

CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS)

NATIONALLY ACCREDITED (IICCYCLE) WITH “A” GRADE BY NAAC
ISO 9001:2015 Certified
TIRUCHIRAPPALLI

DEPARTMENT OF FOOD SERVICE MANAGEMENT AND DIETETICS



B.Sc., NUTRITION AND DIETETICS SYLLABUS

2022-2023 and Onwards

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 breadth 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	<p>ACADEMIC EXCELLENCE AND COMPETENCE</p> <p>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.</p>
PO2	<p>HOLISTIC AND SOCIAL APPROACH</p> <p>Create novel ideas related to the scientific research concepts through advanced technology and sensitivity towards sustainable environmental practices as well as social issues.</p>
PO3	<p>PROFESSIONAL ETHICS AND TEAM WORK</p> <p>Explore professional responsibility through project strategies, internships, field trip/industrial visits and mentorship programmes to transmit communication skills.</p>
PO4	<p>CRITICAL AND SCIENTIFIC THINKING</p> <p>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.</p>
PO5	<p>SOCIAL RESPONSIBILITY WITH ETHICAL VALUES</p> <p>Ensure ethical, social and moral values in the minds of learners and attain gender parity for building a healthy nation.</p>

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



CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS), TRICHY-18
DEPARTMENT OF FOOD SERVICE MANAGEMENT AND DIETETICS
B.Sc., NUTRITION AND DIETETICS
LEARNING OUTCOME BASED CURRICULUM FRAMEWORK (CBCS-LOCF)
(For the Candidates admitted from the Academic year 2022-2023 onwards)

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 *	Ikkala Ilakkiyam	22ULT1	6	3	3	25	75	100
			Basic French-I	22ULF1						
			Hindi Literature & Grammar-1	22ULH1						
			History of Popular Tales, Literature and Sanskrit Story	22ULS1						
	II	English Language Course-I(ELC)	Functional English for Effective Communication – I	22UE1	6	3	3	25	75	100
	III	Core Course – I(CC)	Food Science	22UND1CC1	5	5	3	25	75	100
		Core Practical - I (CP)	Food Science (P)	22UND1CC1P	3	3	3	40	60	100
		First Allied Course – I (AC)	Food Microbiology	22UND1AC1	4	3	3	25	75	100
		First Allied Course – II (AP)	Food Microbiology (P)	22UND1AC2P	4	3	3	40	60	100
	IV	Ability Enhancement Compulsory Course – I (AECC)	UGC Jeevan Kaushal - Universal Human Values	22UGVE	2	2	-	100	-	100
		TOTAL			30	22				700

II	I	Language Course – II (LC) – Tamil * / Other Languages *)	Idaikkala Illakiyamm Pudhinamum	22ULT2	5	3	3	25	75	100
			Basic French-II	22ULF2						
			Hindi Literature & Grammar-II	22ULH2						
			Poetry, Textual Grammar and Alankara	22ULS2						
	II	English Language Course-II(ELC)	Functional English for Effective Communication – II	22UE2	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)	Macro and Micro Nutrients	22UND2CC3	3	3	3	25	75	100
		First Allied Course – III (AC)	Human Physiology	22UND2AC3	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	23				800

III	I	Language Course – III – Tamil * / Other languages *)	Kaapiyamum, Nadagamum	22ULT3	5	3	3			100
			Intermediate French-I	22ULF3						
			Hindi Literature & Grammar-III	22ULH3						
			Prose, Textual Grammar and Vakyarachana	22ULS3						
	II	English Language Course-III(ELC)	Learning Grammar Through Literature - I	22UE3	6	3	3			100
	III	Core Course– IV(CC)	Diet Therapy I	22UND3CC4	6	6	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	23					700

15 Days INTERNSHIP during Semester Holidays

IV	I	Language Course – IV (LC) Tamil * / Other Languages*)	Pandaiya Ilakiyam	22ULT4	6	3	3			100
			Intermediate French-II	22ULF4						
			Hindi Literature & Functional Hindi	22ULH4						
			Drama, History of Drama Literature	22ULS4						
	II	English Language Course - IV(ELC)	Learning Grammar Through Literature - II	22UE4	6	3	3			100
	III	Core Course – V(CC)	Diet Therapy II	22UND4CC5	6	6	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 Chemistry	22UND4AC6	4	3	3	25	75	100
		Internship	Internship	22UND4INT	-	2	-	-	-	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	25					800

V	III	Core Course – VI(CC)	Food Processing and Preservation	22UND5CC6	6	6	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	22UND5CC7	6	6	3	25	75	100
		Core Course – VIII(CC)	Community Nutrition	22UND5CC8	6	6	3	25	75	100
		Discipline Specific Elective – I (DSE)	A. Food Standards and Quality Control	22UND5DSE1A	5	4	3	25	75	100
			B. Food Product Development and Marketing	22UND5DSE1B						
	C. Front Office Management and Housekeeping		22UND5DSE1C							
	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	29					700

VI	III	Core Course – IX(CC)	Perspectives of Home Science	22UND6CC9	6	6	3	25	75	100
		Core Course – X(CC)	Food Service Management	22UND6CC10	5	5	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	22UND6DSE2A	5	4	3	25	75	100
			B. Sports Nutrition	22UND6DSE2B						
			C. Basics in Food Analysis	22UND6DSE2C						
	Project	Project Work	22UND6PW	5	4	-	-	100	100	
	V	Gender Studies	Gender Studies	22UGGS	1	1	-	100	-	100
		Extension activity		22UGEA	0	1	0	-	-	-
	TOTAL			30	28					700
	GRAND TOTAL			180	150					4400

Courses & Credits for UG Science Programmes

Part	Course	No. of Courses	Credits	Total Credits
I	Tamil/ Other Language	4	12	12
II	English	4	12	12
III	Core (Theory & Practical)	11 6	58 19	109
	Project Work	1	4	
	Internship	1	2	
	First Allied	3	9	
	Second Allied	3	9	
	DSE	2	8	
IV	GEC	2	4	15
	SEC	2	4	
	AECC-I -Universal Human Values	1	2	
	AECC-II-Environmental Studies	1	2	
	AECC-III-Innovation and Entrepreneurship	1	1	
	AECC-IV Professional Skills	1	2	
V	Gender Studies	1	1	02
	Extension Activities	–	1	
		44		150

SEMESTER I	INTERNAL MARKS: 25		EXTERNAL MARKS:75	
COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
22UND1CC1	FOOD SCIENCE	CORE	5	5

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	Cognitive Level
	On the successful completion of the course, students will be able to	
CO 1	Define and classify the food groups and different cooking methods.	K1,K2,K3,K4
CO 2	Explain structure, composition and processing of food groups.	K1,K2,K3,K4
CO 3	Illustrate the chemical reactions that occur during cooking and changes that occur during storage of fruits and vegetables.	K1,K2,K3,K4
CO 4	Predict properties and role of food groups in cookery.	K1,K2,K3,K4
CO 5	Examine the quality of egg and factors affecting tenderness of meat.	K1,K2,K3,K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	2	2	2	3	3	2	2	3
CO2	3	3	2	2	2	3	2	2	2	3
CO3	3	3	2	2	2	3	2	2	2	3
CO4	3	3	2	2	2	3	2	2	2	3
CO5	3	3	2	2	2	3	2	2	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	<p>a. INTRODUCTION TO FOOD SCIENCE AND NUTRITIONAL CLASSIFICATION OF FOODS Definition of Food Science, Basic Five Food Groups, Food Pyramid, Nutritional classification of foods – Energy yielding, body building, protective and regulatory foods.</p> <p>b. CLASSIFICATION OF NUTRIENT Macro Nutrients - Carbohydrate, Protein and Fat and Micro Nutrients – Vitamins, Minerals and its Sources.</p> <p>c. COOKING METHODS Objectives, different types cooking methods- moist, dry heat methods, microwave cooking, combination of cooking methods and, Recent methods of cooking – Ohmic cooking and induction cooking - merits and demerits.</p>	16	CO1, CO3, CO4, CO5	K1, K2, K3, K4
II	<p>a. CEREALS AND CEREAL PRODUCTS Structure, composition, nutritive value and milling of wheat and parboiling of rice. Nutritional importance of millets - (maize, jowar, ragi, bajra), malting of cereals and role of cereals in cookery.</p> <p>b. PULSES Composition, nutritive value, factors affecting cooking quality of pulses, germination, role of pulses in cookery.</p> <p>c. NUTS AND OILSEEDS Composition, Nutritive value.</p>	18	CO1, CO2, CO4	K1, K2, K3, K4
III	<p>a. FRUITS Classification, nutritive value, changes during ripening of fruits, enzymatic browning and methods of prevention, storage techniques.</p> <p>b. VEGETABLES Classification and nutritive value, pigments-fat-soluble, water-soluble, selection of vegetables, cooking of vegetables-changes during cooking, nutrient loss, effect of cooking on the pigments.</p>	14	CO1, CO2, CO3, CO4	K1, K2, K3, K4

IV	<p>a. MILK AND MILK PRODUCTS Composition, nutritive value, types of milk products- fermented milk products (Butter milk, Yogurt) and non - fermented milk products (Skim milk, Evaporated milk, sweetened condensed milk, Milk powder, Khoa, Ice cream).</p> <p>b. EGG Structure, composition and nutritive value, evaluation of quality of egg.</p> <p>c. MEAT Structure, composition, types of meat, cuts of meat, ageing and curing of meat, post mortem changes in meat, and tenderness of meat, meat cookery.</p> <p>d. POULTRY Composition, classification and nutritive value, poultry cookery.</p> <p>e. FISH Structure, composition, nutritive value, selection of fish, fish cookery.</p>	15	CO1, CO2, CO4, CO5	K1, K2, K3, K4
V	<p>a. FATS AND OILS Composition, types of oils, functions, rancidity, hydrogenation, winterization, smoking point and role of fat or oil in cookery.</p> <p>b. SUGAR Nutritive value, sugar related products, stages of sugar cookery, crystallization, factors affecting crystallization.</p> <p>c. SPICES AND CONDIMENTS Uses of spices in Indian cookery and medicinal properties.</p>	12	CO1, CO2, CO4	K1, K2, K3, K4
VI	<p>SELF STUDY FOR ENRICHMENT (Not to be included for External Examination) Solar cooking method- merits and demerits. Role of Nuts and oilseeds in cookery. Criteria of selection of fruits. Role of milk in cookery. Types of spices in Indian cookery.</p>	-	CO1, CO2, CO3, CO4	K1, K2, K3, K4

Text Book

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 Book

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 References:

1. <https://www.scienceofcooking.com/>
2. https://www.brainkart.com/article/Structure-of-cereal-grains_33949/
3. <https://fruitsandveggies.org/stories/key-nutrients-that-protect/>
4. <https://pubmed.ncbi.nlm.nih.gov>
5. <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, PPT, Discussion, Assignment, Demo, Quiz, Seminar.

Course Designers

MS. E. AGALYA

MS. C. NIVETHA

SEMESTER I	INTERNAL MARKS - 40		EXTERNAL MARKS - 60	
COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
22UND1CC1P	FOOD SCIENCE (P)	CORE PRACTICAL	3	3

Course Objectives

- To gain knowledge in food groups.
- To compare weighing and measuring of raw and cooked food items.
- To formulate recipes by applying different cooking techniques.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement	Cognitive Level
	On the successful completion of the course, students will be able to	
CO 1	Identify various food groups and cooking techniques	K1,K2,K3,K4
CO 2	Interpret weighing and measuring and compare weight of raw and cooked food items	K1,K2,K3,K4
CO 3	Prepare recipes from five food groups	K1,K2,K3,K4
CO 4	Relate cooking methods with different food groups	K1,K2,K3,K4
CO 5	Determine role of food groups in cookery	K1,K2,K3,K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	2	2	2	3	3	2	2	3
CO2	3	3	2	2	2	3	2	2	2	3
CO3	3	3	2	2	2	3	2	2	2	3
CO4	3	3	2	2	2	3	2	2	2	3
CO5	3	3	2	2	2	3	2	2	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
1.	Identification of ingredients from various food groups.	3	CO1	K1, K2, K3, K4
2.	Weighing and measuring of raw and cooked food items.	3	CO2	K1, K2, K3, K4
3.	CEREAL BASED RECIPES: Idli, Chapathi, Poori, Vermicelli upma, Kozhukattai, Aloo paratha, Rice.	3	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
4.	MILLET BASED RECIPES: Ragi Vermicelli upma, Sathumavu mix, Millet ball, Millet pongal, Millet payasam	3	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
5.	PULSE BASED RECIPES: Sundal, Bholi, Green gram payasam, Dhal makhani, Vadai, Sambar and Sprouts salad.	6	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
6.	FRUITS BASED RECIPES: Fritters, Halwa, Salad, Milkshakes and Fresh juices	6	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
7.	VEGETABLES BASED RECIPES: Green leafy kootu, Avial, Stewed potato curry, Poriyal, Vegetable Salad, and Vegetable soup.	6	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
8.	MILK BASED RECIPES: Paneer, Phirnee, Payasam, Ice cream and Basanthi.	6	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
9.	MEATBASED RECIPES: Deep fried Chicken, Mutton gravy.	3	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
10.	FISH BASED RECIPES: Steamed fish, Fish fry, Fish gravy.	3	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
11.	EGG BASED RECIPES: Boiled, Scrambled and Poached egg, Curry and Omelette.	3	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.

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

Pedagogy:

E-content, Lecture, Power point presentation, Seminar, Assignment, Demonstration and Industrial visit

Web Links:

1. <https://www.scienceofcooking.com/>
2. [https://www.nios.ac.in/media/documents/SecHmscicour/english/Home%20Science%20\(Eng\)%20Ch-4.pdf](https://www.nios.ac.in/media/documents/SecHmscicour/english/Home%20Science%20(Eng)%20Ch-4.pdf)
3. https://www.youtube.com/watch?v=QO_V3h14Fyc&ab_channel=SciShow
4. <https://everydaynourishingfoods.com/how-to-cook-fluffy-millets/>

Course Designers:

- Ms. E. AGALYA
- Ms. C. NIVETHA

SEMESTER I	INTERNAL MARK : 25		EXTERNAL MARK : 75	
COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
22UND1AC1	FOOD MICROBIOLOGY	ALLIED	4	3

Course Objectives

- To acquire knowledge in relevance to microbiology and its applications in everyday life
- To learn various technique in food preservation.
- To understand the role of microorganisms in food industry and their beneficial effects.

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	Describe fundamental principles pertaining to food microbiology	K1,K2,K3,K4
CO2	Relate the preservation methods for the prevention of spoilage	K1,K2,K3,K4
CO3	Examine microbial quality of food and water	K1,K2,K3,K4
CO4	Interpret role of microbes in fermented food products	K1,K2,K3,K4
CO5	Illustrate benefits and hazards of micro organism	K1,K2,K3,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	<p>a. INTRODUCTION TO MICROBIOLOGY Microscope – Types and uses, classification of microorganisms – Prokaryotes and Eukaryotes.</p> <p>b. MORPHOLOGY OF MICROORGANISMS Virus, Fungi, Protozoa and Algae.</p>	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	<p>a. GROWTH AND MULTIPLICATION Growth curve, batch culture and continuous culture, chemostat and turbidostat.</p> <p>b. FACTORS AFFECTING GROWTH Intrinsic factors -nutrient content, pH, redox potential, antimicrobial barrier and water activity Extrinsic factors - relative humidity, temperature and gaseous atmosphere.</p>	12	CO1, CO2, CO3, CO4	K1, K2, K3, K4
III	<p>a. MICROBIOLOGY OF WATER Bacteriological examinations, total count, test for E – Coli and Purification of water. Modern methods of purification – Reverse Osmosis, ultraviolet purification, activated carbon.</p> <p>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.</p>	12	CO1, CO2, CO3, CO4	K1, K2, K3, K4
IV	<p>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.</p> <p>b. MICROBIOLOGY OF NON - PERISHABLE FOODS Contamination, spoilage and preservation of cereal and cereal products, pulses and legumes, sugar and sugar products.</p>	12	CO1, CO2, CO4	K1, K2, K3, K4
V	<p>a. BENEFICIAL EFFECTS OF MICROORGANISMS Fermentation, Role of microorganisms in fermented foods - cheese, sauerkraut, and soy-based foods, factors controlling fermentation in foods. Probiotics and Prebiotics,</p> <p>b. HAZARDS OF MICROORGANISMS Food poisoning, food borne diseases – Salmonellosis, Botulism, Hepatitis, Amoebic dysentery.</p>	12	CO1, CO2, CO4, CO5	K1, K2, K3, K4
VI	<p>SELF STUDY FOR ENRICHMENT (Not to be included for External Examination) Morphology of Bacteria. Difference between chemostat and turbidostat. Role of salt and sugar in control of microorganism. List the microorganism responsible for spoilage in fruits and vegetables. Benefits of food preservation.</p>	-	CO1, CO2, CO4, CO5	K1, K2, K3, K4, K5

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. Pelczar Jr 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, New Delhi.,
2. Vijaya Ramesh k. (2007) *Food Microbiology*. (1st ed). New Age International Publishers. New Delhi.
3. Bohra and Parihar. (2012) *Food Microbiology*. Student edition, Jodhpur
4. Anathanarayan, (2013) *Textbook of Microbiology*. University Press (India) Pvt. Ltd, Hyderabad.

Web Links

1. <http://airccse.org/journal/ijscai/papers/3214ijscai01>.
2. <https://www.biologydiscussion.com/microorganisms/microbes-microorganisms/microbes-in-the-food-industry-microorganisms-biology/82587>
3. <https://www.rapidmicrobiology.com/test-method/theory-and-practice-of-microbiological-water-testing>
4. <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.

Pedagogy:

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

Course Designers

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

SEMESTER I	INTERNAL MARK : 40		EXTERNAL MARK : 60	
COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
22UND1AC2P	FOOD MICROBIOLOGY (P)	ALLIED PRACTICAL	4	3

Course Objective

- To acquire knowledge on cultivation of microorganisms.
- To isolate microorganisms from food products.
- To evaluate number of microorganisms from food products.

Course Outcome and Cognitive Level Mapping

Co Number	Co Statement	Cognitive Level
	On the successful completion of the course, students will be able to	
CO1	Explain the instruments and their functions used for microbiological analysis	K1,K2,K3,K4
CO2	Illustrate the preparation methods of culture media	K1,K2,K3,K4
CO3	Summarize the culture media techniques	K1,K2,K3,K4
CO4	Distinguish potability of water	K1,K2,K3,K4
CO5	Evaluate microorganism responsible for spoilage in different in foods	K1,K2,K3,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	2	3	3
CO2	2	2	3	2	2	3	3	2	3	3
CO3	2	2	3	2	2	3	3	2	3	3
CO4	2	2	3	2	2	3	3	2	3	3
CO5	2	2	3	2	2	3	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
1.	Instrumentation in microbiology laboratory and their function – Microscope, Shaker, Water bath	6	CO1	K1,K2,K3,K4
2.	Instrumentation in microbiology laboratory and their function – Autoclave, Hot air oven, Laminar air flow.	6	CO1	K1,K2,K3,K4
3.	Instrumentation in microbiology laboratory and their function - Centrifuge, Calorimeter, Spectrophotometer	6	CO1	K1,K2,K3,K4
4.	Preparation of culture media.	6	CO1, CO2, CO3	K1,K2,K3,K4
5.	Prepare pure culture techniques using spread plate method	6	CO1, CO2, CO3	K1,K2,K3,K4
6.	Preparation of culture techniques using streak plate method	6	CO1, CO2, CO3	K1,K2,K3,K4
7.	Prepare pure culture techniques using pour plate method	6	CO1, CO2, CO3	K1,K2,K3,K4
8.	Staining techniques - Simple and Differential	6	CO1, CO2, CO3	K1,K2,K3,K4
9.	Microbiological analysis of water.	6	CO1, CO2, CO3, CO4	K1,K2,K3,K4
10.	Isolation of spoilage organisms from different food commodities.	6	CO1, CO2, CO4, CO5	K1,K2,K3,K4

Text Book

1. Vivek Kumar. (2011). *Laboratory manual of Microbiology*. Scientific Publishers (India)
2. Bharti Arora and D.R. Arora. (2007). *Practical Microbiology*. New Delhi CBS Publishers & Distributors.

Reference Book

1. Casida, L.E, J.R, (2012). *Industrial Microbiology*. New Age Publications. New Delhi.
2. Michael J Waites, Neil L Morgan. (2001). *Industrial Microbiology: An Introduction*. Blackwell Science Ltd. UK.
3. Rao, A.S. (2001). *Introduction to Microbiology*. Hall of India Private Ltd. New Delhi.

Web Links

1. <http://microbiologysociety.org>
2. <https://ttk.elte.hu>
3. <https://www.futurelearn.com>

Pedagogy:

Demonstration, E-content, Lecture, Power point presentation

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
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	Cognitive Level
	On the successful completion of the course, students will be able to	
CO1	Identify national nutritional guidelines for various life stages.	K1,K2,K3, K4
CO2	Describe physiological changes in various stages of life cycle.	K1,K2,K3, K4
CO3	Articulate nutritional care plan for all age groups.	K1,K2,K3, K4
CO4	Correlate nutritional strategies to combat the nutritional problems.	K1,K2,K3, K4
CO5	Plan menu according to nutritional requirements of different age group.	K1,K2,K3, 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	<p>a) Fundamentals of Nutrition - Basic five food groups, nutrient needs - Dietary Reference Intakes, RDA and dietary guidelines, my plate, balanced diet.</p> <p>b) Menu planning - Definition, principles of menu planning, points to be considered in menu planning, steps involved in planning menu, factors influencing meal planning.</p>	15	CO1, CO2, CO3, CO4, CO5.	K1, K2, K3, K4
II	<p>a) Nutrition for Pregnancy – Physiological changes during pregnancy, stages of pregnancy, nutritional assessment and guidance in prenatal care, importance of pre and periconceptual nutrition during pregnancy, nutritional problems, complications, food and nutritional requirements, dietary guidelines.</p> <p>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.</p>	15	CO1, CO2, CO3, CO4, CO5.	K1, K2, K3, K4
III	<p>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.</p>	15	CO1, CO2, CO3, CO4, CO5.	K1, K2, K3, K4

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

1. <https://quizizz.com/admin/quiz/5fa0555b365e37001e0c688d/nutrition-through-the-lifecycle>
2. <http://213.55.90.4/admin/home/Dmu%20Academic%20Resource//Health%20Science/Nutrition%20and%20Food%20Science/2nd%20Year/Nutrition%20T>
3. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=NuAs6SreCGryddEfs4kkBA==>
4. <https://www.fda.gov/media/135301/download>
5. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=NuAs6SreCGryddEfs4kkBA==>
6. <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,K2,K3, K4
CO2	Explain the importance of RDA for various stages of life cycle	K1,K2,K3, K4
CO3	Describe the meal plan according to RDA	K1,K2,K3, K4
CO4	Interpret the nutrient content of the planned recipe	K1,K2,K3, K4
CO5	Prepare meal for various stages of life cycle	K1,K2,K3, 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

LIST OF EXPERIMENT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	Plan, calculate nutritive value and prepare meal for pregnant women	6	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	Plan, calculate nutritive value and prepare meal for lactating women.	6	CO1, CO2, CO3, CO4, CO5.	K1, K2, K3, K4
III	Plan, calculate nutritive value and prepare meal for an infant . Preparation of supplementary foods – Liquid, semi solid and solid.	6	CO1, CO2, CO3, CO4, CO5.	K1, K2, K3, K4
IV	Plan, calculate nutritive value and prepare meal for preschooler	6	CO1, CO2, CO3, CO4, CO5.	K1, K2, K3, K4
V	Plan, calculate nutritive value and prepare meal for school going children	6	CO1, CO2, CO3, CO4, CO5.	K1, K2, K3, K4
VI	Plan, calculate nutritive value and prepare meal for an adolescent boy and an adolescent girl.	6	CO1, CO2, CO3, CO4, CO5.	K1, K2, K3, K4
VII	Plan, calculate nutritive value and prepare meal based low, moderate and high income for an adult man and an adult women.	3	CO1, CO2, CO3, CO4, CO5.	K1, K2, K3, K4
VIII	Plan, calculate nutritive value and prepare meal for elderly.	6	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 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

- 1.<https://www.tarladalal.com/recipes-for-healthy-pregnancy--369>
- 2.<https://www.indianhealthyrecipes.com/indian-baby-food-recipe/>
- 3.<https://poshan.outlookindia.com/story/poshan-news-healthy-recipes-for-adolescents/361731>
- 4.<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	HOURS / WEEK	CREDIT
22UND2CC3	MACRO AND MICRO NUTRIENTS	CORE	3	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	Cognitive Level
	On the successful completion of the course, students will be able to	
CO1	Identify food sources of macro and micro nutrients	K1, K2, K3, K4,
CO2	Explain inter- relationship between health and nutrition	K1, K2, K3, K4,
CO3	Predict excess and deficiency effects of various nutrients	K1, K2, K3, K4,
CO4	Interpret functions of macro and micro nutrients	K1, K2, K3, K4,
CO5	Determine water and electrolyte balance.	K1, K2, K3, 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	<p>a. Introduction to Nutrition– Inter-relationship between health and nutrition. Classification of nutrients-Macro and micro nutrients.</p> <p>b. National and International recommendation for nutrient requirements- WHO, FAO, ICMR. RDA– Definition, factors affecting RDA, general principles of deriving RDA.</p>	09	CO1, CO2, CO3, CO4.	K1, K2, K3, K4
II	<p>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.</p> <p>b. Energy Balance – 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.</p>	09	CO1, CO2, CO3, CO4.	K1, K2, K3, K4
III	<p>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)</p> <p>b. Lipids – Nutritional classification of lipids and fatty acids, Essential fatty acids, functions, deficiency and excess effects, health benefits of omega fatty acids.</p>	09	CO1, CO2, CO3, CO4.	K1, K2, K3, K4,

<p>IV</p>	<p>a. Vitamins - Fat Soluble Vitamins (A, D, E & K) - Functions, deficiency and excess effects. Water Soluble Vitamins (B complex & C) - Functions, RDA, sources, deficiency and excess effects.</p> <p>b. Water – Definition, distribution of water, functions, requirements, sources, water balance, maintenance of water balance, distribution of electrolytes, maintenance of electrolyte balance.</p>	<p>09</p>	<p>CO1, CO2, CO3, CO4, CO5.</p>	<p>K1, K2, K3, K4</p>
<p>V</p>	<p>a. Minerals-Macro Minerals- (Calcium, Phosphorus, Potassium, Sodium) - Functions, sources, deficiency and excess effects.</p> <p>b. Micro Minerals (Iron, Iodine, Fluorine) - Functions, sources, deficiency and excess effects.</p>	<p>09</p>	<p>CO1, CO2, CO3, CO4.</p>	<p>K1, K2, K3, K4</p>
<p>VI</p>	<p>SELF STUDY FOR ENRICHMENT (Not to be included for External Examination) Definition of health, nutrition and nutritional status. Sources of dietary fibre. High biological value food sources. Role of water in human body. Interrelationship between nutrients.</p>	<p>-</p>	<p>CO1, CO2, CO3, CO4, CO5.</p>	<p>K1, K2, K3, K4</p>

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

1. <https://www.publichealthnotes.com/classification-of-nutrients-type-i-type-ii-macro-micro/>
2. <https://openoregon.pressbooks.pub/nutritionscience/chapter/1c-classification-of-nutrients/>
3. <https://www.medicalnewstoday.com/articles/161547#nutrition>
4. https://www.healthline.com/nutrition/protein-deficiency-symptoms#TOC_TITLE_HDR_6
5. <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 - II	INTERNAL MARKS: 25		EXTERNAL MARKS: 75	
COURSE CODE	COURSE TITLE	CATEGORY	HRS / WEEK	CREDITS
22UND2AC2	HUMAN PHYSIOLOGY	ALLIED	4	3

Course Objectives

- To augment knowledge on anatomical perception of organs and its co-ordination with other organs.
- To study the structure of human organs.
- To understand the functions 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:	Knowledge Level
CO1.	Outline composition, functions of blood and lymphatic system	K1, K2, K3, K4
CO2.	Interpret structure and functions of organs in the body.	K1, K2, K3, K4
CO3.	Explain processes of the systems in the body.	K1, K2, K3, K4
CO4.	Discuss classification of tissue and functions of sense organs	K1, K2, K3, K4
CO5.	Evaluate structure and functions of endocrine and reproduction system	K1, K2, K3, K4

Mapping of CO with PO and PSO

Cos	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	-	3	1	-	3	-	3	3	2
CO2	3	-	3	1	-	3	-	3	3	2
CO3	3	-	3	1	-	3	-	3	3	2
CO4	3	-	3	1	-	3	-	3	3	2
CO5	3	-	3	1	-	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	<p>Blood and Circulatory System</p> <p>a. Blood– Functions, Composition – Plasma, Cellular components; Red Blood Cells – Structure and functions, White Blood Cells – Types and function, Platelets. Haemoglobin – Structure and functions, Erythropoiesis, Blood coagulation. Blood groups and Rh Factor.</p> <p>b. Lymphatic System – Composition of lymph, structure and functions of lymphatic system- lymphoid tissue, lymph nodes.</p>	12	CO1, CO2, CO3	K1, K2, K3, K4
II	<p>Cardiovascular and Respiratory System</p> <p>a. Heart and Circulation- Structure of heart and blood vessels, Properties of cardiac muscle, cardiac cycle, origin and conduction of heart beat, measurement of arterial blood pressure</p> <p>b. Respiratory System- Structure and functions of respiratory system – nasal cavity, pharynx, larynx, trachea, bronchi, bronchioles, alveoli and lungs. Mechanics of Respiration, Artificial Respiration.</p>	12	CO2, CO3	K1, K2, K3, K4
III	<p>Nervous System And Sense Organs</p> <p>a. Nervous System- General classification of nervous system, Structural organization of nervous system – neuron, ganglion, neuroglia, nerves – classification - motor, sensory & mixed, structure and functions - spinal cord, brain - anatomy and functions of cerebrum, cerebellum, brain stem and medulla oblongata.</p> <p>b. Sense Organs- Structure and function of eye, ear, nose and tongue.</p> <p>c. Skin and Tissues- structure and functions of skin, tissues – classification: epithelial, connective, muscular and nervous and functions of tissue.</p>	12	CO2, CO3, CO4	K1, K2, K3, K4

IV	<p>Digestive System and Excretory System</p> <p>a. 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. Movements of the intestine.</p> <p>b. Excretory system- Physiology of the Urinary System- kidney, nephron, ureter, urinary bladder, urethra. Composition of urine, formation of urine, micturition.</p>	12	CO2, CO3, CO4	K1, K2, K3, K4
V	<p>Endocrine and Reproductive system</p> <p>a. Endocrine System- Structure and functions of thyroid, pituitary, parathyroid, Adrenals, islets of langerhans of pancreas</p> <p>b. Reproductive System-Anatomy of the male and female reproductive organs, menstrual cycle, mammary glands, Fertilization, Development of Embryo, Pregnancy and parturition.</p>	12	CO2, CO3, CO5	K1, K2, K3, K4
VI	<p>SELF STUDY FOR ENRICHMENT (Not to be included for External Examination)</p> <p>Functions of blood, Structure of heart, Basic functions of sense organs, Hunger mechanism, Amenorrhea.</p>	-	CO1, CO2, CO3, CO4 , CO5	K1, K2, K3, K4

RELATED EXPERIENCE

- Histology of Tissues – Columnar, cubical, ciliated, squamous, stratified squamous.
- Microscopic structure of organs – lungs, artery, vein, stomach, ovary, testis, uterus, pancreas.
- Histology of muscles – cardiac, striated, non –striated
- Estimation of Haemoglobin (Shali's method)
- Determination of Bleeding time (Duke method)
- Determination of Clotting time (Capillary method)
- Measurement of Blood pressure – before and after exercise
- Determination of Pulse rate – before and after exercise.
- Determination of Blood group and Rh factor

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.
4. Muruges.N. (2010). *Anatomy Physiology and Health Education*.(6th ed.).

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. Muruges.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.

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.

Web links

1. <https://www.khanacademy.org/science/health-and-medicine/human-anatomy-and-physiology>
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

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

Course Designers

- Ms. B. THANUJA
- Ms. S. AGALYA