CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS)

NATIONALLY ACCREDITED (IIICYCLE) WITH "A" GRADE BY NAAC
ISO 9001:2015 Certified
TIRUCHIRAPPALLI

DEPARTMENT OF FOOD SERVICE MANAGEMENT AND DIETETICS

B.Sc., NUTRITION AND DIETETICS

SYLLABUS

2023-2024 and Onwards

CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS), TRICHY-18

DEPARTMENT OF FOOD SERVICE MANAGEMENT AND DIETETICS

B.Sc., NUTRITION AND DIETETICS

LEARNING OUTCOME BASED CURRICULUM FRAME WORK (CBCS-LOCF)

(For the Candidates admitted from the Academic year 2023-2024 onwards)

Semester I

Semester	Part	Course	Title	Course Code	Inst .Hrs. / week	Credits	Exam			Total
							Hrs.	Marks		
								Int	Ext	
I	I	Language Course – I (LC) – Tamil * / Other Languages *	பொதுத்தமிழ் -I	23ULT1	6	3	3	25	75	100
			Hindi ka Samanya Gyan aur Nibandh	23ULH1						
			Poetry, Grammar and History of Sanskrit Literature	23ULS1						
			Foundation Course: Paper I- French I	23ULF1						
	II	English Language Course-I (ELC)	General English– I	23UE1	6	3	3	25	75	100
	III	Core Course –I (CC)	Human Physiology	23UND1CC1	5	5	3	25	75	100
		Core Practical-I (CP)	Human Physiology (P)	23UND1CC1P	3	3	3	40	60	100
		First Allied Course –I (AC)	Food Chemistry	23UND1AC1	4	3	3	25	75	100
		First Allied Course –II (AP)	Food Chemistry (P)	23UND1AC2P	4	3	3	40	60	100
	IV	Ability Enhancement Compulsory Course– I (AECC)	Value Education	23UGVE	2	2	-	100	-	100
		TOTAL			**30**	**22**				**700**

Semester II

Semester	Part	Course	Title	Course Code	Inst .Hrs. / week	Credits	Exam			Total
							Hrs.	Marks		
								Int	Ext	
II	I	Language Course – II (LC) – Tamil * / Other Languages *	பொதுத்தமிழ் - II	23ULT2	6	3	3	25	75	100
			Hindi Literature & Grammar - II	22ULH2						
			Prose, Grammar and History of Sanskrit literature	23ULS2						
			Basic French - II	22ULF2						
	II	English Language Course-II (ELC)	General English - II	23UE2	6	3	3	25	75	100
	III	Core Course –II (CC)	Nutrition Through Life Span	22UND2CC2	5	5	3	25	75	100
		Core Practical-II (CP)	Nutrition Through Life Span (P)	22UND2CC2P	3	3	3	40	60	100
		Core Course –III (CC)	Food Science	23UND2CC3	2	2	3	25	75	100
		First Allied Course – III (AC)	Macro and Micro Nutrients	23UND2AC3	4	3	3	25	75	100
	IV	Ability Enhancement Compulsory Course– II (AECC)	Environmental Studies	22UGEVS	2	2	-	100	-	100
		Ability Enhancement Compulsory Course– III (AECC)	Innovation and Entrepreneurship	22UGIE	2	1	-	100	-	100
		Extra Credit Course	SWAYAM ONLINE COURSE		As per UGC Recommendation					
		TOTAL			**30**	**22**				**800**

Semester III

Sem	Part	Course	Title	Course Code	Inst. Hrs/Week	Credits	Exam			Total
							Hrs	Marks		
								Int	Ext	
III	I	Language Course – III (LC) – Tamil* / Other Languages *)	பொதுத்தமிழ்-III	23ULT3	6	3	3	25	75	100
			Hindi Literature & Grammar III	22ULH3						
			Drama, Grammar and History of Sanskrit Literature	23ULS3						
			Intermediate French - I	22ULF3						
	II	English Language Course- III (ELC)	Learning Grammar Through Literature - I	23UE3	6	3	3	25	75	100
	III	Core Course– IV(CC)	Diet Therapy I	23UND3CC4	5	5	3	25	75	100
		Core Practical–III (CP)	Diet Therapy I (P)	22UND3CC3P	3	3	3	40	60	100
		Second Allied Course- I (AC)	Nutritional Biochemistry	22UND3AC4	4	3	3	25	75	100
		Second Allied Course – II (AP)	Nutritional Biochemistry (P)	22UND3AC5P	4	3	3	40	60	100
	IV	Generic Elective Course– I (GEC)	Basics in Nutrition	22UND3GEC1	2	2	3	25	75	100
			Basic Tamil - I	22ULC3BT1						
			Special Tamil - I	22ULC3ST1						
		Extra Credit Course	SWAYAM ONLINE COURSE		As per UGC Recommendation					
		TOTAL			**30**	**22**				**700**

Semester IV

Sem	Part	Course	Title	Course Code	Inst. Hrs/ Week	Credits	Exam			Total
							Hrs	Marks		
								Int	Ext	
IV	I	Language Course – IV (LC) Tamil * / Other Languages*)	பொதுத்தமிழ்-IV	23ULT4	6	3	3	25	75	100
			Hindi Literature & Functional Hindi	22ULH4						
			Alankara, Didactic and Modern Literatures and Translation	23ULS4						
			Intermediate French II	22ULF4						
	II	English Language Course - IV(ELC)	Learning Grammar Through Literature - II	23UE4	6	3	3	25	75	100
	III	Core Course – V(CC)	Diet Therapy II	23UND4CC5	6	5	3	25	75	100
		Core Practical - IV(CP)	Diet Therapy II (P)	22UND4CC4P	4	4	3	40	60	100
		Second Allied Course – III (AC)	Food Microbiology	23UND4AC6	4	3	3	25	75	100
		Internship	Internship	22UND4INT	-	2	-	40	60	100
	IV	Generic Elective Course– II (GEC)	Meal Planning for the Family	22UND4GEC2	2	2	3	25	75	100
			Basic Tamil - II	22ULC4BT2						
			Special Tamil - II	22ULC4ST2						
		Skill Enhancement Course– I (SEC)	Basics in Food Production (P)	22UND4SEC1P	2	2	3	40	60	100
		Extra Credit Course	SWAYAM ONLINE COURSE		As per UGC Recommendation					
		TOTAL			**30**	**24**				**800**

SEMESTER -V

Sem	Part	Course	Title	Course Code	Inst. s/Week	Credits	Exam			Total
							Hrs	Marks		
								Int	Ext	
V	III	Core Course – VI(CC)	Food Processing and Preservation	23UND5CC6	6	5	3	25	75	100
		Core Practical – V(CP)	Food Processing and Preservation (P)	22UND5CC5P	3	3	3	40	60	100
		Core Course - VII(CC)	Basics in Research Methodology and Computer Applications	23UND5CC7	6	5	3	25	75	100
		Core Course – VIII(CC)	Community Nutrition	23UND5CC8	6	5	3	25	75	100
		Discipline Specific Elective – I (DSE)	A. Food Standards and Quality Control	23UND5DSE1A	5	3	3	25	75	100
			B. Food Product Development and Marketing	23UND5DSE1B						
			C. Front Office Management and Housekeeping	23UND5DSE1C						
	IV	Ability Enhancement Compulsory Course - IV (AECC)	UGC Jeevan Kaushal - Professional Skills	22UGPS	2	2	-	100	-	100
		Skill Enhancement Course – II (SEC)	Bakery and Confectionary (P)	22UND5SEC2P	2	2	3	40	60	100
		Extra Credit Course	SWAYAM ONLINE COURSE		As per UGC Recommendation					
		TOTAL			**30**	**25**				**700**

SEMESTER -VI

Sem	Part	Course	Title	Course Code	Inst. rs/Week	Credits	Exam			Total
							Hrs	Marks		
								Int	Ext	
VI	III	Core Course – IX(CC)	Perspectives of Home Science	23UND6CC9	6	5	3	25	75	100
		Core Course – X(CC)	Food Service Management	23UND6CC10	5	4	3	25	75	100
		Core Course – XI(CC)	Cyber Security	22UGCS	5	4	3	25	75	100
		Core Practical – VI(CP)	Food Service Management (P)	22UND6CC6P	3	3	3	40	60	100
		Discipline Specific Elective – II (DSE)	A. Functional Foods and Nutraceuticals	23UND6DSE2A	5	3	3	25	75	100
			B.Sports Nutrition	23UND6DSE2B						
			C.Basics in Food Analysis	23UND6DSE2C						
		Project	Project Work	22UND6PW	5	4	-	-	100	100
	IV	Ability Enhancement Compulsory Course - V (AECC)	Gender Studies	22UGGS	1	1	-	100	-	100
	V	Extension activity		22UGEA	0	1	0	-	-	-
		TOTAL			**30**	**25**				**700**
		GRAND TOTAL			**180**	**140**				**4400**

CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS)

DEPARTMENT OF FOOD SERVICE MANAGEMENT AND DIETETICS

VISION

To strengthen and integrate academic excellence, ethical values and social responsibility to develop a healthy nation by imparting skill based knowledge, professional competency and entrepreneurial skills.

MISSION

- To have a breath of knowledge across the subject areas of Nutrition and Dietetics.
- To professionally enrich the students for successful career in Academia, Industry and Research.
- To promote and inculcate self-reliance, social relevance, sound value system and code of professional practice among students.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEOs	Statements
PEO1	**LEARNING ENVIRONMENT** To facilitate value-based holistic and comprehensive learning by integrating innovative learning practices to match the highest quality standards and train the students to be effective leaders in their chosen fields.
PEO2	**ACADEMIC EXCELLENCE** To provide a conducive environment to unleash their hidden talents and to nurture the spirit of critical thinking and encourage them to achieve their goal.
PEO3	**EMPLOYABILITY** To equip students with the required skills in order to adapt to the changing global scenario and gain access to versatile career opportunities in multidisciplinary domains.
PEO4	**PROFESSIONAL ETHICS AND SOCIAL RESPONSIBILITY** To develop a sense of social responsibility by formulating ethics and equity to transform students into committed professionals with a strong attitude towards the development of the nation.
PEO5	**GREEN SUSTAINABILITY** To understand the impact of professional solutions in societal and environmental contexts and demonstrate the knowledge for an overall sustainable development.

PROGRAMME OUTCOMES FOR
B.Sc., NUTRITION AND DIETETICS PROGRAMME

PO NO	Programme Outcome On completion of B.Sc., Programme, the students will be able to
PO1	**ACADEMIC EXCELLENCE AND COMPETENCE** Elicit firm fundamental knowledge in theory as well as practical for coherent understanding of academic field to pursue multi and interdisciplinary science careers in future.
PO2	**HOLISTIC AND SOCIAL APPROACH** Create novel ideas related to the scientific research concepts through advanced technology and sensitivity towards sustainable environmental practices as well as social issues.
PO3	**PROFESSIONAL ETHICS AND TEAM WORK** Explore professional responsibility through project strategies, internships, field trip/industrial visits and mentorship programmes to transmit communication skills.
PO4	**CRITICAL AND SCIENTIFIC THINKING** Equip training skills in internships, research Projects to do higher studies in multidisciplinary path with higher level of specialization to become professionals of high-quality standards.
PO5	**SOCIAL RESPONSIBILITY WITH ETHICAL VALUES** Ensure ethical, social and moral values in the minds of learners and attain gender parity for building a healthy nation.

PROGRAMME SPECIFIC OUTCOMES FOR
B.Sc ., NUTRITION AND DIETETICS PROGRAMME `

PSO NO	Programme Specific Outcomes` Students of B.Sc., Nutrition & Dietetics will be able to	POs Addressed
PSO1	Apply the knowledge of food science, nutrition and dietetics to resolve the scientific issues and problems.	PO1
PSO2	Assess the nutritional status and recommend nutritional support and therapeutic care as sustainable approach for better health and prevention of diseases.	PO1, PO2
PSO3	Associate physiological, biochemical and microbiological parameters with health and diseases.	PO1
PSO4	Develop technical and human relation skills in relation to food services, demonstrate professional attributes required to manage the hospitality industry and to communicate effectively in the context of nutrition and dietetics.	PO3, PO4
PSO5	Demonstrate critical thinking skills and analytical abilities to identify and solve problems through internships and projects.	PO4, PO5

SEMESTER I	INTERNAL MARKS: 25			EXTERNAL MARKS:75
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS / WEEK**	**CREDITS**
23UND1CC1	**HUMAN PHYSIOLOGY**	**CORE**	**5**	**5**

Course Objectives

- To augment knowledge on anatomical perception of organs and its co-ordination with other organs.
- To understand the functions of the human organs.
- To study the structure of human organs.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO 1	Define the main structures composing human body	K1
CO 2	Explain process of the system in the body	K2
CO 3	Relate organ structure with function	K3
CO 4	Determine functions of cells, tissues and organs	K4
CO 5	Ascertain physiological adaptations	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	3	3	3	2	3	2
CO2	3	3	3	2	3	3	3	2	3	2
CO3	3	3	3	2	3	3	3	2	3	2
CO4	3	3	3	2	3	3	3	2	3	2
CO5	3	3	3	2	3	3	3	2	3	2

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation "-" indicates there is no correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**a. Cell :** Structure of organelles and functions. Tissues– Structure, classification and functions. **b. Blood :** Composition, functions, coagulation, factors affecting coagulation, blood groups. **c. Immune system** : Innate, acquired and active immunity, cell mediated immunity, humoral immunity and complement system	15	CO1, CO2, CO3, CO4, CO5	K1,K2,K3,K4
II	**a. Heart and Circulatory system**: Structure, cardiac cycle, cardiac output, factors affecting cardiac output, normal ECG, heart failure, blood pressure, control and factors affecting blood pressure. **b. Respiratory system :** Structure and functions, Lung volumes and lung capacities, Factors affecting efficacy of respiration.	15	CO1, CO2, CO3, CO4, CO5	K1,K2,K3,K4
III	**a. Nervous System:** General classification of nervous system-, Structural organization of nervous system – neuron, ganglion, neuroglia, nerves – classification - motor, sensory and mixed, Structure and functions - spinal cord, brain - anatomy and functions of cerebrum, cerebellum, brain stem and medulla oblongata. **b. Sense Organs :** Structure and function of eye, ear, nose and tongue.	15	CO1, CO2, CO3, CO4, CO5	K1,K2,K3,K4
IV	**a Gastrointestinal and Hepto biliary system :** Digestive system- Anatomy, Structure and Functions of mouth, pharynx, esophagus, stomach, Small intestine and large intestine. Digestive gland – salivary, liver, gall bladder and pancreas. Digestion in the mouth, stomach and intestines. **b. Excretory system :** Urinary System-Structure and functions of organs of urinary system, Mechanism of urine formation. micturition Skin- Structure and functions, Regulation of body temperature.	15	CO1, CO2, CO3, CO4, CO5	K1,K2,K3,K4

V	**a. Endocrine system :** Thyroid, Parathyroid, Adrenal gland, Pituitary and Sex glands – Structure and functions **b. Reproductive system :** Female reproductive system--Structure and functions, menstrual cycle, menarche and menopause. Male Reproductive system - Structure and functions.	15	CO1, CO2, CO3, CO4, CO5	K1,K2,K3,K4
VI	**SELF STUDY FOR ENRICHMENT** **(Not to be included for External Examination)** Functions of heamoglobin, Artificial respiration, Errors of refraction, Movements of the intestine Menstrual disorders.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

Text Books

1. Sembulingam. (2016). *Essentials of Medical Physiology*. Health Sciences Publisher. New Delhi.
2. Subramanyam., Sarada. (2018). *Textbook of Human Physiology*. S.Chand and company Ltd, New Delhi.
3. Randhawa.S.S., Atul Kabra.(2017). *Human Anatomy and Physiology*-I. S.Vikas and Company, India.

Reference Books

1. Guyton (2000). Guyton and Hal *Textbook of Medica Physiology*, Saunders, United States of America.
2. Waugh Anne Ross and Wilson (2003). *Anatomy and Physiology in Health and Illness*. Churchill Livingston. New York.
3. Murugesh. N (2011*). Anatomy and Physiology*, Sathya Publishers, Madurai.
4. Wilson Ross (2014). *Anatomy and Physiology in Health and Illness*, Reed Elsevier India Private Limited. New Delhi.
5. Chatterjee .C.2016). *Human Physiology* Volume I, Medical Allied Agency. Kolkata.

Web Link:

1. https://www.khanacademy.org/science/health-and-medicine/human-anatomy- andphysiology
2. https://www.biologyonline.com/tutorials/the-human-physiology
3. https://digitaleditions.library.dal.ca/intropsychneuro/chapter/hunger-and-eating/
4. https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=NuAs6SreCGryddEfs4kkB A==

Journals:

1. Human Physiology, Maik Nauka / Interperiodica Publishing, Russian Federation.
2. Indian Journal of Clinical Anatomy and Physiology, Innovative publication Pvt. LTD, India.
3. American Journal of Physiology - Endocrinology and Metabolism, American Physiological Society, United States.
4. Canadian Journal of Physiology and Pharmacology, Canadian Science Publishing, Nrc Research Press, Canada.

Pedagogy

Chalk and talk, PPT, Discussion, Assignment, Demo, Quiz, Seminar.

Course Designers

- Ms. S.FATHIMA

SEMESTER I	INTERNAL MARKS: 40			EXTERNAL MARKS:60
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS / WEEK**	**CREDITS**
23UND1CC1P	**HUMAN PHYSIOLOGY (P)**	**CORE PRACTICAL**	**3**	**3**

Course Objectives

- To acquire knowledge on cellular arrangements
- To understand the components present in blood
- To learn methods to be adopted for the measurement of various blood parameters

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Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO 1	Identify cells present in the body	K1
CO 2	Explain cellular adaptations related to physiological changes	K2
CO 3	Illustrate the methods to be adapted for the measurement of various blood parameters	K2
CO 4	Predict number of cells present in blood	K3
CO 5	Dissect various cellular arrangement in tissues and organs	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	3	3	3	2	3	2
CO2	3	3	3	2	3	3	3	2	3	2
CO3	3	3	3	2	3	3	3	2	3	2
CO4	3	3	3	2	3	3	3	2	3	2
CO5	3	3	3	2	3	3	3	2	3	2

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation

"3" – Substantial (High) Correlation "-" indicates there is no correlation.

List of Experiments

1. Microscopic study of tissues- epithelial, connective and muscular.
2. Collection of blood sample-Capillary blood from finger tips and venous blood.
3. Separation of blood components (Centrifugation).
4. Estimation of hemoglobin-Sahli's Acid hematin method.
5. Determination of Hematocrit (Wintrobe method).
6. Preparation and examination of stained blood smear (Wedge or glass slide method).
7. Determination of Erythrocyte Sedimentation Rate (Wintrobe method).
8. Determination of blood group.
9. Determination of bleeding time (Duke method) and coagulation time (Capillary tube method).
10. Platelet count (Rees Ecker method by hemocytometry).
11. Clinical examination of radial pulse (pulse rate).
12. Measurement of blood pressure (Sphygmomanometry).
13. Effect of exercise on blood pressure and heart rate.
14. Microscopic structure of heart, digestive system and kidney.
15. Microscopic structure of reproductive organs-ovary, uterus, mammary glands and testis.
16. Microscopic structure of endocrine glands-thyroid, pituitary and adrenal.

Text Books

1. G.K.Pal and Parvati Pal.(2001) *Text book of practical physiology*. Orient Longman Ltd.

Reference Books

1.Sembulingam. (2016). *Essentials of Medical Physiology*. Health Sciences Publisher. New Delhi.
2. Subramanyam., Sarada. (2018). *Textbook of Human Physiology*. S.Chand and Company Ltd, New Delhi

Web Links:

1. https://www.khanacademy.org/science/health-and-medicine/human-anatomy-andphysiology
2. https://www.biologyonline.com/tutorials/the-human-physiology
3. https://digitaleditions.library.dal.ca/intropsychneuro/chapter/hunger-and-eating/
4. https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=NuAs6SreCGryddEfs4kkB A==

Pedagogy

Chalk and talk, PPT, Discussion, Assignment, Demonstration

Course Designers

- MS. S.FATHIMA

SEMESTER I	INTERNALMARKS:25			EXTERNALMARKS:75
COURSE CODE	COURSETITLE	CATEGORY	HRS / WEEK	CREDITS
23UND1AC1	FOOD CHEMISTRY	ALLIED	4	3

Course Objectives

- To gain insight into the chemistry of foods
- To understand the scientific principles involved in food preparation
- To understand the various properties exhibited by foods

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the Successful completion of the course, students will be able to	Cognitive Level
CO1	Define physical and chemical properties of food	K1
CO2	Explain the structural changes of food during cooking	K2
CO3	Predict the cooking quality of food	K3
CO4	Classify plant pigments	K3
CO5	Examine the uses of food additives and leavening agent	K4

Mapping of CO with PO and PSO

Cos	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	1	1	3	3	1	1	1
CO2	3	2	2	1	1	3	2	1	1	1
CO3	3	3	2	2	1	3	3	1	1	1
CO4	3	3	2	2	1	3	3	1	2	1
CO5	3	2	1	-	-	3	3	2	1	1

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation "-" indicates there is no correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Introduction to Food Science, Physiochemical properties of food and water** **a) Introduction to Food Science –** Definition of Food Science, Basic Five Food Groups and its components, Nutritional classification of food. **b) Introduction to physiochemical properties of food** - Physical Properties of water and ice, hydrogen bonding, bound water, water activity, determination of moisture content**.** **c)Types of colloidal system -** Colloids, sol, gel, emulsion and foam.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	**Starch and Sugar** **a)Starch-** Structure, characteristics, components and types, swelling of starch granules, gel formation, gelatinization, retrogradation, effect of sugar, acid, alkali, fat and surface-active agents on starch. **b)Sugar** - Stages of sugar, artificial sweeteners, solubility and crystallization, factors affecting crystallisation – crystalline and non-Crystalline candies, caramelization, chemistry of milk sugar, non-enzymatic browning and its preventive measures.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
III	**Protein** **a)Properties and components of protein -** Coagulation and denaturation of protein, protein concentrates, isolates and hydrolysate and their application, effect of soaking, fermentation and germination on pulse protein. **b)Chemistry of protein**-Action of heat, acid, and alkali on vegetable and animal protein.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
IV	**Fats and oils** **a)Physical and chemical properties of fats and oils -** Hydrogenation, winterization, decomposition of triglycerides, shortening power of fats. **b) Changes in fats and oils**–Changes during cooking, factors affecting absorption of fat in foods.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
V	**Pigments, Food additives and Leavening agents** **a) Pigments -** Types of plant pigments, water and fat soluble pigments, natural colours used in foods, pectins, phenolic components, enzymatic	12	CO1, CO2, CO3, CO4,	K1, K2, K3, K4

	browning in fruits and vegetables. volatile compounds in fruits and vegetables. **b) Food additives**-Classification and its uses. **c) Leavening agents** - Types, physical, chemical and biological leavening agents, mechanism of action.		CO5	
VI	**SELF STUDY FOR ENRICHMENT** **(Not to be included for External Examination)** Types of emulsion, Factors affecting gelatinization, Chemistry of coagulation of egg, Types and prevention of rancidity, Uses of Leavening agents.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

Text Books

1. Shakuntala Manay. N. (2013). *Foods: Facts and Principles*. (3rd ed.). New Age International Publishers, New Delhi.
2. Swaminathan, M. (2019). *Advanced Text Book on Food and Nutrition*. (2nd ed.). Bangalore Printing and Publishing Co. Ltd, Bangalore.
3. Srilakshmi.B.(2020). *Food Science*. (8th ed). New Age International Publishers, New Delhi.
4. Iqbal, Syed Aftab. (2011). *Advanced Food Chemistry*.Discovery Publishing House, New Delhi.
5. Chopra H,K and Panesar P,S. (2015). *Food Chemistry*. Narosa Publishing House(P) Ltd, New Delhi.

Reference Books

1. Vickie, A., Vaclavik Elizabeth, W.Christian. (2014). *Essentials of Food Science*.(4th ed.). Springer Science and Business Media, New York.
2. Raheena Begum, M. (2015). *Textbook of Foods. Nutrition and Dietetics*. (3rd ed.), Sterling Publishers Pvt. Ltd, New Delhi.
3. Avantina Sharm. (2019). *Textbook of Food Science and Technology*. (3rd ed.). CBS Publishers and Distributors.

Web Links

- https://www.sciencedirect.com/journal/food-
- https://www.eolss.net/sample-chapters/c10/e5-08-07-00.pdf
- http://egyankosh.ac.in//handle/123456789/69055

Journals

1. Journal of food chemistry and nutrition science, Pakistan.
2. Food chemistry, Elsevier, United Kingdom.

Pedagogy

E-content, Lecture, Power point presentation, Seminar, Assignment, Group Discussion

Course Designer

Ms.N.GANGA DEVI

SEMESTER I	INTERNALMARKS:40			EXTERNALMARKS:60
COURSE CODE	COURSE TITLE	CATEGORY	HRS / WEEK	CREDITS
23UND1AC2P	FOOD CHEMISTRY (P)	ALLIED PRACTICAL	4	3

Course Objectives

- To gain the knowledge on chemistry of various nutrients present in food.
- To understand the physical and chemical changes during cooking.
- To develop skills to judge the quality of food.

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Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On successful completion of the course, students will be able to	Cognitive Level
CO1	Identify the structure of starch molecules	K1
CO2	Describe the factors affecting the cooking quality of food	K2
CO3	Predict enzymatic browning in fruits and vegetables	K3
CO4	Infer the changes of fats and oils during temperature modifications	K4
CO5	Determine the role of food additives	K4

Mapping of CO with PO and PSO

Cos	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	1	2	3	3	1	1	1
CO2	3	2	2	1	1	3	2	1	1	1
CO3	3	2	2	1	1	3	3	1	1	1
CO4	3	2	2	1	1	3	3	1	2	1
CO5	3	2	2	1	1	3	3	2	1	1

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation "-" indicates there is no correlation.

List of Experiments

1. **Chemistry of starch** - Properties of food starches, microscopic examination of uncooked and cooked gelatinized starch, dextrinization.
2. **Chemistry of sugar** - Stages of sugar cookery, sugar crystallization in preparation of fondant, fudge, and caramel, browning reaction in milk sugar.
3. **Chemistry of proteins in cereals and pulses -** Gluten formation, factors influencing texture, digestibility of pulses - soaking, germination, addition of sodium bicarbonate, addition of salt, water quality- hard and soft water, pressure cooking, and malting of pulses.
4. **Chemistry of proteins in milk and egg** - Curdling of milk using lime juice, butter milk, tomato juice. Coagulation of egg white and egg yolk (boiled egg, poached egg, omelete), prevention of Ferrous sulphide formation on the yolk, factors affecting whipping quality of egg white – effect of salt, sugar, vinegar, fat and milk
5. **Chemistry of Fats and Oils** - Determination of smoking temperature of different fats and oils, effect of temperature of oil on texture and palatability of foods - Frying pooris at different temperatures.
6. **Chemistry of Plant Pigments** - Changes in colour and texture of vegetables due to different methods of cooking, cooking medium and addition of acid/alkali on water-soluble and fat-soluble pigments, enzymatic browning in apples, banana, brinjal and raw banana and its preventive measures.
7. **Food additives and Raising agents** - Role of MSG (Mono Sodium Glutamate), sodium benzoate and KMS (Potassium bi sulphate) in food preparation and preservation, use of baking soda, baking powder, yeast in baking and food preparation- prepare one dish with each of these, uses of herbs and spices to enhance flavour.

Text Books

1. Shakuntala ManayN. (2013). *Foods: Facts and Principles*. (3rd ed). New Age International Publishers,New Delhi.
2. Swaminathan M. (2019). *Advanced Text Book on Food and Nutrition*.(2nd ed). Bangalore Printing and Publishing Co. Ltd, Bangalore.

Reference Books

1. Krishna Arora.(2008). *Theory of cookery*.Frank Brothers & Co.
2. Penfield MP and Ada Marie C.(2012). *Experimental Food Science*. Academic Press, SanDiego

Web Links

- https://www.ihmnotes.in/assets/Docs/Books/Theory_of_Cookery.pdf
- http://staffnew.uny.ac.id/upload/132318572/pendidikan/buku-esp.pdf
- https://www.scienceofcooking.com/

Journals

1. Journal of food chemistry and nanotechnology, United Scientific Group, USA
2. Journal of Agricultural and Food chemistry, American chemical society, United States.

Pedagogy:

E-content, Lecture, Power Point presentation, Seminar, Assignment, Demonstration

Course Designer:

Ms. N.GANGA DEVI

SEMESTER- II	INTERNAL MARKS: 25		EXTERNALMARKS:75	
COURSECODE	**COURSETITLE**	**CATEGORY**	**HRS / WEEK**	**CREDITS**
22UND2CC2	**NUTRITION THROUGH LIFE SPAN**	**CORE**	**5**	**5**

Course Objectives

- To learn about nutritional needs of various age group.
- To enable the students to plan menu.
- To acquire knowledge on physiological changes in various stages of life cycle.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Identify national nutritional guidelines for various life stages.	K1
CO2	Describe physiological changes in various stages of life cycle.	K2
CO3	Relate nutritional care plan for all age groups.	K3
CO4	Associate nutritional strategies to combat the nutritional problems.	K4
CO5	Determine menu according to nutritional requirements of different age group.	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	-	3	3	-	3	3
CO2	3	3	3	2	-	3	3	-	3	3
CO3	3	3	3	2	-	3	3	-	3	3
CO4	3	3	3	2	-	3	3	-	3	3
CO5	3	3	3	2	-	3	3	-	3	3

“1” – Slight (Low) Correlation ¬ “2” – Moderate (Medium) Correlation
“3” – Substantial (High) Correlation ¬ “-” indicates there is no correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**a) Fundamentals of Nutrition -** Basic five food groups, nutrient needs - Dietary Reference Intakes, RDA and dietary guidelines, my plate, balanced diet. **b) Menu planning** - Definition, principles of menu planning, points to be considered in menu planning, steps involved in planning menu, factors influencing meal planning.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	**a) Nutrition for Pregnancy** – Physiological changes during pregnancy, stages of pregnancy, nutritional assessment and guidance in prenatal care, importance of pre and periconceptional nutrition during pregnancy, nutritional problems, complications, food and nutritional requirements, dietary guidelines. **b) Nutrition for Lactation** – Role of hormones in milk production, factors affecting the volume and composition of breast milk, role of galactogogues, food and nutritional requirements, dietary guidelines, Lactation failure and factors responsible for lactation failure.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
III	**a) Nutrition for Infants**- Growth and development, importance of breast feeding, advantages of breast feeding, food and nutritional requirements. Weaning – definition, types of weaning and supplementary foods, points to be considered in introducing weaning foods, problems faced while introducing weaning foods, complication in infant feeding - Low birth weight , artificial feeding, special children.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

	b) Nutrition for Preschoolers – Growth and development, food and nutritional requirements, factors affecting nutritional status, low cost supplementary foods and nutritional problems among preschoolers.			
IV	**a) Nutrition for school going children** – Growth and development, food and nutritional requirements, packed lunch – factors to be considered, sample menu, school lunch programmes, nutritional problems. **b) Nutrition for adolescent** – Growth and development, body composition, puberty, secondary sexual characteristics, food and nutritional requirements, dietary guidelines, nutritional problems.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
V	**a) Nutrition for adulthood** – Food and nutritional requirements, dietary guidelines, nutritional problems. Nutrition and work efficiency. **b) Nutrition for Elderly** –Process of ageing, food and nutritional requirements, dietary guidelines, nutrition related problems, degenerative diseases.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
VI	**SELF STUDY FOR ENRICHMENT (Not to be included for External Examination)** Classification of nutrients. Traditional sources of lactogogues . Points to be considered while planning packed lunch for a school going child. Physiological changes during elderly.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

Text Books

1. Srilakshmi ,B (2014). *Dietetics*. New Age International. New Delhi
2. Gajalakshmi ,R (2014). *Nutrition Science.* CBS Publishers and Distributors Pvt. Ltd

Reference Books

1. Barasi, Mary E, Great Britain (2002). *Human Nutrition: Health Perspective* Hodder
2. Sari Edelstein (2009). *Life cycle nutrition*:*An Evidence- based Approach.* Jones and Bartlett Publisher.
3. Swaminathan M (2012). *Handbook of Food and Nutrition*. Bangalore Publishing Co. Ltd.
4. Gopalan.C, Rama Sastri.V.B and Balasuramanian.S.C (2020). *Nutritive Value of Indian Foods* National Institute of Nutrition (ICMR) Hyderabad.
5.Shubhangini A Joshi. (2021).*Nutrition and Dietetics*, McGraw-Hill Education (India) Pvt Limited New Delhi..5th ed

6. Ravinder Chadha and Pulkit Mathur.(2015)**.***Nutrition: A Lifecycle Approach.* The orient black swan.

Web Links

- .https://quizizz.com/admin/quiz/5fa0555b365e37001e0c688d/nutrition-through-the-lifecycle
- http://213.55.90.4/admin/home/Dmu%20Academic%20Resource//Health%20Science/Nutrition%20and%20Food%20Science/2nd%20Year/Nutrition%20T
- https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=NuAs6SreCGryddEfs4kkBA==
- https://www.fda.gov/media/135301/download
- https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=NuAs6SreCGryddEfs4kkBA==
- https://egyankosh.ac.in/handle/123456789/31256

Journals

1. Journal of Nutrition and Metabolism, Biomed central, United Kingdom
2. Pregnancy Hypertension, Elsevier B.V, Netherlands

Pedagogy

E-content, Lecture, Power point presentation, Seminar, Assignment, Group discussion.

Course Designers

Ms. S. FATHIMA
Ms. T.R. REVATHI

SEMESTER-II	INTERNAL MARKS: 40		EXTERNAL MARKS:60	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS / WEEK**	**CREDITS**
22UND2CC2P	**NUTRITION THROUGH LIFE SPAN (P)**	**CORE PRACTICAL**	**3**	**3**

Course Objectives

- To gain knowledge on nutritive value of Indian foods.
- To understand the importance of nutrition for various stages of life cycle.
- To plan meal for various stages of life cycle.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Identify nutritive value of various foods	K1
CO2	Explain the importance of RDA for various stages of life cycle	K2
CO3	Prepare meal according to RDA	K3
CO4	Determine the nutrient content of the planned recipe	K4
CO5	Ascertain meal for various stages of life cycle	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	-	3	3	-	3	3
CO2	3	3	3	2	-	3	3	-	3	3
CO3	3	3	3	2	-	3	3	-	3	3
CO4	3	3	3	2	-	3	3	-	3	3
CO5	3	3	3	2	-	3	3	-	3	3

“1” – Slight (Low) Correlation ¬ “2” – Moderate (Medium) Correlation
“3” – Substantial (High) Correlation ¬ “-” indicates there is no correlation.

List of Experiments

1. Plan, calculate nutritive value and prepare meal for pregnant women.
2. Plan, calculate nutritive value and prepare meal for lactating women.
3. Plan, calculate nutritive value and prepare meal for an infant.
   Preparation of supplementary foods – Liquid, semi solid and solid.
4. Plan, calculate nutritive value and prepare meal for preschooler
5. Plan, calculate nutritive value and prepare meal for school going children
6. Plan, calculate nutritive value and prepare meal for an adolescent boy and an adolescent girl.
7. Plan, calculate nutritive value and prepare meal based low, moderate and high income for an adult man and an adult woman.
8. Plan, calculate nutritive value and prepare meal for elderly.

Text Books

1. Srilakshmi B (2014). *Dietetics New Age International*.New Delhi
2. Gajalakshmi R (2014). *Nutrition Science* CBS Publishers and Distributors Pvt. Ltd

Reference Books

1. Barasi, Mary E, Great Britain (2002). *Human Nutrition: Health Perspective* Hodder and Stoughton.
2. Sari Edelstein (2009). *Life cycle nutrition*. Lones and Bartlett Publisher.
3. Swaminathan M (2012). *Handbook of Food and Nutrition.* Bangalore Publishing Co Ltd
4. Gopalan.C, Rama Sastri.V.B and Balasuramanian.S.C (2016). *Nutritive Value of Indian Foods* National Institute of Nutrition (ICMR) Hyderabad

Web Links

- https://www.tarladalal.com/recipes-for-healthy-pregnancy--369
- https://www.indianhealthyrecipes.com/indian-baby-food-recipe/
- https://poshan.outlookindia.com/story/poshan-news-healthy-recipes-for-adolescents/361731
- https://www.tarladalal.com/recipes-for-senior-citizen-easy-to-chew-1028

Pedagogy

E-content, Lecture, Power point presentation, Seminar, Assignment, Group discussion.

Course Designers

- Ms.S.FATHIMA
- Ms.T.R.REVATHI

SEMESTER - II	INTERNAL MARKS: 25			EXTERNAL MARKS:75
COURSE CODE	COURSE TITLE	CATEGORY	HRS / WEEK	CREDITS
23UND2CC3	FOOD SCIENCE	CORE	2	2

Course Objectives

- To obtain knowledge on different food groups and their composition
- To study the different methods of cooking
- To understand the role of food groups in cookery

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO 1	Identify foods based on food groups and list their uses.	K1
CO 2	Explain classification, nutritive value and storage of different food groups	K2
CO 3	Relate changes in food due to cooking, processing and factors that affect acceptability, and nutritive value of various food groups	K3
CO 4	Sketch different methods of cooking and select the methods best suited for cooking different foods.	K3
CO 5	Ascertain the selection criteria of different food groups	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	-	2	2	3	3	3	2	-
CO2	3	3	-	2	2	3	3	3	2	-
CO3	3	3	-	2	2	3	3	3	2	-
CO4	3	3	-	2	2	3	3	3	2	-
CO5	3	3	-	2	2	3	3	3	2	-

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation "-" indicates there is no correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**a) Fundamentals Food Science** Definition of food science, basic five food groups, nutritional classification of foods–energy yielding, body building, protective and regulatory foods. **b) Cooking methods** Objectives, different types cooking methods-moist, dry heat methods, microwave cooking, combination of cooking methods. Recent methods of cooking–Ohmic cooking and induction cooking –merits and demerits.	6	CO1 CO2 CO3 CO4 CO5	K1, K2, K3, K4
II	**a) Cereals and Millets** Classification of cereals**,** structure, composition, nutritive value o f cereals, milling of parboiling of rice. Nutritional importance of millets-(maize, jowar, ragi, bajra), malting of cereals and role of cereals in cookery. **b) Pulses** Composition, nutritive value, factors affecting cooking quality of pulses, germination, role of pulses in cookery.	6	CO1 CO2 CO3 CO4 CO5	K1, K2, K3, K4
III	**a) Vegetables** Classification and nutritive value, pigments-fat-soluble, water-soluble, selection of vegetables, cooking of vegetables-changes during cooking. **b) Fruits** Classification, nutritive value, changes during ripening of fruits, enzymatic browning and methods of prevention.	6	CO1 CO2 CO3 CO4 CO5	K1, K2, K3, K4
IV	**a) Milk and Milk Products** Composition, nutritive value, types of milk products-fermented milk products (Buttermilk, Yogurt) and non-fermented milk products (Skim milk, evaporated milk, sweetened condensed milk, Milk powder, Khoa, Ice cream, Pasteurization, and homogenization. **b) Egg, Meat, Poultry and Fish** Structure, classification, composition, nutritive value, selection, post mortem changes in meat, and tenderness of meat, cooking and storage.	6	CO1 CO2 CO3 CO4 CO5	K1, K2, K3, K4

V	**a) Fats, Sugar, Spices and Condiments** Types, sources-animal fats and vegetable fats, functions, rancidity, smoking point and role of fat or oil in cookery. **b) Sugar** Types and market forms of sugars, sugar related products, uses in cookery. **c) Salt**-Types and Uses **d) Spices and Condiments** Classification, uses of spices in Indian cookery and medicinal properties.	6	CO1 CO2 CO3 CO4 CO5	K1, K2, K3, K4
VI	**SELF STUDY FOR ENRICHMENT** **(Not to be included for External Examination)** Solar cooking method- merits and demerits. Role of millets in cookery. Criteria of selection of fruits. Role of milk in cookery. Stages of sugar cookery.	-	CO1 CO2 CO3 CO4 CO5	K1, K2, K3, K4

Text Books

1. Potter, Norman. N. (2007).*Food Science*. (5th ed). CBS Publications and distributors. New Delhi.

2. Shakuntala Manay. N. (2013). *Foods: Facts and Principles*. (3rd ed). New Age International Publishers. New Delhi.

3. Swaminathan, M. (2019). *Advanced Text Book on Food and Nutrition*. Volume (2nd ed). Bangalore Printing and Publishing Co. Ltd, Bangalore.

4**.** Mahatb, S. Bamji. Kamala Krishnasamy. Brahman. G.N.V.(2020).*Textbook of Human Nutrition*. (3rd ed.). Oxford and IBH Publishing Co. P. Ltd., New Delhi.

Reference Books

1. Sharma Jyoti, S. (2009). *Applied Nutrition and Food Science*. Akansha Publishing House, New Delhi.

2. Raheena Begum, M. (2015). *Textbook of Foods, Nutrition and Dietetics*. (3rd ed.). Sterling Publishers Pvt. Ltd, New Delhi.

3. Krause, M. V. Hunesher, M. A. (2013). *Food, Nutrition and Diet Therapy*. W. B. Saunders Company. Philadelphia. London.

4. Vickie, A. Vaclavik Elizabeth, W. Christian. (2014).*Essentials of Food Science*. (4th ed.). Springer Science and Business Media, New York.

5. Avantina Sharma. (2019). *Textbook of Food Science and Technology*. (3rd ed.). CBS Publishers and Distributors.

Web Links:

- https://www.scienceofcooking.com/
- https://www.brainkart.com/article/Structure-of-cereal-grains_33949/
- https://fruitsandveggies.org/stories/key-nutrients-that-protect/
- https://pubmed.ncbi.nlm.nih.gov
- https://journalofethnicfoods.biomedcentral.com

Journals

1. Food Science and Nutrition, John Wiley and Sons Ltd publisher, United Kingdom.

2. Food and Nutrition Research, Co-Action Publishing, Sweden.

3. Journal of Food Science Education, Institute of Food Technologists publishing, United States.

4. Journal of the Science of Food and Agriculture, Wiley-Blackwell publishing, England.

Pedagogy:

Chalk and talk, Power Point Presentation, Discussion, Assignment, Quiz, Seminar.

Course Designers:

MS. E. AGALYA
MS. C. NIVETHA

SEMESTER – II	INTERNAL MARKS – 25		EXTERNAL MARKS - 75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS / WEEK**	**CREDIT**
23UND2AC3	**MACRO AND MICRO NUTRIENTS**	**ALLIED**	**4**	**3**

Course Objectives

- To gain knowledge on classification of nutrients.
- To get insight into the role of nutrients in maintaining health of the individual and community.
- To understand the inter-relationship of the various nutrients.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Identify food sources of macro and micro nutrients	K1
CO2	Illustrate functions of macro and micro nutrients	K2
CO3	Relate inter– relationship between health and nutrition	K3
CO4	Predict excess and deficiency effects of various nutrients	K3
CO5	Determine water and electrolyte balance	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	2	2	1	3	3	1	3	-
CO2	3	3	2	2	1	3	3	1	3	-
CO3	3	3	2	2	1	3	3	1	3	-
CO4	3	3	2	2	1	3	3	1	3	-
CO5	3	3	2	2	1	3	3	1	3	-

“1” – Slight (Low) Correlation ¬ “2” – Moderate (Medium) Correlation

“3” – Substantial (High) Correlation ¬ “-” indicates there is no correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**a) Carbohydrates –** Nutritional classification, functions, sources, deficiency and excess effects. Dietary Fibre – definition, Classification. physiological and metabolic effect, role of fibre in prevention of diseases**.** **b) Energy** – Units of measurement, determination of energy value of food, components of energy requirement, measurement of total energy requirements. Energy requirement during work. Specific Dynamic Action. Basal Metabolic Rate and factors affecting BMR	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	**a) Proteins –**Nutritional classification of proteins and amino acids, functions of proteins and amino acids, sources, deficiency and excess effects. Evaluation of protein quality. (PER, BV, NPU, CS) **b) Lipids –** Nutritional classification of lipids and fatty acids, Essential fatty acids, functions, deficiency and excess effects, health benefits of omega fatty acids.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
III	**a) Vitamins - Fat Soluble Vitamins-** (A, D, E & K) –Functions, RDA, sources, deficiency and excess effects. **b) Water Soluble Vitamins -** (B complex & C) - Functions, RDA, sources, deficiency and excess effects.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3,K4,
IV	**a) Minerals-Macro Minerals-** (Calcium, Phosphorus, Potassium, Sodium) - Functions, RDA, sources, deficiency and excess effects. **b) Micro Minerals -** (Iron, Iodine, Fluorine) - Functions, RDA, sources, deficiency and excess effects.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

V	**a) Water –** Definition, distribution of water, functions, requirements, sources, water balance, maintenance of water balance, distribution of electrolytes, maintenance of electrolyte balance. **b) Nutrient interrelationship –** Interrelationship between macronutrients and vitamins.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
VI	**SELF STUDY FOR ENRICHMENT** **(Not to be included for External Examination)** Health benefits of dietary fibre. High biological value protein. Toxicity of vitamins. General functions of minerals in human body. Role of water in human body.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

Text Books

1. Swaminathan, M. (1999). *Handbook of Food and Nutrition*. Bangalore Publishing Co Ltd, Bangalore.
2. Srilakshmi, B. (2017). *Nutrition Science.*New Age International(p)ltd. New Delhi.
3. Longvah, T.. Anandhan, R.,.Bhaskarachary, K. Venkaiah, K. (2017).*Indian Food Composition Table.* National Institute of Nutrition.

Reference books

1. Swaminathan, M. (1998).*Essentials of Food and Nutrition.* Bappco, Bangalore.
2. Vidya, Chintapalli. (1996*). Textbook of Nutrition*. Discovery Book Palace(p) Ltd, Chennai.
3. Berdanier, Carolyn, D. (2015). *Advanced Nutrition: Macronutrients, Micronutrients, and Metabolism.* Atlantic Publishers and Distributors. New Delhi.
4. Raheena Begum, M. (2009). *Textbook of Foods, Nutrition and Dietetics.* Sterling Publishers. New Delhi.
5. Martin Eastwood. (2013). *Principles of Human Nutrition.* Wiley Publishing.
6. Bamji Mahtab, S. (2017). *Textbook of Human Nutrition* (3rd ed.). Oxford & IBH Publishing Co Pvt Ltd. New Delhi.
7. Gopalan, C. (2011). *Dietary Guidelines for Indians.* Second Edition National Institution of Nutrition. Hyderabad.

Web links

- https://www.publichealthnotes.com/classification-of-nutrients-type-i-type-ii-macro-micro/
- https://openoregon.pressbooks.pub/nutritionscience/chapter/1c-classification-of-nutrients/
- https://www.medicalnewstoday.com/articles/161547#nutrition
- https://www.healthline.com/nutrition/protein-deficiency-symptoms#TOC_TITLE_HDR_6
- https://www.healthline.com/health/mineral-deficiency#What-are-the-symptoms-of-mineral-deficiency

Journals

1. Italian Journal of Pediatrics, Biomedical Central Ltd, Springer.
2. International Journal of Innovative Research and Reviews Erzurum, Turkey.
3. Journal of Food and Nutritional Disorders, London, United Kingdom

Pedagogy

Chalk and talk, PPT, Discussion, Assignment, Demo, Quiz, Seminar.

Course Designers

Ms. E.AGALYA

SEMESTER III	INTERNAL MARKS:25		EXTERNAL MARKS:75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS/ WEEK**	**CREDITS**
23UND3CC4	**DIET THERAPY I**	**CORE**	**5**	**5**

Course Objectives

- To know the principles of diet therapy
- To study the metabolic changes of disease conditions
- To understand the modification of normal diet for therapeutic purposes

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO 1	Identify the responsibilities, professional ethics and code of conduct of dietitian	K1
CO 2	Explain the principles of diet therapy, drug nutrient interaction and special feeding methods	K2
CO 3	Relate the causes, symptoms and complications of diseases	K3
CO 4	Compute nutritional care for food allergy and children with special needs	K3
CO 5	Ascertain dietary principles in planning and preparing diet for various diseases and compute nutritive value	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	3	3	3	3	3	3
CO2	3	3	3	2	3	3	3	3	3	3
CO3	3	3	3	2	3	3	3	3	3	3
CO4	3	3	3	2	3	3	3	3	3	3
CO5	3	3	3	2	3	3	3	3	3	3

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation

"3" – Substantial (High) Correlation "-" indicates there is no Correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**a) Dietitian** Definition and classification of dietitian. Qualities and responsibilities of dietitian. Role of dietitian in hospitals and community. Professional ethics and code of conduct of dietitian. **b) Diet therapy and progressive modifications** Definition, principles of a therapeutic diet. Routine Hospital diets and progressive modifications - Clear fluid diet, full fluid diet, soft diet, regular normal diet, bland diet. Specially modified therapeutic diets – High and low calorie, high and low protein, high and low residue diets, high and low-fat diets.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	**a) Drug nutrient interaction** Modification of diet according to medical prescription – Diet effects on drug disposition, drug effects on nutrients and interaction of drugs. **b) Special feeding methods** Enteral and Parenteral feeding- Indications, types (oral supplements, tube feeding, parenteral feeding, TPN, pre and postoperative diets) methods of administration, monitoring and associated complications.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
III	**a) Nutritional care for diseases of gastro intestinal tract** Peptic ulcer, Diarrhoea, Constipation, Haemorrhoids and Malabsorption syndrome – aetiology, clinical findings and dietary management. b) **Nutritional care for febrile condition** Metabolic changes during fever and types of fever (acute and chronic), aetiology, clinical findings and dietary management of Typhoid, Influenza, Malaria, Tuberculosis and HIV.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
IV	**a) Nutritional care for diseases of biliary system** Jaundice, Fatty liver, hepatitis, cirrhosis and Hepatic coma- aetiology, clinical findings and dietary management. Cholelithiasis and Cholecystitis- aetiology, clinical findings and dietary management.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

	b) **Nutritional care for obesity and underweight** Obesity and overweight- Definition, etiology, types, assessment, complications, prevention and dietary management. Underweight-Definition, aetiology, prevention and dietary management.			
V	**a) Nutritional care for allergy** Definition, food allergens, clinical manifestations, diagnosis of food allergy and dietary management. **b) Nutritional care for the children with special needs** Down's syndrome, Cerebral Palsy, Autism, Attention Deficit Hyperactivity Disorder – Clinical findings, nutritional care and feeding difficulties.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
VI	**SELF STUDY FOR ENRICHMENT** **(Not to be included for External Examination)** Indian Dietetic Association, Comparison of enteral and parenteral nutrition, Nutritional care for pandemic fevers, Grading of obesity, Food induced anaphylaxis.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

Text Books

1. Srilakshmi B.(2019). Dietetics.(8th ed)New Age International. New Delhi.
2. Sangeetha Karnik. (2010). Nutrition and Diet Therapy.Biotech Pharma Publications.
3. Sumati R Mudambi. (2012).Fundamentals of Foods, Nutrition and Diet Therapy. (6 th ed). New Age International, New Delhi.
4. De Bruyne, Pinna, Whitney. (2012).Nutrition and Diet Therapy. (8th ed). Library of Congress.
5. Avantina Sharma. (2017).Principles of Therapeutic Nutrition and Dietetics.CBS Publishers and Distributors.

Reference Books

1. Mahatb, S., Bamji., Kamala Krishnasamy, Brahman, G.N.V., (2020). Textbook of Human Nutrition. (3 rd ed.). Oxford and IBH Publishing Co. P. Ltd., New Delhi.
2. Raheena Begum, M. (2015). Textbook of Foods, Nutrition and Dietetics. (3rd ed.). Sterling Publishers Pvt. Ltd. New Delhi.
3. Krause, M. V. Hunesher, M. A. (2013). Food, Nutrition and Diet Therapy. W. B. Saunders Company. Philadelphia. London.
4. Kathleen ML. and Escott S.(2000) .Krause's Food, Nutrition and Diet Therapy. (9thed.). W.B. Saunders Company Pennsylvania.

Web links

- https://www.sciencedirect.com/topics/medicine-and-dentistry/full-liquid-diet
- https://www.webmd.com/allergies/allergies-elimination-diet
- https://www.iffgd.org/upper-gi-disorders.html
- https://pinnt.com/Enteral-Nutrition.aspx
- https://www.urmc.rochester.edu/childrens-hospital/nutrition/special-needs.aspx

Journals

1. Canadian Journal of Dietetic Practice and Research, Dieticians Canada, Canada
2. Journal of Human Nutrition and Dietetics, Wiley-Blackwell, England
3. Journal of the Academy of Nutrition and Dietetics, Elsevier
4. Journal of Human Nutrition and Dietetics, Wiley online library, UK
5. Nutrition and Health-SAGE Journals

Pedagogy

Lecture, Chalk and Talk, Seminar, Assignment, E-Content, Power Point Presentation, Quiz.

Course Designer

- Dr. B. THANUJA

SEMESTER III	INTERNAL MARKS:40	EXTERNAL MARKS:60		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS/ WEEK**	**CREDITS**
22UND3CC3P	**DIET THERAPY I (P)**	**CORE PRACTICAL**	**3**	**3**

Course Objectives

- To understand the modification of normal diet for therapeutic purpose
- To calculate nutritive value based on therapeutic modification
- To acquire the skills of preparing diet for various disease conditions

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO 1	Define therapeutic diet and state characteristics of routine hospital diets such as clear liquid diet, full liquid diet and soft diet	K1
CO 2	Explain the basic principles involved in planning diets for different disease conditions.	K2
CO 3	Relate practical knowledge of therapeutic diet to meet the requirement of diet therapy	K3
CO 4	Prepare diets to meet out the quality and quantity requirements for specific disease conditions	K3
CO 5	Infer dietary principles in planning and preparing diet for various diseases and compute nutritive value	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	1	-	3	2	1	2	-
CO2	3	3	3	1	-	3	2	1	2	-
CO3	3	3	3	1	-	3	2	1	2	-
CO4	3	3	3	1	-	3	2	1	2	-
CO5	3	3	3	1	-	3	2	1	2	-

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation "-" indicates there is no correlation.

List of Experiments

1. Planning and Preparation of Therapeutic diets
   - Clear liquid diet
   - Full liquid diet
   - Soft diet
2. Planning and Preparation of diet for
   - Peptic ulcer
   - Diarrhoea
   - Constipation
3. Planning and Preparation of diet for Fevers
   - Typhoid
   - Tuberculosis
4. Planning and Preparation of diet for
   - Obesity
   - Under weight
5. Planning and Preparation of diet for
   - Hepatitis
   - Cirrhosis
6. Visit to hospital dietary units

Text Books

1. Srilakshmi B. (2019). *Dietetics.*(8th ed)New Age International, New Delhi.
2. F. P. Antia& Philip Abraham. (2002).*Clinical Dietetics and Nutrition. (*4th ed). Oxford University Press.

Reference Books

1. Barasi, Mary E, Great Britain (2002). *Human Nutrition: Health Perspective* Hodder and Stoughton.
2. Gopalan.C. Rama Sastri.V.B and Balasubramanian.S.C. (2017). *Nutritive Value of Indian Foods* National Institute of Nutrition (ICMR) Hyderabad.

Web links

- https://vikaspedia.in/health/nutrition/dietary-guidelines-1/avoid-overeating-to-prevent-overweight-and-obesity
- https://www.youtube.com/watch?v=aa9bvQtJv6s
- https://www.youtube.com/watch?v=9EUFrKdmd5U

Pedagogy

Lecture, Chalk and Talk, Demonstration, Practical, E-Module, Visit to hospital dietary unit.

Course Designers

- Ms. B.THANUJA
- Ms.C.NIVETHA

SEMESTER III	INTERNAL MARKS: 25	EXTERNAL MARKS:75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS / WEEK**	**CREDITS**
22UND3AC4	**NUTRITIONAL BIOCHEMISTRY**	**ALLIED**	**4**	**3**

Course Objectives

- To acquire knowledge on basic concepts of biochemical reactions
- To understand the biochemical reactions involved in the metabolism of various nutrients in the body
- To comprehend the mode of action of different enzymes in cell

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On Successful Completion of the course, students will be able to	Cognitive Level
CO1	State the structure, classification, properties and functions of macro and micro nutrients	K1
CO2	Illustrate on the cellular functions for maintaining the homeostasis	K2
CO3	Describe enzyme activity in the metabolic action	K2
CO4	Predict the anabolic and catabolic mechanism of nutrients	K3
CO5	Associate the effect of free radicals and gene on nutrient metabolism	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	-	2	3	3	-	2	-
CO2	3	2	3	-	2	3	3	-	2	-
CO3	3	2	3	-	2	3	3	-	2	-
CO4	3	2	3	-	2	3	3	-	2	-
CO5	3	2	3	-	2	3	3	-	2	-

"1" – Slight (Low) Correlation, "2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation , "-" indicates there is no correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COS	COGNITIVE LEVEL
I	**a) Cell** Introduction, cell organelles, cell membrane, movement of the substances and water through the cell membrane, bioelectric potentials. **b) Enzymes** Definition, classification of enzymes, Coenzyme, Role of B-vitamins as coenzyme, factors affecting enzyme activity, enzyme inhibition. **c)Hormones** Protein hormones, steroid hormones.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	**a) Protein** Amino acids classification, structure, properties, protein structure, peptide linkage, covalent backbone, three-dimensional conformation, quaternary structure of oligomeric proteins. Determination of –N and –C terminal amino acids, protein functions. Hormonal regulation of protein metabolism. Protein metabolism- synthesis of proteins and metabolism of amino acids. **b) Nucleotides and nucleic acids** Structure of purine and pyrimidines nucleotides, DNA, RNA – structure and types, biosynthesis and catabolism of purine and pyrimidine nucleotide	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
III	**a) Carbohydrates** Classification, structure, properties and functions. Hormonal regulation of carbohydrate metabolism. Carbohydrate metabolism – glycolysis, HMP shunt pathway, TCA cycle, gluconeogenesis from TCA intermediates/ amino acids/ acetyl CoA, concept of glycogenesis and glycogenolysis. Glucose homeostasis.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

	b) Lipids Classification, structure, properties, biological significance, Bioenergetics – electron transport and oxidative phosphorylation, redox potential, high energy compounds. Hormonal regulation of lipid metabolism. Lipid metabolism – Alpha, omega, beta oxidation of fatty acids, biosynthesis of fatty acids.			
IV	**a) Vitamins** Fat Soluble Vitamins – A,D,E,K and its metabolism. Water Soluble – B,C and its metabolism. **b) Minerals -**Macro Minerals – Calcium, Phosphorus, Sodium, Potassium, Magnesium and its metabolism. Micro Minerals – Iron, Fluorine, Zinc, Iodine, Selenium and its metabolism.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
V	**a) Free radicals and antioxidants** Definition, Formation in biological systems. Antioxidants– definition, classification – enzymatic and non-enzymatic. **b) Nutrigenomics** Definition, Scope, effects of nutrients on gene expression – direct interactions, epigenetic interactions, genetic variations.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
VI	**SELF STUDY FOR ENRICHMENT (Not to be included for External Examination)** Functions of enzymes, Role of hormones in nutrient metabolism, Classification of fatty acids, Synergetic mechanism of nutrients, Functions of antioxidants.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

Text Books

1.Sucheta PDandekai.(2000).*Medical Biochemistry*.B.I.Churchill Livingstone.
2. Lauralee Sherwood.(2007). *Human Physiology*(6th Ed). Brooks Cole Publishing Co.
3. AmbikaShanmugam.(2008).*Fundamentals of Biochemistry for Medical students*.Lippincott Williams & Wilkins.
4. Rafi MD.(2015).*Textbook of Biochemistry for Medical Students.* University of Health Sciences. University Press.

Reference Books

1. Patricia Trueman.(2007).*Nutritional Biochemistry.* MJP Publishers.
2. Mallikarjuna Rao N.(2008).*Medical Biochemistry*.S.Chandand Company Ltd. NewDelhi.
3. Jain J L.(2008).*Fundamentals of Biochemistry*.S.Chandand Company Ltd.New Delhi.
4. Robert k Murray.(2009).*Harper's Illustrated Biochemistry.*McGraw Hill.
5. John E Hall.Guyton&Hall.(2013).*Text Book of Medical Physiology*.Elsevier India Private Limited. New Delhi.
6. Agarwal G R Meerut.(2014).*Text Book of Biochemistry*.Krishnaprakashan Media (P) Ltd.
7. SatyanarayananU.(2014).*Biochemistry.* Elsevier India Private Limited.New Delhi.

Web links

- https://opentextbc.ca/anatomyandphysiology/chapter/24-4-lipid-metabolism/
- https://www.ncbi.nlm.nih.gov/books/NBK9921/
- https://vikaspedia.in/health/nutrition/antioxidants/antioxidant-and-their-medicinal-applications

Journals

1. Journal of Nutritional Biochemistry, Elsevier Science Inc, United States
2. Biochemistry, American Chemical Society, United States

Pedagogy

E-content, Lecture, Power point presentation, Seminar, Assignment.

Course Designers

- Ms. S.FATHIMA
- Ms. M.VINOTHINI

SEMESTER III	INTERNAL MARKS: 40		EXTERNAL MARKS: 60	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS / WEEK**	**CREDITS**
22UND3AC5P	**NUTRITIONAL BIOCHEMISTRY (P)**	**ALLIED PRACTICAL**	**4**	**3**

Course Objective

- To develop skills in handling analytical equipment
- To understand the procedures of qualitative analysis
- To learn the analytical techniques of quantitative analysis

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On Successful Completion of the course, students will be able to	Cognitive Level
CO1	Identify the chemicals used for qualitative and quantitative analysis	K1
CO2	Illustrate qualitative and quantitative analysis	K2
CO3	Prepare reagents for qualitative and quantitative analysis	K3
CO4	Predict the procedure involved in qualitative and quantitative analysis	K3
CO5	Infer the results	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	-	2	3	3	-	2	-
CO2	3	2	3	-	2	3	3	-	2	-
CO3	3	2	3	-	2	3	3	-	2	-
CO4	3	2	3	-	2	3	3	-	2	-
CO5	3	2	3	-	2	3	3	-	2	-

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation

"3" – Substantial (High) Correlation "-" indicates there is no Correlation.

List of Experiments

1. Qualitative tests for Sugars -Glucose, Fructose, Lactose, Maltose, Sucrose, Starch.
2. Qualitative tests for Proteins.
3. Qualitative tests for Minerals.
4. Quantitative estimation of Glucose – Benedicts method
5. Quantitative estimation of Iron – Titration method
6. Quantitative estimation of Calcium – Titration method
7. Quantitative estimation of Ascorbic acid- Colorimetry
8. Technique of Chromatography (Paper)
9. Electrophoretic pattern of blood proteins (Demonstration)

Text Books

1. Ambika Shanmugam(2008).*Fundamentals of Biochemistry for Medical students.* Lippincott Williams Wilkins
2. Pattabiraman .N.T(2001).*Laboratory Manual in Biochemistry*.All India Publishers and Distributors Regd,Chennai

Reference Books

1. Shanmugam.S, Sathishkumar,T, PanneerSelvam. K.(2010).*Laboratory handbook on biochemistry*. PHI learning Private Ltd,Chennai.
2. Evangeline Jones.(2016). Manual of Practical Medical Biochemistry,(2nd ed).Jaypee Brothers Medical Publishers(p) Ltd.

Web links

- https://opentextbc.ca/anatomyandphysiology/chapter/24-4-lipid-metabolism/
- https://www.ncbi.nlm.nih.gov/books/NBK9921/

Pedagogy

E-content, Lecture, Demonstration, Power point presentation.

Course Designers

- Ms. S.FATHIMA
- Ms. M.VINOTHINI

SEMESTER III	INTERNAL MARKS :25		EXTERNAL MARKS :75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HOURS / WEEK**	**CREDIT**
22UND3GEC1	**BASICS IN NUTRITION**	**GENERIC ELECTIVE**	**2**	**2**

Course Objectives

- To gain basic knowledge on classification of nutrients
- To get insight into the role of nutrients in maintaining health
- To understand importance of nutrition education

Course Outcomes

CO Number	CO statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Define nutrition and Recommended Dietary Allowances	K1
CO2	Explain classification of nutrients and objectives of nutritional programmes	K2
CO3	Illustrate the sources, requirement, functions, deficiency and excess effect of nutrients	K2
CO4	Predict the methods of nutritional assessment	K3
CO5	Ascertain techniques involved in nutrition education	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	2	2	-	3	3	-	3	3
CO2	3	3	2	2	-	3	3	-	3	3
CO3	3	3	2	2	-	3	3	-	3	3
CO4	3	3	2	2	-	3	3	-	3	3
CO5	3	3	2	2	-	3	3	-	3	3

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation

"3" – Substantial (High) Correlation "-" indicates there is no correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**a)Nutrition and Health**- Definition of Nutrition and Health, Importance of nutrition for health, Basic five food group, My plate and the functions of food. **b) Nutrients and RDA**-Definition and classifications of nutrients, RDA, factors affecting RDA.	**4**	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	**a)Carbohydrates** – Nutritional classification, functions, requirement, excess and deficiency effects. Role of dietary fibre in human nutrition, **b) Protein** – Nutritional classification, functions, sources, requirement, excess and deficiency disorders. Amino acids- Classification and functions. **c) Lipids** – Classification, functions, sources, requirement, excess and deficiency effects. Fatty acids – Classification and functions.	**8**	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
III	**a)Vitamins** – Fat soluble vitamins -A, D, E and K - functions, sources, requirements excess and deficiency disorders, Water soluble vitamins – Vitamin C and B vitamins (Thiamine, Riboflavin, Niacin, Pyridoxin, Folic acid, B12) - functions, sources, requirement, excess and deficiency disorders. **b) Minerals** – Calcium, Phosphorus, Sodium, Potassium, Iron, Iodine, Fluorine - functions, sources, requirement, excess and deficiency disorders.	**8**	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
IV	**a) Basics of assessing nutritional status :Direct method** -Anthropometric measurements (BMI, WHR, Broca's Index), Biochemical and Clinical assessment. **b) Indirect method** - Dietary Survey (24-hour dietary recall, food frequency questionnaire, diet history, dietary record),Vital statistics.	**6**	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

V	**a) Nutrition education –**Definition**, t**ools, steps, importance of nutrition education. Nutrition education for prevention of underweight, obesity, anaemia. **b) Nutrition intervention programmes in India** - Nutritional Anaemia Prophylaxis Programme, National Prophylaxis Programme against Vitamin A Deficiency Diseases, National Goitre Control Programme, Integrated Child Development Services (ICDS).	**4**	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
VI	**SELF STUDY FOR ENRICHMENT** **(Not to be included for External Examination)** Food pyramid, Sources of energy, Functions of water in human body and water balance, Importance of assessment of nutritional status, PEM-Types and symptoms.	**-**	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

Text Books

1.Srilakshmi B.(2021). *Nutrition Science.*(7th ed) New Age International Publishers. New Delhi.
2.Swaminathan.M. (2018). *Hand book of Food and Nutrition*.Bangalore Printing and Publishing Co Ltd. Bangalore
3.Raheena Begum.M. (2019).*A Text Book of Foods. Nutrition and Dietetics.*(3rd revised ed). Sterling Publishers Private Limited.

Reference Books

1. Gajalakshmi R. (2018). *Nutrition Science.*(2nd ed). CBS Publishers and distributors Pvt Ltd. New Delhi, India.
2. IndraniT.K. (2017).*Nursing Manual of Nutrition and Therapeutic Diet.*(2nd ed). Jaypee Brothers Medical publishers (P) Ltd, New Delhi.
3. SunetraRoday. (2018).*Food Science and Nutrition*(3rd ed).Oxford University press, New Delhi, India.

Web links

- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3995129/
- http://www.tuscany-diet.net/carbohydrates/classification-functions/
- https://www.nia.nih.gov/health/vitamins-and-minerals

Journals

1. Journal of the Korean Society of Food Science and Nutrition, Korean Society of Food Science and Nutrition, South Korea.
2. Food and Agricultural Immunology, Taylor & Francis, England.
3. Nutrition and Food Science, Emerald Group Publishing Ltd, United Kingdom.

Pedagogy

E-content, Lecture, Power Point Presentation, Seminar, Assignment

Course Designers

- Ms.E.AGALYA
- Ms.R.ARTHY

SEMESTER IV	INTERNAL MARKS:25			EXTERNAL MARKS:75
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS/ WEEK**	**CREDITS**
23UND4CC5	**DIET THERAPY II**	**CORE**	**6**	**5**

Course Objectives

- To learn role of dietary treatment in the management of disease conditions.
- To know the principles of dietary management.
- To know the role of computers in management of dietary practice.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO 1	Define the causes, symptoms and complications of diseases.	K1
CO 2	Explain the application of dietary principles in the management of various diseases and compute nutritive value	K2
CO 3	Interpret the role of nutraceuticals in the prevention of diseases	K2
CO 4	Apply the steps in diet counselling process	K3
CO 5	Examine the importance of computers in nutrition practice	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	3	3	2	3	3	2
CO2	3	3	3	2	3	3	2	3	3	2
CO3	3	3	3	2	3	3	2	3	3	2
CO4	3	3	3	2	3	3	2	3	3	2
CO5	3	3	3	2	3	3	2	3	3	2

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation

"3" – Substantial (High) Correlation "-" indicates there is no correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	a. **Nutritional care for Diabetes Mellitus:** Aetiology and predisposing factors, symptoms, types, diagnostic and screening criteria, complications, food exchange list, glycemic index, glycemic load treatment and dietary modifications. b. **Nutritional care for Hormonal diseases:** aetiology, symptoms, and dietary modification for – Cushing's syndrome, Addison's disease, hypothyroidism and hyperthyroidism.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	a. **Nutritional care for cardiovascular diseases:** Hyperlipidaemia, Hypertension, Atherosclerosis and Congestive cardiac failure - aetiology, clinical findings and dietary management. b. **Nutritional care for Neoplastic Diseases:** Cancer – Types, stages and markers. Nutrition in the etiology of cancer. Nutritional effects of cancer and cancer therapy, nutritional care of cancer patients	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
III	a. **Nutritional care for diseases of the musculoskeletal system:** Arthritis, Osteoporosis and Gout - meaning, symptoms, causes, treatment and dietary management b. **Nutritional care for burns:** Types, causes, pathophysiology, medical nutrition therapy.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
IV	a. **Nutritional care for Renal diseases:** Nephritis, Nephrosis, Renal failure and Urinary calculi - Predisposing factors, symptoms and dietary management. Dialysis -types, and modification of diet in dialysis. b. **Nutritional care for Inborn errors of metabolism:** Phenylketonuria, Galactosemia, Fructosuria, Niemann – pick disease– causes, symptoms, and dietary management.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
V	a. **Nutrition care process and Dietary Counseling** - Nutrition Care Process: Definition, Steps of Nutrition Care Process. Dietary counselling: clients and counselors, client responsibility, attributes of a successful counselor, steps in counseling process, counseling guidelines.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

	b. **Computers in Management of Nutrition Practice:** General information – data input, data output, data analysis, data communication, clinical care – communication in patient care and nutritional therapy, Computer application in Preparation of dietary charts for patients.			
VI	**SELF STUDY FOR ENRICHMENT (Not to be included for External Examination)** Uses of food exchange list, Side effects of cancer treatment, Relate structure of skin with types of burns, Dietary Management after renal transplantation, Application of artificial intelligence and computer applications in dietetics practice	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

Text Books

1. Srilakshmi B.(2019). Dietetics.(8th ed)New Age International. New Delhi.
2. Sangeetha Karnik. (2010). Nutrition and Diet Therapy.Biotech Pharma Publications.
3. Sumati R Mudambi. (2012).Fundamentals of Foods, Nutrition and Diet Therapy. (6th ed).New Age International, New Delhi.
4. De Bruyne, Pinna, Whitney. (2012).Nutrition and Diet Therapy. (8th ed). Library of Congress.
5. Avantina Sharma. (2017).Principles of Therapeutic Nutrition and Dietetics.CBS Publishers and Distributors.

Reference Books

1. Mahatb, S., Bamji., Kamala Krishnasamy, Brahman, G.N.V., (2020).Textbook of Human Nutrition. (3rd ed.). Oxford and IBH Publishing Co. P. Ltd., New Delhi.
2. Raheena Begum, M. (2015). Textbook of Foods, Nutrition and Dietetics. (3rd ed.). Sterling Publishers Pvt. Ltd. New Delhi.
3. Krause, M. V. Hunesher, M. A. (2013). Food, Nutrition and Diet Therapy. W. B. Saunders Company. Philadelphia. London.
4. Kathleen ML. and Escott S.(2000) .Krause'sFood, Nutrition and Diet Therapy. (9^{th} ed.). W.B. Saunders Company Pennsylvania.

Web links

- https://www.nutrition.org.uk/nutritionscience/health-conditions/heart-disease.html
- https://www.medanta.org/severe-burns/
- https://labtestsonline.org/conditions/kidney-disease
- https://www.medicinenet.com/diabetes_mellitus/article.htm
- http://www.fao.org/3/W0795T/w0795t03.htm
- https://vikaspedia.in/health/nutrition

Journals

1. Canadian Journal of Dietetic Practice and Research, Dieticians Canada, Canada
2. Journal of Human Nutrition and Dietetics, Wiley-Blackwell, England
3. Journal of the Academy of Nutrition and Dietetics, Elsevier
4. Journal of Human Nutrition and Dietetics, Wiley online library, UK
5. Nutrition Research, Elsevier Science Ltd, United States.
6. European Journal of Clinical Nutrition

Pedagogy

Lecture, Chalk and Talk, Seminar, Assignment, E-Content, PowerPoint Presentation, Quiz.

Course Designers

- Dr.B.THANUJA
- Ms.C.NIVETHA

SEMESTER IV	INTERNAL MARKS:40			EXTERNAL MARKS:60
COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
22UND4CC4P	DIET THERAPY II (P)	CORE PRACTICAL	4	4

Course Objectives

- To understand the modification of normal diet for therapeutic purpose.
- To acquire the skills of preparing diet for various disease conditions.
- To gain experience in diet counselling for different health conditions.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO 1	Describe knowledge on therapeutic diets	K1
CO 2	Interpret nutrition principles in to the treatment and prevention of diseases.	K2
CO 3	Implement diagnostic and treatment measures through the nutrition care Process.	K3
CO 4	Determine principles and importance of therapeutic diets for various diseases	K4
CO 5	Examine tools for diet counselling	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	3	3	2	3	3	2
CO2	3	3	3	2	3	3	2	3	3	2
CO3	3	3	3	2	3	3	2	3	3	2
CO4	3	3	3	2	3	3	2	3	3	2
CO5	3	3	3	2	3	3	2	3	3	2

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation "-" indicates there is no correlation.

List of Experiments

1. Planning, preparation and diet counselling for Diabetes Mellitus
    - Insulin Dependent Diabetes Mellitus (IDDM)
    - Non Insulin Dependent Diabetes Mellitus (NIDDM)
    - Gestational Diabetes Mellitus (GDM)
2. Planning, preparation and diet counselling for Cardio Vascular Diseases
    - Hypertension
    - Atherosclerosis
3. Planning, preparation and diet counselling for musculoskeletal disorders
    - Gout
    - Osteoporosis
4. Planning, preparation and diet counselling for renal diseases
    - Nephritis
    - Nephrosis
5. Planning, preparation and diet counselling for
    - Burns
    - Cancer

Text Books

1. Srilakshmi B. (2019). *Dietetics.*(8th ed)New Age International, New Delhi.
2. F. P. Antia& Philip Abraham. (2002).*Clinical Dietetics and Nutrition. (*4th ed). Oxford University Press.

Reference Books

1. Barasi, Mary E, Great Britain (2002). *Human Nutrition: Health Perspective* Hodder and Stoughton.
2. Gopalan.C. Rama Sastri.V.B and Balasubramanian.S.C. (2017). *Nutritive Value of Indian Foods* National Institute of Nutrition (ICMR) Hyderabad.

Web links

- https://www.ncbi.nlm.nih.gov/books/NBK482514/
- https://diabetesjournals.org/care/article/42/5/731/40480/Nutrition-Therapy-for-Adults-With-Diabetes-or
- https://www.jrnjournal.org/

Pedagogy

Lecture, Chalk and Talk, Demonstration, Practical, E-Module.

Course Designers

- Dr. B.THANUJA
- Ms.C.NIVETHA

SEMESTER IV	INTERNAL MARK: 25		EXTERNAL MARK: 75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS/ WEEK**	**CREDITS**
23UND4AC6	**FOOD MICROBIOLOGY**	**ALLIED**	**4**	**3**

Course Objectives

- To gain understanding of microbiology and its practical applications in daily life.
- To explore different methods of food preservation
- To comprehend the significance of microorganisms in the food industry and their positive impacts.

Course Outcome and Cognitive Level Mapping

CO Number	Co Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Identify the basic microbiology foundational concepts	K1
CO2	Understand the morphological characteristics of various microorganism	K2
CO3	Apply the skills to analyse microbial growth patterns and assess the diverse factors influencing growth within different environmental conditions	K3
CO4	Analyse the appropriate methods for microbial control and ensure food safety and preservation	K3
CO5	Evaluate the beneficial and hazardous effects of microorganisms	K4

Mapping of Co with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	2	3	2	2	3	3	3	3	3
CO2	2	2	3	2	2	3	3	2	2	2
CO3	2	2	3	2	2	3	3	2	2	3
CO4	2	2	3	3	2	3	3	3	3	3
CO5	2	2	3	2	2	3	3	3	3	3

“1” – Slight (Low) Correlation ¬ “2” – Moderate (Medium) Correlation ¬
“3” – Substantial (High) Correlation ¬ “-” indicates there is no correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**a) Introduction to Microbiology** Microscope – Types and uses, Classification of microorganisms – Prokaryotes and Eukaryotes **b)Morphology of microorganisms** Bacteria, Virus, Fungi, Protozoa and Algae.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	**a) Growth and multiplication of microorganisms** Growth curve, batch culture and continuous culture, chemostat and turbidostat. **b)Factors affecting growth of microorganisms** Intrinsic factors -nutrient content, pH, redox potential, antimicrobial barrier and water activity Extrinsic factors - relative humidity, temperature and gaseous atmosphere.	12	CO1, CO2, CO3, CO4. CO5	K1, K2, K3, K4
III	**a)Microbiology of water** Total count, test for E –Coli and Purification of water. Modern methods of purification – Reverse Osmosis, ultraviolet purification, activated carbon. **b)Control of microorganisms** Temperature – high, low, sterilization, irradiation. Chemical agents – Disinfectant, benzoates, sorbates, propionates, acetates, nitrates, nitrites, sulphur dioxide, sulphites, pickling, addition of sugar or salt, drying. Antibiosis.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
IV	**a)Microbiology of perishable foods** Contamination, spoilage and preservation of vegetables and fruits, milk and milk products, meat and meat products, egg, poultry, baked products and canned products. **b)Microbiology of non - perishable foods** Contamination, spoilage and preservation of cereal and cereal products, pulses and legumes, Properties of food spoilage Psychrotropes and Thermophiles.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
V	**a)Beneficial effects of microorganisms** Fermentation factors controlling fermentation in foods, Role of microorganisms in fermented foods -	12	CO1, CO2,	K1, K2, K3, K4

	cheese, sauerkraut, and soy-based foods, Concept of probiotics, prebiotics, symbiotics, Production and application of microbial enzymes and vitamin **b)Hazards of microorganisms** Food poisoning, food borne diseases – Salmonellosis, Botulism, Amoebic dysentery.		CO3, CO4, CO5	
VI	**SELF STUDY FOR ENRICHMENT (Not to be included for External Examination)** Synthetic Microbiology, Environmental friendly batch culture, Natural Preservatives, Contamination and spoilage of Sugar and sugar Products, Production and application of various organic acid using micro-organisms i.e. citric acid, fumaric acid, lactic acid, benzoic acid, gluconic acid, acetic acid.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

Text Books

1. Frazier William, C. (2014). *Food Microbiology.* (5th ed) McGraw Hill Irwin Companies. New York
2. Adams. (2018) *Food Microbiology*. (2nd ed).New Age International Publishers. New Delhi.
3. PelczarJr Michael, J. (2014) *Microbiology*. McGraw Hill Education (India) Private Ltd, New Delhi.

Reference Books

1. Sugandhar Babu R P. (2008) *Food Microbiology.* Adhyayan Publishers and distributors,
2. New Delhi.,
3. Vijaya Ramesh k. (2007) *Food Microbiology.* (1st ed).New Age International Publishers. New Delhi.
4. Bohra and Parihar. (2012) *Food Microbiology*. Student edition, Jodhpur
5. Anathanarayan, (2013) *Textbook of Microbiology*. University Press (India) Pvt. Ltd, Hyderabad.

Web Links

- http://airccse.org/journal/ijscai/papers/3214ijscai01.
- https://www.biologydiscussion.com/microorganisms/microbes-microorganisms/microbes-in- the food-industry-microorganisms-biology/82587
- https://www.rapidmicrobiology.com/test-method/theory-and-practice-of-microbiological-water-testing
- https://academic.oup.com/femsle/article/362/20/fnv151/543071

Journals

1. Journal of Microbiology and Infectious Disease, Turkey .
2. Journal of Basic Microbiology, Wiley-Blackwell, Germany.
3. Journal of Microbiology, Microbiological Society Korea, South Korea.
4. Journal Applied Microbiology, Cardiff, U K.
5. Journal of Micrbiome, United Kingdom

Pedagogy:

E-content, Lecture, Power point presentation, Seminar, Assignment

Course Designers

- Ms. S. FATHIMA

SEMESTER IV	INTERNAL MARKS: 40			EXTERNAL MARKS:60
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS / WEEK**	**CREDITS**
22UND4INT	**INTERNSHIP**	**INTERNSHIP**	**-**	**2**

Course Objectives

- To acquire knowledge on basic etiquette of a counsellor.
- To handle different areas of counselling.
- To gain knowledge on report writing.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Identify different functional areas in hospital	K1
CO2.	Explain work process followed in dietary department	K2
CO3.	Describe the management of human resources in dietary department	K2
CO4.	Prepare diet according to disease condition	K3
CO5.	Ascertain appropriate diet counselling methods	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	3	3	2	3	3	2
CO2	3	3	3	2	3	3	2	3	3	2
CO3	3	3	3	2	3	3	2	3	3	2
CO4	3	3	3	2	3	3	2	3	3	2
CO5	3	3	3	2	3	3	2	3	3	2

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation

"3" – Substantial (High) Correlation "-" indicates there is no correlation.

DIETARY INTERNSHIP

SYLLABUS

- The Practical work consists of internship in a multispecialty hospital for 15 days.
- Visits to different wards to observe patients requiring special diets.
- Experience in calculating and planning modified diets.
- Supervising and handling the food preparation and service in the dietary department of the hospital.
- Calculating the diet according to medical prescription.
- Accompanying the doctor while visiting the patient.
- Counsel the patient with different health condition.
- Case study- Selecting and observing 5 patients requiring a therapeutic diet in relation to Patient's dietary history - income, occupation, food habits and social factors.

Preparation of the report should include

- History of the hospital
- Facilities provided
- Organization structure
- Duties of the dietitian
- Layout of the dietary unit
- Dietary Department facilities
- Records
- Types of services
- Special dietary preparation
- Storage of food
- Handling of leftovers and shortages
- Sanitation and hygiene
- Case study

Text books

1. Shubhangini A Joshi. (2010). *Nutrition and Dietetics*. McGraw Hill Education Private Limited, New Delhi.
2. Anne Payne, Hellen Barker. (2010). *Advancing Dietetics and Clinical Nutrition*. Churchill Livingstone Elsevier, UK
3. Gopalan C, Rama Sastri B V and Balasubramaniyan S C. (2016). *Nutritive value of Indian Foods*. National Institute of Nutrition, Hyderabad.

Reference Books

1. Park. A. (2007). *Park's Textbook of Preventive and Social Medicine*. Bharat Publishers, Jabalpur.
2. C.R. Pennington. (2013). *Therapeutic Nutrition – A Practical Guide*. Springer, US.

Pedagogy:

E-content, Lecture, Seminar, Assignment, Demonstration

Course Designers

- Ms.S.FATHIMA
- Ms.M.VINOTHINI

SEMESTER IV	INTERNAL MARKS: 25			EXTERNAL MARKS:75
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS / WEEK**	**CREDITS**
22UND4GEC2	**MEAL PLANNING FOR THE FAMILY**	**GENERIC ELECTIVE**	**2**	**2**

Course Objectives

- To understand the role of nutrition in different stages of life cycle.
- To gain experience in planning menu for different stages of life cycle.
- To develop skills in organizing and evaluating nutrition projects in the community.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Identify the inter relationship between health and nutrition	K1
CO2.	Explain menu planning principles and RDA for different stages of life cycle	K2
CO3.	Illustrate the importance of nutritional requirements and modified diet for various age groups and conditions	K2
CO4.	Predict nutritional problems throughout life cycle	K3
CO5.	Determine dietary principles in menu planning for various lifecycle and conditions	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	2	3	2	2	3	2	3	3
CO2	3	3	2	3	2	2	3	2	3	3
CO3	3	3	2	3	2	2	3	2	3	3
CO4	3	3	2	3	2	2	3	2	3	3
CO5	3	3	2	3	2	2	3	2	3	3

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation "-" indicates there is no correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Principles of Nutrition and Meal planning** Classification and functions of Nutrients. Define, malnutrition, over nutrition, under nutrition. RDA. Meal Planning – Definition, Objectives, Principles and Factors affecting Meal Planning. Food guide for selecting an adequate diet.	6	CO1 CO2 CO3 CO4 CO5	K1,K2,K3,K4
II	**Nutrition for Pregnancy and Lactation** Pregnancy- Physiological changes, complications, food and nutritional requirements. Dietary guidelines. Lactation – role of hormones in milk production, food and nutritional requirements, advantages of breast feeding.	6	CO1 CO2 CO3 CO4 CO5	K1,K2,K3,K4
III	**Nutrition for Infants and Pre-schoolers** Infant -Importance of breast milk, food and nutritional requirements, weaning and supplementary foods. Pre-schoolers - Food habits, food and nutritional requirements, points to be considered while planning a menu. nutritional problems.	6	CO1 CO2 CO3 CO4 CO5	K1,K2,K3,K4
IV	**Nutrition for School going children and Adolescents** School going children - Food and Nutritional requirements, nutritional problems. Adolescents - Food and Nutritional requirements and eating disorders.	6	CO1 CO2 CO3 CO4 CO5	K1,K2,K3,K4
V	**Nutrition during Adulthood and Old age** Adulthood - Reference man and Reference woman, Food and nutritional requirements. Old age - Nutritional requirements, nutritional problems and dietary management.	6	CO1 CO2 CO3 CO4 CO5	K1,K2,K3,K4
VI	**SELF STUDY FOR ENRICHMENT** **(Not to be included for External Examination)** Basic Five Food Groups. Draw a sample Menu for pregnancy and lactation. Stunting and wasting. Pointed to be considered while planning a packed lunch. RDA for Adult belonging heavy worker.	-	CO1 CO2 CO3 CO4 CO5	K1,K2,K3,K4

Text books

1. Srilakshmi B. (2017) *Nutrition Science*. 6th ed. New Age International Publishers, New Delhi.
2. Sumati R. Mudambi., Rajagopal M.V. (2021). Fundamentals *of Foods, Nutrition and Diet Therapy*. New Age International Publishers, New Delhi.
3. Swaminathan M. (2010). *Hand book of Food and Nutrition.* Bangalore printing and publishing co., Ltd, Bangalore.
4. Raheena Begum M. (2019). *A Text Book of Foods, Nutrition and Dietetics.* 3rd ed. Sterling publishers private Limited, New Delhi.

Reference Books

1. Gajalakshmi R. (2018). *Nutrition Science*. 2nd ed. CBS Publishers and distributors Pvt Ltd, New Delhi.
2. Indrani T K. (2005).Nursing Manual of Nutrition and Therapeutic Diet. Jaypee Brothers, Medical publishers (p) Ltd, New Delhi.
3. Khumud Khanna etal .(2020). Text book of Nutrition and Dietetics. 2nd ed.Elite Publishing House Pvt. Ltd New Delhi..

Web links

- https://www.ncbi.nlm.nih.gov/books/NBK209825/
- https://www.who.int/nutrition/topics/nutrecomm/en/

Journals

1. Nutrition, Elsevier Science Inc, United States.
2. Journal of Youth and Adolescence, Springer/Plenum Publishers, United States.
3. Journal of Food and Nutrition Research,Food Research Inst, Bratislava, Slovakia

Pedagogy: E-content, Lecture, Power point presentation, Seminar, Assignment, Quiz.

Course Designers

- Ms.E.AGALYA
- Ms.N.GANGA DEVI

SEMESTER IV	INTERNAL MARKS: 40		EXTERNAL MARKS:60	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS / WEEK**	**CREDITS**
22UND4SEC1P	**BASICS IN FOOD PRODUCTION (P)**	**SKILL ENHANCEMENT**	**2**	**2**

Course Objectives

- To acquire knowledge on culinary skills in food production.
- To gain knowledge on preliminary techniques.
- To observe the various methods and techniques of cooking.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO 1	Identify the Basic Cooking methods and pre-preparations	K1
CO 2	Explain the uses of equipment in food production	K2
CO 3	Apply the practical skills and techniques used to prepare food	K3
CO 4	Infer the culinary skills in the preparation of food production	K4
CO 5	Determine the basic preparation of stock, soups, sauces and salads	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	2	3	3	3	2	2	2
CO2	3	3	3	2	3	3	3	2	3	2
CO3	3	3	3	2	3	3	3	2	2	2
CO4	3	3	3	2	3	3	3	2	2	2
CO5	3	3	3	2	3	3	3	2	2	2

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation "-" indicates there is no correlation.

List of Experiments

1. Equipments – Identification, Description, Uses and handling.

2. Basic Cooking methods – Moist heat, dry heat and combination methods

3. Pre- preparation Techniques – Cutting techniques, paring, peeling, grating, grinding, sieving, steeping.

4. Stocks, Types of stock (Basic stock - Brown, white, fish, vegetable) Preparation of stock recipes.

5. Soups, Classification with examples, Basic recipes of Consommé Soup – Classification, Preparation and serving of Soups, common garnishes for soups.

6. Sauces - Basic Mother Sauces (Béchamel, Espagnole, Veloute, Hollandaise, Mayonnaise, Tomato Sauce) Preparation of sauce recipes.

7. Salad – Salads and its types, Salad dressings Salad Preparation (Potato Salad, Beetroot Salad, Green Salad, Fruit Salad, Lentil Salad).

Text Books

1. Krishna Arora.(2008). *Theory of cookery* Fronk Bros and Co. Publishers, New Delhi.
2. R. Singaravelavan.(2016). 2nd ed. *Food & Beverage Service.* Oxford University press. India.
3. Yogambal Ashokkumar.(2009).*Text book of Bakery and Confectionary* Prentice-hall of India Pvt. Ltd
4. V. Cessarani and R.Kinton 2002 *Practical Cookery* Hodder and Stoughton publishers

Reference Books

1. Krishna Arora, *Theory of Cookery*, 2008 Fran Brothers & Company (Pub) Pvt. Ltd.
2. Bali, Parvinder. (2013) *Quantity Food Production Operations and Indian Cuisine- S*.oxford, London
3. Aggarwal, D.K. (2006). *Kitchen Equipment & Design*, Aman Publications, New Delhi.
4. Vikas Singh, (2011) *Text Book of food Production (BTK),* Aman Pub., N. Delhi.
5. Parvinder S. Bali. (2014) *Food Production Operations*, 3rd Edition, Oxford University Press, New Delhi.
6. Philip, Thangam E. (2009) *Modern Cookery*, 5th Edition, Anna Salai, Chennai.

Web links

- https://bngkolkata.com/kitchen-equipment/
- https://www.chelseagreen.com/2023/fundamentals-stocks-broths/
- https://www.researchgate.net/publication/359336449_Chapter_no_2_Soups_21_Classification_of_Soups_with_5_examples_each_22_Consomm'eDefinition_Ingredients_Clarification_Recipe_for_one_ltr_five_variation_23_Garnishesh_Accompaniments_for_soup_Consomm'es
- https://hmhub.in/salads-salad-dressings/

Pedagogy

E-content, Lecture, Power Point Presentation, Seminar, Assignment, Visit to Food

Processing and Packaging units.

Course Designers

- Ms. T. R. REVATHI
- Ms. R. ARTHY

SEMESTER V	INTERNAL MARKS: 25		EXTERNAL MARKS:75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS / WEEK**	**CREDITS**
23UND5CC6	**FOOD PROCESSING AND PRESERVATION**	**CORE**	**6**	**5**

Course Objectives

- To understand the values of food processing and preservation.
- To apply food processing techniques to various food groups.
- To acquire knowledge on food preservation methods.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On Successful Completion of the course, students will be able to	Cognitive Level
CO1	List the principles, methods and benefits of processing and preservation	K1
CO2	Explain changes and nutritional losses during processing and preservation of food groups.	K2
CO3	Prepare the different food groups into value added products	K3
CO4	Predict the importance of packaging in processing and preservation	K3
CO5	Ascertain the uses of storage in different food products	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	-	-	2	3	3	3	3	3	1
CO2	3	-	-	2	3	3	3	3	3	1
CO3	3	-	-	2	3	3	3	3	3	1
CO4	3	-	-	2	3	3	3	3	3	1
CO5	3	-	-	2	3	3	3	3	3	1

"1" – Slight (Low) Correlation "2" – Moderate (Medium)Correlation
"3" – Substantial (High) Correlation "-" indicates there is no correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COS	COGNITIVE LEVEL
I	**Food processing** – Definition, principles, classification- minimally processed foods, preserved foods, manufactured foods, formulated foods, methods and benefits of food processing, effect of food processing on nutrients, scope of food processing industry, sectors of food processing industry, future prospects and trends in modern food processing. **Processing of cereals and Millets -** Processing of cereals-Milling process, stone milling, roller milling. Cereals and Millets products- wheat, rice, corn, barley, semolina, amylase rich food, macaroni products, puffed rice, flaked rice and value- added products, packaging, storage.	18	CO1, CO2, CO3, CO4, CO5	K1,K2,K3,K4
II	**Processing of pulses** -Germination, fermentation, agglomeration, decortication, milling, puffing. By - products of pulses- dals and grams, processed soya. **Processing of nuts and oil seeds**- coconut, groundnut, sesame, sunflower seeds, flaxseeds Processing – Extraction of oil and refining, meal concentrates and value addition, nutritional losses during processing, packaging, storage. **Processing of spices and condiments** - Cumin, fenugreek, coriander, fennel, poppy, aniseed, cinnamon, chilli, cardamom, turmeric, ginger, tamarind, nutmeg, asafoetida, Black pepper- Processing , cleaning, reconditioning and grinding, packaging, storage.	18	CO1, CO2, CO3, CO4, CO5	K1,K2,K3,K4
III	**Processing of milk-** Filtration, homogenization, pasteurization, drying, fermentation. Milk products- cheese, panner, milk powder, ice cream, khoa, packaging, storage. **Processing of flesh foods**- Processing of fleshy foods by freezing, smoking, drying, canning, packaging, storage.	18	CO1, CO2, CO3, CO4, CO5.	K1,K2,K3,K4

	Processing of fruits and vegetables -Processing of fruits and vegetables by pickling, freezing, drying and canning. Vegetable and fruit products – preserves, jams, jellies, squashes, concentrates, packaging, storage. **Processing of sugar-** Extraction, clarification, and crystallization, separation of crystals, refining of sugar, recovery of sugar molasses, packaging, storage.			
IV	**Food preservation-** principles of food preservation and techniques of food preservation. **Food preservation by low and high temperature:** Freezing and refrigeration: Introduction to refrigeration - cool storage - freezing – definition - principle of freezing - freezing curve -changes occurring during freezing - types of freezing - slow freezing, quick freezing. introduction to thawing, changes during thawing and its effect on food. Thermal Processing- Commercial heat preservation methods – Sterilization, commercial sterilization, Pasteurization, and Canning – bottling.	18	CO1, CO2, CO3, CO4, CO5	K1,K2,K3,K4
V	**Food preservation by drying, dehydration and irradiation:** Definition of drying - preservation, sun drying - dehydration (i.e. mechanical drying), heat and mass transfer, factors affecting rate of drying - normal drying curve - names of types of driers used in the food industry. Evaporation – Definition, factors affecting evaporation, names of evaporators used in food industry. Kinds of ionizing radiations used in food irradiation- mechanism of action - uses of radiation processing in food industry.	18	CO1, CO2, CO3, CO4, CO5	K1,K2,K3,K4
VI	**SELF STUDY FOR ENRICHMENT** **(Not to be included for External Examination)** Importance of food processing. Uses of soaking. Different cuts of fleshy foods. Application of Pasteurization. Working principles of driers	-	CO1, CO2, CO3, CO4, CO5	K1,K2,K3,K4

Text Books

1. Vikas Ahlluwalia.(2007). *Food Processing.* Paragon International Publishers,
2. Anupama Rani. (2010). *Food Processing Preservation and Storage*. Sonali Publications

Reference Books

1. Norman N. Potter, Joseph H. Hotchkiss. (2007). *Food Science* , (5th Ed). Cbs Publishers and Distributors Pvt . Ltd
2. Avantina Sharma.(2006). *Textbook of Food Science & Technology*. International Book Distribution Co
3. Shubhangini A Joshi (2010). *Nutrition and Dietetics*. McGraw Hill Education Pvt. Ltd
4. Janice Albert. (2010). *Innovations in food labelling*. Woodhead publishing ltd, New Delhi.

Web Links

- http://www.fao.org/3/a-au104e.pdf
- https://apps.icarda.org/wsInternet/wsInternet.asmx/DownloadFileToLocal?filePath=Tools_and_guidelines/Technical_bulletin3.pdf&fileName=Technical_bulletin3.pdf
- https://www.niir.org/books/book/handbook-on-spices-condiments-cultivation-processing-extraction-h-panda/isbn-9788178331324/zb
- https://pubmed.ncbi.nlm.nih.gov/26312771/

Journals

1. Trends in Food Science and Technology, Elsevier Bv, Netherlands
2. Journal of Food Engineering, Elsevier, Netherlands
3. Journal of Food Processing and Technology, Wiley, ISSN 1745-4549, Ohio state

Pedagogy:

E-content , Lecture, Power point presentation, Seminar, Assignment, Demonstration

Course Designers

- Ms. E.AGALYA

SEMESTER V	INTERNAL MARKS: 40		EXTERNAL MARKS:60	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS / WEEK**	**CREDITS**
22UND5CC5P	**FOOD PROCESSING AND PRESERVATION (P)**	**CORE PRACTICAL**	**3**	**3**

Course Objectives

- To understand the importance of food processing and preservation.
- To gain insight on the practical aspects of food processing and preservation.
- To develop entrepreneurial skills.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On Successful Completion of the course, students will be able to	Cognitive Level
CO1	Define the principles and techniques of processing and preservation	K1
CO2	Interpret the pH of different food products	K2
CO3	Classify different types of preservatives	K3
CO4	Prepare value added food products	K3
CO5	Examine the sensory aspects of different food products	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	-	-	2	3	3	3	3	3	1
CO2	3	-	-	2	3	3	3	3	3	1
CO3	3	-	-	2	3	3	3	3	3	1
CO4	3	-	-	2	3	3	3	3	3	1
CO5	3	-	-	2	3	3	3	3	3	1

"1" – Slight (Low) Correlation "2" – Moderate (Medium)Correlation
"3" – Substantial (High) Correlation "-" indicates there is no correlation.

List of Experiments

1. Principles and techniques of food processing and food preservation.
2. Evaluation of foods using organoleptic method.
3. Determination of pH of different foods using pH meter**.**
4. Preparation of extruded products – Pasta / noodle, popcorn.
5. Preparation of germinated and fermented Products – Green gram sprout, Idly batter
6. Preparation of chutneys– Tamarind and gongura.
7. Preparation of milk products – Paneer, curd, cheese, khova.
8. Preservation of foods by sugar- Jam, jelli, marmalade, squash, tuity fruity, amla preserves and fruit bar.
9. Preservation of foods by salt and oil –Lemon, mango and garlic pickles.
10. Preservation of foods by acid – sauerkraut, sauce.
11. Preservation of foods by drying - Vathal , vadam.

Text Books

1. Vikas Ahlluwalia.(2007). *Food Processing.* Paragon International Publishers,
2. Anupama Rani. (2010). *Food Processing Preservation and Storage*. Sonali Publications

Reference Books

1. Norman N. Potter, Joseph H. Hotchkiss. (2007). *Food Science* , (5th Ed). Cbs Publishers and Distributors Pvt . Ltd
2. Avantina Sharma.(2006). *Textbook of Food Science & Technology*. International Book Distribution Co
3. Shubhangini A Joshi (2010). *Nutrition and Dietetics*. McGraw Hill Education Pvt. Ltd
4. Janice Albert. (2010). *Innovations in food labelling*. Woodhead publishing ltd, New Delhi.

Pedagogy:

E-content , Power point presentation, Demonstration, Practical.

Course Designers

- Ms. M.VINOTHINI
- Ms. E.AGALYA

SEMESTER - V	INTERNAL MARKS: 25		EXTERNAL MARKS:75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS / WEEK**	**CREDITS**
23UND5CC7	**BASICS IN RESEARCH METHODOLOGY AND COMPUTER APPLICATIONS**	**CORE**	**6**	**5**

Course Objectives

- To understand research methods and data processing
- To gain knowledge on data analysis using statistics
- To know about computer applications in data analysis

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO 1	Identify the research problem and research design	K1
CO 2	Illustrate the methods involved in sampling, collection of data and processing	K2
CO 3	Apply manuscript writing techniques for various purposes	K3
CO 4	Analyze data using suitable statistical analysis and computer applications	K4
CO 5	Assess the character of the research and be capable of drawing research conclusions tailored to specific requirements	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	1	1	1	2	3	3	3	3	1
CO2	2	1	1	1	2	3	3	3	3	1
CO3	2	1	1	1	2	3	3	3	3	1
CO4	2	1	1	1	2	3	3	3	3	1
CO5	2	1	1	1	2	3	3	3	3	1

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation

"3" – Substantial (High) Correlation "-" indicates there is no correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Fundamentals of Research and Research Design** Definition, objectives, importance and characteristics of research. Steps in research process. Research problem – Definition, selection, Necessity of defining the Problem, Technique Involved in Defining a Problem, Types of research- Descriptive, Analytical, Applied, Fundamental, Quantitative, Qualitative, Conceptual and Empirical research. Research Design - research design in case of exploratory research studies, research design in case of descriptive and diagnostic research studies and research design in case of hypothesis-testing research studies.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	**Sampling and Scaling Technique** Different sampling Methods-Probability and non-probability sampling methods. Sampling and non-sampling errors, sample size, sampling fundamentals and theory of sampling. Scaling Techniques: Comparative (Rank Order, Paired Comparison and q-sort) and Non-comparative (Likert Scale, Thurston Scale, Semantic Differential Scale)	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
III	**Data Collection and Analysis** Primary data collection methods - preparation of schedules and questionnaires. Interview method of enquiry, training of interviewers. Secondary data collection method- Reliability of data, suitability of data, adequacy of data. Processing of data – Editing, Coding, Classification and Tabulation. Measures of central tendency- Mean, median, mode, measures of dispersion/variability - range, variance, standard deviation, standard error, coefficient of variation.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
IV	**Research report writing and Research Ethics** Components or layout of a thesis - Introduction, review of literature, methodology, results and discussion, summary and conclusion, bibliography, footnotes and appendix. Types of report- Technical reports, popular reports. Manuscript writing – original, review article, abstract, research article. Research ethics- Principles of research ethics, publication ethics, publication misconduct.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

V	**Use of Computer Applications in Research** Using Excel for data management, Use of SPSS for Data Analysis and Interpretation, Tabulation and Graphical Representation of Data, Software for Reference Management and Detection of Plagiarism Quoting, Paraphrasing, and Avoiding Plagiarism.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
VI	**SELF STUDY FOR ENRICHMENT** **(Not to be included for External Examination)** Hypothesis and its types, Calculate sample size using unknown population size formula, Difference between Questionnaire and Interview schedule, Bibliography formats and styles (APA, Chicago, MLA, ASA), Use of computer applications in data processing.		CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

RELATED EXPERIENCE

1.Design interview schedule / questionnaire by applying research ethics.
2. Processing of data – editing, coding, classification and tabulation
3. Data analysis - Calculate mean, median, mode, standard deviation using SPSS
4.Graphical representation of data using SPSS
5. One way ANOVA analysis using SPSS

Text Books

1. Kothari G.R.(2004).*Research Methodology*. New Age International (P) Ltd
2. Dr.Rajamohan.S. and Thilagaraj A.(2010).*Introduction to Statistics*(2nd ed). Learntech Press
3.Saravanavel P. (2013).*Research Methodology*. Kitab Mahal Allahabad

Reference Books

1. VijayalakshmiG. and Sivapragasam .C. (2008).*Research Methodology*. MJP Publishers
2. Borse. M. N. (2004).*Hand Book of Research Methodology*. Shree Niwas Publications, Jaipur(India).
3. Grumani N.(2014).*Research Methodology for Biological Sciences*. MJP Publishers
4. Ramadas. R. and Wilson. A.(2014). *Research and Writing*. MJP Publishers.
5. Gupta S. P.(2002).*Statistical Methods*. Sultan Chand & Sons, New Delhi.

Web Link:

1. https://www.google.co.in/books/edition/Fundamental_of_Research_Methodology_and/zrFw-bt6PKIC?hl=en&gbpv=1&dq=research+methodology+books+pdf&p

2.https://www.google.co.in/books/edition/Research_Methodology/k6pMrsB5T_oC?hl=en&gbpv=1&dq=research+methodology+books+pdf&printsec=frontcover&bshm=rimc/1

3. https://egyankosh.ac.in/bitstream/123456789/11204/1/Unit-1.pdf

4. https://egyankosh.ac.in/bitstream/123456789/8380/1/Unit-10.pdf

5. https://www.ignouhelp.in/ignou-mlie-102-study-material/

Journals:

1. BMC Medical Research Methodology, Biomed Central Ltd, England.

2. Health Services and outcomes Research Methodology, Kluwer Acedemic Publishers, Netherlands

3. International Journal of Social Research Methodology: Theory and Practice, Taylor& Francis United Kingdom

4. Research Methodology in Strategy and Management, Elsevier Bv, Netherlands

Pedagogy

Chalk and talk, PPT, Discussion, Assignment, Demo, Quiz, Seminar.

Course Designers

- Ms. S. FATHIMA
- Ms.L.GAYATHRI

SEMESTER V	INTERNAL MARKS: 25		EXTERNAL MARKS:75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS / WEEK**	**CREDITS**
23UND5CC8	**COMMUNITY NUTRITION**	**CORE**	**6**	**5**

Course Objectives

- To provide information regarding nutritional assessment
- To enable students to understand national nutritional problems and their implications.
- To acquaint them knowledge regarding nutrition intervention programmes.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On Successful Completion of the course, students will be able to	Cognitive Level
CO1	Identify ecological factors leading to malnutrition	K1
CO2	Describe role of nutrition intervention programmes	K2
CO3	Apply nutrition education programme and create nutrition awareness.	K3
CO4	Execute the skills in assessment of nutritional status of community.	K3
CO5	Determine the strategies for Improving nutrition and health status of the community.	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	3	3	3	3	2	3
CO2	3	3	2	3	3	3	3	3	2	3
CO3	2	3	3	3	2	3	3	3	2	3
CO4	3	3	3	3	2	3	3	3	2	3
CO5	3	3	3	3	2	3	3	3	2	3

"1" – Slight (Low) Correlation "2" – Moderate (Medium)Correlation
"3" – Substantial (High) Correlation "-" indicates there is no correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COS	COGNITIVE LEVEL
I	**Malnutrition and National Nutrition Policy** **a. Ecology of Malnutrition** - Definition, prevalence malnutrition, viscous cycle, ecological factors leading to malnutrition-income, family size, dietary pattern, occupation, customs, food fads, fallacies, ignorance and other factors. Synergism between malnutrition and infection. **b. National Nutrition Policy** – objectives, Strategies-Direct and Indirect, Food Security-Dimension, activity	18	CO1, CO2, CO3, CO4, CO5.	K1,K2,K3,K4
II	**Nutritional Problems and Nutritional Assessment** a. **Nutritional Problems -** Prevalence, causes, consequences and prevention of common nutritional problems – Protein Energy Malnutrition (PEM), Vitamin A Deficiency Disease, Anemia, Iodine Deficiency Disorder (IDD), Intra burden, Double burden, Triple burden. b. **Assessment of Nutritional status** -Direct method - Anthropometry, biochemical, biophysical and clinical assessment). Indirect method - Dietary Survey (24-hour dietary recall, food frequency questionnaire, diet history, dietary record), Vital statistics. .	18	CO1, CO2, CO3, CO4, CO5.	K1,K2,K3,K4
III	**Nutrition Intervention & Immunization Programmes** a. **Nutrition intervention programmes in India** – School Lunch Programme, Chief Minister's Nutritious Noon Meal Program (CMNNMP), Chief Minister's Breakfast Scheme, Integrated Child Development Services (ICDS), Nutritional programmes for adolescent girls, Primary Health Care (PHC), Public Distribution System (PDS), Poshan Abhiyan 2.0, Annapoorna Scheme. **b. Immunization**–Universal Immunization Programmes (UIP), Immunization schedule, milestones, improving coverage, improving quality, and new vaccine introduced.	18	CO1, CO2, CO3, CO4, CO5.	K1,K2,K3,K4

IV	**National, International and Voluntary Agencies to Promote Community Health** a. **National Organization concerned with food and Nutrition** – Indian Council of Medical Research (ICMR), National Institute of Nutrition (NIN), National Nutrition Monitoring Bureau (NNMB), Central Food Technological Research Institute (CFTRI), Defence Food Research Laboratory (DFRL), and National Institute of Public Cooperation and Child Development (NIPCCD), Food and Nutrition Board (FNB). **b. International Organization concerned with Food and Nutrition-** Sustainable development goal**s.** Food and Agricultural Organization (FAO), United Nations International Children's Emergency Fund (UNICEF), World Bank, World Health Organization (WHO)	18	CO1, CO2, CO3, CO4, CO5.	K1,K2,K3,K4
V	**Nutrition Education and Programmes** **a. Nutrition Education -** Definition, importance, principles and methods of nutrition education. Nutrition Intervention Theories-Behavioral, Social Cognitive theory, meaningful Learning Model. Role of audio-visual aids in nutrition education-Information Electronics Communication Technology. **b. Organization of nutrition education programmes** - Principles, planning, executing and evaluating nutrition education programmes, problems encountered in conducting nutrition education programmes. **c. Nutritional recommendation for Epidemics: health and social measures for COVID-19.**	18	CO1, CO2, CO3, CO4, CO5.	K1,K2,K3,K4
VI	**SELF STUDY FOR ENRICHMENT** **(Not to be included for External Examination)** Relationship between infection and malnutrition. Fluorosis. Special nutrition Programme. Role of ICMR in public health. Importance of E-content to create Nutritional Awareness.	-	CO1, CO2, CO3, CO4, CO5.	K1,K2,K3,K4

TextBooks

1. Swaminathan, M., (2007), Essentials of Food and Nutrition. An Advanced Textbook The Bangalore Printing and Publishing Co. Ltd, Bangalore.
2. Srilakshmi, B., (2020), Nutrition Science, New Age International Publication, New Delhi

ReferenceBooks

1. Park, A., (2007), Park's Textbook of Preventive and Social Medicine, (11th ed), M/S Banarasidas, Bharat Publishers, 1167, Prem Nagar, Jabalpur.
2. Bamji M.S, PrahladRao N, Reddy V.,(2004), Textbook of Human Nutrition, (2nd ed), Oxford and PBH Publishing Co. Pvt. Ltd , New Delhi.
3. Bhatt D.P,(2008), Health Education, KhelSahitya Kendra, New Delhi.
4. Gibney, M.J., Margetts, B.M., Kearney, J.M., Arab, L., (2004), Public Health Nutrition, Blackwell Publishing Co. UK.

Web links

1. https://www.worldbank.org/en/topic/agriculture/brief/food-security-update/what-is-food-security
2. https://vikaspedia.in/health/nutrition/malnutrition
3. https://egyankosh.ac.in/bitstream/123456789/33443/1/Unit-16.pdf

Journals

1. https://www.nutritionintl.org/
2. https://www.india.gov.in/national-nutrition-policy-ministry-women-child-development?page=3

Pedagogy

E-content, Lecture, Power point presentation, Seminar, Assignment, Quiz, Group project.

Course Designers

- Ms.N.GANGA DEVI

SEMESTER V	INTERNAL MARKS:25	EXTERNAL MARKS:75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS/ WEEK**	**CREDITS**
23UND5DSE1A	**FOOD STANDARDS AND QUALITY CONTROL**	**DISCIPLINE SPECIFIC ELECTIVE - I**	**5**	**3**

Course Objectives

- To gain knowledge about food quality and safety system.
- To Know the techniques of evaluation of food quality.
- To understand common food adulterants and toxins.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO 1	Define food safety and food regulations in India and cite examples for quality checking of raw food materials	K1
CO 2	Describe specification for different food products and food additives	K2
CO 3	Explain and demonstrate the method of sensory and objective evaluation for assessing food quality indices	K3
CO 4	Determine the possible food toxins and microbes for quality deterioration of food	K4
CO 5	Apply and compute quality management systems to food processing unit	K4

Mapping of CO with PO and PSO

Cos	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	2	1	3	3	1	2	1
CO2	3	2	3	1	1	3	3	1	2	1
CO3	3	2	3	1	1	3	3	1	2	1
CO4	3	2	3	1	1	3	3	1	2	1
CO5	3	2	3	2	1	3	3	1	2	1

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation "-" indicates there is no correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Food Safety and Quality** **a) Food Safety and Quality** -Introduction to Food Safety, History of food regulations in India, Quality features of foods, quality checking of raw material and processed foods, Factors affecting food quality, Food quality indices – cereals, pulses, nuts and oil seeds, vegetables, fruits, milk and milk products, non – vegetarian foods, oils, spices and condiments, processed foods – canned foods, baked products and preserved foods. b) **Quality Control Measure** - objectives, and Advantages of quality control and stages of quality control	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	**Food Additives and their specifications** **a) Food Additives**: - Classification of food additives, usages and optimal level recommended for usage as specification – Food colors, Flavoring agents, leavening agents, preservatives, Acidity regulators, Anticaking agent, Antifoaming agent, Bulking agent, Foaming agent, Artificial sweeteners, Emulsifier and Stabilizers. **b) Food specifications:** objectives and advantages, Food specification for various food products – starchy foods, milk and milk products, fruit products, beverages, spices and condiments, oils and fats, preserved foods.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
III	**Quality Evaluation of Food** a) **Subjective evaluation**: Sensory characters of food, organs involved in assessment – physiological process, types of sensory tests - Scoring Tests**,** Paired Comparison Tests 1, Paired Comparison Tests 2, Triangle Test, Duo Trio Test, Ranking test, requirements to conduct sensory	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

	evaluation, Role and defects in sensory evaluation – panel member, essential qualities of a panel member, procedure of sensory evaluation, Score card: Hedonic Rating Scale, and Points to be remembered while preparing score card b) **Objective evaluation**: objectives, requirements, different tests and instruments used for objective evaluation: sugar content - Refractometer, acidity - Ph meter, viscosity - Rheometer, moisture - Moisture balance, colour - Colorimetry, Texture – Texturometer Penetrometer, advantages and limitations.			
IV	**Food Toxins and Adulterants** a) **Food Toxins**: Mycotoxins – aflatoxins, aspergillus and pencillium species, mushroom poisoning, sea food toxins. Other toxins naturally occurring in foods: Lathyrogens, haemagglutinins, goitrogens. Toxic minerals and other inorganic compounds in food and water; selenium, fluorine, nitrates and nitrites, oxalates and phytates. b) **Food Adulteration**: Definition, Types, Common food adulterants; tests for detecting food adulterants, contamination with toxic metals, pesticides and insecticides; effects of food adulteration and contamination, measures to control food adulteration, Prevention of food adulterants act	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
V	**Food Standards and Regulations:** **a) Hazard Analysis**- Physical hazards (metals, glass, etc.), Chemical hazards (food additive toxicology, pesticides, antibiotics, heavy metals and packaging components), Biological hazards (epidemiology of biological pathogens: virus, bacteria and fungi), Hazard Analysis Critical Control Point (HACCP).	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

	b) Food Standards and Food Laws Voluntary standards and Certification system – BIS and AGMARK, International Food Standards - Codex Alimentarius Commission (IFS), Food Safety and Standards Authority of India (FSSAI). Good Manufacturing Practice (GMP), Food and Drug Administration (FDA).			
VI	**SELF STUDY FOR ENRICHMENT** **(Not to be included for External Examination)** Importance of food safety, Role of food additives in baked products, Importance of score card, List out the adulteration in spices,	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

Text Books

1. Dr.A.N.Jha, *Environmental Regulation and Food Safety* , 2009, ALP Books, New Delhi
2. Swaminathan, M, *Essentials of Food and Nutrition*, 2014, BAPCO, Bangalore
3. Swaminathan, M, *Hand Book of Food Science and Experimental Foods*, 2018, BAPCO, Bangalore
4. Srilakshmi B, *Food Science*, 2016, New Age International Publishers, NewDelhi.

Reference Books

1. Neal D. Fortin, *Food Regulation Law, Science, Policy, and Practice*, 2016, Wiley
2. Hui, Y.H, *Food Plant Sanitation*, 2003, Marcel Dekker, Inc.
3. Potter N, and Hotchkiss J.H, *Food Science*, 2008, CBS Publications and Distributors, Daryaganji, NewDelhi.
4. EdwardG.Schilling, *Acceptance Sampling in Quality control*, 2nd Edition, CRC Press,Mallbook., 1996
5. EillianH.Meyer, *Food Chemistry*, Affiliated West PressPvt.,Ltd, New Delhi,1973.
6. Pomeraz, Y. and MeLoari, C.E. (1996): *Food Analyasis: Theory and Practice*, CBS publishers and Distributor, New Delhi.

Web links

- **https://www.ams.usda.gov/selling-food/product-specs**
- **https://link.springer.com/chapter/10.1007/978-1-4615-6998-5_39**
- **https://www.fda.gov/food/guidance-regulation-food-and-dietary-supplements/hazard-analysis-critical-control-point-haccp**
- **https://www.sciencedirect.com/topics/food-science/food-adulteration**

Journals

1. Food Analytical Methods, Springer, United States
2. Food and Drug Law Journal, Food Drug Law Inst, United States
3. Journal of food quality, open access, United Kingdom
4. Food Quality and safety, Oxford Academic, China

Pedagogy

E-content , Lecture, Power point presentation, Seminar, Assignment, Demonstration.

Course Designers

- Ms. N. GANGA DEVI

SEMESTER V	INTERNAL MARKS: 25		EXTERNAL MARKS:75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS / WEEK**	**CREDITS**
23UND5DSE1B	**FOOD PRODUCT DEVELOPMENT AND MARKETING**	**DISCIPLINE SPECIFIC ELECTIVE**	**5**	**3**

Course Objectives

• To understand the various aspects of newer food product development.
• To learn the marketing strategies.
• To know the government regulation pertaining to new food product.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO 1	Define the basic standards pertaining to new product development	K1
CO 2	Describe role of market research and marketing efforts in the product development process	K2
CO 3	Apply the knowledge of food laws and sensory science to food product development	K3
CO 4	Infer the new product categories in food market and their characteristics.	K4
CO 5	Associate various aspects of new food product development and marketing	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	1	1	2	3	1	1	1	1
CO2	3	2	1	1	2	3	1	1	1	1
CO3	3	2	1	1	2	3	1	1	1	1
CO4	3	2	1	1	2	3	1	1	1	1
CO5	3	2	1	1	2	3	1	1	1	1

"1" – Slight (Low) Correlation ¬ "2" – Moderate (Medium) Correlation ¬
"3" – Substantial (High) Correlation ¬ "-" indicates there is no correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIVEL EVEL
I	**New product development** Definition, principles and classification, steps in food product development, characterization and factors influencing new product development. Health concerns impact of technology and market place influence.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	**Formulation of new product** Selection of raw materials, portion size, standardization methods, calculation of nutritive values, cost production, shelf life. Development of prototype product-purposes, finalizing the design, choosing the manufacturing approach, post-processing, assembly, validation, refinement, and improvements.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
III	**Sensory and Objective evaluation** Sensory evaluation-establishing sensory panels, designing score card, conduct a sensory evaluation test, shelf life analysis, objective evaluation- instruments used for physio-chemical and microbiological evaluation.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
IV	**Packaging** Types of packing materials, package testing, food labelling and nutritional labelling, developing packaging systems for maximum stability and cost effectiveness, new product development – patent, patent laws, international code for Intellectual property rights (IPR).	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
V	**Marketing** Approaches to study marketing and marketing functions, food choice models and new product trends, market structure, market efficiency and market integration. Role of government in promoting agricultural marketing.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
VI	**SELF STUDY FOR ENRICHMENT** **(Not to be included for External Examination)** Genetically modified foods Specific consumer oriented foods Importance of objective evaluation Factors affecting success and failures in new product development Agricultural and Processed Food Products Export Development Authority (APEDA)	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

Text Book

1.Avantina Sharma. (2012).*Textbook of Food Science and Technology*. CBS Publishers and Distributors Pvt.Ltd.
2.N.Shakunthala Manay M. Shadaksharaswamy. (2008).*Food Facts and Principles*. New Age International Publishers, NewDelhi.
3.VikasAhlluwa llia. (2007).*Food Processing*. Paragon International Publishers, New Delhi

Reference Book

1.Gordon W.Fuller. (2011).*New Food Product Developmentfrom Concept to Market Place*, CRC Press
2.D.G.Rao. (2016).*Fundamentals of Food Engineering*. PHI Learning Private Limited, New Delhi

Web Link:

- https://savoreat.com/product-development-of-food-strategy-innovations-trends-and-examples/
- https://pubmed.ncbi.nlm.nih.gov/18582508/
- http://www.niftem-t.ac.in/food_product_development.php
- https://www.youtube.com/watch?v=oHM1Sr9p60Y
- https://www.shu.ac.uk/courses/food-and-nutrition/msc-food-consumer-marketing-and-product-development/full-time

Journals:

1.Journal of Food Products Marketing, Volume 29, Issue 7 (2023) The Ohio State University Columbus, Ohio Print ISSN: 1045-4446 Online ISSN: 1540-4102
2. Journal of International Food and Agribusiness Marketing, The Scimago Journal & Country Rank (Elsevier B.V.). ISBN 08974438, 15286983

Pedagogy

Chalk and talk, PPT, Discussion, Assignment, Demo, Quiz, Seminar.

Course Designers

MS.T.R.REVATHI

SEMESTER V	INTERNAL MARKS: 25		EXTERNAL MARKS:75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS / WEEK**	**CREDITS**
23UND5DSE1C	**FRONT OFFICE MANAGEMENT AND HOUSEKEEPING**	**DISCIPLINE SPECIFIC COURSE**	**5**	**3**

Course Objectives

- To gain knowledge on role of front office and housekeeping as functional area.
- To understand the functions of front office and housekeeping department.
- To study the operational aspects of front office and housekeeping.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO 1	Define the guest cycle, types and process of reservation in a hotel.	K1
CO 2	Describe knowledge on front office processes on Registration procedures.	K2
CO 3	Apply in-depth knowledge on the guest services provided during the stay in a hotel.	K3
CO 4	Determine contents, cleaning methods, various service procedures of guestrooms.	K4
CO 5	Infer the organization structure, Staff, their duties, and responsibilities in cleaning agents and equipment in Housekeeping	K4

Mapping of CO with PO and PSO

Cos	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	1	1	-	3	3	3	2	3	3	2
CO2	1	1	-	3	3	3	2	3	3	2
CO3	1	1	-	3	3	3	2	3	3	2
CO4	1	1	-	3	3	3	2	3	3	2
CO5	1	1	-	3	3	3	2	3	3	2

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation "-" indicates there is no correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	a. **Introduction to front office** - Introduction to front office as an department. Importance and role of front office . Functions of front office, Types of hotel rooms, Attributes of front office staff members. Duties of front office staff. b. **Layout of front office department** - Front Office Layout -Sections of the front office department and their layout and importance – Reservation, Reception, Concierge, Bell desk, Lobby, Telephones, Cashier, Inter and Intra-department coordination. Equipments and front office systems.	15	CO 1, CO 2, CO 3, CO 4, CO 5	K1, K2, K3, K4
II	a. **Front office organization and operations:** Organization structure, Front desk operations & functions, Equipments handling at front office, Basis of Room charging, Tariff fixation, Introduction to the guest cycle. b. **Reservation operations**: Meaning, Importance, sections, Modes and sources of reservation. Different channels of reservation. Tools of reservation. Systems of reservation. reservation amendment and cancellation procedure. Group reservation	15	CO 1, CO 2, CO 3, CO 4, CO 5	K1, K2, K3, K4
III	a. **Guest registration and check in procedure:** Meaning, Importance, check in procedure, Pre arrival activities ,On arrival and post arrival. Guest registration documents. Luggage handling at the time of arrival. Room selling techniques. b. **Checkout procedures:** The Guest Departure and Post Departure Services at Front Desk, guest services, miscellaneous charges, credit security measures, express check out, early and late check outs, group departures, post departure courtesy services	15	CO 1, CO 2, CO 3, CO 4, CO 5	K1, K2, K3, K4
IV	a. **Hotel housekeeping:** Definition, Importance, sections of Housekeeping, Responsibilities of the Housekeeping department. Housekeeping Department: Organizational framework of the Department, Inter departmental Coordination with more emphasis on Front office and the Maintenance department. b. **Room servicing:** Cleaning of Guest Rooms & Bathrooms: Daily cleaning of (Occupied/Departure/ Vacant/ Under Maintenance/VIP rooms (Systematic Procedures), Special Cleaning, Weekly Cleaning /Spring Cleaning, Evening service/ Turn Down Service, System & procedures involved, Forms and Formats, Replenishment	15	CO 1, CO 2, CO 3, CO 4, CO 5	K1, K2, K3, K4

	of Guest supplies and amenities, Use of Maids Cart & Caddy.			
V	a. **Routine services and cleaning process:** Cleaning of Check out room, Occupied Room, Vacant Room. Evening service. Cleaning Equipment - General considerations & selections, Classification & Types of equipment's, Care & maintenance. Cleaning agents - General criteria for selection, Classification, Cleaning of Public Areas: Cleaning Process, Cleaning and upkeep of Public areas. **b. Floor finishes:** Classification and characteristics: Hard and soft floor finishes methods of cleaning. Wall Finishes- Different wall finishes in rooms, public and back areas, Wall papers: Uses and demerits.	15	CO 1, CO 2, CO 3, CO 4, CO 5	K1, K2, K3, K4
VI	**SELF STUDY (Not to be included for External Examination)** Responsibilities of front office staff, Types of reservation, Cash and credit control in check out procedures, Hygiene and Grooming Standards of Housekeeping Personnel, Uses of wall finishes.	-	CO 1, CO 2, CO 3, CO 4, CO 5	K1, K2, K3, K4

Text Books

1. Ahmed Ismail. (2004). *Front office operations And Management*. Delmar Publications
2. Sudhir Andrews.(2014). *Hotel Front Office a Training Manual*, (3rdedition) McGraw Hill Education (India) Private Limited.
3. Dr. B.K.Chakravarthi.(2011). *Hotel Front Office Training Manual*. A.P.H Publishing Corporation.
4. R.K. Arora.(2009).*Hotel Organization And Front Office Management*. A.P.H Publishing Corporation.

Reference Books

1. Ahmed Ismail. (2004). *Front office operations And Management*. Delmar Publications.
2. Kyesung chon and Raymond. T.Sparrowe. (2001). *Welcome to Hospitality An Introduction* (2nd ed) Delmar publication.
3. G.Raghubalan, Smritee Raghubalan. (2015). *Hotel Housekeeping operations and Managemen*t, Oxford University Press.
4. Tarachand.(2000). *Hotel and Restaurant Management*. Mohit Publications, New Delhi.
5. S.K. Bhatnagar (2005). *Front Office Management*. Frank Bros.& Co.(Publishers) Limited.
6. Ravi Aggarwal (2010*). Hotel Front Office – Systems & Procedures*, sublime publications.
7. M.A. khan.(2005).*Front Office*.Anmol Publication Private Limited.

Web Links

- https://www.ihmnotessite.net/hotel-core-areas
- https://www.ihmnotessite.net/types-of-rooms
- https://www.ihmnotessite.net/fo-organisation
- https://www.bharatskills.gov.in/pdf/E_Books/FrontOffice1Sem_TP.pdf
- file:///C:/Users/Lenovo/Downloads/BHM-704ET.pdf

Journals

1. The Journal of Hospitality & Tourism Research, Sage Publication.

Pedagogy

E-content, Lecture, Power Point Presentation, Seminar, Assignment, Group discussion.

Course Designers

- Ms. C. NIVETHA

SEMESTER V	INTERNAL MARKS:40		EXTERNAL MARKS:60	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS/ WEEK**	**CREDITS**
22UND5SEC2P	**BAKERY AND CONFECTIONARY (P)**	**SKILL ENHANCEMENT**	**2**	**2**

Course Objectives

- To enable the students to obtain basic knowledge about bakery and confectionary.
- To learn preparation techniques of baked products.
- To develop skills in the preparation of confectionary items.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On Successful Completion of the course, students will be able to	Cognitive Level
CO1	Identify role of equipment in bakery units	K1
CO2	Explain basic bakery preparation requirements	K2
CO3	Illustrate different types of bakery products	K2
CO4	Prepare different confectionary products	K3
CO5	Demonstrate practical application of field visit	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	-	1	3	1	3	3	2	3	-
CO2	3	-	1	3	1	3	3	2	3	-
CO3	3	-	1	3	1	3	3	2	3	-
CO4	3	-	1	3	1	3	3	2	3	-
CO5	3	-	1	3	1	3	3	2	3	-

"1" – Slight (Low) Correlation "2" – Moderate (Medium)Correlation
"3" – Substantial (High) Correlation "-" indicates there is no correlation.

List of Experiments

1. Introduction to Bakery -Role of ingredients and equipment used in bakery
2. Introduction to Confectionary -Role of ingredients and equipment used in confectionary
3. Preparation of Cake -Sponge cake, Pineapple cake, Bread-Salt Bread.
4. Preparation of Cookies - Whole wheat cookies; Biscuit- Salt biscuit.
5. Preparation of tart, pie and pastry - Fresh fruit tart, Apple pie, Vegetable Puff.
6. Preparation of Icing and frosting - Basic Butter cream, American Frosting.
7. Preparation of candied fruit, fondant and fudge- Amla candy, Marshmallow, fondant, Chocolate fudge.

Text Books

1. Kingslee, John. (2014). *Professional Text to Bakery and Confectionary*. New Age International Publishers, New Delhi.

2. Samuel A.Matz. (2008). *Bakery Technology and Engineering*. CBS Publishers.

Reference Books

1. Vij, Sneha. (2000). *Bread Basket India*. BPI (INDIA) Pvt Ltd.

2. Kingslee, John. (2014). *Professional Text to Bakery and Confectionary*. New Age International Publishers, New Delhi.

3. Parvinder S. Bali. (2018). *Theory of Bakery and Patisserie*. Oxford University Press, New Delhi

Web links

- https://nios.ac.in/online-course-material/vocational-courses/bakery.aspx
- https://www.fssai.gov.in/dam/jcr:22be15fc-8b41-4c4d-bf11-1c49812cd4f3/Draft_Special_Bakery_Units_Manual_English_08_11_2017.pdf
- https://aissmschmct.in/wp-content/uploads/2020/07/Chapter1-Introduction-to-bakery-confectionery.pdf

Pedagogy:

E-content, Lecture, Power point presentation, Seminar, Assignment, Demonstration, Visit to commercial bakery unit.

Course designers

- Ms. T.R.REVATHI
- MS. M.VINOTHINI

SEMESTER VI	INTERNAL MARKS: 25 EXTERNAL MARKS:75			
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS / WEEK**	**CREDITS**
23UND6CC9	**PERSPECTIVES OF HOME SCIENCE**	**CORE**	**6**	**5**

Course Objectives

- To understand the components of home science.
- To learn the principles of food service management, food science and nutrition.
- To understand the process of human development.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to:	Cognitive Level
CO1	Label different food groups and its composition	K1
CO2	Summarize principles of management and organization	K2
CO3	Apply supportive services and extension education programmes for national development	K3
CO4	Infer the growth and development in different stages of human life cycle	K3
CO5	Illustrate role of fibers and yarns in textiles and clothing	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	2	2	3	3	3	3	3
CO2	3	2	1	3	2	2	2	2	2	2
CO3	3	3	2	3	1	2	3	3	2	3
CO4	3	3	3	3	2	3	3	3	2	3
CO5	3	1	1	1	1	2	2	2	2	2

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation

"3" – Substantial (High) Correlation "-" indicates there is no correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIV ELEVEL
I	**Textiles and clothing** Fiber-classification (natural, synthetic), Yarn-definition, types. Fabric- construction method- weaving, knitting nonwovens. Clothing- clothing theory, selection of clothing, Cloth finishing-dyeing, embroidery. **Interior Design** Types, elements, principles, Colour scheme, dimensions of colour. Flower arrangement - principles, requirement, types and style. Furniture-selection, arrangement principles and furnishing materials**.**	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	**Food Service Management** Principles, functions and tools of management. Management of resources. Organization of spaces-kitchen, storage and service. Personnel management-Recruitment, selection and training.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
III	**Food Science and Nutrition** Basic five food groups, my plate, nutritional composition of food groups. Definition of nutrition, balanced diet, classification and functions of nutrients. Principles of meal planning, RDA and nutritional requirements of different age groups.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
IV	**Human Development** Growth and development of Pre - natal Neonate, Infancy, Pre- school, School going and adolescence. Theories of human development and behavior.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
V	**Extension education** Definition, objectives, principles of extension education. Role of home science extension in rural and national development- Welfare Programme- National Social Assistance Programme (NSAP), Mahatma Gandhi National Rural Employment Guarantee Act, Pradhan Mantri Gram Sadak Yojana, Annapoorna Scheme, Women's Voluntary Service (WVS), Swarna Jayanthi Gram Swarozgar Yojana (SGSY).	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

VI	**SELF STUDY FOR ENRICHMENT (Not to be included for External Examination)** Types of embroidery, Methods of cost control in food service establishment, Assessment of nutritional status Difference between growth and development, **Objectives of Training of Rural Youth for Self Employment (TRYSEM).**	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

Text Books

1. M.A.Varghees e, N.N. Ogale K.Srinivasan. (2005). *Home management.* New Age International Private Limited, New Delhi.
2. Pemalatha Mullick,*Textbook Of Home Science*. Laura E.Berk. (2012). *Child Development.* Pearson, United States of America.
3. Dr.S.S.Khank. (2013). *Human Resource .Management.* S.Chand & Company Ltd, New Delhi.

Reference Books

1. SrivastavaSushil a. (2020). *Text Book of Human Development*. S.Chand Rani, Sudha CompanyLimited, New Delhi.
2. Trueman Team. (2019). *NTA – UGC NET Home Science*. Danika Publishing Company, New Delhi.

Web links

- https://www.yourarticlelibrary.com/home-management/home-management-meaning-concept-and- needs/47779
- https://rural.nic.in/departments/departments-of-mord/department-rural-development
- https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=8x0nJkh/R0vHkX1U70Z/CQ==

Journals

1. International Journal of Home Science, Tirupati Journal Solutions, New Delhi.
2. Journal of Textile and Clothing Science, International Licence–India.
3. Journal on Interior Design, John Wiley and Sons-United States.

Pedagogy:

E-content, Lecture, Power point presentation, Seminar, Assignment

Course Designer:

- Ms. N.GANGA DEVI

SEMESTER VI	INTERNAL MARKS: 25		EXTERNAL MARKS:75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS / WEEK**	**CREDITS**
23UND6CC10	**FOOD SERVICE MANAGEMENT**	**CORE**	**5**	**4**

Course Objectives

- To gain knowledge about various types of food service operations.
- To learn about the principles and functions of management.
- To understand the food laws governing food service establishments.

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Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO 1	Identify different types and sectors of food service institutions	K1
CO 2	Illustrate the process involved in menu planning, purchasing, receiving and storage	K2
CO 3	Explain the uses of equipments and other resources in production and service.	K3
CO 4	Apply principles of management in managerial process	K4
CO 5	Infer components of hygiene, sanitation and laws in food service institutions	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	1	3	3	3	3	2	3	2
CO2	3	2	1	3	3	3	3	2	3	2
CO3	3	2	1	3	3	3	3	2	3	2
CO4	3	2	1	3	3	3	3	2	3	2
CO5	3	2	1	3	3	3	3	2	3	2

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation

"3" – Substantial (High) Correlation "-" indicates there is no correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIV ELEVEL
I	**a) Classification of food service institutions**: Objectives and types - profit oriented, service oriented and public health facility oriented. **b) Menu planning:** Definition, functions and types of menu, Principles of menu planning, menu writing, designing and format. Standardization of recipes -Definition, standard recipe format and uses. Portion control and portioning equipment. **c)Equipment:** Classification, selection, materials used for construction (bases and finishes), care and maintenance of equipment, traditional and modern equipment.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	**a) Purchasing:** Food buyer, purchasing procedure, methods of purchasing, standard purchase specification. **b) Receiving:** Receiving area - Location, space allocation, floor planning, delivery types, delivery procedures and receiving procedure. **c) Storage**: Principles of storage (FIFO, LIFO, Bin cards), types of storage, recommended temperatures for storage and inventory control. **d) Computer applications:** Computer applications in food service establishments.	15	CO1, CO2, CO3, CO4, CO5	K1, K2,K3,K4
III	**a) Food Production:** Location, space allocation, planning and layout, pre preparation techniques, objectives and methods of cooking, effective use of leftover foods. **b) Food Service systems:** Conventional system, commissary system, ready prepared (cook –chill, cook –freeze) and fast -food	15	CO1, CO2, CO3, CO4, CO5	K1,K2,K3,K4

	service systems, cloud kitchen food service system. **c) Food distribution - C**entralized and decentralized service systems in hospitals and others. **d)Cooking fuel**: Types, uses, merits, limitations, fuel economy.			
IV	**a) Introduction to Management:** Definition, principles, functions and tools of management. Organization-principles and types. **b) Human Resource Management:** Man power planning –definition, steps and benefits. Sources of recruitment, selection process, induction, orientation. Training – Benefits and types. Performance appraisal process and methods. **c) Financial Management:** Budget - importance, types (Master, Cash, Operating and Capital budget), steps in budget planning. Components of costs, behaviour of costs, food cost control, methods of controlling food costs. Cost calculation - break even and contribution and standard dish costing. Book keeping, systems of book keeping, books of accounts	15	CO1, CO2, CO3, CO4, CO5	K1,K2,K3,K4
V	**a) Hygiene and Sanitation:** Environmental hygiene and sanitation, hygiene in food handling, personnel hygiene. Food Waste management- Food waste disposers. **b) Safety:** Accident from structural inadequacies, accidents from improper placement of equipment, accidents due to nature and behavior of people at work, accidents from improper selection, maintenance and storage of equipment. Safety- "3 Es of safety" (safety engineering, safety education, safety enforcement), legal responsibilities of a food service manager.	15	CO1, CO2, CO3, CO4, CO5	K1,K2,K3,K4

	c) Laws Governing food service establishments: Labour laws governing working conditions – The Factories Act, 1948; Welfare -The Employees Provident Fund Act, 1952; Health and safety-Employees State Insurance Act, 1948.			
VI	**SELF STUDY FOR ENRICHMENT (Not to be included for External Examination)** Usage of equipment with examples, Types of layouts, Illustrate different kind of cutting techniques, Leadership styles and types, Difference between hygiene and sanitation.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

Text Books

1. Sethi M. and Malhan S.M. (20018). *Catering Management- An Integrated Approach*. 3rd ed. Wiley Eastern Limited, Mumbai.
2. Sethi M, (2015). *Institutional Food Management*, 3rd edition, New age international publishers, New Delhi,
3. Singaravelavan R. (2018). *Food & Beverage Service*. Oxford University press. New Delhi.

Reference Books

1. George B and Chatterjee. S.(2010) *Food and beverage Service and Management*, JAICO.
2. West, B.B., Wood, L. etal. (1987). *Food Services in institutions*, John Wiley and Sons, New York.
3. Bhushan, V.K. (1973). *Business Organization and Management*, Sultan Chand & Co.

Web links

- https://psu.pb.unizin.org/hmd329/chapter/ch4/
- https://www.pearsonhighered.com/assets/samplechapter/0/1/3/2/0132741733.pdf
- https://ebooks.inflibnet.ac.in/hsp06/chapter/equipment-for-quantity-food-production/

Journals

1. Journal of Food Service Management and Education
2. Journal of Food Service, willey publisher, United States.
3. Journal of Food Service Business Research, Taylor and Francis, United Kingdom.

Pedagogy:

E-content , Lecture, Power Point Presentation, Seminar, Assignment

Course Designer:

- Ms.E.AGALYA

SEMESTER VI	INTERNAL MARKS: 40		EXTERNAL MARKS:60	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS / WEEK**	**CREDITS**
22UND6CC6P	**FOOD SERVICE MANAGEMENT (P)**	**CORE**	**3**	**3**

Course Objectives

- To learn the skills in planning the design for food service units.
- To gain practical knowledge on pricing of menus.
- To acquire knowledge on food service establishments to become entrepreneur.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO 1	Identify the different types of food service institutions etiquettes	K1
CO 2	Describe the selection and handling of equipments, standardization of recipes and different styles of food service procedures	K2
CO 3	Explain layout, napkin folding, laying of table	K3
CO 4	Infer the skills in documentation of commercial and non-commercial	K4
CO 5	Ascertain components of hygiene and sanitation in food service institutions	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	1	3	3	3	3	2	3	2
CO2	3	2	1	3	3	3	3	2	3	2
CO3	3	2	1	3	3	3	3	2	3	2
CO4	3	2	1	3	3	3	3	2	3	2
CO5	3	2	1	3	3	3	3	2	3	2

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation "-" indicates there is no correlation.

List of Experiments

1. Identification of commercial and noncommercial food service establishments.
2. Classification and uses of food production and service equipment.
3. Cost comparison of different types of fuel.
4. Standardization of recipes.
5. Standardization of 5 selected quantity recipes in relation to cost, time and equipment.
6. Plan cyclic menu for noncommercial food service establishments.
7. Prepare a la carte menu card for commercial food service establishment.
8. Preparation of check list for evaluation of hygiene and sanitation based on FSSAI.
9. Preparation of check list for Performance appraisal -Check list method and Ranking method.
10. Laying a table and waiting at a table for different styles of food service.

Text Books

1. Sethi M. and Malhan S.M. (20018). *Catering Management- An Integrated Approach*. 3rd ed. Wiley Eastern Limited, Mumbai.
2. Sethi M, (2015). *Institutional Food Management*, 3rd edition, New age international publishers, New Delhi,
3. Singaravelavan R. (2018). *Food & Beverage Service*. Oxford University press. New Delhi.

Reference Books

1. George B and Chatterjee. S.(2010) *Food and beverage Service and Management*, JAICO.
2. West, B.B., Wood, L. etal. (1987). *Food Services in institutions*, John Wiley and Sons, New York.
3. Bhushan, V.K. (1973). *Business Organization and Management*, Sultan Chand & Co.,

Web links

- https://open.lib.umn.edu/humanresourcemanagement/chapter/11-2-appraisal-methods/
- https://www.pearsonhighered.com/assets/samplechapter/0/1/3/2/0132741733.pdf
- https://ebooks.inflibnet.ac.in/hsp06/chapter/equipment-for-quantity-food-production/
- https://www.fssai.gov.in/upload/uploadfiles/files/Inspection%20checklists%20Tamil.pdf

Pedagogy:

Practical, Demonstration, E-content, Lecture, Power point presentation, Visit to food service institutions.

Course Designer:

- Ms.E.AGALYA

SEMESTER VI	INTERNAL MARKS: 25		EXTERNAL MARKS:75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS/ WEEK**	**CREDITS**
23UND6DSE2A	**FUNCTIONAL FOODS AND NUTRACEUTICALS**	**DISCIPLINE SPECIFIC ELECTIVE-II**	**5**	**3**

Course Objectives

- To understand the basics of functional foods and nutraceuticals
- To know the role of functional foods, nutraceuticals and dietary supplements in health and disease
- To understand the safety issues and consumer acceptance of functional foods and nutraceuticals

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO 1	Define the potential of various nutraceuticals and functional foods in promoting human health	K1
CO 2	Describe the role of functional foods, nutraceuticals and dietary supplements in health and disease	K2
CO 3	Apply the knowledge of functional foods and nutraceuticals in product development	K3
CO 4	Associate and analyze labeling, marketing and regulatory issues related to functional food and nutraceutical	K4
CO 5	Infer and explain the safety issues and consumer acceptance of nutraceutical and functional foods	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	2	3	2	2	2	2	2	2
CO2	3	3	2	3	2	2	2	2	2	2
CO3	3	3	2	3	2	2	2	2	2	2
CO4	3	3	2	3	2	2	2	2	2	2
CO5	3	3	2	3	2	2	2	2	2	2

"1" – Slight (Low) Correlation ¬ "2" – Moderate (Medium) Correlation ¬
"3" – Substantial (High) Correlation ¬ "-" indicates there is no correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIV ELEVEL
I	**Introduction to functional foods** a) Evolution and definition of functional foods. b) Types of functional foods-whole foods, fortified foods, enhanced foods. c) Significance and relevance of functional foods in the management of disease and disorders – CVD, cancer, diabetes, obesity and immune enhancement.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	**Introduction to nutraceuticals** a) Definition and Classification of nutraceuticals based on food source, chemical nature and mechanism of action. b) Significance and relevance of nutraceuticals in the management of disease and disorders – CVD, cancer, diabetes, obesity, cognitive and immune enhancement.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
III	**Probiotics, Prebiotics and Synbiotics** a) Probiotics – definition, sources, types, health benefits. b) Prebiotics – definition, types, health benefits of prebiotics. c) Synbiotics - definition, types and health benefits	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
IV	**Phytochemicals and Antioxidants** a) Free radicals – definition , types, formation – exogenous and endogenous, ill effects caused by free radicals. b) Phytochemicals- definition, classification of phytochemicals: Terpenoids, Carotenoids, Polyphenols. c) Antioxidants- definition and mechanism of action, classification of antioxidants- endogenous and exogenous.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
V	**Regulatory aspects of functional foods and nutraceuticals** Regulatory aspects - Regulations of nutraceutical in India (FSSAI), regulatory requirements in India, registration process in India.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
VI	**SELF STUDY FOR ENRICHMENT** **(Not to be included for External Examination)** Importance of functional foods on health. International regulatory guidelines for nutraceuticals. Research frontiers in functional foods. Nutrigenomics concept of personalized nutrition. Recent developments in the delivery of phytochemicals.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

Text Book

1. Agarwal A., (2014)., *Textbook of human nutrition* Jaypee Brothers Medical Publishers (P) Ltd.
2. Edward.R. Farnwort., (2008). *Handbook of Fermented functional foods*. CRC Press.
3. Susan Sungsoo Cho, Mark L. Dreher. (2019) *Handbook of Dietary fibre*. CRC Press.
4. Rotimi E. Aluko., (2012). *Functional Foods & Nutraceuticals.* Springer Publications.

Reference Book

1. Nicola Graimes.(1999). *The practical Encyclopedia of whole foods*. Anness Publishing Ltd
2. Hari Niwas Mishra, Rajesh Kapur, Navneet Singh Deora, Aastha Deswal.(2016). *Functional foods.* New India Publishing Agency. New Delhi
3. Debasis Bagchi. (2014). *Nutraceutical and functional food regulations in the United States and around the world*. Elsevier, USA.
4. Bamji (2003), *Textbook of Human Nutrition*, 3rd edition, Oxford & IBH Publishing Co Pvt Ltd, New Delhi

Web Link:

- https://www.tandfonline.com/toc/ijds19/1/1https://foodrevolution.org/blog/probiotics-and-prebiotics/
- https://www.eatright.org/health/wellness/healthful-habits/functional-foods
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9559824/
- https://egyankosh.ac.in/handle/123456789/62098
- https://www.pediatriconcall.com/articles/nutrition/synbiotics/synbiotics-introduction

Journals:

1. Functional Foods in Health and Disease, Functional Food Center, Inc, United States.
2. Journal of Functional Foods, Elseiver, United States
3. The Pharma Innovation Journal, Akinik Publications, New Delhi
4. International Journal on Nutraceuticals, Functional Foods and Novel Foods from Research to Industrial Applications, NIH, United States

Pedagogy

Chalk and Talk, Power Point Presentation, E- Content, Discussion, Assignment, Quiz, Seminar.

Course Designers

- Ms. T.R. REVATHI

SEMESTER VI	INTERNAL MARKS:25		EXTERNAL MARKS:75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS/ WEEK**	**CREDITS**
23UND6DSE2B	**SPORTS NUTRITION**	**DISCIPLINE SPECIFIC ELECTIVE -II**	**5**	**3**

Course Objectives

- Explore the nutritional requirements of individuals participating in sports activities.
- Understand and address nutritional challenges faced by athletes.
- Acquire insights into the metabolism of various nutrients during exercise.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO 1	Identify the nature of sports and outline its specific nutrient requirements.	K1
CO 2	Explain the metabolism of nutrients during different types of exercise.	K2
CO 3	Relate nutritional problems commonly associated with sports individuals.	K2
CO 4	Determine the nutritional requirements specific to various sports personalities.	K3
CO 5	Ascertain the appropriate nature of supplements to be administered based on the individual needs of different sports personalities	K4

Mapping of CO with PO and PSO

Cos	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	1	1	3	3	1	1	2
CO2	3	3	3	1	1	3	3	1	1	2
CO3	3	3	3	1	1	3	3	1	1	2
CO4	3	3	3	1	1	3	3	1	1	2
CO5	3	3	3	1	1	3	3	1	1	2

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation "-" indicates there is no correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Introduction to Sports Nutrition** Definition, scope of sports nutrition, Organization working for sports nutrition, Importance of sports Nutrition, Physiology of Exercise - Fuels for Exercise - Carbohydrates -Fats – Proteins.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	**Nutrients metabolism and performance enhancement.** Role of macronutrient and micronutrient on exercise and sports performance. Hydration assessment - Pre competition Hydration, The Week before, the day before, on the day.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
III	**Balanced diet for athletes** Determinants of food choice, Balanced diet, Vegetarian diet, food guide pyramid.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
IV	**Nutritional Problems of sports person** The female athlete triad, amenorrhea, osteoporosis, anemia, cramps, - effect on sports performance, treatment and prevention.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
V	**Dietary supplements for sports nutrition** Dietary supplements for sports nutrition and their classification, Macronutrient supplements- Protein supplements, Branched chain Amino Acids, amino acid supplements, carbohydrates, Micronutrient supplements- vitamins, mineral supplements.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
VI	**SELF STUDY FOR ENRICHMENT (Not to be included for External Examination)** Classification of Sports, Sports and energy drinks, Nutrition for Ironman, Triathlon and Ultrathon, Nutritional risks among Adolescent Athletes with Eating disorder, Use of steroids and their harmful effects.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

Text Books

1. B. Srilalakshmi, V. Suganthi, C. kalavani Ashok.(2017). *Exercise Physiology fitness and sports nutrition.* New Age International, India
2. Vijaya lakshmi. (2007). *Sports Nutrition,* khel sahitya kendra, India.

Reference Books

1. Jose Antonio et al (2009) *Essentials of Sports Nutrition and Supplements*, Humana Press.
2. Asker Jeukendrup, Mi chaelGleson 2019 Sport Nutrition Human Kinetics, United States.
3. Wener W.K. Hoeger, Sharon (2012), *Lifetime Physical Fitness and Wellness: A. Personalized Program*, Cengage Learning, Unites States
4. Benardot, Dan. (2000). *Advanced Sports Nutrition*.(3rd ed.,). Human Kinetics Bourns,
5. Fred. (2002). *Essentials of Sports Nutrition*.(2nd edition.,), United States
6. Greenwood, M., Cooke, M.B., Ziegenfuss, T., Kalman, D.S., Antonio, J (2015). *Nutritional Supplements in Sports and Exercise.(3rd ed.,).*USA

Web links

- https://www.nal.usda.gov/fnic/fitness-and-sports-nutrition
- https://www.ncbi.nlm.nih.gov/pmc/articles
- https://jissn.biomedcentral.com/articles

Journals

1. International Journal of Sport Nutrition and Exercise Metabolism (IJSNEM), United States.
2. Journal of the International Society of Sports Nutrition (JISSN), United States.
3. Journal of the American College of Nutrition (JACN), United States.
4. European Journal of Sport Science, United States of America
5. Journal of Sports Sciences, United States of America.

Pedagogy

Lecture, Chalk and Talk, Seminar, Assignment, E-Content, PowerPoint Presentation, Quiz.

Course Designers

- Ms. S. FATHIMA

SEMESTER VI	INTERNAL MARKS: 25	EXTERNAL MARKS: 75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS / WEEK**	**CREDITS**
23UND6DSE2C	**BASICS IN FOOD ANALYSIS**	**DISCIPLINE SPECIFIC ELECTIVE – II**	**5**	**3**

Course Objectives

- To acquire knowledge on the methods used for food analysis.
- To understand the methods of evaluation used for food analysis.
- To understand the working principles of various instruments.

Course Outcome and Cognitive Level Mapping

CO Number	CO statement On the successful completion of the course, students will be able to	Cognitive Level
CO 1	Identify the knowledge obtained to choose the appropriate instrument and technique for food analysis	K1
CO 2	Explain the role of sensory, objective and microbial evaluation in food analysis.	K2
CO 3	Predict the importance of techniques used in food analysis.	K3
CO 4	Infer the usage of various analytical techniques used for quality of foodanalysis.	K4
CO 5	Evaluate the methods and types of chromatography and spectrophotometer and electrophoresis	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO 2	PSO 3	PSO 4	PSO 5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	2	1	3	2	2	2	-
CO2	3	2	3	2	1	3	2	2	2	-
CO3	3	2	3	2	1	3	2	2	2	-
CO4	3	2	3	2	1	3	2	2	2	-
CO5	3	2	3	2	1	3	2	2	2	-

"1" – Slight (Low) Correlation ¬ "2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation ¬ "-" indicates there is no correlation

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Introduction to food analysis** Need and functions of food analysis, factors affecting food analysis, types of sampling, requirements, collection of food samples, preparation, sampling procedure, sampling techniques, Problems in sampling.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	**Sensory evaluation** Sensory characteristics of food . Merits and Limitations of sensory analysis. Sensory tests - types of test - Different test, Rating tests, Sensitivity tests and Descriptive test. Requirements for conducting sensory test - Panel members, testing laboratory, preparation of samples, testing time, design of experiment. Score card - hedonic rating scale, importance of score card and Points to be remembered while preparing score card and construction of score card.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
III	**Objective Evaluation** Basic guidelines, tests used for objective evaluation – chemical methods, physico – chemical methods, microscopic examination and physical methods. Advantages and limitations of objective evaluation.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
IV	**Analysis of Food** Moisture analysis -Oven drying method, distillation method. Ash analysis- Dry, wet, Low temperature. Carbohydrate analysis –Starch analysis. Fibre analysis – Crude fibre analysis, dietary fibre analysis by AOAC method. Protein analysis –Kjeldahl method, Biuret method, Lowry method. Fat analysis – Soxhlet Continuous solvent extraction, non- solvent wet extraction method	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
V	**Basic Food Analytical Techniques** Analytical and testing instruments for food – basic principles, types and application of Centrifuger, Colorimeter, Electophoresis - Paper and Gel, Spectrophotometer, Chromatography-Gas Chromatography and High Perfomance Liquid Chromatography, High Performance Thin Layer Chromatography.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

VI	**SELF STUDY FOR ENRICHMENT** **(Not to be included for External Examination)** Types of food adulteration Qualities required by panel members involved in food analysis, Comparison of Sensory and Objective evaluation, Food adulteration detection techniques, Applications of food analytical instruments.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

Text Books

1. Andrew L.Winton Kate Barber Winton. (2001). *Techniques in Food Analysis*. Agrobios (India) Agro House, Jodhpur.
2. Harry T.Lawless (2010). *Sensory Evaluation of Food Principles and Practices.* Springer Science, New York.
3. Semih Otles. (2016). *Handbook of Food Analysis Instruments*. CRC Press, Bangalore
4. Suzanne Nielsen. (2014). 4th ed. *Food Analysis*. Springer Science &Business Media, Verlag New York.
5. Kaur. N. (2021). 3rd ed. *Instrumental methods of chemical analysis.* Pragati Prakashan EducationalPublishing. Garhwal

Reference Books

1. Joslyn. (1970). *Methods in Food Analysis*. Academic Press, New York.
2. Adrian Jones (2012). *Shelf life Evaluation of foods.* Springer science and Business Media, Verlag New York.
3. King, R.D. (1978*). Developments in Food Analysis Techniques-1*. Applied Science Publishers Ltd., London.
4. Dr R.S. *Khandpur*. (2007) 2nd ed. *Handbook of Analytical Instruments*. Tata McGraw-Hill Education, Ahmedabad.

Web links

- https://egyankosh.ac.in/bitstream/123456789/12395/1/Unit-13.pdf
- https://www.omicsonline.org/scholarly/food-analytical-chemistry-journals-articles-ppts-list.php
- https://www.roitt.com/pdf/Online_Chapter.pdf
- https://www.researchgate.net/publication/37889931_Manuals_of_Food_Quality_Control Microbiological

Journals

1. Journal of Food Composition and Analysis, Elsevier, University of Reading, Reading, UK.
2. Journal of Food Science and Technology, Association of Food Scientists and Technologists of India,Mysuru, Karnataka.
3. Journal of Food and Nutrition Research, Vuh Food Research Inst, Bratislava, Slovakia

Pedagogy

Lecture, Assignment, PowerPoint presentation, Quiz, Seminar, E-content, Industrial Visit

Course designers

- Ms.N.GANGA DEVI

SEMESTER VI	INTERNAL MARKS:-		EXTERNAL MARKS:100	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS/ WEEK**	**CREDITS**
22UND6PW	**PROJECT WORK**	**PROJECT**	**5**	**4**

Course Objectives

- To attain a comprehensive understanding of the course subject matter, demonstrating proficiency in applying acquired knowledge to practical situations.
- To Develop and enhance critical thinking skills through analytical exercises and assessments, fostering the ability to evaluate and solve complex problems.
- To Encourage creative thinking and innovative approaches to problem-solving, allowing students to explore alternative solutions

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO 1	Apply theoretical concepts to practical scenarios, demonstrating a heightened proficiency in real-world applications.	K1
CO 2	Analyze complex problems, fostering critical thinking skills and enabling them to dissect intricate issues within the course domain.	K2
CO 3	Create innovative solutions, synthesizing knowledge from various sources to address challenges in the subject matter	K2
CO 4	Evaluate information critically, honing their judgment skills and discerning the reliability and relevance of data within the course context.	K3
CO 5	Demonstrate effective communication skills, articulating ideas clearly and presenting findings coherently in various formats.	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	1	1	3	2	3	3	3	1
CO2	3	3	1	1	3	2	3	3	3	1
CO3	3	3	1	1	3	2	3	3	3	1
CO4	3	3	1	1	3	2	3	3	3	1
CO5	3	3	1	1	3	2	3	3	3	1

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation "-" indicates there is no correlation.

Students have the option to undertake the project as a group in any of the field listed below;

- Nutrition and Dietetics
- Food Service Management
- Food Science
- Community Nutrition
- Food Product Development
- Food Processing

COMPONENTS OF PROJECT REPORT

- Introduction and objectives
- Review of Literature
- Methodology
- Results and Discussion
- Conclusion
- Bibliography

Course Designers

- Ms.S.FATHIMA

EVALUATION PATTERN

S. NO	COMPONENTS	MARKS
1.	Introduction	15
2.	Review of Literature	15
3.	Methodology	15
4.	Results and Discussion	15
5.	Conclusion	10
6.	Bibliography	10
7.	Viva	20
	TOTAL	**100**