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 *	Podhu Tamil -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 *	Podhu Tamil - 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**

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
PEO 1	**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.
PEO 2	**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.
PEO 3	**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.
PEO 4	**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.
PEO 5	**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 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.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
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