



B.Sc., FOOD SCIENCE AND NUTRITION SYLLABUS
(for affiliated colleges)
ACADEMIC YEAR 2026-2027

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI

OUTCOME BASED EDUCATION - CHOICE BASED CREDIT SYSTEM

OPERATIONAL GUIDELINES FOR FRAMING CURRICULUM

VISION AND MISSION OF THE UNIVERSITY

Vision

"To provide quality education to reach the un-reached"

Mission

- ❖ To conduct research, teaching and outreach programmes to improve conditions of human living
- ❖ To offer a wide variety of off-campus educational and training programs, including the use of information technology, to individuals and groups.
- ❖ To develop partnership with industries and government so as to improve the quality of the workplace and to serve as catalyst for economic and cultural development
- ❖ To provide quality / inclusive education, especially for the rural and un-reached segments of economically downtrodden students including women, socially oppressed and differently abled

PREAMBLE

- ❖ Outcome Based Education (OBE) has emerged as an effective approach in higher education to ensure quality, skill oriented and learner centered education. The Choice Based Credit System (CBCS) provides flexibility in curriculum design enables students to acquire knowledge, skills and competencies according to their interests and career aspirations. The curriculum is designed to promote flexibility, critical thinking, problem solving ability and lifelong learning through effective teaching, learning, and assessment practices. The revised curriculum framework integrates Programme Educational Outcomes (PEOs), Programme Outcomes (POs), Programme Specific Outcomes (PSOs), and Course Outcomes (COs) in alignment with the Vision and Mission of the University. The adoption of Revised Bloom's Taxonomy (RBT) ensures effective attainment of knowledge, skills, ethical values, and employability among learners. The courses are systematically designed and mapped to ensure that the outcomes of all courses collectively contribute to the achievement of the programme outcomes and the holistic development of students.

PROGRAMME EDUCATIONAL OUTCOMES (PEO)

In alignment with the Vision and Mission of the University, the following have been defined as the PEO for the graduates.

PEO1: Developing strong positive attitude to learn independently the concepts in the field of study

PEO2: Ensuring confidence among the learners to apply the knowledge and skills gained to solve real life issues

PEO3: Habituating ethical values among the learners to succeed in personal and professional life

PROGRAMME OUTCOMES (PO)

Programme Outcomes for the Undergraduate and Postgraduate Degree Programmes of the University are articulated as under.

After the successful completion of the Undergraduate Programme from the University, the learner should be able to

PO1: Comprehend the knowledge acquired and communicate the same to others.

PO2: Analyse and compare the factual data/situation to comprehend and to critically evaluate to find solution to the problem ahead.

PO3: Apply theories and philosophies learned in solving the problem in a scientific manner.

PO4: Think reflectively on the earlier activities and attempt for self-directed lifelong learning process.

PO5: Understand multicultural existence and identify the means to prolong moral/ethical values in personal and professional life.

PO6: Explore through multiple sources and get exposed to digital technology

PO7: Act as a responsible member in teams and practice leadership qualities

PROGRAMME SPECIFIC OUTCOMES (PSOs)

On successful completion of Bachelor of Food Science & Nutrition programme, the student should be able to:

PSO1: Disciplinary Knowledge:

Understand the fundamental principles, concepts, and theories related to B. Also, exhibit proficiency in performing experiments in the laboratory.

PSO2: Critical Thinking:

Analyse complex problems, evaluate information, synthesize information, apply theoretical concepts to practical situations, identify assumptions and biases, make informed decisions and communicate effectively.

PSO3: Problem Solving:

Employ theoretical concepts and critical reasoning ability with B and practical skills to solve problems, acquire data, analyze their physical significance and explore new scientific findings.

PSO4: Analytical & Scientific Reasoning:

Apply scientific methods, collect and analyse data, test hypotheses, evaluate evidence, apply statistical techniques and use computational models.

PSO5: Research related skills:

Formulate research questions, conduct literature reviews, design and execute research studies, communicate research findings and collaborate in research projects.

PSO6: Self-directed & Lifelong Learning:

Continuously update knowledge by lifelong learning and contribute to the growth and development of science and technology.

PSO7: Employability and Entrepreneurship

Develop skills for employability, entrepreneurship, and career readiness in industry, education, and technology-driven sectors.

Each Course has to address a minimum of 4 PSOs

Level of contribution of the Course towards attaining PSOs

0 – No Contribution 1 – Low Level 2 – Medium Level 3 – High Level

COURSE OUTCOMES (CO)

Four Course Outcomes (COs) for each course that can be achieved by the learners on completion of that particular course are as follows:

Considering outcomes related to

- i. K1 and K2 level of evaluation in all the Units as CO1
- ii. K3 level of evaluation in all the Units as CO2
- iii. K4 level of evaluation in all the Units as CO3
- iv. K5 and K6 level of evaluation in all the Units as CO4.

All the COs proposed in each of the courses should be mapped with POs based on the relevance.

Level of Correlation between COs and POs

0 – No Correlation 1 – Low 2 – Medium 3 – High

G. Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Programme Specific Outcomes (PSOs) can be carried out accordingly, assigning the appropriate level in the grids:

	POs							PSOs						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
CO1														
CO2														
CO3														
CO4														

Programme Details:

Eligibility criteria: Requires +2 qualification.

Medium of instruction: English **Duration of the programme:** 3 years

Credit Distribution for UG Programme in Food Science & Nutrition

Sem I	Credit	Sem II	Credit	Sem III	Credit	Sem IV	Credit	Sem V	Credit	Sem VI	Credit
1.1. Language	3	2.1. Language	3	3.1. Language	3	4.1. Language	3	5.1. Core Course CC9	4	6.1. Core Course CC13	4
1.2. English	3	2.2. English	3	3.2. English	3	4.2. English	3	5.2. Core Course CC10	4	6.2. Core Course CC14	4
1.3. Core Course CC1	4	2.3. Core Course CC3	4	3.3. Core Course CC5	4	4.3. Core Course CC7	4	5.3. Core Course CC11	4	6.3. Core Course CC15	4
1.4. Core Course CC2	4	2.4. Core Course CC4	4	3.4. Core Course CC6	4	4.4. Core Course CC8	4	5.4. Core Project CC12	4	6.4. Elective EC7	3
1.5. Allied AC1	5	2.5. Allied AC2	5	3.5. Elective EC3	4	4.5. Elective EC4	4	5.5. Elective EC5	3	6.5. Elective EC8	3
1.6. Skill Enhancement Course SEC1	2	2.6. Skill Enhancement Course SEC2	1	3.6. Skill Enhancement Course SEC4	2	4.6. Skill Enhancement Course SEC5	2	5.6. Elective EC6	3	6.6. Naan Mudhalvan	2
1.7. Skill Enhancement (Foundation Course)	2	2.7. Skill Enhancement Course SEC3	1	3.7. EVS	2	4.7. Value Education	2	5.7. Naan Mudhalvan	2	6.7. Extension Activity	1
-	-	2.8. Naan Mudhalvan 1	2	3.8. Naan Mudhalvan 2	2	4.8. Naan Mudhalvan 3	2	5.8. Internship	1		
-	-	-	-								

	23		23		24		24		25		21
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MSU

Consolidated Semester wise and Component wise Credit distribution

Parts	Sem I	Sem II	Sem III	Sem IV	Sem V	Sem VI	Total Credits
Part I	3	3	3	3	-	-	12
Part II	3	3	3	3	-	-	12
Part III	13	13	12	12	22	18	90
Part IV	4	4	6	6	3	2	25
Part V	-	-	-	-	-	1	1
Total	23	23	24	24	25	21	140

MEASUREMENT OF ATTAINMENT OF COURSE OUTCOME

The Course Outcomes (COs) are measured through the performance of learners by direct and indirect assessment methods for that particular course.

i. Internal Assessment (25 Marks)

Tests – 20 Marks

Seminar / Assignments/Attention (Participation) in Class – 5 Marks

ii. Semester End Examinations (75 Marks)

Written exams, Practical, Project report, and Comprehensive Viva Voce

Note: In both Internal and Semester End Examinations

Lower Order Thinking (K1, K2, & K3) – 60 % in each part

Higher Order Thinking (K4, K5, & K6) – 40 % in each part

Part I, II, and Part III components will be separately taken into account for CGPA calculation and classification for the undergraduate programme and the other components. IV, V have to be completed during the duration of the programme as per the norms, to be eligible for obtaining the UG degree.

EVALUATION SCHEME

- B.Sc Food Science and Nutrition curriculum is divided and studied in six semesters.
- The internal assessments and external examination are the two parts of evaluation scheme.
- The external theory and practical examinations will be conducted by the university at the end of each semester.
- There is a separate passing minimum of 40% for the external and overall components.

**DISTRIBUTION OF MARKS BETWEEN INTERNAL AND EXTERNAL ASSESSMENT
FOR CORE, SKILL ENHANCEMENT, ELECTIVE, AND ALLIED COURSES.**

* Theory Marks 25: 75

* Practical Marks 50: 50

Pass a minimum of 40% for external and overall components.

1. Internal Assessment.

Internal Marks for Theory shall be allotted in the following manner

The average of the best two tests from three compulsory tests. Each test is of one hour duration	20 marks
Assignment	05 marks
Total	25 Marks

2. Marks for the Practical / Major Project shall be allotted in the following manner

Internal Marks: 50; External Marks: 50

3. External evaluation of Project:

Project report evaluation and Viva-Voce will be conducted by both the External examiner and the Guide at the end of the semester.

4. Internship

Report for Internship / Industrial Visit / Field Visit / Research Institute Visit.

Should be evaluated along with the project at the end of Vth semester.

Students should submit a report for internship / industrial visit/field visit / Research institute visit/ knowledge update activity at the end of the fifth semester with attendance certificate from the concerned organisation.

The duration of the internship should be 30 hours.

Internal: 50 marks; External: 50 marks

5. Extension Activity:

The student should participate in any one of the programmes like NSS, NCC, YRC, RRC, games and sports/ youth welfare activity, outreach programmes etc. the examination / report / evaluation will be conducted at the end of the sixth semester.

6. Naan Mudhalvan programme is compulsory for all the students. Those who failed in Naan Mudhalvan can write the exam for the substitute subject*.

7. The question pattern for all theory courses shall be as follows.

Duration of Exam: 3 Hours

Section	Type of questions	Mark Distribution
Part A	Ten multiple-choice questions (Two questions from each unit compulsory)	10 x 1=10 Marks
Part B	Five Internal Choice questions (One question from each unit: Either or choice)	5 x 5 =25 marks
Part C	Five Internal Choice questions (One question from each unit: Either or choice)	5 x 8 =40 marks
Total		75 Marks

MODEL QUESTION PAPER

(For those who joined in July 2026 onwards)		
Time: Three hours	Core I- Basic Human Physiology	Maximum: 75 marks
	Part-A (10×1=10 marks)	
	Answer all questions	
1	Which organelle is known as the powerhouse of the cell? a) Nucleus b) Ribosome c) Mitochondrion d) Lysosome	K1
2	Which type of tissue is responsible for transmitting nerve impulses? a) Epithelial tissue b) Connective tissue c) Muscular tissue d) Nervous tissue	K2
3	Which plasma protein plays a major role in blood coagulation? a) Albumin b) Fibrinogen c) Globulin d) Hemoglobin	K2
4	The universal recipient blood group is: a) A b) B c) AB d) O	K1
5	Which hormone stimulates gastric acid secretion? a) Gastrin b) Insulin c) Glucagon d) Aldosterone	K1
6	Which type of immunity develops following vaccination? a) Innate immunity b) Passive immunity c) Active acquired immunity d) Natural immunity	K2
7	The natural pacemaker of the heart is the: a) AV node b) SA node c) Bundle of His d) Purkinje fibres	K1
8	Which factor directly increases cardiac output? a) Reduced stroke volume b) Increased stroke volume c) Reduced venous return d) Decreased heart rate	K3
9	The functional unit of the kidney is the: a) Neuron b) Alveolus c) Nephron d) Glomerulus	K2
10	The permanent cessation of menstruation is known as: a) Menarche b) Ovulation c) Fertilization d) Menopause	K3
	PART- B (5 x 5 = 25 Marks)	
11	(a) Describe the structure and functions of a typical animal cell. OR (b) Explain the classification and functions of connective tissue.	K2

12	(a) Analyze the composition and functions of blood. OR (b) Examine the factors affecting blood coagulation and their physiological significance.	K4
13	(a) Explain the role of innate and acquired immunity in body defence. OR (b) Examine the mechanisms of humoral immunity and cell-mediated immunity.	K3
14	14. (a) Design a flowchart illustrating the cardiac cycle. OR (b) Design a schematic representation showing the mechanism of urine formation.	K6
15	(a) Describe the structure and functions of the thyroid gland. OR (b) Explain the structure and functions of the pituitary gland.	K2
	PART- C (5 X 8 = 40 Marks)	
16	(a) Explore the structure and physiological functions of the gastrointestinal tract and hepatobiliary system. OR (b) Analyze the role of digestive hormones and enzymes in the digestion and absorption of nutrients.	K4
17	(a) Assess the factors affecting cardiac output and evaluate their influence on blood pressure regulation. OR (b) Evaluate the significance of ECG in assessing normal cardiac function and heart failure.	K5
18	(a) Evaluate the role of the complement system in immune responses. OR (b) Estimate the importance of humoral and cell-mediated immunity in disease prevention.	K5
19	(a) Examine the lung volumes and lung capacities and explain their physiological significance.	K3

	OR (b) Judge the factors affecting the efficiency of respiration and gaseous exchange.	
20	(a) Examine the structure and functions of the female reproductive system and discuss the menstrual cycle. OR (b) Explore the structure and functions of the male reproductive system and discuss the endocrine functions of sex glands.	K3

SEMESTER I							
Part	List of Courses	Credits	No. of Hours/ week	Total hours/ semester	CIA	Univ.Exam	Total marks
I	Language-Tamil/Other Languages	3	6	90	25	75	100
II	Language-English	3	6	90	25	75	100
III	Core I- Basic Human Physiology	5	5	75	25	75	100
	Core Practical II-Basic Human Physiology Practical	3	3	45	50	50	100
	Allied I-Contemporary Family Resource Management	3	4	60	25	75	100
	Allied Practical II-Contemporary Family Resource Management Practical	2	2	30	50	50	100
IV	Skill Enhancement Course-SEC-I Fundamentals of Public Health Nutrition	2	2	30	25	75	100
	Foundation Course- Women 's Health and Wellness	2	2	30	25	75	100
	Total	23	30	450	250	550	800

SEMESTER II							
Part	List of Courses	Credits	No. of Hours/ week	hours/ Total semester	CIA	Univ.Exam	Total marks
I	Language-Tamil/Other Languages	3	6	90	25	75	100
II	Language-English	3	4	90	25	75	100
III	Core III-Fundamentals of Food Science	5	5	75	25	75	100
	Core Practical IV-Fundamentals of Food Science Practical	3	3	45	50	50	100
	Allied III-Human Development	3	4	60	25	75	100
	Allied Practical IV-Human Development Practical	2	2	30	50	50	100
IV	Skill Enhancement Course-SEC- II Introduction to Fashion Designing	1	2	30	25	75	100
	SEC- III Landscape Design and Ornamental Garden	1	2	30	25	75	100
	*Naan Mudhalvan-1	2	2	-	-	-	-
	Total	23	30	450	250	550	800

SEMESTER III							
Part	List of Courses	Credits	No. of Hours/ week	Total hours/ semester	CIA	Univ.Exam	Total marks
I	Language-Tamil/Other Languages	3	6	90	25	75	100
II	Language-English	3	6	90	25	75	100
III	Core V-Human Nutrition	5	5	75	25	75	100
	Core VI-Human Nutrition -Practical	3	3	45	50	50	100
	Elective III-Nutrition and Health Communication Or Basic Computer	4	4	60	25	75	100
IV	SEC IV-Foundations of Baking and Confectionery	1	2	30	25	75	100
	EVS-Environmental Studies	2	2	30	25	75	100
	*Naan Mudhalvan-2	2	2	-	-	-	-
	Total	23	30	450	250	550	800

SEMESTER IV							
Part	List of Courses	Credits	No. of Hours/ week	Total hours/ semester	CIA	Univ.Exam	Total marks
I	Language-Tamil/Other Languages	3	6	90	25	75	100
II	Language- English	3	6	90	25	75	100
III	Core VII-Nutrition through Life Cycle	6	5	75	25	75	100
	Core VIII-Nutrition through Life Cycle- Practical	3	3	45	50	50	100
	Elective IV- Fundamentals of Research in Nutritional Sciences or Food Commodities	4	4	60	25	75	100
IV	SEC V – Fibre to Fabric	1	2	30	50	50	100
	Value Education	2	2	30	25	75	100
	*Naan Mudhalvan-3	2	2	-	-	-	-
	Total	24	30	450	225	475	700

SEMESTER V							
Part	List of Courses	Credits	No. of Hours/ week	Total hours/ semester	CIA	Univ.Exam	Total marks
III	Core IX -Principles of Nutritional Biochemistry	4	5	75	25	75	100
	Core X -Dietetics	4	5	75	25	75	100
	Core XI -Dietetics - Practical	4	5	75	50	50	100
	Core XII -Project	3	5	75	50	50	100
	Elective V -Food Service Management Or Personnel Management	3	4	60	25	75	100
	Elective VI -Food Product Development Or Entrepreneurship Development	3	4	60	25	75	100
IV	*Naan Mudhalvan-4	2	2	-	-	-	-
	Internship/ Industrial Visit/ Field Visit	2	0	-	50	50	100
Total		25	30	420	250	450	700

SEMESTER VI							
Part	List of Courses	Credits	No. of Hours/ week	Total hours/ semester	CIA	Univ.Exam	Total marks
III	Core XIII -Functional Foods in Health and Disease	4	6	90	25	75	100
	Core XIV -Fundamentals of Food Microbiology	4	6	90	25	75	100
	Core XV -Food Preservation and Processing	4	6	90	25	75	100
	Elective VII -Sports Nutrition Or Preventive Nutrition	3	5	75	25	75	100
	Elective VIII -Changing Trends in Extension Education Or Food Waste and Byproduct Management	3	5	75	25	75	100
IV	*Naan Mudhalvan-5	2	2	-	-	-	-
	Extension Activity	1	-	-	-	-	-
	Total	21	30	420	125	375	500

*Reappearance for the Naan Mudhalvan Course (External Examination for 100 marks).

Note: Part I, II, and Part III components will be separately taken into account for CGPA calculation and classification for the undergraduate programme, and the other components, IV and V, must be completed during the duration of the programme as per the norms, to be eligible for obtaining the UG degree.

FIRST YEAR

SEMESTER I											
Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	Basic Human Physiology	Core -I	5				5	5	25	75	100

Course Outcomes (COs)

On completion of this course, students will be able to:

CO1: Explain the structure, classification, and functions of cells, tissues, blood, and the major organ systems of the human body.

CO2: Apply the principles of physiology and regulatory mechanisms of the gastrointestinal, hepatobiliary, cardiovascular, respiratory, excretory, immune, and integumentary systems.

CO3: Analyze the functional relationships among body systems, including circulation, immunity, respiration, excretion, and endocrine regulation in maintaining homeostasis.

CO4: Evaluate the structure and functions of the reproductive and endocrine systems, including hormonal regulation of growth, metabolism, reproduction, and body functions.

COURSE CONTENT

UNIT	Contents	No. of Hours
Unit-I	a. Introduction to Human Physiology – Scope, levels of structural organization, homeostasis b. Cell – Structure, organelles and functions. c. Tissues – Structure, classification and functions of epithelial, connective, muscular and nervous tissues.	15
Unit-II	a. Blood – Composition, functions, coagulation, factors affecting coagulation, blood groups. b. Gastrointestinal and Hepatobiliary system – Structure, physiology and functions for different organs and the role of hormones and enzymes.	15
Unit-III	a. Immune system – Innate, acquired and active immunity, cell-	15

	mediated immunity, humoral immunity and the complement system. b. Heart and circulation – Structure, cardiac cycle, cardiac output, factors affecting cardiac output, normal ECG, heart failure, blood pressure, control and factors affecting blood pressure.	
Unit-IV	a. Respiratory System – Structure and functions, mechanism of respiration, transport of respiratory gases, lung volumes and capacities, factors affecting efficiency of respiration. b. Excretory System – Structure and functions of urinary organs, nephron, mechanism of urine formation, regulation of fluid and electrolyte balance. c. Skin – Structure and functions, regulation of body temperature and protective functions of the skin.	15
Unit-V	Reproductive system– a. Female Reproductive System – Structure and functions, ovarian hormones, menstrual cycle, menarche and menopause. b. Male Reproductive System – Structure and functions, spermatogenesis and male sex hormones. c. Endocrine System – Thyroid, parathyroid, pituitary, adrenal and sex glands; structure, hormones and physiological functions.	15
Total		75

References

1. Ross and Wilson (2011), *Anatomy and Physiology in Health and Illness*, 11th Edition, Church Hill Livingstone.
2. West, J.B. (2007), *Best and Taylor's Physiological Basis of Medical Practice*, 11th Edition.
3. Gyton (1996), *Text Book of Medical Physiology*, 9th Edition, Prism Books Pvt. Ltd., W.B. Sanders Company, USA.
4. Chatterjee C.C (2016), *Human Physiology Volume I*, Medical Allied Agency, Kolkata.

5. Chatterjee C.C (2004), *Human Physiology Volume II*, Medical Allied Agency, Kolkata.
6. Sembulingam, K. (2000), *Essentials of Medical Physiology*, Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.
7. Chaudhri, K. (1993), *Concise Medical Physiology*, New Central Book Agency (Parental) Ltd., Calcutta.

Open Educational Resources

1. [OpenStax – Anatomy and Physiology 2e](#)
2. LibreTexts Human Physiology
3. [Merck Manual Professional Edition – Physiology Topics](#)
4. [Khan Academy – Human Anatomy and Physiology](#)
5. [TeachMePhysiology](#)
6. [Innerbody Human Anatomy Explorer](#)
7. [American Physiological Society \(APS\)](#)
8. [The Physiological Society](#)
9. National Library of Medicine – MedlinePlus Anatomy and Physiology Resources
10. [Visible Body Learning Resources](#)
11. [Crash Course Anatomy & Physiology](#)
12. Ninja Nerd Science

CO – PO – PSO Mapping (Course Articulation Matrix)

CO	Pos							PSOs						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
CO1	3	2	1	1	1	1	1	3	2	1	2	1	1	2
CO2	3	3	2	2	1	2	2	3	2	2	3	1	1	3
CO3	3	3	3	2	2	2	2	3	2	3	3	2	1	3
CO4	3	3	2	2	1	2	2	3	2	3	3	2	1	3
Total Score	12	11	8	7	5	7	7	12	8	9	11	6	4	11

0 – No Correlation
High

1 – Low

2 – Medium

3 –

SEMESTER I											
Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	Basic Human Physiology Practical	Core Practical -II			3		3	3	50	50	100

Course Outcomes (COs)

CO1: Identify the microscopic structure of tissues, organs, reproductive organs, and endocrine glands through laboratory observation.

CO2: Perform basic hematological experiments, including blood collection, hemoglobin estimation, blood grouping, blood smear preparation, and platelet count.

CO3: Measure and record physiological parameters such as pulse rate, blood pressure, bleeding time, coagulation time, and assess the effect of exercise on cardiovascular responses.

CO4: Interpret experimental results and relate physiological observations to normal human body functions.

Course content

1. Microscopic study of tissues - epithelial, connective, and muscular.
2. Collection of blood samples - Capillary blood from fingertips and venous blood.
3. Separation of blood components (centrifugation).
4. Estimation of haemoglobin - Sahli 's Acid hematin method.
5. Preparation and examination of stained blood smear (wedge or glass slide method).
6. Determination of blood group.
7. Determination of bleeding time (Duke method) and coagulation time (capillary tube method).
8. Platelet count (Rees Ecker method by hemocytometry).
9. Clinical examination of a radial pulse (pulse rate).
10. Measurement of blood pressure (sphygmomanometry).
11. Effect of exercise on blood pressure and heart rate.
12. Microscopic structure of heart, Brain, digestive system and kidney.
13. Microscopic structure of reproductive organs - ovary, uterus, mammary glands, and testis.
14. Microscopic structure of endocrine glands - thyroid, pituitary, and adrenal.

Reference:

1. Guyton and Hall Textbook of Medical Physiology. Hall JE (2021). *Guyton and Hall Textbook of Medical Physiology*. 14th ed. Elsevier.
2. Practical Physiology. Jain AK (2019). *Practical Physiology*. 9th ed. Jaypee Brothers Medical Publishers.
3. Textbook of Histology. Singh I (2020). *Textbook of Histology with Practical Manual*. 8th ed. Jaypee Brothers Medical Publishers.
4. Medical Laboratory Technology. Sood R (2021). *Medical Laboratory Technology: Methods and Interpretations*. 7th ed. Jaypee Brothers Medical Publishers.
5. Human Anatomy and Physiology. Marieb EN, Hoehn K (2018). *Human Anatomy and Physiology*. 11th ed. Pearson Education.
6. G.K. Pal and Pravati Pal, *Textbook of Practical Physiology*, Orient Longman Ltd., 2001.

CO – PO – PSO Mapping (Course Articulation Matrix)

COs	P O1	P O2	P O3	P O4	P O5	P O6	P O7	PS O1	PS O2	PS O3	PSO 4	PSO 5	PSO 6	PSO 7
CO1	3	2	1	2	2	1	1	3	2	1	1	1	1	2
CO2	3	3	2	3	3	1	1	3	2	2	2	1	1	3
CO3	3	3	2	3	2	1	1	3	2	2	2	1	1	3
CO4	3	3	2	3	2	2	1	3	2	3	2	1	1	3
Total Score	12	11	7	11	9	5	4	12	8	8	7	4	4	11

Correlation Level

3 = High Correlation 2 = Moderate Correlation 1 = Low Correlation Blank = No Correlation

SEMESTER I											
Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	Contemporary Family Resource Management	Allied -I	4				3	4	25	75	100

Course Outcomes (COs)

CO1

Describe and explain the structure, classification, and functions of cells, tissues, blood, and the major organ systems of the human body.

CO2

Apply physiological principles and regulatory mechanisms to explain the functioning of the gastrointestinal, hepatobiliary, cardiovascular, respiratory, excretory, immune, and integumentary systems under normal conditions.

CO3

Analyze the interrelationships among circulatory, respiratory, immune, excretory, and endocrine systems in maintaining body homeostasis.

CO4

Evaluate the roles of the reproductive and endocrine systems in regulating growth, metabolism, reproduction, and other body functions, and formulate explanations for the impact of hormonal imbalances on human health.

Course Content

Unit I – Housing and Space Planning

13

- Meaning and functions of housing. Site selection and factors influencing house planning. Principles of house planning: orientation, grouping, roominess, privacy, flexibility, lighting, ventilation, sanitation, and economy.
- Kitchen planning: types of kitchens, work triangle concept, modular storage, and hygienic kitchen surfaces.
- House plans for low-, middle-, and high-income groups. Eco-friendly housing concepts containing rainwater harvesting and solar energy integration.

Unit II – Care and Maintenance of House

10

- a. Care and maintenance of house and surroundings. Daily, weekly, and periodic cleaning methods. Selection and use of cleaning materials and eco-friendly cleaning agents.
- b. Household sanitation and waste management: source segregation, recycling, e-waste disposal, and sustainable household practices.
- c. Insect and pest control: preventive and remedial measures, safe and non-toxic pest management methods.

Unit III – Elements and Principles of Design **12**

- a. Elements of design: line, form, texture, space, light, and colour. Types and characteristics of design with structural and decorative design.
- b. Principles of design: harmony, proportion, balance, emphasis, and rhythm and their application in interior decoration.
- c. Contemporary interior trends in home decoration.

Unit IV – Colour in Interior Decoration

10

- a. Qualities of colour: hue, value, and intensity. Psychological effects of colours. Advancing and receding colours.
- b. Colour harmonies and their application in interior decoration. Use of colour in creating proportion, balance, harmony, and rhythm.
- c. Contemporary colour trends in interiors.

Unit V – Furniture, Accessories, and Floral Arrangement

15

- a. Selection, arrangement, and care of furniture for living room, bedroom, and dining room. Ergonomic and multifunctional furniture concepts.
- b. Selection and care of soft furnishings and accessories plus curtains, wall hangings, and decorative art pieces.
- c. Table setting and contemporary styling concepts.
- d. Flower arrangement: principles and types of flower arrangement including traditional and modern Ikebana, and biophilic floral arrangements.

References

1. Deshpande R (2004). *Modern Ideal Homes for India*. McGraw-Hill Publishing Co., New Delhi.

2. Faulkner R and Faulkner S (1987). *Inside Today's Home*. Holt, Rinehart and Winston, New York.
3. Gilliat M (1981). *Colour in Interior Design*. B.T. Batsford Ltd., London.
4. Goldstein H and Goldstein V (2000). *Art in Everyday Life*. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
5. Nickell P and Dorsey JM (2002). *Management in Family Living*. CBS Publishers and Distributors, New Delhi.
6. Premavathy Seetharaman, Pannu P and Rekha Bhargava (2005). *Interior Design and Decoration*. CBS Publishers and Distributors, New Delhi.
7. Stella Soundararaj *A Textbook of Household Arts*. Bombay: Orient Longman Ltd., 1968.
8. Varghese A. *Home Management*. New Delhi: New Age International Publishers, 1985.
9. Varghese MA, Ogale NN and Srinivasan K (1990). *Home Management*. New Age International Publishers, New Delhi.

Web Resources

1. [Bureau of Indian Standards \(BIS\)](#)
2. [Ministry of Housing and Urban Affairs \(MoHUA\)](#)
3. [Bureau of Energy Efficiency \(BEE\)](#)
4. [Architectural Digest India](#)
5. [United Nations Environment Programme \(UNEP\)](#)

CO – PO – PSO Mapping (Course Articulation Matrix)

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO1	3	2	2	1	2	2	2	3	2	2	1	2	2	1
CO2	3	3	2	2	3	2	3	3	2	2	2	3	2	2
CO3	2	3	3	2	1	2	2	2	3	3	2	1	2	2
CO4	2	2	3	3	1	2	2	2	3	3	3	1	2	2
Total	10	10	10	8	7	8	9	10	10	10	8	7	8	7

Correlation Level

3 = High Correlation 2 = Moderate Correlation 1 = Low Correlation Blank = No Correlation

SEMESTER I											
Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	Contemporary Family Resource Management Practical	Allied Practical -I			2		2	2	50	50	100

Course Outcomes (COs)

CO1: Describe and explain the principles of housing, space planning, kitchen layouts, and work triangle concepts used in designing functional residential spaces.

CO2: Apply household maintenance practices, including cleaning methods, the use of eco-friendly cleaning agents, and pest control measures for effective home management.

CO3: Analyze the application of elements and principles of design, colour harmonies, and interior decoration concepts in creating aesthetically pleasing residential environments.

CO4: Evaluate and develop appropriate arrangements of furniture, furnishings, accessories, table settings, and floral decorations to enhance the functionality and aesthetics of home environments.

Course content

1. Preparation of house plans for low, middle and high-income groups.
2. Kitchen planning and preparation of kitchen layouts based on the work triangle concept.
3. Identification and application of design elements and principles in interior settings.
4. Preparation of colour schemes for different rooms using colour harmonies.
5. Selection and arrangement of furniture for the living room, bedroom, and dining room.
6. Preparation of table settings for different occasions.

7. Selection and care of household furnishings and accessories.
8. Preparation of simple, traditional and modern flower arrangements
9. Demonstration of daily, weekly, and periodic cleaning methods and preparation of eco-friendly household cleaning agents.
10. Identification of common household pests and demonstration of preventive control measures.
11. Submission of a visit report on interior design studios, furniture showrooms, model houses, or sustainable housing projects.

References:

1. Premavathy Seetharaman, Pannu P and Rekha Bhargava (2005). *Interior Design and Decoration*. CBS Publishers and Distributors, New Delhi.
2. Goldstein H and Goldstein V (2000). *Art in Everyday Life*. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
3. Faulkner R and Faulkner S (1987). *Inside Today's Home*. Holt, Rinehart and Winston, New York.
4. Deshpande R (2004). *Modern Ideal Homes for India*. McGraw Hill Publishing Co., New Delhi.
5. Varghese MA, Ogale NN and Srinivasan K (1990). *Home Management*. New Age International Publishers, New Delhi.
6. Bhatt H (2011). *Fundamentals of Interior Design*. Himalaya Publishing House, Mumbai.
7. Rutt A (2001). *Home Furnishing*. John Wiley and Sons, New York.
8. Gilliat M (1981). *Colour in Interior Design*. B.T. Batsford Ltd., London.
9. Tidey A (1990). *Flower Arrangement: A Practical Guide*. Hamlyn Publishing Group, London.
10. Dhanty M (2003). *Household Textiles and Laundry Work*. Kalyani Publishers, New Delhi.

CO – PO – PSO Mapping (Course Articulation Matrix)

CO s	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	3	2	3	2	2	2	2	3	2	2	2	2	2	1
CO 2	3	3	3	2	3	2	3	3	2	2	2	3	2	2
CO 3	2	3	3	3	1	2	2	2	3	3	2	1	2	2
CO 4	2	2	3	3	1	2	2	2	3	3	3	1	2	2
Tot al	10	10	12	10	7	8	9	10	10	10	9	7	8	7

Correlation Level

3 = High Correlation 2 = Moderate Correlation 1 = Low Correlation Blank = No Correlation

SEMESTER I											
Subject Code	Subject Name	Category	L	T	P	S	Credit	Inst. Hours	Marks		
									CIA	External	Total
	Fundamentals of Public Health Nutrition	Skill Enhancement Course -I	2				2	2	25	75	100

Course Outcomes (COs)

CO1: Explain the concepts, scope, and public health significance of nutrition, including major nutritional problems and deficiency disorders affecting communities.

CO2: Apply methods for assessing nutritional status using anthropometric, clinical, biochemical, dietary, and community-based assessment techniques.

CO3: Analyze national nutrition policies, nutrition intervention programmes, and food security initiatives for the prevention and control of malnutrition.

CO4: Evaluate and implement nutrition education programmes and evaluate the role of national and international agencies in promoting community nutrition and public health

UNIT	CONTENT	HOURS

UNIT I	Introduction to Public Health Nutrition a) Concept and scope of public nutrition b) Definition, concept, scope, importance and multidisciplinary nature of public nutrition c) Nutritional problems affecting the community. d) Etiology, prevalence, clinical features and preventive strategies for malnutrition-related problems and deficiency disorders- Undernutrition (Protein-energy malnutrition, Wasting, Stunting), Overnutrition (obesity and related risks), Nutritional anaemia, Vitamin A deficiency, Iodine deficiency disorders, Fluorosis.	8
UNIT II	Assessment of nutritional status a) Objectives and importance, Methods of assessment: Direct (Clinical signs, Anthropometry, Biochemical tests); Indirect (Diet surveys, vital statistics) b) Uses of nutritional assessment in public health nutrition c) Indicators of nutritional status	4
UNIT III	Nutrition policy and programmes a) National nutritional policy; Integrated Child Development Scheme (ICDS), Midday Meal Program- State and National (Poshan Abhiyan), National programs for the prevention of anaemia, Vitamin A deficiency, Iodine deficiency disorders, Fortification of Foods and Public Distribution System as a preventive approach.	8
UNIT IV	Nutrition education Objectives, principles and scope of nutrition and health education, creating awareness on current public health issues and devising strategies for prevention and management.	5
UNIT V	Role of National and International Agencies in Combating Malnutrition – International agencies: WHO, FAO, UNICEF, WFP; National agencies: FSSAI, ICAR, ICMR, NIN, CFTRI, NNMB, NSI and NIPCCD; objectives, functions, target groups, nutrition-related policies, programmes, surveillance systems, food safety initiatives, and contributions to nutrition and public health.	5

References:

1. Wadhwa, A., and Sharma, S. (2003). *Nutrition in the Community – A Textbook*. Elite Publishing House Pvt. Ltd., New Delhi.
2. Park, K. (2011). *Park's Textbook of Preventive and Social Medicine*, 21st Edition. M/s Banarasidas Bhanot Publishers, Jabalpur, India.
3. Jelliffe, D.B., Jelliffe, E.F.P., Zervas, A., and Neumann, C.G. (1989). *Community*

Nutritional Assessment with Special Reference to Less Technically Developed Countries. Oxford University Press, Oxford.

4. WHO (2006). *Child Growth Standards: Methods and Development: Height-for-Age, Weight-for-Age, Weight-for-Length, Weight-for-Height and Body Mass Index-for-Age* (<http://www.who.int/childgrowth/standards/en/>).
5. Gupta, M.C., and Mahajan, B.K. (2003). *Textbook of Preventive and Social Medicine*, 3rd Ed. Jaypee Brothers, Medical Publishers (P) Ltd.

Web References:

- [Mohfw.nic.in/NRHM/NIDD](http://mohfw.nic.in/NRHM/NIDD)
- www.nrhmorissa.gov.in/NIDDCP.html
- www.Scripts.mit.edu

CO – PO – PSO Mapping (Course Articulation Matrix)

CO s	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PS O1	PS O2	PS O3	PS O4	PS O5	PS O6	PS O7
CO 1	3	2	2	1	3	2	3	3	2	2	2	3	2	2
CO 2	3	3	3	2	2	2	2	3	3	2	2	2	3	2
CO 3	3	3	2	2	3	3	3	3	2	3	2	3	2	2
CO 4	2	3	3	3	2	3	3	2	3	3	3	2	2	2
Tot al	11	11	10	8	10	10	11	11	10	10	9	10	9	8

Correlation Level

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SEMESTER I											
Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	Women's Health and Wellness	Foundation Course	2				2	2	25	75	100

Course Outcomes (COs)

CO1: Describe and explain the nutritional requirements, dietary guidelines, and factors influencing the nutritional status of women across different stages of life.

CO2: Apply knowledge of physical and reproductive health to identify and promote measures for maintaining the overall well-being of women.

CO3: Analyze common mental health issues affecting women and their impact on health, and examine appropriate strategies for stress management and emotional well-being.

CO4: Evaluate the influence of social and lifestyle factors on women's health and develop effective communication, relationship-building, and personal development strategies for enhancing quality of life.

UNIT	CONTENT	Hours
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I	Nutrition for Women - Dietary Guidelines for a healthy lifestyle, Current concepts pertaining to Balanced Diets, Nutrient requirements for young and older women with special focus on Protein, Iron, Vitamin D and Calcium, Factors affecting nutrient intake in women- Socioeconomic, Environmental conditions, Health conditions; Consequences of Eating disorders in young women.	8
II	Physical Health - Significance of Body weight and Body composition parameters, Benefits of Aerobic, Flexibility and Strength training exercises- on General health, Bone health, and risk associated with NCD's.	4
III	Reproductive Health - Menstrual Health, Pregnancy and Lactation, Pre- and Post-Menopausal concerns-preventive measures, sexually transmitted diseases- an overview.	4
IV	Mental Health - Common mental health problems - Trends and issues relating to women, Depression, Anxiety and coping with Stress, Strategies to improve mental health- learning new skills and hobbies, Relaxation techniques such as yoga and meditation.	8
V	Social Health - Balancing home and career, strengthening relationships, enhancing communication skills and Personality Development, technological advancements and their impact, dealing with domestic violence and harassment issues.	6
	Total Hours	30

Activity:

- Preparation of simple healthy recipes, Planning Meals based on Balanced diets,
- Workshop on Fitness, Yoga and Meditation,
- Seminars pertaining to Reproductive Health, Communication Skills, Personality Development.

References:

1. Lanza di Scalea, T., Matthews, K. A., Avis, N. E., et al. (2012). Role stress, role reward, and mental health in a multiethnic sample of midlife women: Results from the Study of Women's Health Across the Nation (SWAN). *Journal of Women's Health, 21*(5), 481–489.
2. Mahan, L. K., & Stump, S. E. (2000). *Krause's Food, Nutrition and Diet Therapy*. Philadelphia, USA: Saunders.
3. Minkin, M. J., & Wright, C. V. (2003). *The Yale Guide to Women's Reproductive Health: From Menarche to Menopause*. London: Yale University Press.
- 4.Sizer, F. S., & Whitney, E. (2014). *Nutrition: Concepts and Controversies* (13th ed.). USA: Wadsworth, Cengage Learning.
5. Sperry, L. (2016). *Mental Health and Mental Disorders*. California: ABC-CLIO.
6. Williams, M. H., Anderson, D. E., & Rawson, E. S. (2013). *Nutrition for Health, Fitness and Sport*. New York: McGraw-Hill Education.
7. Wrzus, C., Hänel, M., Wagner, J., & Neyer, F. J. (2013). Social network changes and life events across the life span: A meta-analysis. *Psychological Bulletin, 139*(1), 53–80.

e-Learning Resources:

- https://www.nhp.gov.in/social-health_pg
- <https://ncert.nic.in/textbook/pdf/jehp112.pdf>
- <https://ncert.nic.in/textbook/pdf/iehp113.pdf>
- <https://ncert.nic.in/textbook/pdf/lebo104.pdf>
- <https://www.nih.gov/health-information/social-wellness-toolkit>
- <https://www.cdc.gov/reproductivehealth/womensrh/index.htm>
- <https://www.nimh.nih.gov/health/topics/caring-for-your-mental-health>
- <https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response>
- <https://www.cdc.gov/mentalhealth/learn/index.htm>

CO – PO – PSO Mapping (Course Articulation Matrix)

CO s	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PS O1	PS O2	PS O3	PS O4	PS O5	PS O6	PS O7
CO 1	3	2	2	1	3	2	2	3	2	2	1	3	2	2
CO 2	3	2	3	2	3	2	2	3	2	2	2	3	2	2
CO 3	2	3	2	3	2	3	3	2	3	2	3	2	2	2
CO 4	2	3	3	3	2	3	3	2	3	3	3	2	2	2
Tot al	10	10	10	9	10	10	10	10	10	9	9	10	8	8

Correlation Level

3 = High Correlation 2 = Moderate Correlation 1 = Low Correlation Blank = No Correlation

SECOND YEAR

SEMESTER II											
Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	Fundamentals of Food Science	Core III	-	5			5	5	25	75	100

Course Outcomes (COs)

On completion of this course, students will be able to:

CO1: Describe and explain the classification, composition, nutritive value, and culinary significance of various food groups and beverages.

CO2: Apply food science principles in cooking methods, food preparation, food processing, and quality evaluation while ensuring nutrient retention and effective utilization of the functional properties of foods.

CO3: Analyze the composition, nutritive value, and cookery principles of cereals, pulses, milk, eggs, meat, poultry, fish, vegetables, fruits, fats, oils, and sugars.

CO4: Evaluate food quality, assess food adulteration and quality defects, and develop suitable measures for improving food preparation, processing, and utilization based on scientific principles.

COURSE CONTENT

Unit-I (14)

a. Food and Food Groups

Definition, functions and classification of foods, food groups, food guide pyramid, food plate concept, balanced diet and dietary guidelines.

b. Principles of Cooking

Objectives and methods of cooking, heat transfer in cooking, effect of cooking on nutrients, factors affecting nutrient retention, healthy cooking practices.

c. Beverages

Classification and nutritional significance of beverages, tea, coffee, cocoa, fruit and vegetable beverages, milk-based beverages, functional beverages, carbonated beverages, sports and energy drinks, alcoholic beverages and their health effects.

Unit-II (16)

- a. Cereals and Millets: Structure, composition and nutritive value of rice, wheat, and oats; Nutritive value of maize, jowar, ragi, and bajra.
- b. Cereal cookery: Effect of moist heat - Hydrolysis, Gelatinisation and factors affecting gelatinisation, gel formation, retrogradation and syneresis; Effect of dry heat; Role of cereals in cookery.
- c. Pulses: Composition, nutritive value, toxic constituents; Pulse cookery - Effect of cooking, factors affecting cooking quality, role of pulses in cookery, germination and its advantages.

Unit-III (18)

- a. Milk and Milk Products: Composition and nutritive value of milk; Milk cookery - Effect of heat, effect of acid, and effect of enzymes; Milk products - Non-fermented and fermented products (does not include preparation); Role of milk in cookery.
- b. Egg: Structure, composition, nutritive value; Egg cookery - Effect of heat, factors affecting coagulation of egg proteins, and effect of other ingredients on egg protein; Role of egg in cookery; Home scale method for detecting egg quality.
- c. Meat: Classification, composition, nutritive value, rigor mortis, ageing, and tenderizing; Meat cookery - Changes during cooking.
- d. Poultry: Classification, composition, and nutritive value.

- e. Fish: Classification, composition, nutritive value, selection, and principles of fish cookery.

Unit-IV (13)

- a. Vegetables: Classification (nutritional), composition, nutritive value; Pigments in vegetables- Water soluble and water insoluble; Enzymes, flavour compounds and bitter compounds; Vegetable cookery- Preliminary preparation, changes during cooking, loss of nutrients during cooking, effect of cooking on pigments, role of vegetables in cookery.
- b. Fruits: Classification, composition, nutritive value, ripening of fruits; Browning- Types and preventive measures.
- c. Spices: General functions, role in cookery; Medicinal value of commonly used spices.

Unit-V (14)

- a. Fats and oils: Composition and nutritive value, basic knowledge about commonly used fats and oils (lard, butter, margarine, cotton seed oil, ground nut oil, coconut oil, soya bean oil, olive oil, rice bran oil, sesame oil, rape seed oil, mustard oil and palm oil); Spoilage of fat- Types and prevention; Effect of heating, role of fats and oils in cookery.
- b. Sugar and related products: Nutritive value, characteristics and uses of various types of sugars; Sugar cookery- Crystallization and factors affecting crystallization; Stages of sugar cookery; Role of sugar in cookery.

References:

1. Maney S (2008). *Foods, Facts and Principles*, 3rd Edition, Published by Wiley Eastern, New Delhi.
2. Usha Chandrasekhar (2002). *Food Science and Application in Indian Cookery*, Phoenix Publishing House P. Ltd., New Delhi.
3. Raina U, Kashyap S, Narula V, Thomas S Suvira, Vir S, Chopra S (2010). *Basic Food Preparation: A Complete Manual*, 4th Edition, Orient Black Swan Ltd., Mumbai.

4. Srilakshmi, B. (2017). *Nutrition Science*, New Age International (P) Ltd., New Delhi.
5. Mahtab, S. Bamji, Kamala Krishnasamy, Brahman G.N.V (2012). *Text Book of Human Nutrition*, Third Edition, Oxford and IBH Publishing Co. P. Ltd., New Delhi.
6. Sunetra Roday (2017). *Food Science and Nutrition*, Oxford University Press, New Delhi.

Suggested Web Resources

1. [Food and Agriculture Organization \(FAO\)](#)
2. [National Institute of Nutrition \(NIN\)](#)
3. [Food Safety and Standards Authority of India \(FSSAI\)](#)
4. [Institute of Food Technologists \(IFT\)](#)
5. [World Health Organization – Nutrition](#)

CO – PO – PSO Mapping (Course Articulation Matrix)

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PS O1	PS O2	PS O3	PS O4	PS O5	PS O6	PS O7
CO 1	3	2	2	1	2	1	2	3	2	2	1	2	2	1
CO 2	3	3	2	2	2	2	2	3	2	2	2	2	2	2
CO 3	3	3	3	2	2	2	2	3	3	3	2	2	3	2
CO 4	2	3	3	2	3	2	2	2	3	3	2	3	2	2
Total	11	11	10	7	9	7	8	11	10	10	7	9	9	7

Correlation Level

3 = High Correlation 2 = Moderate Correlation 1 = Low Correlation Blank = No Correlation

SEMESTER II											
Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	Fundamentals of Food Science Practical	Core Practical IV	-		3		3	3	50	50	100

Course Outcomes (COs)

On completion of this practical course, students will be able to:

CO1: Describe and explain standard food measurement techniques, food grouping, and the evaluation of edible portions of various food materials.

CO2: Apply appropriate experimental procedures to study the physicochemical changes occurring during the cooking of cereals, pulses, milk, eggs, vegetables, fruits, fats, and sugars.

CO3: Analyze the principles of food science involved in the preparation of various food products using suitable cooking methods.

CO4: Evaluate the factors influencing food quality, nutrient retention, texture, flavour, and appearance during food preparation, and recommend appropriate measures for quality improvement.

Course Content

Food Science Practical / Experiential Learning

Week	Practical	Hours
1	Grouping of foods according to ICMR classification; Measurement of food materials using standard measuring cups, spoons and weighing scales	3
2	Determination of edible portion percentage of foods; Observation of microscopic structure of starches before and after gelatinisation	3
3	Study of the effect of temperature, time, concentration, sugar and acid on starch gelatinisation	3
4	Preparation of recipes demonstrating gelatinisation, gluten formation and gel formation; Demonstration of the best method of cooking rice	3
5	Effect of soaking, hard water, sodium bicarbonate and papaya on pulse cookery; Preparation of recipes using pulses and cereal-pulse combinations	3
6	Demonstration of factors affecting coagulation of milk proteins; Preparation of recipes using milk and milk products	3
7	Evaluation of milk quality and demonstration of common milk processing methods	3
8	Demonstration of ferrous sulphide formation in eggs and preventive measures; Study of factors affecting omelette texture	3
9	Preparation of recipes demonstrating functions of eggs as binding, thickening, emulsifying and enriching agents	3
10	Demonstration of the effect of acid, alkali and overcooking on vegetable pigments; Effect of water quantity on cooked vegetables	3
11	Demonstration of enzymatic browning and methods of prevention	3
12	Preparation of salads, soups and curries using fruits and vegetables	3
13	Determination of smoking points of commonly used cooking oils; Preparation of recipes using shallow-fat and deep-fat frying methods	3
14	Demonstration of stages of sugar cookery; Preparation of recipes using sugar and jaggery	3
15	Preparation of beverages (refreshing, nourishing, stimulating, soothing)	3

	and appetizing); Record submission and evaluation	
	Total	45

References:

1. Manay, N.S. and Shadaksharaswamy, M. (2008). *Foods: Facts and Principles*. New Age International Publishers, New Delhi.
2. Usha Chandrasekhar (2002). *Food Science and Application in Indian Cookery*. Phoenix Publishing House Pvt. Ltd., New Delhi.
3. Raina, U., Kashyap, S., Narula, V., Thomas, S., Vir, S. and Chopra, S. (2010). *Basic Food Preparation: A Complete Manual*. Orient BlackSwan, Hyderabad.
4. Sunetra Roday (2017). *Food Science and Nutrition*. Oxford University Press, New Delhi.
5. Srilakshmi, B. (2017). *Nutrition Science*. New Age International Publishers, New Delhi.
6. Mudambi, S.R. and Rao, S.M. (2012). *Food Science*. New Age International Publishers, New Delhi.
7. Potter, N.N. and Hotchkiss, J.H. (2012). *Food Science*. Springer Publications.
8. Swaminathan, M. (2014). *Handbook of Food and Nutrition*. BAPPCO Publishers, Bangalore.

Web Resources

1. [National Institute of Nutrition \(NIN\)](#)
2. [Food Safety and Standards Authority of India \(FSSAI\)](#)
3. [Food and Agriculture Organization \(FAO\)](#)
4. [Institute of Food Technologists \(IFT\)](#)
5. [World Health Organization – Nutrition](#)

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COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PS O1	PS O2	PS O3	PS O4	PS O5	PS O6	PS O7
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CO 2	3	3	3	2	2	2	2	3	3	2	2	2	3	2
CO 3	3	2	3	3	2	2	2	3	3	3	2	2	3	2

CO 4	2	3	3	2	3	2	2	2	3	3	2	3	2	2
Total	11	10	12	9	8	7	8	11	11	10	7	8	10	7

Correlation Level

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SEMESTER II											
Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	Human Development	Allied -III	4				3	4	25	75	100

Course Outcomes (COs)

On completion of this course, students will be able to:

CO1: Describe and explain the principles, stages, and developmental tasks of human growth and development across the lifespan.

CO2: Apply knowledge of human development to interpret the physical, cognitive, social, emotional, and language changes occurring during infancy, childhood, and adolescence.

CO3: Analyze developmental challenges during adolescence, adulthood, and old age, and examine appropriate coping and support mechanisms.

CO4: Evaluate the characteristics, needs, and rehabilitation measures of exceptional children, and develop suitable approaches based on developmental concepts and field-based observations.

Course Content

UNIT	CONTENT	HRS
UNIT I	Growth and development Meaning- growth and development, principles of governing growth and development, developmental task of different stages. Methods of study of human development. Practical - preparation of case study - observing various developmental aspects- physical, motor, cognitive, creative, social, emotional, and intellectual of a particular child.	15
UNIT II	Infancy and Childhood Characteristics, physical, social, and emotional development, cognitive and language development during infancy, early childhood, and late childhood. Children's play – meaning, types, importance stages. Parental Disciplinary Techniques–merits and demerits Practical - Socio-metric study of early adolescents. Analysis of various play techniques.	10
UNIT III	Adolescence Adolescence –physical and psychological changes, emotional, moral and social development, Problems of adolescence. Delinquency–causes, prevention, and rehabilitation. Educational and vocational guidance, the role of family and schools and colleges in guiding adolescence Practical - A survey on Juvenile Delinquency prevalence.	15
UNIT IV	Adulthood and Old Age Adulthood- Characteristics and developmental tasks, all aspects of development and vocational adjustments. Old age: Characteristics of old age, physical changes, and psychological changes. Place of the Aged in Indian Society Practical –Survey on problems of old age.	10

UNIT V	Exceptional Children Introduction to Children with Special Needs and Identification & Educational Rehabilitation - Gifted children, orthopedically challenged, mentally retarded, hearing impaired, visually handicapped, Learning disability Practical- Visit to an institution for exceptional children.	10
	TOTAL	60

References

1. Berk, L.E. (2018). *Development Through the Lifespan*. Pearson Education, New Delhi.
2. Papalia, D.E. and Martorell, G. (2021). *Human Development*. McGraw-Hill Education, New York.
3. Hurlock, E.B. (2017). *Developmental Psychology: A Life Span Approach*. McGraw-Hill Education.
4. Santrock, J.W. (2020). *Life-Span Development*. McGraw-Hill Education, New York.
5. Feldman, R.S. (2019). *Development Across the Life Span*. Pearson Education.
6. Crain, W. (2015). *Theories of Development: Concepts and Applications*. Pearson Education.
7. Sharma, R.N. and Sharma, R.K. (2018). *Child Development*. Atlantic Publishers, New Delhi.
8. Kuppaswamy, B. (2016). *Child Behaviour and Development*. Konark Publishers, New Delhi.

Web Resources

1. [UNICEF](#)
2. [World Health Organization \(WHO\)](#)
3. [National Institute of Public Cooperation and Child Development \(NIPCCD\)](#)
4. [American Academy of Pediatrics \(AAP\)](#)
5. [Child Development Institute](#)

CO – PO – PSO Mapping (Course Articulation Matrix)

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PS O1	PS O2	PS O3	PS O4	PS O5	PS O6	PS O7
CO 1	3	2	2	1	2	2	2	3	2	2	1	2	2	2
CO 2	3	3	2	2	2	2	2	3	3	2	2	2	2	2
CO 3	3	3	3	2	2	3	3	3	2	3	2	2	2	2
CO 4	2	3	3	3	2	3	2	2	3	3	3	2	2	2

Tot al	11	11	10	8	8	10	9	11	10	10	8	8	8	8
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Correlation Level

3 = High Correlation 2 = Moderate Correlation 1 = Low Correlation Blank = No Correlation

SEMESTER II											
Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	Human Development Practical	Allied Practical -IV			2		2	2	50	50	100

Course Outcomes (COs)

CO1: Describe and explain the principles, stages, and developmental tasks associated with human growth and development.

CO2: Apply knowledge of physical, cognitive, emotional, social, and language development to interpret developmental changes during infancy, childhood, and adolescence.

CO3: Analyze developmental issues and adjustment problems encountered during adolescence, adulthood, and old age.

CO4: Evaluate the characteristics and needs of exceptional children and develop appropriate interventions and recommendations based on developmental concepts, field-based studies, surveys, and case analyses.

Course content

Practical / Experiential Learning (30 Hours)

S. No.	Practical / Experiential Learning Activities	Hours
1	Preparation of a case study observing physical, motor, cognitive, creative, social, emotional, and intellectual development of a child.	2
2	Observation and recording of developmental milestones in infants and children.	2
3	Socio-metric study of early adolescents.	2
4	Analysis of various play techniques and preparation of play materials suitable for different age groups.	2
5	Observation of child behaviour in preschool/school settings and report preparation.	2
6	Survey on juvenile delinquency prevalence and contributing factors.	2
7	Study of educational and vocational aspirations among adolescents.	2
8	Survey on adjustment problems during adolescence.	2
9	Survey on problems faced by adults in family and workplace settings.	2
10	Survey on problems of old age and coping strategies adopted by elderly persons.	2
11	Interview with senior citizens regarding ageing and lifestyle changes.	2
12	Observation and identification of characteristics of children with special needs.	2
13	Visit to an institution for exceptional children and submission of a report.	2
14	Preparation of educational materials for parents on child development and guidance.	2
15	Record submission, seminar presentation, and viva voce.	2
Total		30

References:

1. Berk, L.E. (2018). *Development Through the Lifespan*. Pearson Education.
2. Papalia, D.E., Olds, S.W. and Martorell, G. (2021). *Human Development*. McGraw-

Hill Education.

3. Santrock, J.W. (2020). *Life-Span Development*. McGraw-Hill Education.
4. Hurlock, E.B. (2017). *Developmental Psychology: A Life Span Approach*. Tata McGraw-Hill.
5. Feldman, R.S. (2019). *Development Across the Life Span*. Pearson Education.
6. Sharma, R.N. and Sharma, R.K. (2018). *Child Development*. Atlantic Publishers.
7. Crain, W. (2015). *Theories of Development: Concepts and Applications*. Pearson Education.
8. Kuppaswamy, B. (2016). *Child Behaviour and Development*. Konark Publishers.

Web Resources

1. [UNICEF](#)
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4. [American Academy of Pediatrics \(AAP\)](#)
5. [Child Development Institute](#)

CO – PO – PSO Mapping (Course Articulation Matrix)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	2	1	2	2	2	3	2	2	1	2	2	2
CO2	3	3	2	2	2	2	2	3	3	2	2	2	2	2
CO3	3	3	3	2	2	3	3	3	2	3	2	2	2	2
CO4	2	3	3	3	2	3	2	2	3	3	3	2	2	2
Total	11	11	10	8	8	10	9	11	10	10	8	8	8	8

Correlation Level

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SEMESTER II											
Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	Introduction to Fashion Designing	Skill Enhancement Course II	2				1	2	25	75	100

Course Outcomes (COs)

CO1: Describe basic fashion concepts, terminology, fashion cycles, and career opportunities in the fashion industry.

CO2: Apply the elements and principles of design in apparel selection and fashion design.

CO3: Analyze the application of colour theories and colour harmonies in dress designing and fashion illustration.

CO4: Evaluate clothing requirements for different body types, age groups, and occasions, and develop fashion figures and wardrobe plans based on design principles and consumer needs.

Course Content

UNIT	Content	Hours
UNIT I	Introduction to Fashion Designing: Fashion and its importance. Basic fashion terms: fashion, style, fad, classic, trend, fashion cycle, haute couture, prêt-à-porter, fashion merchandising. Overview of the fashion industry and career opportunities.	6
UNIT II	Design in Apparel: Concept and types of design – structural and decorative design. Elements of design: line, shape, colour and texture. Principles of design: balance, rhythm, emphasis, harmony and proportion. Application of design principles in dress selection and apparel designing. Practical: Application of structural and decorative design, elements and principles of design in apparel.	7
UNIT III	Colour and Dress Designing : Meaning and importance of colour. Colour wheel and basic colour theories. Dimensions of colour – hue, value and intensity. Colour harmonies and their application in dress design. Practical: Preparation of colour wheel and application of colour harmonies in apparel designing.	6
UNIT IV	Figure Drawing and Figure Analysis: Basic human proportions and fashion figure drawing (8-head theory). Figure analysis and selection of suitable dress designs for different body types. Practical: Simple fashion figure drawing and dress sketching.	6
UNIT V	Wardrobe Planning and Fashion Selection: Wardrobe planning for different age groups. Factors influencing clothing selection. Designing and selecting dresses for various occasions such as school, work, parties, weddings and sports.	5
	Total Hours	30

References

1. Brown, P. and Rice, J. (2014). *Ready-to-Wear Apparel Analysis*. Pearson Education, New York.
2. Tortora, P.G. and Eubank, K. (2018). *Survey of Historic Costume*. Fairchild Publications, New York.
3. Seetharaman, P., Pannu, P. and Bhargava, R. (2005). *Interior Design and Decoration*. CBS Publishers & Distributors, New Delhi.
4. Bhatt, H. (2011). *Fundamentals of Fashion Design*. Himalaya Publishing House, Mumbai.
5. Ireland, P.J. (2010). *Fashion Design Drawing and Presentation*. Batsford Publications, London.
6. Gini Stephens Frings (2018). *Fashion: From Concept to Consumer*. Pearson Education, New York.
7. Tata Young (2011). *Fashion Design Illustrated*. Laurence King Publishing, London.
8. Wolfe, M.G. (2012). *Fashion Merchandising*. Goodheart-Willcox Publishers, Illinois.

Web Resources

1. [National Institute of Fashion Technology \(NIFT\)](#)

2. Fashion Design Council of India (FDCI)
3. Vogue India
4. Fashion Revolution
5. The Business of Fashion
6. <https://purushu.com/2010/08/elements-of-design-in-fashion.html>
7. <https://vanseodesign.com/web-design/color-meaning/>
8. <http://bieap.gov.in/Pdf/FGMPaperI.pdf>
9. <http://textilelearner.blogspot.com/2015/07/drafting-procedures-of-line-frock.html>
10. <http://textilelearner.blogspot.com/2015/06/drafting-procedures-of-ladies-kurti.html>

CO – PO – PSO Mapping (Course Articulation Matrix)

CO s	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PS O1	PS O2	PS O3	PS O4	PS O5	PS O6	PS O7
CO 1	3	2	2	2	1	2	2	2	2	2	1	1	2	2
CO 2	3	3	3	2	1	2	2	3	3	2	2	1	2	2
CO 3	2	3	3	2	1	2	2	2	3	3	2	1	2	2
CO 4	2	3	3	3	1	2	2	2	3	3	3	1	2	2
Tot al	10	11	11	9	4	8	8	9	11	10	8	4	8	8

Correlation Level

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SEMESTER II											
Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	Landscape Design and Ornamental Garden	SEC III	2				1	2	25	75	100

Course Outcomes (COs)

CO1: Explain the principles of landscape design and evaluate site requirements for planning public, private, and kitchen gardens.

CO2: Apply knowledge of ornamental plants, garden components, and decorative elements in the planning and development of gardens.

CO3: Analyze various styles and types of landscape gardens and their suitability based on aesthetic and functional requirements.

CO4: Evaluate landscape requirements and develop landscape plans incorporating special gardens, indoor and outdoor plants, and sustainable gardening practices.

UNIT	CONTENT	HOURS
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UNIT I	Landscape Design - Definition, Importance and Principles of Design in Landscaping. Requirements in Landscape Area- Site & Location, Site Evaluation, Soil Properties, Water Systems, Climatic Conditions and Lighting. Public and Private Garden. Importance of Kitchen Garden. Practical: Identifying and selecting ornamental plants.	7
UNIT II	Ornamental Gardening: Definition, Components of Garden- Arboretum. Shrubbery, Fernery, Arches and Pergolas, Edges and Hedges. Integral Elements of Garden- Climbers and Creepers, Cacti & Succulents, Herbs, Annuals & Perennials, Flower Borders & Beds. Supplementary Elements of Garden- Ground Covers, Carpet Beds, Bamboo Groves, Topiary and Garden Adornments. Practical: Practices in preparing home garden designs	8
UNIT III	Styles and Types of Landscape Garden - Garden Styles: Formal, Informal and Freestyle, Wild Gardening, Types of Gardens: Persian, Mughal, Japanese, English, Italian, Buddha and Spanish garden. Practical: Practices in preparing any one style of garden design.	5
UNIT IV	Special Types of Gardens - Vertical Garden, Roof Garden, Bog Garden, Sunken Garden, Rock Garden, Clock Garden, Bonsai Gardens, Temple Garden & Sacred Groves. Practical: Project on landscaping	5
UNIT V	Indoor-Outdoor Plants - Kinds and Classification, Factors Influencing Growth of Plants. Planning and Execution of Landscape Design Based on the Styles and Kinds of Plants. Practical: Visit parks and botanical gardens.	5
	Total	30

References

1. Bose, T.K. and Mukherjee, D. (2011). *Gardening in India*. Oxford & IBH Publishing Co., New Delhi.
2. Randhawa, G.S. and Mukhopadhyay, A. (2014). *Floriculture in India*. Allied Publishers, New Delhi.
3. Arora, J.S. (2012). *Introductory Ornamental Horticulture*. Kalyani Publishers, Ludhiana.
4. Laurie, M. (2010). *Introduction to Landscape Architecture*. Elsevier Publications.
5. Bhattacharjee, S.K. (2006). *Landscape Gardening and Design with Plants*. Aavishkar Publishers, Jaipur.
6. Singh, A.K. (2018). *Landscape Gardening*. New India Publishing Agency, New Delhi.
7. Bose, T.K., Maiti, R.G. and Dhua, R.S. (2015). *Ornamental Horticulture*. Naya Udyog Publishers, Kolkata.
8. Kumar, N. (2017). *Introduction to Horticulture*. Rajalakshmi Publications, New Delhi.

Web Resources

1. [Indian Council of Agricultural Research \(ICAR\)](#)
2. [National Horticulture Board \(NHB\)](#)
3. [Royal Horticultural Society \(RHS\)](#)
4. [Missouri Botanical Garden](#)

5. Botanical Survey of India (BSI)

CO – PO – PSO Mapping (Course Articulation Matrix)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	PS O6	PS O7
CO1	3	2	2	1	3	2	2	3	2	2	1	3	2	2
CO2	3	2	3	2	3	2	2	3	3	2	2	3	2	2
CO3	2	3	3	2	2	2	2	2	3	3	2	2	2	2
CO4	2	3	3	3	3	2	3	2	3	3	3	3	2	2
Total	10	10	11	8	11	8	9	10	11	10	8	11	8	8

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