/sites/default/files/space\\_nutrition\\_book.pdf](https://www.nasa.gov/sites/default/files/space_nutrition_book.pdf)
13. <http://spacelink.nasa.gov/products>

**Objectives**

- Nutrition in the Life Cycle will cover nutritional needs of individuals during critical stages of development.
- Students will learn about the biological basis for nutritional requirements in normal development and maintaining health in adulthood.
- Consequences of over- and under-nutrition and how to identify and address these issues will be discussed.

**Theory**

S.No.	Topic	No .of Lectures
1.	Infancy- Role of nutrition on physical and mental development, rate of growth-weight as an indicator, assessment of growth, nutrient requirement during infancy, feeding of infants, value of breast feeding on infants, breast feeding versus artificial feeding, types of milk and their use in infant feeding.	3
2.	Weaning and supplementary foods, weaning practices in community, feeding of premature and low-birth-weight infants, Nutritional disorders and common ailments in infancy, feeding the sick child, Immunization schedule and growth charts	3
3.	Preschool age: Physical growth and mental development, prevalence of malnutrition in preschool years and food habits, nutritional requirements during preschool age and supplementary foods	3
4.	School age. Physical growth and mental development, nutritional requirements during school age, specific problems, specific problems in feeding school children	3
5.	Adolescence. Physical and physiological changes, nutritional requirements, food preferences and nutritional problems, problems, growth spurt and nutrition, adolescent fads influencing nutrition.	3
6.	Adulthood, Sex, occupation and income, nutritional requirements, biological and nutritional consequences and complications due to pollutants, vegetarianism.	3
7.	Nutrition, work capacity and physical fitness. Nutrition, infection and immunity, nutrients and drugs interaction.	3
8.	Pregnancy. Physiological changes in pregnancy, weight gain during pregnancy, food and nutrient requirements. Complications of pregnancy and their nutritional management, impact of nutrition on the outcome of pregnancy.	3

S.No.	Topic	No .of Lectures
9.	Nutritional need of fetus during different stages of fetal cell growth and maternal nutritional needs.	2
10.	Psycho-physiology of lactation; milk synthesis and secretion, maternal needs during lactation, composition of colostrums and mature human milk, milk of mothers of pre-term babies. Non-nutritional factors of human milk; immunological factors, enzymes, hormones. Human milk banking.	3
11.	Elderly. Physical and physiological changes, nutritional requirements, problems of old age, nutrients influencing aging process	3
	<b>Total</b>	<b>32</b>

### Practical

S.No.	Experiment	No .of practicals
1.	Grouping of foods based on richness of nutrients and quantifying foods to give uniform content of each nutrient.	2
2.	Planning and formulation of food exchange lists.	1
3.	Planning, preparation and evaluation of diet for adult men and women involved in different activities.	3
4.	Planning, preparation and evaluation of diets for pregnant women, , lactating mothers, weaning and supplementary foods for infants	3
5.	Planning, preparation and evaluation of diets for preschool children, school going children, packed lunches for preschoolers and school children,	3
6.	Planning, preparation and evaluation of diets for adolescent boys and girls, elderly, preschool children with PEM and vitamin. A deficiency	3
7.	Planning diets for anemic children, adolescents and pregnant women.	1
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Moris, E.S. (1994). Modern nutrition in health and disease. Leaned Febinger, USA.
2. Srilakshmi, B. (1995). Dietetics. Newage international publishers, New Delhi.
3. Corinne H.R, Marilyn R. L, Wanda L. C and E. Garwick. (1982). Normal and therapeutic nutrition. (pp- 1-16). New York, Macmillan Publishing Company.
4. Williams, S.R.; Worthington, R.S.; Snehlinka, E.D.; Pipes, P.; Ress, J.M. and Mahal, K.L. (1988).
5. Introduction to nutrition throughout the life cycle. Times Mirroe/Mosby College Publishers.

## ND-416 Fundamentals of Research Methodology & Library Search 2(1+1)

### Objectives

- Understand some basic concepts of research and its methodologies
- Identify appropriate research topics
- Select and define appropriate research problem and parameters
- Prepare a project proposal (to undertake a project)
- Organize and conduct research (advanced project) in a more appropriate manner
- Write a research report and thesis
- Write a research proposal (grants)

### Theory

S.No.	Topic	No .of Lectures
1.	Introduction to Research - Research: Meaning, Types, Scope and Significance, Foundations of Research: Meaning, Objectives, Motivation, Utility.	1
2.	Concept of theory, empiricism, deductive and inductive theory.	1
3.	Characteristics of scientific method - Understanding the language of Research - Concept, Construct, Definition, Variable. Research Process.	1
4.	Guiding Principles in Selection of Research Problem; Research Objectives and Approaches, Problem Identification & Formulation, Research Question – Investigation Question Measurement Issues	2
5.	Hypothesis - Qualities of a good Hypothesis, Null Hypothesis & Alternative Hypothesis. Hypothesis Testing - Logic & Importance.	1
6.	Research Process and Criteria of Good Research; Research Method ; Research Design – Meaning, Need, Key Components, Data Collection, Survey and Sampling,	2
7.	Data: Meaning, Nature, Types and Sources; Methods of Collecting Secondary Data, Surveys – Definition, Purpose and Scope; Survey Techniques and their Limitations.,	2
8.	Questionnaires and Schedules – Definition and Differentiation; Types of Questionnaires; Salient Features of an Effective Questionnaire,	1
9.	Sampling and Sample Designs: Concept, Purpose and Types; Criteria for Selecting appropriate sampling Procedure;	1
10.	Data Analysis – Tools and Techniques, Use of proper statistical procedures, Preparation of Research Report,	2
11.	Impact factor of Journals, When and where to publish? Ethical issues related to publishing, Plagiarism and Self-Plagiarism.	1
12.	Use of Encyclopedias, Research Guides, Handbook etc., Academic Databases for Computer Science Discipline.	1
	<b>Total</b>	<b>16</b>

**Practical**

S.No.	Experiment	No .of practicals
1.	Identifying problem,	1
2.	Formulating research hypothesis,	3
3.	Questionnaire design,	3
4.	Collection of secondary data,	3
5.	Analysis & report writing.	3
6.	Use of reference management software, article writing	3
	<b>Total</b>	<b>16</b>

**ELECTIVE - 2****Food Science****FND-123****Food Preservation and Storage****2(0+2)****Objective**

- This course will provide the information about the shelf life of different food products, differentpreservations and processing techniques
- Students will also get hands on experience and knowledge about handling of food items on scientific lines to prepare and develop different preserved food product

**Practical**

S.No.	Experiment	No .of practicals
1.	Market survey of raw and preserved products	2
2.	Preparation of preserved products- Squash, cordial, crush	1 1 1
3.	Jams, jellies, marmalade	1 1 1
4.	Candy, preserves, murabbas	1 1 1

S.No.	Experiment	No .of practicals
5.	Pickles with and without oil	1 1
6.	Chutneys, ketchup, sauces	1 1 1
7.	Candies, Toffees	1 1
8.	Cheese and Syrup	1 1
9.	Drying of blanched and unblanched fruits and vegetables by solar dryer, sun and oven drying methods	2
10.	Shelf life and sensory evaluation of developed products	2
11.	Packaging of fruits and vegetables.	1
12.	Labelling and costing of products	1
13.	Demonstration on canning and bottling of fruits and vegetables	1
14.	Demonstration on storage of food grains	1
15.	Preparation of papad, wadian utilizing cereals and legumes and their storage	2
16.	Visits to food processing and preservation units, canning bottling units, grain storage institute.	2
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Bhutani, R. C. 2011. Fruit and Vegetable Preservation. Daya Publishing House.
2. Sehgal, S., Grewal, R.B., Kawatra, A. and Kaur, Y. 1997. Practical Aspects of Food Preservation. Directorate of Publications. Haryana Agricultural University, Hisar.
3. Vijay K., 1999. Text book of Food, Storage and Preservation, Kalyani Publishers, New Dehi.
4. Kalia, M. and Sood, S. 2010. Food Preservation and Processing. Revised Edition, Kalyani Publishers, New Delhi.
5. Jood, S. and Khetarpaul, N. 2002. Food Preservation. Geeta Somani, Agrotech Publishing Academy, Udaipur.
6. Sivasankar, B. 2002. Food Processing and Preservation. PHI Learning Pvt. Ltd. Delhi.



7. Srivastava R P and Kumar S. 2019. Fruits and Vegetable Preservation: Principles and Practices. Revised and Enlarged 3rd Edition. CBS publishers and distributors.
8. Subbulakshmi, G. and Udipi, S.A. 2006. Food processing and preservation. New Age International Publishers.
9. Potter, N.N. (1996). Food Science. The AVI Publishing Company, Inc. Westport, Connecticut.

## **FND-211**

## **Principles of Human Nutrition**

**3(2+1)**

### **Objective**

At the end of the course, the student will have knowledge of

- Different types of carbohydrates, lipids and fatty acids and proteins and amino acids required for human nutrition.
- The energy requirement and expenditure in the human body during rest and physical activity.
- The physiological and biochemical role of water, minerals and vitamins and their metabolism in the human body.
- The diseases and symptoms resulting from deficiency of major and minor nutrients.
- The biochemical monitors used to assess the nutritional status of different nutrients.

### **Theory**

<b>S.No.</b>	<b>Topic</b>	<b>No .of Lectures</b>
1.	Historical development and the relationship of nutrition to health, growth and human welfare.	1
2.	Definitions of terms used in nutrition- Recommended dietary allowances, balanced diet, health foods, functional foods, phytochemicals, Nutraceuticals, dietary supplements, ethnic foods, organic foods, fabricated foods, extruded foods, convenience foods, junk foods, GM foods and proprietary foods.	3
3.	Food groups (Four, Five, Seven, Nine, Eleven) Food pyramid, my plate concept, Bioavailability, enrichment, fortification and restoration of nutrients.	1 1
4.	Energy units, sources and requirements, fuel value of foods, Methods of measuring energy value of food, energy requirement of body, physical activity and thermogenic effect of food, Respiratory Quotient, SDA BMR- methods of measurement, factors affecting BMR Energy expenditure in different activities, Energy balance.	1 2 1 2

S.No.	Topic	No .of Lectures
5.	Carbohydrates- Types, functions, sources, requirement, Digestion and absorption of carbohydrates, health conditions affected by carbohydrates Dietary Fiber-Classification,sources, composition, properties & nutritional significance	2 1
6.	Lipids- Types, functions, sources, requirement,Digestion and absorption of lipids health problems associated with lipids.	3
7.	Proteins- Types, functions, sources, requirement, Digestion and absorption of proteins, Quality evaluation, improvement and deficiency and protein energy malnutrition.	2 2
8.	Vitamins- Classification, functions, sources, requirement, deficiency and toxicity of fat soluble-(A, D, E, K) Water soluble – C, B Complex (thiamine, riboflavin, niacin, B6, Pantothenic acid, B12 and folic acid).	2 2
9.	Minerals-Classification, functions, sources, requirements, deficiency and toxicity of calcium, phosphorus, iodine, fluorine, iron, sodium, potassium, chloride, copper and zinc, Factors affecting bio availability of calcium and iron and other minerals.	3 1
10.	Water- functions, sources, distribution in body Water balance and electrolyte balance	1 1
	<b>Total</b>	<b>32</b>

### Practical

S.No.	Experiment	No .of practicals
1.	Serving size of common dishes	2
2.	a. Planning and preparation of nutrient rich dishes :protein, calcium, iron, vitamin A, thiamine, riboflavin, niacin and ascorbic acid. b. Calculate calorie and cost of dishes prepared for above nutrients	
3.	Evaluation of three days energy balance	2
4.	Planning and preparation of dishes based on simple processing techniques to improve bioavailability of nutrients.	
	Germination	1
	Fermentation	1
	Mutual supplementation	1
	Malting and others	1
5.	Planning and preparation of low cost nutritious recipes	1
6.	Study of common deficiency diseases through audio visual aids	1
	<b>Total</b>	<b>16</b>

### **Suggested Readings**

1. Mogra, R. and Joshi, P. (2023), Principles of Human Nutrition, 1<sup>st</sup> Edition, Agrotech Publishing Academy, Udaipur.
2. Agrawal, A. and Udipi, A.S. 2022. Textbook of Human Nutrition. Jaypee Brothers Medical Publishers.
3. Recommended dietary allowances and estimated average requirements nutrient requirements for Indians – 2020- A Report of the Expert Group Indian Council of Medical Research, National Institute of Nutrition
4. Raghuvanshi, R. S., Mittal, M. 2014. Food Nutrition and Diet Therapy. India: Westville Publishing House New Delhi
5. Bamji, M.S., Krishnaswamy, K. and Brahman, G.N.V. 2009. Text book of Human Nutrition. Oxford & IBH Publishing Company Pvt. Ltd.
6. Sehgal, S. and Raghuvanshi, R.S. 2007. Text Book of Community Nutrition. ICAR Publication.
7. Wilson, E.D.; Fisher, K.H. and Garcia P.A. 1980. Principles of Nutrition. John Wiley & Sons, New York.
8. Longvah, T., Ananthan, R., Bhaskarachary, K. and Venkaiah, K. 2017. Indian Food Composition Tables. National Institute of Nutrition, ICMR, New Delhi.
9. Shakuntala Manay N, Shadaksharaswamy M. 1998. Foods, Facts and Principles, New Age International Publishers, New Delhi.

### **FND-212**

### **Fundamentals of Food Science**

**3(2+1)**

#### **Objectives**

- This course is designed to introduce students to the field of food science.
- This course will include; possible jobs, food harvest, production methods, food chemistry, preserving methods, meeting nutritional needs, grading procedures used and the science involved.
- Understand both fundamental and applied aspects of food science.
- Provides for fundamental understanding of food chemistry, and food microbiology.
- Gain insights about role of specific nutrients in maintaining health and identifying nutrient specific foods.

## Theory

S.No.	Topic	No .of Lectures
1.	Cooking- Objectives, cooking methods, their types, merits and demerits.	2
2.	Cereals and millets - Structure, composition, processing techniques, effect of heat and acid, functions of starch in the cookery, retrogradation of starch.	3
3.	Legumes, nuts and oil seeds - Composition, processing techniques, effect of heat, acid and alkali.	3
4.	Fruits and vegetables - Types, composition, pigments, changes caused by heat, acid and alkali.	3
5.	Milk and milk products – Composition, types, products, effect of acid on milk cookery, uses and functions.	3
6.	Egg - Structure, composition, grading of egg, function and changes during cooking.	3
7.	Meat, poultry and fish- Types, structure, composition, pigments, factors affecting tenderness, post-mortem changes and changes during cooking.	3
8.	Sugars- Types, composition, manufacturing process, Effect of heat and acid, crystallization factors affecting crystallization, functions of sugar in cookery, fondants and fudge.	2 2
9.	Fats and oils - kinds, composition, effect of heat, functions in cookery, processing techniques, Rancidity of fats;	3 1
10.	Methods of improving nutritive value of foods – germination, fermentation, malting, mutual supplementation etc.	2
11.	Brief overview of beverages; Condiments and spices, importance in daily life.	2
	<b>Total</b>	<b>32</b>

## Practical

S.No.	Experiment	No .of Practical's
1.	Orientation to kitchen equipment and their uses,	1
2.	Weighing and measuring food items, condiments and spices.	1
3.	Cooking of foods using different methods.	1
4.	Cereal cookery– Practical exercise on dextrinization and gelatinization of rice starch, gluten formation in wheat.	1

S.No.	Experiment	No .of Practical's
5.	Legumes – Identification and cooking methods.	1
6.	Nuts and oilseeds- Use in food preparations. Preparations using Germination, fermentation, mutual supplementation.	1
7.	Vegetable cookery- Different preparations with vegetables and effect of heat and alkali on pigments.	2
8.	Preparation of soups, salads and beverages.	1
9.	Milk and milk products- Maillard reaction, Use in various preparations.	1
10.	Egg cookery - Preparations showing functions of egg as binding, coating agent: poached egg, boiled egg, scrambled egg, omelet, egg curry.	1
11.	Meat, poultry and fish cookery – Preparations involving various methods of cooking.	1
12.	Sugar – Preparations showing functions of sugar in cooker- caramelization, coating agent, crystallization, syrups of different consistencies, sweets, chocolates, candies.	2
13.	Fats and oils – Demonstration of smoking point, use in various preparations like deep fat frying, shallow fat frying, shortening effects of oil, factors affecting absorption of oil.	2
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Sharma, A. 2017. Textbook of Food Science and Technology. CBS Publication.
2. Fox, B. F. and Cameron, A. G. 1970. Food Science - a Chemical Approach. University Press, London.
3. Swaminathan, M. 1988. Handbook of Food Science and Experimental Foods BAPPCO, Bangalore.
4. Raghuvanshi, R.S. and Bisht, K. 2010. Uses of Soybean: Products and Preparation. Guriqbal Singh(Ed.). *In: Soybean: Botany, Production and Uses*, CAB International, U.K.
5. Raghuvanshi, R.S. and Singh, D.P. 2009. Food preparations and use. William Erskina *et al.* (Eds.). *In: The Lentil: Botany Production and Uses*. CAB International, U.K.
6. Shakuntala Manay N, Shadaksharaswamy M. 1998. Foods, Facts and Principles, New AgeInternational Publishers, New Delhi.

**Objectives**

- To impart knowledge of various areas related to food processing and packaging.
- To enable the students to understand food composition and its physico-chemical, nutritional, microbiological and sensory aspects.

**Theory**

S.No.	Topic	No. of Lectures
1.	Food processing and preservation techniques for cereals, milk, fruits and vegetables, oil seeds, meat, fish and poultry and their impact on physical and chemical characteristics.	3 3 3 3 3 3
2.	Physico-chemical characteristics, nutritional quality and shelf-life studies.	3 3 3
3.	Factors effecting quality of processed foods.	3
4.	Food packaging, package functions, requirement and packaging materials.	3 3
5.	Principles in the development of protective packaging.	3
6.	Laws related to packaging.	3
7.	Shelf-life of packed food, special problems in packaging of foodstuffs.	3 3
	<b>Total</b>	<b>48</b>

**Practical**

S.No.	Experiment	No. of Practicals
1.	Market survey for packaged processed food stuffs.	3
2.	Cereal cookery. Preparations showing dextrinization and gelatinization, gluten formation and influence factors.	2 2
3.	Vegetable cookery: effect of heat and alkali on pigment, preparation of soups, salads and beverages.	1 2 1 1
4.	Use of milk and milk products and egg in various preparations.	2
5.	Estimation of shelf- life of packaged food stuffs.	2
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Potter, N.N. (1996). Food science. The AVI Publishing Company, Inc., Westport, Connecticut.
2. Kalia, M. and Sood, S. (2010). Food preservation and processing. Revised edition, Kalyani Publishers, New Delhi.
3. Srilakshmi, B. (2010). Food science (Fifth ed.) New Age International Pvt. Limited Pub., New Delhi.
4. Frank, A., and Paine, H.Y. (2003). A Handbook of food packaging. Springer science and business Media, U.K.

## **FS-412      Fruits and Vegetables Processing and Technology      4(2+2)**

### Objectives

- To acquire a basic knowledge of in the field of fruit and vegetable processing
- To acquire a basic understanding of agriculture sector and processing of fruits and vegetables is of vital importance
- To develop an essential understanding of the scope of fruit and vegetable processing in the country
- To acquire a fundamental background of the methods of fruit and vegetable processing.
- To practice the methods and techniques of fruit and vegetable processing at laboratory scale, and to evaluate the student's produce in each lab.

### Theory

S.No.	Topic	No .of Lectures
1.	Importance and scope of fruits and vegetables in human diet.	1
2.	Scenario of fruit and vegetable production and processing at national and international level.	2
3.	General principles involved in preservation of fruits and vegetable products. Tools, equipment, lay out and other requirements of fruit and vegetable processing unit.	1 1
4.	Processing using sugar - principles and processing of jam, jelly, marmalade, fruit bar, preserves and candies.	2 1
5.	Unfermented and fermented products - fruit juices, RTS, nectar, cordial, squash, syrup, carbonated beverages, cider and vinegar.	2 1

S.No.	Topic	No .of Lectures
6.	Processing using salt - principle – brining. Preservation of horticultural produces - preparation of pickles, ketchup and sauces.	2
7.	Tea, coffee and cocoa products Wine and fermentation technology.	1 1
8.	Drying and dehydration: definition, principle, method, suitability – types of driers - solar, cabinet, spray drier, drum drier, fluidized bed drier and freeze drying.	1 1 1
9.	Methods of concentration - open kettle, flash evaporators, thin film evaporators, vacuum evaporators, freeze concentration, dehydro-freezing, ultrafiltration and reverse osmosis.	1 1 1
10.	Processing of dehydrated fruits, vegetables and spice products and fruit pulp.	2
11.	Canning - principles, methods - preparation of canned products – spoilage of canned foods and its prevention.	2 1
12.	Preservation by low temperature: definition, principle, method, suitability- refrigeration, freezing, preparation of frozen foods.	1 1
13.	Preservation by controlled atmosphere, modified atmosphere - definition, principle, method, suitability.	2
14.	Processing by irradiation - definition, principle, method, suitability and application of irradiation in food industry.	2
	<b>Total</b>	<b>32</b>

### Practical

S.No.	Experiment	No .of practicals
1.	Evaluation of pectin grade;	2
2.	Canning of mango/guava/papaya;	3
3.	Preparation and quality evaluation of fruit jam with fruits of regional importance;	2
4.	Preparation and quality evaluation of fruit jelly with fruits of regional importance;	2
5.	Preparation and quality evaluation of fruit marmalade;	2
6.	Preparation and quality evaluation of fruit preserve and candy;	2



S.No.	Experiment	No .of practicals
7.	Preparation and quality evaluation of fruit RTS;	2
8.	Preparation and quality evaluation of squash / syrup;	2
9.	Preparation of grape raisin / dried fig / dried banana;	3
10.	Processing of tomato products;	2
11.	Preparation and evaluation of dehydrated vegetables;	2
12.	Preparation and quality evaluation of wafers with vegetables / tubers;	2
13.	Preparation of fruit cheese;	2
14.	Preparation of pickle / mixed pickle;	2
15.	Preparation of dried ginger / mango powder (amchur).	2
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Giridharilal, Sidappa.G.S and Tandon.G.L.1979. Preservation of Fruits and Vegetables. ICAR. New Delhi.
2. Kalia, M. and Sood, S. 2010. Food Preservation and Processing. Revised edition, Kalyani Publishers, New Delhi.
3. Singh, I. S. 2009. Post-harvest handling and processing of fruits and vegetables. Westville Publishing House, New Delhi.
4. Sudheer, K.P and V.Indira. 2007. Post-Harvest Technology of Horticultural Crops. New India Publishing Agency, PitamPura, New Delhi-110088.
5. Verma, L.R. and V.K. Joshi. 2000. Post-Harvest Technology of Fruits and Vegetables. Vol. 1 and 2. Indus Publishing Company. New Delhi.
6. Horticulture at a glance. 2018. Government of India Ministry of Agriculture & Farmers' Welfare Department of Agriculture, Cooperation & Farmers' Welfare Horticulture Statistics Division.

### Web Resources

1. [www.cfs.purdue.edu/class](http://www.cfs.purdue.edu/class)
2. [https://agritech.tnau.ac.in/postharvest/pht\\_intro.html](https://agritech.tnau.ac.in/postharvest/pht_intro.html)

**Objectives**

- To provide knowledge and skills for quality production of meat and meat products
- Develop human resource for meat industry and associated activities
- Train personnel for self-employment.
- Impart knowledge and technical proficiency in:
  - Good slaughter practices
  - Handling of meat on scientific lines
  - Production of quality meat and meat products
  - Testing and quality control of meat and meat products
  - Managing small and medium enterprises.

**Theory**

<b>S.No.</b>	<b>Title</b>	<b>No. of Lectures</b>
1.	Animal foods – needs – availability – demand and supply of animal foods. Growth and development of Indian meat industry	1
2.	Meat and poultry - pre-slaughter operations - preparation of animals and poultry birds for slaughter. Slaughtering of animals – requirements - stunning methods	2
3.	External treatment of carcasses - skinning, depilation – external and internal treatment of carcasses – evisceration - slaughter lines and systems.	3
4.	Identification of parts of the animal - structure – composition – nutritive value of meat. Post mortem changes of meat – eating quality of meat tissues.	3
5.	Equipment in processing of meat - their design – usage and its application. Meat cutting – types of carcasses - indicators of quality of carcass.	3
6.	Meat composition – quality and spoilage. Eating quality of meat – color - chemical nature of myoglobin - discoloration of meat - texture and tenderness of meat - pre-slaughter and post slaughter factors affecting tenderness – improvement of tenderness.	3
7.	Spoilage of meat - sources of contamination, growth of microorganisms – identification of spoilage.	2
8.	Meat inspection, sanitation and preservation techniques. Principles of preservation of meat - hurdle concept.	2

S.No.	Title	No. of Lectures
9.	Methods of preservation of meat - chilling and freezing – heating – canning and thermal processing curing and smoking, dehydration - Intermediate moisture foods – freeze drying, irradiation, high pressure treatment.	2
10.	Ohmic heating, High power ultra sound processing technology. Direct microbial inhibition – antibiotics – chemical preservation.	2
11.	Processed meats - formulation of meat products- enrobed meat products– fermented, canned and restructured meat products – restructured steaks, roasts, blocks – portion and sticks.Dried meat – pickled, spiced and marinated meat – prefabricated meat- effect of processing on quality of meat products.	3
12.	Equipment's used in processing of meat. Poultry - dressing - composition - nutritive value - processing and preservation methods - storage, spoilage and preventive measures of poultry meat.	2
13.	Standards and quality control measures adopted for meat and meat products. National and International - HACCP for meat and poultry and processed meat products.	2
14.	Fraudulent substitution of meat - its recognition and impact.Waste utilization of animal foods - edible and non-edible parts. New concept in meat technology: cultured meat, lab-grown meat. Plant-based meat analogues, <i>in-vitro</i> meat	2
	<b>Total</b>	<b>32</b>

### Practical

S. No.	Title	No. of Practicas
1.	Formulation of Questionnaire and conduct of survey on the availability of animal foods in selected areas.	2
2.	Effect of processing on sheep meat (moisture content, color change, shrinkage and sensory quality attributes).	2
3.	Curing of meat using sugar, salt and nitrite.	1
4.	Effect of tenderizing agents on meat cookery.	1
5.	Quality evaluation of processed meat and chicken products	3
6.	Preparation of battered chicken.	1
7.	Pickling and canning of meat.	2
8.	Microbial quality of stored animal and chicken meat products.	2
9.	Visit to slaughter house and meat cold storageunit	2
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Lawrie, R. A., and Ledward, D.A., Meat Science. 2006. Woodhead Publishing Limited.
2. Ioannis.S. Boziaris. 2013. Seafood Processing Technology: Quality and Safety, 2013, Wiley andBlackwell Ltd.
3. Vikas Nanda. 2014. Meat, Egg and Poultry Science & Technology. I.K. International Publishing HousePvt. Ltd., New Delhi.
4. B.D. Sharma and Kinshuki Sharma. 2011. Outlines of Meat Science and Technology. Jaypee BrothersMedical Publishers Pvt. Ltd., New Delhi.
5. Fidel Toldra, Y. H. Hui, Iciar Astiasaran, Wai-Kit Nip, Joseph G. Sebranek, Expedito-Tadeu
6. Silveira, Louise H. Stahnke, Regine Talon. 2007. Handbook of Fermented Meat and Poultry. BlackwellPublishing Professional, Ames, Iowa, USA.
7. Joseph Kerry, John Kerry and David Ledward. 2005. Meat Processing-Improving Quality. WoodheadPublishing Ltd., Cambridge, England.
8. NIIR Board of Consultants & Engineers. 2005. Preservation of Meat and Poultry. Asia Pacific BusinessPress, Inc., Delhi.
9. Annual report. Department of Animal Husbandry and Dairying Ministry of Fisheries, Animal Husbandryand Dairying Government of India. Latest issues
10. <https://gfi.org/science/the-science-of-cultivated-meat/>
11. Kyriakopoulou, K., Dekkers, B., & van der Goot, A. J. (2019). Plant-based meat analogues.In *Sustainable meat production and processing* (pp. 103-126). Academic Press.
12. Tziva, M., Negro, S. O., Kalfagianni, A., & Hekkert, M. P. (2020). Understanding the protein transition: The rise of plant-based meat substitutes. *Environmental Innovation and Societal Transitions*, 35, 217- 231.
13. Stephens, N., Di Silvio, L., Dunsford, I., Ellis, M., Glencross, A., & Sexton, A. (2018). Bringing cultured meat to market: Technical, socio-political, and regulatory challenges in cellular agriculture. *Trends in food science & technology*, 78, 155–166. <https://doi.org/10.1016/j.tifs.2018.04.010>

### **FS-417                      Pulses and Oilseeds: Processing and Technology                      3(2+1)**

#### **Objectives**

- This course will impart knowledge to the students on Legume and Oil Seed Processing.
- By the end of the course students will be able to develop good expertise on the technical aspects of dhal milling, oil milling and various legumes and oil seeds-based product preparations.

## Theory

S. No.	Title	No. of Lectures
1.	Food uses of major pulses- Bengal gram, green gram, black gram, red gram, lentils etc.	4
2.	Primary processing of pulses- Cleaning, drying, storage, control of storage pests. Secondary processing methods-Dehulling, small scale processing, large scale processing.	4
3.	Traditional dal mills and modern dal mills, nutrient losses during processing.	2
4.	Processing methods of pulses like soaking, germination, cooking, fermentation etc.	4
5.	Major oilseeds produced in India and their utility groundnut, rapeseed/mustard, soybean, sesame seed, sunflower, safflower, cottonseed, linseed, castor.	3
6.	Pre-treatments and oil extraction from different oilseeds.	4
7.	Refining, bleaching, deodorization, hydrogenation processes of edible oils Anti-nutritional factors and toxic constituents of pulses and oilseeds.	4
8.	Technology of production of oilseed meals/flours, protein concentrates and isolates of pulses and oilseeds and their utilization.	4
9.	By product utilization of pulses and oilseeds.	3
	<b>Total</b>	<b>32</b>

## Practical

S. No.	Title	No. of Practicals
1.	Market survey of pulse and oilseed-based snack foods	2
2.	Preparation of pulses and oilseed-based snack foods.	2
3.	Demonstrations on soaking, dehulling, germination, fermentation methods Analysis of antinutrients- Phytic acid, saponins, trypsin inhibitors etc.	4
4.	Preparation of snacks based on pulses and oilseeds.	2
5.	Preparation of recipes based on germinated and fermented pulses.	4
6.	Visit to traditional dal mills, modern dal mills, oil mills to expose students to dal milling operations and oil extraction operations.	2
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Chakraverty. A. 1995. Post-harvest technology of cereals, pulses and oilseeds, 3<sup>rd</sup> Ed. Oxford and IBH publishing co., Pvt. Ltd.
2. Vijaya Khader, 2001, Textbook of Food Science and Technology, Indian Council of Agricultural Research, New Delhi.
3. Kalia, M. and Sood, S. (2010). Food Preservation and Processing. Revised Edition, Kalyani Publishers, New Delhi.
4. Raghuvanshi, R.S. and Bisht, K. 2010. Uses of Soybean: Products and Preparation. Guriqbal Singh (Ed.). In: Soybean: Botany, Production and Uses, CAB International, U.K.
5. Raghuvanshi, R.S. and Singh, D.P. 2009. Food preparations and use. William Erskina *et al.* (Eds.). In: The Lentil: Botany Production and Uses. CAB International, U.K.
6. Agricultural Statistics at a Glance. 2021. Ministry of Agriculture & Farmers Welfare Department of Agriculture & Farmers Welfare Directorate of Economics & Statistics goi.<http://www.fao.org>
7. <http://ecoursesonline.iasri.res.in/mod/resource/view.php?id=5933>
8. [https://agritech.tnau.ac.in/postharvest/pht\\_pulses\\_processing.html#:~:text=Processing](https://agritech.tnau.ac.in/postharvest/pht_pulses_processing.html#:~:text=Processing)  
A%20Processing%20of%20pulses%20is,of%20preparing%20pulses%20for%20consumption.

### FS-418

### Sensory Evaluation of Foods

2(1+1)

#### Objectives

- This course introduces the methodology used in sensory evaluation of food product.
- Students will be exposed to the ability of humans to use their senses to evaluate the quality attributes of food product using sensory evaluation methods such as analytical and effective methods.
- This course will also cover the use of relevant statistics in analyzing sensorial evaluation data.

#### Theory

S. No.	Title	No. of Lectures
1.	Sensory quality evaluation - introduction, method, sensory panel;	2
2.	physiological and psychological foundations of sensory evaluation	2
3.	Principles of good practice: the sensory testing environment, test protocol considerations, Factors influencing sensory measurements	2

S. No.	Title	No. of Lectures
4.	Basic principles: Senses and sensory perception, Physiology of sensory organs, Sensory and instrumental analysis in quality control	2
5.	Sensory attributes of foods and beverages and their perceptions, appearance, flavor, taste, aroma, texture/mouthfeel	2
6.	trigeminal sensations, Sensory evaluation methodology, threshold measurements, difference tests, scaling procedures, descriptive analytical methods, consumer tests, Instrumental measurements, color texture, flavor, Correlation of sensory and instrumental measures	2
7.	Applications of sensory tests for quality assurance product development product optimization marketing	2
8.	Objective methods of evaluation. Relationship between objective and subjective methods.	2
	<b>Total</b>	<b>16</b>

### Practical

S. No.	Title	No. of Practicals
1.	Determination of threshold value for basic tastes and odor	3
2.	Odor recognition, difference (PC, Duo trio, triangle)	3
3.	Selection of judging panel; Training of judges for recognition of certain common flavor and texture defects using different types of sensory tests	3
4.	Descriptive analysis methodology; Texture profile methodology;	2
5.	Sensory evaluation of various food products using different scales, score cards and tests Estimation of color	3
6.	Designing a sensory laboratory	2
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Amerine, M.A., Pangborn, R.M. and Rossles, E.B. 1965. Principles of Sensory Evaluation of Food. Academic Press, London.
2. Early, R. 1995. Guide to Quality Management Systems for Food Industries. Blackie Academic.
3. Lawless, H.T. and Klein, B.P. 1991. Sensory Science Theory and Applications in Foods. Marcel Dekkery Macrae, R., Rolonson Roles and Sadlu, M.J. 1994. Encyclopedia of Food Science & Technology & Nutrition. Vol. XI. Academic Press.

4. Maslowitz, H. 2000. Applied Sensory Analysis of Foods. Vols. I, II. CRC Press, Boca Raton, FL, USA.
5. Rai, S.C. and Bhatia, V.K. 1988. Sensory Evaluation of Agricultural Products. Indian Agricultural Statistics Research Institute (ICAR), New Delhi.
6. Harry, T. Lawless, Hildegard Heymann. 2010. Sensory Evaluation of Food: Principles and Practices. 2nd Ed., Springer, New York or Dordrecht Heidelberg, London.

## **ELECTIVE - 3**

### **Institutional Food Service Management**

**FND-211**

**Principles of Human Nutrition**

**3(2+1)**

#### **Objective**

At the end of the course, the student will have knowledge of

- Different types of carbohydrates, lipids and fatty acids and proteins and amino acids required for human nutrition.
- The energy requirement and expenditure in the human body during rest and physical activity.
- The physiological and biochemical role of water, minerals and vitamins and their metabolism in the human body.
- The diseases and symptoms resulting from deficiency of major and minor nutrients.
- The biochemical monitors used to assess the nutritional status of different nutrients.

#### **Theory**

<b>S.No.</b>	<b>Topic</b>	<b>No .of Lectures</b>
1.	Historical development and the relationship of nutrition to health, growth and human welfare.	1
2.	Definitions of terms used in nutrition- Recommended dietary allowances, balanced diet, health foods, functional foods, phytochemicals, Nutraceuticals, dietary supplements, ethnic foods, organic foods, fabricated foods, extruded foods, convenience foods, junk foods, GM foods and proprietary foods.	3
3.	Food groups (Four, Five, Seven, Nine, Eleven)	1
	Food pyramid, my plate concept, Bioavailability, enrichment, fortification and restoration of nutrients.	1



S.No.	Topic	No .of Lectures
4.	Energy units, sources and requirements, fuel value of foods, Methods of measuring energy value of food, energy requirement of body, physical activity and thermogenic effect of food, Respiratory Quotient, SDA BMR- methods of measurement, factors affecting BMR Energy expenditure in different activities, Energy balance.	1 2 1 2
5.	Carbohydrates- Types, functions, sources, requirement, Digestion and absorption of carbohydrates, health conditions affected by carbohydrates Dietary Fiber-Classification,sources, composition, properties & nutritional significance	2 1
6.	Lipids- Types, functions, sources, requirement,Digestion and absorption of lipids health problems associated with lipids.	3
7.	Proteins- Types, functions, sources, requirement, Digestion and absorption of proteins, Quality evaluation, improvement and deficiency and protein energy malnutrition.	2 2
8.	Vitamins- Classification, functions, sources, requirement, deficiency and toxicity of fat soluble-(A, D, E, K) Water soluble – C, B Complex (thiamine, riboflavin, niacin, B6, Pantothenic acid, B12 and folic acid).	2 2
9.	Minerals-Classification, functions, sources, requirements, deficiency and toxicity of calcium, phosphorus, iodine, fluorine, iron, sodium, potassium, chloride, copper and zinc, Factors affecting bio availability of calcium and iron and other minerals.	3 1
10.	Water- functions, sources, distribution in body Water balance and electrolyte balance	1 1
	<b>Total</b>	<b>32</b>

### Practical

S.No.	Experiment	No .of practicals
1.	Serving size of common dishes	2
2.	a .Planning and preparation of nutrient rich dishes :protein, calcium, iron, vitamin A, thiamine, riboflavin, niacin and ascorbic acid. b.(calculate calorie and cost of dishes prepared for above nutrients	6
3.	Evaluation of three days energy balance	2

S.No.	Experiment	No .of practicals
4.	Planning and preparation of dishes based on simple processing techniques to improve bioavailability of nutrients.	
	Germination	1
	Fermentation	1
	Mutual supplementation	1
	Malting and others	1
5.	Planning and preparation of low cost nutritious recipes	1
6.	Study of common deficiency diseases through audio visual aids	1
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Mogra, R. and Joshi, P. (2023), Principles of Human Nutrition, 1<sup>st</sup> Edition, Agrotech Publishing Academy, Udaipur.
2. Agrawal, A. and Udipi, A.S. 2022. Textbook of Human Nutrition. Jaypee Brothers Medical Publishers.
3. Recommended dietary allowances and estimated average requirements nutrient requirements for Indians – 2020- A Report of the Expert Group Indian Council of Medical Research, National Institute of Nutrition
4. Raghuvanshi, R. S., Mittal, M. 2014. Food Nutrition and Diet Therapy. India: Westville Publishing House New Delhi.
5. Bamji, M.S., Krishnaswamy, K. and Brahman, G.N.V. 2009. Text book of Human Nutrition. Oxford & IBH Publishing Company Pvt. Ltd.
6. Sehgal, S. and Raghuvanshi, R.S. 2007. Text Book of Community Nutrition. ICAR Publication.
7. Wilson, E.D.; Fisher, K.H. and Garcia P.A. 1980. Principles of Nutrition. John Wiley & Sons, New York.
8. Longvah, T., Ananthan, R., Bhaskarachary, K. and Venkaiah, K. 2017. Indian Food Composition Tables. National Institute of Nutrition, ICMR, New Delhi
9. Shakuntala Manay N, Shadaksharaswamy M. 1998. Foods, Facts and Principles, New Age International Publishers, New Delhi.

**Objectives**

- This course is designed to introduce students to the field of food science.
- This course will include; possible jobs, food harvest, production methods, food chemistry, preserving methods, meeting nutritional needs, grading procedures used and the science involved.
- Understand both fundamental and applied aspects of food science.
- Provides for fundamental understanding of food chemistry, and food microbiology.
- Gain insights about role of specific nutrients in maintaining health and identifying nutrient specific foods.

**Theory**

<b>S.No.</b>	<b>Topic</b>	<b>No .of Lectures</b>
1.	Cooking- Objectives, cooking methods, their types, merits and demerits.	2
2.	Cereals and millets - Structure, composition, processing techniques, effect of heat and acid, functions of starch in the cookery, retrogradation of starch.	3
3.	Legumes, nuts and oil seeds - Composition, processing techniques, effect of heat, acid and alkali.	3
4.	Fruits and vegetables - Types, composition, pigments, changes caused by heat, acid and alkali.	3
5.	Milk and milk products – Composition, types, products, effect of acid on milk cookery, uses and functions.	3
6.	Egg - Structure, composition, grading of egg, function and changes during cooking.	3
7.	Meat, poultry and fish- Types, structure, composition, pigments, factors affecting tenderness, post-mortem changes and changes during cooking.	3
8.	Sugars- Types, composition, manufacturing process, Effect of heat and acid, crystallization factors affecting crystallization, functions of sugar in cookery, fondants and fudge.	2 2
9.	Fats and oils - kinds, composition, effect of heat, functions in cookery, processing techniques, Rancidity of fats;	3 1
10.	Methods of improving nutritive value of foods – germination, fermentation, malting, mutual supplementation etc.	2
11.	Brief overview of beverages; Condiments and spices, importance in daily life.	2
	<b>Total</b>	<b>32</b>

## Practical

S.No.	Experiment	No .of Practical's
1.	Orientation to kitchen equipment and their uses,	1
2.	Weighing and measuring food items, condiments and spices.	1
3.	Cooking of foods using different methods.	1
4.	Cereal cookery– Practical exercise on dextrinization and gelatinization of rice starch, gluten formation in wheat.	1
5.	Legumes – Identification and cooking methods.	1
6.	Nuts and oilseeds- Use in food preparations. Preparations using Germination, fermentation, mutual supplementation.	1
7.	Vegetable cookery- Different preparations with vegetables and effect of heat and alkali on pigments.	2
8.	Preparation of soups, salads and beverages.	1
9.	Milk and milk products- Maillard reaction, Use in various preparations.	1
10.	Egg cookery - Preparations showing functions of egg as binding, coating agent: poached egg, boiled egg, scrambled egg, omelet, egg curry.	1
11.	Meat, poultry and fish cookery – Preparations involving various methods of cooking.	1
12.	Sugar – Preparations showing functions of sugar in cooker- caramelization, coating agent, crystallization, syrups of different consistencies, sweets, chocolates, candies.	2
13.	Fats and oils – Demonstration of smoking point, use in various preparations like deep fat frying, shallow fat frying, shortening effects of oil, factors affecting absorption of oil.	2
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Sharma, A. 2017. Textbook of Food Science and Technology. CBS Publication.
2. Fox, B. F. and Cameron, A. G. 1970. Food Science - a Chemical Approach. University Press, London.
3. Swaminathan, M. 1988. Handbook of Food Science and Experimental Foods BAPPCO, Bangalore.
4. Raghuvanshi, R.S. and Bisht, K. 2010. Uses of Soybean: Products and Preparation. Guriqbal Singh(Ed.). *In: Soybean: Botany, Production and Uses*, CAB International, U.K.
5. Raghuvanshi, R.S. and Singh, D.P. 2009. Food preparations and use. William Erskina *et al.* (Eds.). *In: The Lentil: Botany Production and Uses*. CAB International, U.K.
6. Shakuntala Manay N, Shadaksharaswamy M. 1998. Foods, Facts and Principles, New AgeInternational Publishers, New Delhi.

**Objectives**

- To gain a understanding of the psychological factors that influence food choices, eating behaviors, and our relationship with food.
- To explore the impact of sensory experiences (taste, smell, sight, touch) on food perception and preference.
- To examine the psychology behind food marketing and advertising strategies.
- To develop practical strategies to cultivate a mindful and healthy relationship with food.

**Theory**

<b>S.No.</b>	<b>Topic</b>	<b>No .of Lectures</b>
1.	Introduction to food psychology, Interaction of hunger and satiety, Sensory perception and food preferences.	2 2 2
2.	Role of positive and negative emotions on selection/ choice of food eating behavior.	3
3.	Meal composition and effect of specific nutrients on stress/ mood, Understanding and managing cravings, Anorexia nervosa.	2 1 1
4.	Binge eating behaviour, Mindful eating practices, Social cues and dinner environment.	1 1 2
5.	Psychological influence of food marketing and advertisement, digital food marketing.	3
6.	Public health challenge, Cultural food tradition and practices, Food and mental well being	2 2 2
7.	Application of food psychology, Overeating, Disordered eating and body image concerns	1 1 2
8.	Strategies for individual and community health.	2
	<b>Total</b>	<b>32</b>

## Suggested Readings

1. "Food: A Guide to Understanding Eating Behavior" by Jane Ogden (2017)
2. "The Psychology of Food" by Paul Rozin (2017)
3. "Food, Culture, and Society: A Reader" by Carole Counihan and Penny Van Esterik (2018)
4. "The Oxford Handbook of Food and Foodways" edited by Jeffrey M. Pilcher (2017)
5. "Food Choice, Acceptance and Consumption" by H. L. Meiselman (2018)
6. "The Psychology of Eating: From Healthy to Disordered Behavior" by Jane Ogden (2018)
7. "Food and Emotions" by Alexandra Watkins and David A. Booth (2017)
8. "The Food Psychology Handbook" by Brian Wansink (2019)
9. "Mindless Eating: Why We Eat More Than We Think" by Brian Wansink (2016)
10. "Slim by Design: Mindless Eating Solutions for Everyday Life" by Brian Wansink (2014)

## FND-221

## Normal Nutrition and Meal Planning

3 (2+1)

### Objectives

- To acquire basic knowledge of nutrient requirements, recommended dietary allowances, and dietary modification under different physiological conditions and disease conditions.
- To develop practical skills in planning and management of diets for the different age groups under normal/ physiological conditions keeping in mind the dietary guidelines and to modify the diet plans to suit the disease conditions

### Theory

S. No.	Topic	No. of lectures
1.	Determination of nutritional requirements- Basic principles of menu planning, factors affecting planning menus for individual and family. Steps involved in meal planning.	1
2.	Concept of calorie consumption unit. Factors (physiological and psychological) affecting food requirements of individuals, families and different groups of people.	2
3.	Classification of vegetarianism. Importance of balanced diets. Food exchange list. Use of food exchangelist in diet planning. Introduction to normal nutrition- Food, nutrient requirement and menu planning of adults (male and female of all activities level), pregnant women, lactating women, Infants. Breast feeding, advantages of breast feeding, breast feeding during illness, feeding of pre-term baby, feeding problems	3

S. No.	Topic	No. of lectures
4.	Weaning and complementary feeding. Food and nutrient requirement of pre-school children, school age children, adolescents, old age people Physiological and psychological changes during old age.	3
5.	Introduction to therapeutic nutrition- Definition of therapeutic nutrition/ Diet therapy, objectives of therapeutic diet. Principles of diet therapy and Importance and modification of normal diet to therapeutic diets. Routine Hospital Diet-clear liquid diet, liquid diet, semi-solid diet, soft diet, normal diet, bland diet, high and low calorie diet, high and low protein diet, high and low fiber diet, low cholesterol diet etc	3
6.	Therapeutic adaption- change in consistency, change in energy intake, change in nutrient, change in fiber, change in frequency of feeding, change in elimination of food	3
7.	Methods of feeding- enteral feeding, parenteral feeding, advantages and disadvantages of these methods	2
8.	Aetiology, symptoms and dietary management in acute and chronic fevers. Typhoid, influenza, tuberculosis. Viral and auto immune diseases-causes, symptoms and diet management. Allergy – causes, symptoms and diet management.	2
9.	etiology, symptoms and dietary management in gastrointestinal disorders- Diarrhoea, constipation, peptic ulcer, diverticular disease, inflammatory bowel disease, celiac disease, lactose intolerance etc. and other disorders	3
10.	Aetiology, symptoms and dietary management in liver diseases- fatty liver, hepatitis, jaundice, cirrhosis of liver.	2
11.	Aetiology, symptoms and dietary management in cardiovascular disease, atherosclerosis and hypertension.	2
12.	Aetiology, symptoms and dietary management in diabetes mellitus. Aetiology, symptoms and dietary management in overweight and obesity and underweight.	2
13.	Aetiology, symptoms and dietary management in renal disease- nephritis, nephrotic syndrome acute renal failure, chronic renal failure etc	2
14.	Aetiology, symptoms and dietary management in cancer.	2
	<b>Total</b>	<b>32</b>

## Practical

S.No.	Topic	No. of lectures
1.	Standardization of serving size portions	3
2.	Planning, preparation and calculation of diets for different age groups- Infancy, preschool age, school age, Adolescent, adult, old age	3 3
3.	Planning, preparation and calculation of diets for pregnant and lactating women.	2
4.	Planning, preparation and calculation of packed lunches, clear liquid diet, full fluid diet, soft diet, tube feeding diet, high calorie/ fiber diet etc.	2
5.	Planning, preparation and calculation of diets for following diseased condition- diarrhea, constipation, peptic ulcer, hepatitis, hypertension, atherosclerosis, diabetes, mellitus, overweight/ obesity.	3
	<b>Total</b>	<b>16</b>

## Suggested Readings

1. Raghuvanshi, R.S. and Mittal, M. (2014). Food Nutrition and Diet Therapy. Westvills Publication Delhi.
2. Agarwal, A and Udipi, S. (2014). Text Book of Human Nutrition. Jaypee Medical Publication Delhi.
3. Antia, p. (1986). Clinical dietetics and nutrition. Oxford univ. Bombay
4. Srilakshmi, B. (1995). Dietetics. Newage international publishers, New Delhi.
5. Agarwal, A and Udipi, S. (2014). Text Book of Human Nutrition. Jaypee Medical Publication Delhi.
6. Antia, p. (1986). Clinical dietetics and nutrition. Oxford univ. Bombay
7. Srilakshmi, B. (1995). Dietetics. Newage international publishers, New Delhi.

## FND-224

## Food Standards and Quality Control

3(2+1)

### Objectives

- To develop qualified and competent human resource in the field of the food standards and quality management for regulators, industry, academic/research institutions, certifying and accreditation bodies, food trade, food testing and training
- To delve in depth on various aspects of food standards and quality management i.e. food standards, harmonization with global benchmarks, quality management systems, food analysis, instrumentation, risk analysis /management, traceability and auditing to transform the food ecosystem



- To nurture a positive and disciplined food standard and quality culture among the professionals
- To conduct research studies on emerging food standard issues and formulation of science based regulatory framework.

### Theory

S.No.	Topic	No. of Lectures
1.	Importance of food quality control and assurance.	2
2.	Food additives, preservatives, coloring agents, antioxidants, emulsifying agents, leavening agents and stabilizing agents.	3
3.	Food Standards and Regulations in India: FSSAI, Prevention of Food Adulteration Act, Fruit Product Order, AGMARK, Essential Commodity Act, Consumer Protection Act, Bureau of Indian Standards, Codex Standards, Food and Drug Administration (FDA)	3 3
4.	Various methods for the assessment of quality of different foods	3
5.	Food safety management systems-GMP/GHP, HACCP, GLP, GAP, The Kosher and Halal Food Laws.	3
6.	Food packaging, packaging material	3
7.	Adulteration, Food adulteration – common adulterants – health hazards, heavy metals. Tests to detect adulterants in food.	3
8.	Quality criteria of foods – food grains, fruits, vegetables and animal foods	3
9.	Quality criteria of processed foods. Physical, chemical and microbial contamination of foods	3
10.	Pesticides- Mechanisms of Toxicity-Residues in Food, Acceptable daily limits	3
	<b>Total</b>	<b>32</b>

### Practical

S.No.	Topic	No. of Lectures
1.	Sensory and nutritional evaluation of some finished products.	2
2.	Detection of adulterants and preservatives in products	1
3.	Identification of critical control points in a product line	1
4.	Sensory evaluation of different food samples	2
5.	Visit to quality control laboratory/food processing industries and note the procedures and parameters used for quality assessment.	2

S.No.	Topic	No. of Lectures
6.	Estimation of quality parameters- cereals, pulses, fruits and veg.	2
7.	Market survey and quality analysis of street foods	1
8.	Evaluation of food quality – objective and subjective methods	2
9.	Market survey and quality analysis of street foods -	1
10.	Study of food labelling	1
11.	Identification of food logos.	1
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Potter, N.N. 1996. Food Science. The AVI Publishing Company Inc., Westport, Connecticut.
2. Jellinek, G. 1985. Sensory Evaluation of Foods: Theory and Practice. Ellis Horwood Ltd. Chichester, England.
3. Manual of Food Standards and Quality Control. 2014. Dept. of Foods and Nutrition, CCS HAU, Hisar.
4. Detect Adulteration with Rapid Test (DART) booklet fssai <https://www.fssai.gov.in/flipbook.php?bookid=201#book2/7>
5. Radonit Lassztity. 2008. Food Quality and Standards. Encyclopedia of Life effort systems. USA.
6. Patricia and Cuuring A. An operational Text book, guide to Food Laws and Regulations.
7. Food Safety and Standards (Food Products Standards and Food Additives) Regulation, 2011.
8. Kalia, M. and Sood, S. 2010. Food Preservation and Processing. Revised edn. Kalyani Publishers, New Delhi

## **FS-411                                      Food Processing and Packaging                                      4(3+1)**

### Objectives

- To impart knowledge of various areas related to food processing and packaging.
- To enable the students to understand food composition and its physic chemical, nutritional, microbiological and sensory aspects.

## Theory

S.No.	Topic	No .of Lectures
1.	Food processing and preservation techniques for cereals, milk, fruits and vegetables, oil seeds, meat, fish and poultry and their impact on physical and chemical characteristics.	3 3 3 3 3 3
2.	Physico-chemical characteristics, nutritional quality and shelf-life studies.	3 3 3
3.	Factors effecting quality of processed foods.	3
4.	Food packaging, package functions, requirement and packaging materials.	3 3
5.	Principles in the development of protective packaging.	3
6.	Laws related to packaging.	3
7.	Shelf-life of packed food, special problems in packaging of foodstuffs.	3 3
	<b>Total</b>	<b>48</b>

## Practical

S.No.	Experiment	No .of practicals
1.	Market survey for packaged processed food stuffs.	3
2.	Cereal cookery. Preparations showing dextrinization and gelatinization, gluten formation and influence factors.	2 2
3.	Vegetable cookery: effect of heat and alkali on pigment, preparation of soups, salads and beverages.	1 2 1 1
4.	Use of milk and milk products and egg in various preparations.	2
5.	Estimation of shelf- life of packaged food stuffs.	2
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Potter, N.N. (1996). Food science. The AVI Publishing Company, Inc., Westport, Connecticut.
2. Kalia, M. and Sood, S. (2010). Food preservation and processing. Revised edition, Kalyani Publishers, New Delhi.
3. Srilakshmi, B. (2010). Food science (Fifth ed.) New Age International Pvt. Limited Pub., New Delhi.
4. Frank, A., and Paine, H.Y. (2003). A Handbook of food packaging. Springer science and business Media, U.K.

### IFSM-413

### Event Management

3(0+3)

#### Objectives

The course will enable the students to:

- Be aware of event management as a profession.
- Gain basic knowledge about establishing and managing an event.
- Understand and develop soft skills that would help in event management

#### Practical

S. No.	Topic	No. of Practicals
1.	Identifying practical situations for event management, conceptualizing goal and objectives, Overall show management.	3 2
2.	Exhibit sales and promotion.	3
3.	Festivals (diwali, religious ceremonies). Social gathering. Food fair/Conference/ workshop/seminar/congress programming	2 2
4.	SWOT analysis of event	3
5.	Portfolio preparation; Presentation and projection for work.	3 3
6.	Project report on visit to different types of organizational settings like hotel, guest house, hostel, small offices, clubs, fast food centres for management and organization of events	3 3
7.	Project planning. Programme planning and execution.	3
8.	Project development. Event accountancy. Event communication and sponsorship.	3 3
9.	Event marketing and advertising.	3

S. No.	Topic	No. of Practicals
10.	Live event management	3
11.	Visit to different organizations/hotels etc.	3
12.	Project preparation and report presentation.	3
	<b>Total</b>	<b>48</b>

### Suggested Readings

1. Aditya, Suvarna. (2003). Event Management Development Institute. I.E.S. Management College. 4th Floor, 791, S.K.Marg, Opp. Lilavati Hospital, Bandra (W), Mumbai - 400 050.
2. Kit, Potions, H.P. Bhuson. (1998). Festival and Special Event Management. IBM Cooperation, 60Renfrew Drive, Suite 105, Markham, Ontario, Canada L3R0E1.
3. National Institute of Event Management. Ground Floor, Nandavan Building, Corner of Vallabhbhai Road and Ansari Road, Vile Parle (W), Mumbai.
4. Sulekha, Narayna. (2001). International Institute of Event Management. SNDT Women's University, Juhu Campus, Juhu Tara Road, Santacruz (W), Mumbai - 400 049.
5. Anukrati Sharma, Shruti Arora. 2018. Event Management and Marketing: Theory, Practical Approaches and Planning (English, Paperback)

## IFSM-415

## Ergonomics in Food Service

2(2+0)

### Objectives

- To identify the current problems related to ergonomic in food production process,
- To understand and analyze the actual production data by using Rapid Upper Limb Assessment (RULA) and Rapid Entire Body Assessment (REBA)
- To recommend the ergonomic workplace environment based on the condition of the study.

### Theory

S. No.	Title	No. of Lectures
1.	Introduction to Ergonomics, principles, domains significance and applications	2
2.	Functional design, Facility design, Work zones	2
3.	Work flow and travel distance, Work triangle	2
4.	Managing central kitchens, Kitchen layout, kitchen storage, kitchen planning, kitchen forms	2

S. No.	Title	No. of Lectures
5.	Equipment selection and cart selection maintenance	2
6.	Material selection and placement	2
7.	Managing human resource issues, Operational issues, food safety and hygiene and service ware	2
8.	Ergonomics for Waiter staff, Cooks, food preparation workers, dishwashers	2
9.	Musculoskeletal disorders – meaning, causative factors	2
10.	Common MSD in food industry-	2
11.	Awkward posture, repetition, force.	2
12.	Ergonomic injury signs, symptoms and reporting.	2
13.	Ergonomic Risk	2
14.	Factors and safety Trends in accidents, Task Specific Ergonomics.	2
15.	Safety Responsibilities, Safety Responsibilities of Employers, Employees and Health Care Providers	2
16.	Ergonomics Solutions & Stress-Engineering Improvements Administrative Improvements and Personal Protective Equipment	2
	<b>Total</b>	<b>32</b>

### Suggested Readings

1. Brudger, R. S. (2003) Introduction to Ergonomics, Taylor and Francis London
2. Grandjean, E. (2000) Fitting the Task to the Man, Taylor and Francis, London
3. California Department of Industrial Relations (2003) Ergonomics in Action: A Guide to Best Practices for the Food-Processing Industry, OSHA.
4. Dan Macleod (2006) The Ergonomics Kit. (Second Edition). Taylor and Francis, London.
5. <https://www.tdi.texas.gov/pubs/videoresource/fsergofood.pdf>

## **FS-418                                      Sensory Evaluation of Foods                                      2(1+1)**

### Objectives

- This course introduces the methodology used in sensory evaluation of food product.
- Students will be exposed to the ability of humans to use their senses to evaluate the quality attributes of food product using sensory evaluation methods such as analytical and effective methods.
- This course will also cover the use of relevant statistics in analyzing sensorial evaluation data.

## Theory

S. No.	Title	No. of Lectures
1.	Sensory quality evaluation - introduction, method, sensory panel;	2
2.	physiological and psychological foundations of sensory evaluation	2
3.	Principles of good practice: the sensory testing environment, test protocol considerations, Factors influencing sensory measurements	2
4.	Basic principles: Senses and sensory perception, Physiology of sensory organs, Sensory and instrumental analysis in quality control	2
5.	Sensory attributes of foods and beverages and their perceptions, appearance, flavor, taste, aroma, texture/mouthfeel	2
6.	trigeminal sensations, Sensory evaluation methodology, threshold measurements, difference tests, scaling procedures, descriptive analytical methods, consumer tests, Instrumental measurements, color texture, flavor, Correlation of sensory and instrumental measures	2
7.	Applications of sensory tests for quality assurance product development product optimization marketing	2
8.	Objective methods of evaluation. Relationship between objective and subjective methods.	2
	<b>Total</b>	<b>16</b>

## Practical

S. No.	Title	No. of Practicals
1.	Determination of threshold value for basic tastes and odor	3
2.	Odor recognition, difference (PC, Duo trio, triangle)	3
3.	Selection of judging panel; Training of judges for recognition of certain common flavor and texture defects using different types of sensory tests	3
4.	Descriptive analysis methodology; Texture profile methodology;	2
5.	Sensory evaluation of various food products using different scales, score cards and tests Estimation of color	3
6.	Designing a sensory laboratory	2
	<b>Total</b>	<b>16</b>

### Suggested Readings

1. Amerine, M.A., Pangborn, R.M. and Rossles, E.B. 1965. Principles of Sensory Evaluation of Food. Academic Press, London.
2. Early, R. 1995. Guide to Quality Management Systems for Food Industries. Blackie Academic.
3. Lawless, H.T. and Klein, B.P. 1991. Sensory Science Theory and Applications in Foods. Marcel Dekker. y Macrae, R., Rolonson Roles and Sadlu, M.J. 1994. Encyclopedia of Food Science & Technology & Nutrition. Vol. XI. Academic Press.
4. Maslowitz, H. 2000. Applied Sensory Analysis of Foods. Vols. I, II. CRC Press, Boca Raton, FL, USA.
5. Rai, S.C. and Bhatia, V.K. 1988. Sensory Evaluation of Agricultural Products. Indian Agricultural Statistics Research Institute (ICAR), New Delhi.
6. Harry, T. Lawless, Hildegard Heymann. 2010. Sensory Evaluation of Food: Principles and Practices. 2nd Ed., Springer, New York or Dordrecht Heidelberg, London.

### IFSM-418

### Print and Electronic Media

**3(0+3)**

#### Objectives

- To develop the learner into competent and efficient in the field of reporting news, processing and program production in the field of media.
- The Subject is designed to make the students learn about script, interviews techniques, phone-ins, panel discussion, voice over, live shows and field reporting.

#### Practical

S. No.	Title	No. od Practical
1.	Visit to print and electronic stations for familiarization with equipment's.	2
2.	Interaction with personnel of print and electronic media.	2
3.	Report writing on observations and presentation.	2
4.	Planning a press note/ press release for print media	2
5.	Screening of radio news programmes	3
6.	Screening of TV news programmes	3
7.	Exercises on writing different types of reports for radio.	3



S. No.	Title	No. of Practical
8.	Exercises on writing different types of reports - television formats	3
9.	Hands-on experience with editing.	3
10.	Planning a press note/ press release for electronic media	3
11.	Writing and presentation of radio and television news	3
12.	Orientation to photography/videography and its equipment.	3
13.	Hands on training with different types of professional cameras	3
14.	Writing captions for photographs.	3
15.	Writing and editing photo features for selected photographs and presentation.	2
16.	Familiarization with different online articles.	2
17.	Content creation for online journal.	2
18.	Creating a blog, awareness videos.	3
19.	Using social media channels such as Facebook/Instagram/LinkedIn/Twitter/WhatsApp, to create nutrition related post.	1
	<b>Total</b>	<b>48</b>

### Suggested Readings

1. Kumar A. (1999). The Electronic Media. Anmol Publications, New Delhi.
2. Bhatt, S.C. (1993) Broadcast Journalism. Basic Principles Har Anand Publications, Delhi
3. Bhatnagar, R. (2001). Print Media and Broadcast Journalism. Indian Publisher Distributors, Delhi
4. Katyal, V.P (2007). Fundamentals of Media Ethics. Cyber Tech Publishers, New Delhi.
5. Fernández-Celemín, L., & Jung, A. (2006). What should be the role of the media in nutrition communication? British Journal of Nutrition, 96(S1), S86-S88. doi:10.1079/BJN20061707
6. <http://hosbeg.com.printmedia.an>
7. <https://www.vskills.in/certification>
8. <https://www.nyfaedu.printjournal>.

## Skill Enhancement Courses

**SEC-FND-111**

**Jam Jelly Preparation**

**2 (0+2)**

### Objectives

- Students will learn to develop basic skills of preparation of Jam and jellies. This will build confidence among students to start new venture.
- To impart knowledge of various types of preparations of jam and jellies.
- To enable the students to develop skill of preparing jam and jellies.

### Practical

S. No.	Course outline	No. of Practical's
1.	Nutritional aspect of Fruits; Basic characteristics of jams, jellies, marmalades, fruit preserves, glazed and crystallized fruits.	2
2.	Role of sugar and other ingredients in fruit preservation. Introduction to various food additives used in jams, jellies and other fruit preserves	3 2
3.	Basic tools and equipment used in the preparation of jams, jellies and crystallized fruits such as pulper, sealers, juice extracting machines, autoclaves, steam jacketed kettle, etc.	3
4.	Introduction to different types of packaging materials used. Identification of different types of spoilage occurring in fruits; Selection and grading of raw and ripe fruits for preservation.	3 2
5.	Preparation of Jam, jelly and marmalades - ripe mango, green mango, pineapple, apple, guava, orange, mixed fruits, etc.	3
6.	Preparation of glazed and crystallized fruit preserves- ginger, orange, apple, etc.	3
7.	Analysis of the raw material and finished product - Pectin grade, Acidity of fruit juice and pickle, Total Solid content, Brix measurement, Moisture content, Ash content, reducing and non-reducing sugar content.	3 2
8.	Study on the shelf life of the finished product.; Basics of labeling, packaging and presentation of sweets	3
9.	Waste Management and up keeping of work place	3
	<b>Total</b>	<b>32</b>

**SEC-FND-112****Cake Making****2 (0+2)****Objectives**

- Students will learn to develop basic skills of preparation of cakes. This will build confidence among students to start new venture.
- To impart knowledge of various types of preparations of cakes.
- To enable the students to develop skill of preparing different types of cakes.

**Practical**

S. No.	Course outline	No. of Practical's
1.	Ingredient used in Cake Making Types & Varieties: Flour, Sugar, Shortening – Fats and oil. Egg, Moistening agent, Leavening Agents.	3 3
2.	Cake Making Methods: Sugar butter process, Flour butter process. Genoise method, Blending and rubbing method	3 3
3.	Characteristic of Cakes: External characteristics, Internal Characteristics.	3
4.	Balancing cake formula	3
5.	Cake Faults and remedies	2
6.	Basic Cake Making: Plain Sponge, Madeira Cake, Rock Cake. Fruit Cake, Fatless Sponge, Swiss Rolls, Genoise Sponge.	3 3
7.	Market survey for cake and confectionary food stuffs.	3
8.	Project writing of small-scale bakery and confectionery unit.	3
	<b>Total</b>	<b>32</b>

**SEC-FND-113****Indian Traditional Sweets****2 (0+2)****Objectives**

- Students will learn to develop basic skills of preparation of traditional sweets of India. This will build confidence among students to start new venture in traditional Indian sweets.
- To impart knowledge of various types of traditional Indian sweets.
- To enable the students to develop skill of preparing traditional sweets of India.

## Practical

S. No.	Course outline	No. of Practical's
1.	Basic ingredients and their role in preparation different types of traditional sweets	2
2.	Basic tools and equipment used in the preparation sweets	2
3.	Stages of Sugar cookery	2
4.	Preparation of Bengali sweets like-Rasogolla, Rajbhog, Rasbhari, Chamcham, Rasmalai, Sandesh Raskadam, Mohanbhog, Kheer Mohan & Channa Toast.	3 3
5.	Preparation of milk and khoya based sweets like- khoa Burfi, chocolate burfi, khoa peda, kesar peda, pista burfi, badaam pista burfi , kesar khoa burfi, kalakand, milk cake, khoa roll, kheer kadam, coconut burfi, meva bati etc.	3 3
6.	Preparation of ghee based sweets -Patisa, Gulab Jamun, Soan Papdi, Gujia, Imarti, Motipak, Balushahi, Laddu	3
7.	Preparation of khaju and dry fruits based sweets like-Kaju Burfi, Kaju Roll, Kaju Laddu, Badam Burfi, Pista Lauj & Anjeer Burfi etc.	3 2
8.	Basics of labeling, packaging and presentation of sweets	3
9.	Waste Management and up keeping of work place	3
	<b>Total</b>	<b>32</b>

**SEC-FND-114**

**Cake Decoration and Icing**

**2 (0+2)**

### Objectives:

- Students will learn to develop basic skills of decorating and icing the cake. This will build confidence among students to start new venture.
- To impart knowledge of various types of preparations of icings.
- To enable the students to develop skill of preparing icings and toppings.

## Practical

S. No.	Course outline	No. of Practical's
1.	Techniques of Icing –ingredients used in icing	2
	Role of ingredients in Icing	2
2.	Tools of icing, preparing	3
	Applying various types of icing	3
3.	Icings and Toppings;	3
	Fondant	2
	American frosting	2
	Butter cream icing.	2
4.	Royal icing;	2
	Gum paste	2
	Marzipan	2
	Marshmallow	2
	Lemon meringue	1
	Fudge	1
	almond paste	1
	Glaze icing	2
Total		32

**SEC-FND-115**

**Pickle Preparation**

**2 (0+2)**

### Objectives

- Students will learn to develop basic skills of preparation of Pickles. This will build confidence among students to start new venture.
- To impart knowledge of various types of preparations of pickles.
- To enable the students to develop skill of preparing pickles.

## Practical

S. No.	Course outline	No. of Practical's
1.	Nutritional aspect of Fruits and vegetables; Basic characteristics of pickles.	2
2.	Role of various ingredients used in fruit and vegetable preservation	2
3.	Introduction to various food additives used in pickle making- Spices and other constituents, condiment. Additives and ingredients, and flavouring, colouring agent and preservative.	3 2
4.	Basic tools and equipment used in the preparation of pickle making such as boilers, choppers, mechanized peelers, sealers, autoclaves, steam jacketed kettle, pickle mixer	3
5.	Introduction to different types of packaging materials used. Identification of different types of spoilage occurring in fruits; Selection and grading of raw and ripe fruits and vegetables for preservation.	2 3
6.	Preparations of different types of pickles from fruits and vegetables- <ul style="list-style-type: none"> <li>Preparation of salty and oily pickle (green mango, green chili, lemon, ginger, mixed type).</li> <li>Preparation of sweet pickle (Mango, plum, papaya, date, mango lather, mixed type etc.</li> </ul>	3 3
7.	Examination of processed products- Examination of processed products- Detection of benzoic acid, sulphur dioxide and KMS in fruits and vegetable products.	3
8.	Cleaning and maintenance of the equipment; Study of containers like Glass, Tin, packaging materials, such as plastic pouches, glass containers, plastic bottle and cartons; Information to be mentioned on label and pack	3
9.	Waste Management and up keeping of work place	2
	<b>Total</b>	<b>32</b>

**Objectives**

- Students will learn to develop basic skills of preparation of candies. This will build confidence among students to start new venture.
- To impart knowledge of various types of preparations of candies.
- To enable the students to develop skill of preparing candies.

**Practical**

S. No.	Course outline	No. of Practical's
1.	Introduction to candy making; Basic ingredients and their role in preparation different types of candies.	2
2.	Basic tools and equipment used in the preparation of candies	1
3.	Stages of Sugar cookery, caramelization of sugar, crystallization of sugar, invert sugar, corn syrup.	2
4.	Preparation of: Ganache- Ganache techniques & uses, -Various types of ganache, how to work with ganache.	3
5.	Piped & Filled Truffles- Making various recipes of ganache used for piped truffles and filled truffles; Tempering chocolate, Slab Ganache, finishing truffles - Tempering white, milk & dark chocolate.  Molded Truffles- Producing chocolates using shell molds and slabbing with metal bars.	3 2
6.	Learn how to prepare & decoratively color molds before filling, cut ganache slabs with use of guitar, proper dipping and finishing technique with tempered chocolate, including use of transfer sheets.  Finish all Truffles- How to store & freeze finished Truffles.	3 2
7.	Candy Bars- Discussion of different characteristics of a candy bar, History and popularity of the Candy bar, How to Assemble a candy bar.	3 2
8.	Jellies & Pate de Fruit- Learn the differences between the use of gelatin and pectin in gummy candies, Preparation of jellies and Pate de fruit.	3
9.	Crystalline Confections- Learn how the crystallization of sugar creates candy, Preparation of different Fondants and Fudges.	2

<b>S. No.</b>	<b>Course outline</b>	<b>No. of Practical's</b>
10.	Crystalline Confections- Learn how the crystallization of sugar creates candy, Preparation of different Fondants and Fudges	2
11.	Waste Management and up keeping of work place	2
	<b>Total</b>	<b>32</b>

### **Suggested Readings**

1. Chocolates & Confections, 2nd Ed by Greweling Publisher: Wiley, ISBN: 9780470424414F



# **Experiential Learning Courses**

**Experiential Learning Courses****EL -FSN 421      Development of Designer Health Foods      3(0 + 3)****Objective:**

1. To enable students to learn the basics of Designer health food products
2. To acquaint the students with newer technologies and machineries used in product development.
3. To develop professional skill among the students to prepare health products and their commercialization.

**Practicals**

<b>S. No.</b>	<b>Topic</b>	<b>No .of Practicals</b>
1	Familiarization of Designer health foods available in market,	6
2	Collection of information and Report writing	4
3	Orientation to processing equipment's; operation, maintenance	5
3	Selection and storage of raw material: perishable, semi perishable, non-perishable	2
5	Product formulation:	5
6	Development and preparation of Nutri dense foods	10
7	Therapeutic foods,	10
8	Procedure for obtaining quality standards	3
9	Consumer validation	3
<b>Total</b>		<b>48</b>

**Suggested Readings**

1. Altschul A., M) .1993 .(Low calorie foods .Marcel Dekker. Goldberg, I) .1994 .( Functional foods: Designer foods, Pharma Foods, Nutraceuticals .Springer.
2. Matz, S.A) .2004 .(Formulating and processing of dietetic foods .CHIPS Publ.
3. Kalia, M. and Sood, S. (2010). Food preservation and processing. Revised edition, Kalyani Publishers, New Delhi.
4. Srilakshmi, B) .2010 .(Food science )Fifth ed (.New Age International Pvt .Limited, Pub., New Delhi.
5. Gordon, W.F) .2011 .(New food product development :From concept to market place )third edition .(CPR, Press.

**Objective:**

1. To enable students to learn the basics of producing bakery products.
2. To develop skill among the students to prepare bakery products.
3. To impart knowledge about commercialization of bakery products.

**Practicals**

<b>S. No.</b>	<b>Topic</b>	<b>No .of Practicals</b>
1	Preparation of Dessert (mousse, parfait, tresleches, tiramisu, panacotta)	10
2	Country loaf bread making	6
3	Sourdough bread making	6
4	Lamination folding system	6
5	Cupcake & muffin making and frosting	5
6	Packaging and packaging material, labeling, costing and financial management	5
7	Licensing, Marketing (open and digital) and Commercialization of health food products	5
8	Visit of food industry	3
9	Report presentation	2
<b>Total</b>		<b>48</b>

**Suggested Reading**

1. Ashok Kumar Y. 2012. Text book of Bakery and Confectionery. PHI Learning, India.
2. Scott D. 2020. Bread Baking for Beginners: A Simple essential guide to kneading and baking bread.
3. Mathuravalli S M D. 2022. Handbook of bakery and Confectionary. CRC Press.
4. Bakers Handbook on Practical Baking, 1994. US Wheat Associates, New Delhi
5. NIIR Board of consultants and Engineers. 2014. The complete technology book on bakery products (Baking Science with formulation and production). NIIR Project consultancy services, New Delhi.

## EXPERIENTIAL LEARNING COURSES

**ATS-421**

**Apparel Production Technologies**

**3(0+3)**

### Objectives

1. To develop knowledge of the students in apparel designing and pattern making using software applications.
2. To develop professional skill among students in designing and development of apparels using advance machines

### Practical

S. No.	Topic	No. of Classes
1	Orientation of students with different software used in apparel designing, pattern making, marker making and grading.	6
2	Orientation about working operations of advance sewing machineries and other tools used in apparel production	10
3	Procurement of raw material- selection criterion for quality and fabric design, materials requirement planning, need and demand based selection.	8
4	Introduction about fabric ornamentation and value addition methods in apparel production, significance and scope of surface embellishments..	8
5	Pilot production of various apparel prototypes of standard sizes with design variations and quality specifications	8
6	Checking of finished apparels for quality evaluation, product costing, product labeling, packaging, consumer validation.	8
<b>Total</b>		<b>48</b>

### Suggested Readings

1. Carr Harold and John Pomeroy, 1996. Fashion Design and Product Development. Blackwell Science.
2. Cooklin Gerry, 1997. Garment Technology for Fashion Designers. Blackwell Science.
3. Gray, S. 1998 CAD/ CAM in Clothing and Textiles, Gower Publishing Ltd. London.
4. Taylor, P. Computers in Fashion Industry, Heinemann, London.
5. Arena Multimedia 2000. Drawing and illustration- creating basic shapes.
6. Software catalogues.

**Objectives**

1. To enhance the creative skill of students for commercial apparel production.
2. To impart the know-how of marketing and sales management

**Practical**

<b>S. No.</b>	<b>Topic</b>	<b>No. of Classes</b>
1	Orientation to enterprise resource planning with special reference to procurement, production, marketing, inventory and account management.	2
2	Commercial apparel production; commercial pattern engineering, grading, marker planning, pattern envelop, pattern guide sheet, fabric and pattern layout, construction steps	8
3	Commercial production of apparels with different themes	10
4	Product costing-cost estimates and economic feasibility, Branding, Labelling, Packaging	8
5	Developing new market through offline and online mode-advertisement, digitalization of information for marketing, marketing tools and techniques	8
6	Exhibitions and window display for product launching and sales promotion.	8
7	Documentation of developed products, preparation of reports and evaluation.	4
<b>Total</b>		<b>48</b>

**Suggested Readings**

3. Bray Natalic, 1995. More Dress Pattern Designing. Blackwell Science.
4. Erwin, M.D. 1970. Practical dress design: Principles of Fitting and Pattern and Marking. USA. The Macmillan Company
5. Helen, J.A. 2009. Pattern making for Fashion Design. New Delhi. Dorling Kindersley India Pvt. Ltd.
6. Armstrong, H. (1986) Pattern making for fashion designing, New York: Harper Collins.
7. Jarnow Jeannette, Guessio Miriam, 1991. Inside the Fashion Business. Prentice Hall
8. Easey Mike, 2000. Fashion Marketing. Blackwell Science
9. Paola de Helena and Mueller Stewart Carol, 1986. Marketing today's Fashion. Prentice Hall, New Jersey
10. Stone, E. and Samples, J.A. 1985 : Fashion Merchandising - An Introduction Mc-Graw Hill Book Company.
11. Packard, S. 1983. Fashion buying and merchandising. (2<sup>nd</sup> Ed.) New York