

CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS)

Nationally Re-Accredited (3rd Cycle) with 'A' Grade (CGPA 3.41 out of 4) by NAAC

TIRUCHIRAPPALLI – 620 018



SYLLABUS FOR B.Sc., NUTRITION AND DIETETICS (2021-2022)

B.Sc NUTRITION AND DIETETICS

PROGRAMME EDUCATIONAL OBJECTIVES

PEO 1: The graduates will successfully serve as Dietitians, Food Service Administrators and Project officers in Nutrition and Child care.

PEO 2: The graduates will practice professional ethics and understand socio cultural issues, thereby provide solution for health problems.

PEO 3: The graduates will equip themselves in higher studies and entrepreneurship by applying innovative techniques to suite the recent trends.

PROGRAMME OUTCOMES

PO1: To apply the knowledge of food science, nutrition and dietetics to the scientific issues and problems.

PO 2: To assess the nutritional status and recommend nutritional support and care.

PO 3: To learn physiological, biochemical and microbiological parameters associated with health and diseases.

PO 4: To develop technical and human relation skills in relation to food service management

PO 5: To Demonstrate critical thinking skills and analytical abilities to identify and solve problems in the nutritional sciences.

CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS),TRICHY-18
PROGRAMME STRUCTURE - B.Sc ., NUTRITION ANDDIETETICS
UNDER CHOICE BASED CREDITSYSTEM
(For the candidates admitted from the academic year 2021-2022)

SEM	PART	COURSE	COURSE TITLE	SUBJECT CODE	INS. HRS / WEEK	CREDIT	EXAM HRS	MARKS		TOTAL
								INT	EXT	
I	I	Language Course – I (LC) – Tamil/Other Languages	IkkalaIlakkiyam	19ULT1	6	3	3	25	75	100
			Story, Novel, Hindi Literature- I & Grammar- I	19ULH1						
			History of Popular Tales Literature and Sanskrit Story	19ULS1						
			Communication in French-I	19ULF1						
	II	English Language Course I (ELC)	Functional Grammar for Effective Communication-I	19UE1	6	3	3	25	75	100
	III	Core Course – I (CC)	Food Science	19UND1CC1	6	5	3	25	75	100
				Core Practical – I (CP)	Food Science-Practical	19UND1CC1P	3	2	3	40
		First Allied Course – I (AC)	Food Microbiology	19UND1AC1	4	4	3	25	75	100
				First Allied Course - II Practical (AP)	Food Microbiology and Food Chemistry –Practical	19UND1AC1P	3	-	-	-
		IV	UGC Jeevan Kaushal Life Skills	Universal Human Values	20UGVE	2	2	3	25	75
			TOTAL		30	19				600

II	I	Language Course – II (LC) – Tamil/Other Languages	Idaikalailakkiyamum pudhinamum	19ULT2	6	3	3	25	75	100
			Prose, Drama, Hindi Literature-2 & Grammar-II	19ULH2						
			Poetry Textual Grammar and Alakara	19ULS2						
			Communication in French-II	19ULF2						
	II	English Language Course II (ELC)	Functional Grammar for Effective Communication-II	19UE2	6	3	3	25	75	100
	III	Core Course – II (CC)	Human Physiology	19UND2CC2	6	6	3	25	75	100
		First Allied Course – II Practical (AP)	Food Microbiology and Food Chemistry –Practical	19UND1AC1P	3	3	3	40	60	100
		IV	Environmental Studies	Environmental studies	21UGES	2	2	3	25	75
V	Extra Credit Course	SWAYAM ONLINE COURSE	To be Fixed Later	As per UGC Recommendation						
		TOTAL		30	21				700	

III	I	Language Course – III (LC) – Tamil/Other Languages	Kappiyamum Nadagamum	19ULT3	6	3	3	25	75	100		
			Medieval, Modern Poetry & History of Hindi Literature 3	19ULH3								
			Prose, Textual Grammar and Vakyarachana	19ULS3								
			Communication in French - III	19ULF3								
	II	English Language Course III (ELC)	Reading and Writing for Effective Communication -I	19UE3	6	3	3	25	75	100		
	III	Core Course – III (CC)	Principles of Nutrition	19UND3CC3	6	5	3	25	75	100		
				Core Practical – III (CP)	Principles of Nutrition – Practical	19UND3CC3P	3	2	3	40	60	100
				Second Allied Course – I(AC)	Nutritional Biochemistry	19UND3AC3	4	4	3	25	75	100
				Second Allied Course – II Practical (AP)	Nutritional Biochemistry & Clinical Biochemistry – Practical	19UND3AC2P	3	-	-	-	-	-
	IV	Non Major Elective I – for those who studied tamil under Part-I	Basics in Nutrition	19UND3NME1	2	2	3	25	75	100		
				a. Basic Tamil for other language students							Basic Tamil	19ULC3BT1
				b. Special Tamil for those who studied Tamil upto +2 but opt for other languages in degree Programme							Special Tamil	19ULC3ST1
	V	Extra Credit Course	SWAYAM ONLINE COURSE	To be Fixed Later	As per UGC Recommendation							
			TOTAL		30	19					600	

IV	I	Language Course – IV (LC) – Tamil/Other Languages	Pandaiya Ilakkiyam	19ULT4	6	3	3	25	75	100
			Letter writing, Precise Writing, General Essays, Technical Terms, Proverbs, Amplifications, Idioms & Phrases, History of Hindi Literature -4	19ULH4						
			Drama, History of Drama Literature	19ULS4						
			Communication in French -IV	19ULF4						
	II	English Language Course IV (ELC)	Reading and Writing for Effective Communication -II	19UE4	6	3	3	25	75	100
	III	Core Course – IV (CC)	Nutrition through Life Cycle	19UND4CC4	5	5	3	25	75	100
		Core Practical – IV (CP)	Nutrition through Life Cycle – Practical	19UND4CC4P	3	2	3	40	60	100
		Second Allied Course – II Practical (AP)	Nutritional Biochemistry & Clinical Biochemistry – Practical	19UND3AC2P	3	3	3	40	60	100
		Second Allied Course - III (AC)	Clinical Biochemistry	19UND4AC4	3	2	3	25	75	100
	IV	Non Major Elective II – for those who studied tamil under Part-I	Nutrition for the Family	19UND4NME2	2	2	3	25	75	100
		a. Basic Tamil for other language students	Basic Tamil	19ULC4BT2						
		b. Special Tamil for those who studied Tamil upto +2 but opt for other languages in degree programme	Special Tamil	19ULC4ST2						
		Skill Based Elective – I	I.A.Regional Cuisines	19UND4SBE1A						
			I.B.Basics in Food Production	19UND4SBE1B	2	2	3	25	75	100
V	Extra Credit Course	SWAYAM ONLINE COURSE	To be Fixed Later	As per UGC Recommendation						
		TOTAL		30	22				800	

V	III	Core Course – V (CC)	Diet Therapy I	19UND5CC5	5	5	3	25	75	100	
		Core Course – VI (CC)	Dietary Food Service Management	19UND5CC6	5	5	3	25	75	100	
		Core Course – VII (CC)	Dietary Internship	19UND5CC7	5	5	-	40	60	100	
		Core Practical - V (CP)	Diet Therapy I – Practical	19UND5CC5P	4	3	3	40	60	100	
		Major Based Elective – I	I.A. Food Standards and Quality Control	19UND5MBE1A	5	5	3	25	75	100	
	I.B. Techniques of Food Evaluation		19UND5MBE1B								
	IV	Skill Based Elective – II	II.A. Bakery and Confectionary - Practical	19UND5SBE2AP	2	2	3	40	60	100	
			II.B. Computer Applications in Nutrition and Dietetics - Practical	19UND5SBE2BP							
		Skill Based Elective – III	III.A. Food Preservation - Practical	19UND5SBE3AP	2	2	3	40	60	100	
			III.B. Food Product Development - Practical	19UND5SBE3BP							
		UGC Jeevan Kaushal Life Skills	Professional Skills	19UGPS	2	2	3	25	75	100	
	V	Extra Credit Course	SWAYAM ONLINE COURSE	To be Fixed Later	As per UGC Recommendation						
			TOTAL		30	29					800

VI	III	Core Course – VIII (CC)	Diet Therapy II	19UND6CC8	6	6	3	25	75	100	
		Core Course – IX (CC)	Perspectives of Home Science	19UND6CC9	6	6	3	25	75	100	
		Core Practical– VI (CP)	Diet Therapy II - Practical	19UND6CC6P	5	4	3	40	60	100	
		Major Based Elective – II	II.A. Community Nutrition	19UND6MBE2A							
			II.B. Principles of Resource Management	19UND6MBE2B	6	6	3	25	75	100	
		Major Based Elective – III	III.A. Food Processing	19UND6MBE3A	6	6	3	25	75	100	
			III.B. Nutraceuticals and Functional Foods	19UND6MBE3B							
		V	Extension Activities	19UGEA	-	1	-	-	-	-	
			Gender Studies	19UGGS	1	1	3	25	75	100	
			TOTAL		30	30				600	
			GRAND TOTAL		180	140				4100	

SEMESTER – I	FOOD SCIENCE	HOURS / WEEK – 6	
CORE COURSE - I		CREDIT – 5	
COURSE CODE – 19UND1CC1		INTERNAL 25	EXTERNAL 75

Objectives

- To obtain knowledge on different food groups, their composition and their role in diet.
- To study the different methods of cooking.

Course outcomes

On the successful completion of the course, students will be able to:

CO Number	CO Statement	Knowledge Level
CO1.	Define food and list the different cooking methods	K1
CO2.	Explain the structure, composition and by-products of cereals and pulses	K2
CO3.	Illustrate the chemical reactions that occur during ripening, cooking and storage of fruits	K2
CO4.	Classify and explain the composition of milk and meat products and techniques adopted for cooking	K3
CO5.	Predict the role of fats and oils, sugar, spices and condiments in cookery.	K3

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1.	S	M	M	M	S
CO2.	S	M	M	M	S
CO3.	S	M	M	M	S
CO4.	S	M	M	M	S
CO5.	S	M	M	M	S

S- Strong; M-Medium;

Syllabus

UNIT I

(16Hours)

- a. **Introduction to Food Science:** Definition of Food Science, Basic Five Food Groups, Food Pyramid.
- b. **Nutritional classification of foods** – Energy yielding, body building and protective and regulatory foods.
- c. **Cooking methods:** Objectives, different types cooking methods- moist, dry heat methods, microwave cooking, combination of cooking methods and solar cooking method - merits and demerits.

UNIT II

(20Hours)

- a. **Cereals and Cereal products:** Structure, composition, nutritive value and milling of wheat, parboiling of rice, by-products of cereals, malting of cereals, nutritional importance of millets - (maize, jowar, ragi, bajra), storage and infestation, role of cereals in cookery.
- b. **Pulses:** Composition and nutritive value, factors affecting cooking quality of pulses, processing of pulses, germination and fermentation – process, advantages and disadvantages, toxic constituents–trypsin inhibitors, lathyragens, favism, haemagglutinins, cyanogenic glycoside, saponins, goitrogens, tannins, role of pulses in cookery.
- c. **Nuts and Oilseeds:** Composition, Nutritive value, Role of Nuts and oilseeds in cookery

UNIT III

(14Hours)

- a. **Fruits:** Classification, nutritive value, changes during ripening of fruits, selection of fruits, enzymatic browning and methods of prevention, storage techniques.
- 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.

UNIT IV

(22Hours)

- a. **Milk and Milk Products:** Composition and nutritive value, processing of milk, types of milk products-whey protein concentrate, skim milk, evaporated milk, dry milk, filled milk, flavoured milk, toned and double toned milk, ice-cream, khoa, curd, cream and cheese, role of milk in cookery.
- b. **Egg:** Structure, composition and nutritive value, evaluation of quality of egg, role of egg in cookery.
- 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.
- d. **Poultry:** Composition, classification and nutritive value, poultry cookery.
- e. **Fish:** Structure, composition, nutritive value, selection of fish, fish cookery.

UNIT V

(18Hours)

- a. **Fats and oils:** Composition, processing and refining of fats and oils, rancidity, plasticity, hydrogenation, winterization, smoking point, factors affecting smoking point, fat substitutes, absorption of fat during cooking, role of fat or oil in cookery.
- b. **Sugar:** Nutritive value, sugar related products, stages of sugar cookery, crystallization, factors affecting crystallization.
- c. **Spices and condiments:** #Types and uses in Indian cookery, medicinal properties#

#-# : Self Study

Textbooks

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Shakuntala Manay N	2001	Foods: facts and principles	New Age International Publishers, New Delhi
2.	Potter, Norman N	2007	Food Science	CBS Publications and distributors, New Delhi
3.	Srilakshmi B	2016	Food Science	New Age International Publishers, New Delhi

Reference books

S.No.	Author name	Year of Publication	Title of the book	Publishers name
1.	Raheena Begum M	2008	Textbook of Foods, Nutrition and Dietetics	Sterling Publishers Pvt. Ltd., New Delhi
2.	Sharma Jyoti S	2009	Applied Nutrition and Food Science	Akansha Publishing House, New Delhi(2009).
3.	Vickie A.Vaclavik, Elizabeth W.Christian	2014	Essentials of Food Science	Springer Science and Business Media, New York
4..	Avantina Sharma	2017	Textbook of Food Science and Technology	CBS Publishers and Distributors

Journals:

- Food Science and Nutrition, John Wiley and Sons Ltd publisher, United Kingdom.
- Food and Nutrition Research, Co-Action Publishing, Sweden.
- Journal of Food Science Education, Institute of Food Technologists publishing, United States.
- Journal of the Science of Food and Agriculture, Wiley-Blackwell publishing, England.

Web links:

<https://study.com/academy/lesson/what-is-food-science-definition-research.html><https://www.nia.nih.gov/health/important-nutrients-know-proteins-carbohydrates-and-fats>

Pedagogy: E-content, Lecture, Power point presentation, Seminar, Assignment, Industrial visit

Course Designers

- Ms.S.Preethi
- Ms.E.Agalya

SEMESTER – I	FOOD SCIENCE - PRACTICAL	HOURS / WEEK – 3	
CORE PRACTICAL - I		CREDIT – 2	
COURSE CODE – 19UND1CC1P		INTERNAL	EXTERNAL
		40	60

Objectives

- To gain knowledge in food groups and methods of cooking.
- To classify recipes based on different cooking techniques adopted.

Course Outcomes

On the successful completion of the course, students will be able to:

CO Number	CO Statement	Knowledge Level
CO1.	Identify various food groups.	K1
CO2.	Illustrate weighing and measuring of raw food items	K2
CO3.	Describe the different cooking techniques.	K2
CO4.	Prepare recipes from five food groups	K3
CO5.	Predict role of food groups in cookery	K3

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1.	S	M	M	M	S
CO2.	S	M	M	M	S
CO3.	S	M	M	M	S
CO4.	S	M	M	M	S
CO5.	S	M	M	M	S

S- Strong; M-Medium

Syllabus

- Weighing and measuring of raw food items
- **Cereals:** Preparation: Idli, Chapathi, Poori, Ragi upma, Kozhukattai, Aloo paratha, Rice. Millet based recipes –Sathumavu mix, Millet ball, Millet pongal, Millet payasam
- **Pulses:** Preparation: Sundal, Bholi, Green gram payasam, Dhal makhani, Vadai, Sambar and Sprouts salad.
- **Fruits:** Preparation: Fritters, Halwa, Salad, Milkshakes and Freshjuices.
- **Vegetables:** Preparation: Avial, Stewed potato curry, Koottu, Poriyal, Vegetable Salad, and Vegetable soup.
- **Milk:** Preparation: Cottage Cheese, Paneer, Phirnee, Payasam, Ice cream and Basanthi.
- **Meat:** Preparation: Deep fried Chicken, Mutton gravy.
- **Fish:** Preparation: Steamed fish, Fish fry.
- **Egg:** Preparation: Boiled, Scrambled and Poached egg, Curry and Omelette.

Text Books

S.No	Author name	Year of publication	Title of the book	Publishers name
1.	Shakuntala Manay N	2001	Foods: facts and principles	New Age International Publishers, NewDelhi
2.	Potter, Norman N	2007	Food Science	CBS Publications and distributors, New Delhi

Reference Books

S.No	Author name	Year of publication	Title of the book	Publishers name
1.	Raheena Begum M	2008	Textbook of Foods, Nutrition and Dietetics	Sterling Publishers Pvt. Ltd., NewDelhi
2.	Sumathi R Mudambi and M.V.Rajagopal	2004	Fundamentals of Foods and Nutrition	New Age International Publishers, New Delhi
3.	Avantina Sharma	2017	Textbook of Food Science and Technology	CBS Publishers and Distributors

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

Course Designers

- Ms.S.Preethi
- Ms.E.Agalya

SEMESTER – I	FOOD MICROBIOLOGY	HOURS / WEEK – 4	
FIRST ALLIED COURSE - I		CREDIT – 4	
COURSE CODE – 19UND1AC1		INTERNAL 25	EXTERNAL 75

Objectives

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

Course outcomes

On the successful completion of the course, students will be able to:

CO Number	CO Statement	Knowledge Level
CO1.	List and identify the sources of microorganisms.	K1
CO2.	Describe the factors affecting the growth of microorganisms.	K2
CO3.	Illustrate role of microorganisms in the spoilage of perishable foods.	K2
CO4.	Explain role of microorganisms in the spoilage of non perishable foods.	K2
CO5.	Apply the beneficial effects of microorganisms in food processing industries.	K3

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1.	M	M	S	S	S
CO2.	M	M	S	S	S
CO3.	M	M	S	S	S
CO4.	M	M	S	S	S
CO5.	M	M	S	S	M

S- Strong; M-Medium

Syllabus

UNIT I

(12Hours)

a. Microbiology

Definition, History, Microscope – Types and uses, classification of microorganisms – prokaryotes and eukaryotes.

b. Morphology of microorganisms

#Bacteria#, Virus, Fungi- Moulds and Yeasts, Protozoa and algae.

UNIT II

(12Hours)

a. Growth and multiplication

Growth curve, batch culture and continuous culture, chemostat and turbidostat.

b. Factors affecting growth

Intrinsic factors - nutrient content, pH, Redox potential, antimicrobial barrier and water activity. Extrinsic factors - relative humidity, temperature and gaseous atmosphere.

UNIT III

(12Hours)

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 foods.

b. Microbiology of Non perishable foods

Contamination, spoilage and preservation of cereal and cereal products, pulses and legumes, sugar and sugar products.

UNIT IV

(12Hours)

a. Microbiology of water:

Sources, bacteriological examinations, total count, test for E-coli and purification of water, Modern methods of purification - Reverse Osmosis, Ultraviolet purification, role of activated carbon.

b. Control of Microorganisms:

Temperature – high, low, Sterilization, Irradiation. Chemical agents – Disinfectant, benzoates, sorbates, propionates, acetates, nitrates and nitrites, sulphur dioxide and sulphites and antibiotics, Pickling, addition of sugar or salt, fermentation, drying

UNIT V

(12Hours)

a. Beneficial effects of microorganisms

Role of micro organisms in fermented foods - curd, probiotics, cheese, sauerkraut, meat, and soy based foods and alcoholic beverages, factors controlling fermentation in foods.

b. Hazards of microorganisms

Food poisoning, food borne diseases – Salmonellosis, Botulism, Poliomyelitis, Hepatitis, Amoebic dysentery.

- #: Self study

Text Books

S.No.	Author name	Year of Publication	Title of the book	Publishers name
1.	Frazier William C	2012	Food Microbiology	Mcgraw Hill Irwin Companies, New York
2.	Adams, M R	2014	Food Microbiology	New Age International Publishers, New Delhi
3.	PelczarJr, Michael J	2014	Microbiology	Mcgraw Hill Education (India) Private Ltd, NewDelhi

Reference Books

S.No	Author name	Year of publication	Title of the book	Publishers name
1.	SugandharBabu R P	2008	Food Microbiology	Adhyayan Publishers and distributors, Newdelhi
2.	Vijaya Ramesh K	2009	Food Microbiology	New Age International Publishers, NewDelhi
3.	BohraandParihar	2012	Food Microbiology	Student edition
4.	Anathanaraya	2013	Textbook of Microbiology	University Press(India) Pvt. Ltd, Hyderabad

Journals :

- Indian Journal of Microbiology Research, IP Innovative Publication Private Limited, NewDelhi
- Journal of Basic Microbiology, Wiley-Blackwell, Germany
- Journal of Microbiology, Microbiological Society Korea, SouthKorea

Web Links

<http://airccse.org/journal/ijscailpapers/3214ijscail01.pdf><https://www.ncbi.nlm.nih.gov/books/NBK216688/><https://www.fda.gov/files/food/published/Evaluation-and-Definition-of-Potentially-Hazardous-Foods.pdf><https://nptel.ac.in/courses/102103015/pdf/mod5.pdf>

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

Course Designers

- Ms.S.Agalya
- Ms.J.Sudharshini

SEMESTER I & II	FOOD MICROBIOLOGY & FOOD CHEMISTRY – PRACTICAL	HOURS / WEEK – 3	
FIRST ALLIED COURSE -II PRACTICAL		CREDIT – 3	
COURSE CODE – 19UND1AC1P		INTERNAL 40	EXTERNAL 60

Objectives

- To acquire knowledge on cultivation of microorganisms.
- To understand the chemical changes in food.

Course outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Identify the instruments and match their application in Microbiological laboratory.	K1
CO2.	Describe the pure culture and staining techniques.	K2
CO3.	Illustrate the microbiological analysis of water.	K2
CO4.	Explain the chemistry of various nutrients present in food.	K2
CO5.	Predict the physical and chemical changes that take place during cooking.	K3

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1.	S	M	S	M	S
CO2.	S	M	S	M	S
CO3.	S	M	S	M	S
CO4.	S	S	M	M	S
CO5.	S	S	M	M	S

S- Strong; M-Medium

Syllabus

FOOD MICROBIOLOGY

- Instrumentation in microbiology laboratory and their function (microscope, autoclave, hot air oven).
- Preparation of culture media.
- Pure culture techniques (spread plate, streak plate and pour plate methods).
- Staining techniques (simple and differential)
- Microbiological analysis of water.
- Isolation of spoilage organisms from different food commodities.

FOOD CHEMISTRY

- **Chemistry of Starches:** Gelatinization properties of food starches, microscopic examination of uncooked and gelatinized starch.
- **Chemistry of Sugars:** Stages of sugar cookery, sugar crystallization in preparation of fondant, fudge, and caramel
- **Chemistry of Proteins:** Gluten formation. Soaking, germination and malting of pulses, coagulation of egg white and egg yolk (Boiled Egg, Poached Egg, Omelet), coagulation and precipitation of milk, preparation techniques on meat tenderization using curd, papaya and ginger garlic paste.
- **Chemistry of Fats and Oils:** Determination of smoking temperature of different fats and oils, factors affecting absorption of fat in deep fat frying of foods.
- **Chemistry of Plant Pigments:** Effect of acids, alkali and heat on water-soluble and fat-soluble pigments, enzymatic browning in apples, banana, brinjal and raw banana and preventive measures

Text Books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Iqbal, Syed Aftab	2011	Advanced Food Chemistry,	Discovery Publishing House, New Delhi
2.	Chopra H,K and Panesar P,S	2015	Food Chemistry	Narosa Publishing House (P) Ltd, New Delhi

Reference Books

S.No	Author name	Year of publication	Title of the book	Publishers name
1.	A.S.Rao	2001	Introduction to Microbiology	Prentice-Hall of India Private Ltd, NewDelhi
2.	BhartiArora, D.R.Arora	2007	Practical Microbiology	CBS Publishers &Distributors, NewDelhi
3.	Satarkar, Archana	2008	Food Science and Nutrition	ABD Publishers, Jaipur
4.	Shubhangini, A. Joshi	2010	Nutrition and Dietetics with Indian case studies	McGraw Hill Education (India) Pvt., Ltd., New Delhi

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

Course Designers

- Ms.B.Thanuja
- Ms.S.Preethi

SEMESTER – II	HUMAN PHYSIOLOGY	HOURS / WEEK – 6	
CORE COURSE - II		CREDIT – 6	
COURSE CODE – 19UND2CC2		INTERNAL 25	EXTERNAL 75

Objectives

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

Course outcomes

On the successful completion of the course, students will be able to:

CO Number	CO Statement	Knowledge Level
CO1.	Outline composition and functions of blood	K1
CO2.	Interpret anatomy and physiology of circulatory and respiratory system	K2
CO3.	Explain the structure, functions of nervous system and sense organs	K2
CO4.	Discuss regulation of digestive and excretory system	K2
CO5.	Relate structure and functions of endocrine and reproduction system	K3

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1.	S	M	S	M	S
CO2.	S	M	S	M	S
CO3.	S	M	S	M	S
CO4.	S	M	S	M	S
CO5.	S	M	S	M	S

S- Strong; M-Medium

Syllabus

UNIT I

BLOOD AND CIRCULATORY SYSTEM

(18Hours)

- a) Blood– Composition and Functions; White Blood Cells – Types and function; Red Blood Cells – Structure and functions, Haemoglobin – Structure and functions, Erythropoiesis, Blood coagulation.
- b) Reticulo- Endothelial System – Definition and functions, ABO Blood group system.
- c) Lymphatic System – Lymphoid tissue, Lymph Nodes, Lymphatic Vessels, Function and Clinical Significance.

UNIT II

CARDIOVASCULAR AND RESPIRATORY SYSTEM

(18Hours)

- 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
- b. **Respiratory System:** Structure of Respiratory organs, Mechanics of Respiration, Artificial Respiration.

UNIT III

NERVOUS SYSTEM AND SENSE ORGANS

(18Hours)

- a. **Nervous System:** General classification of nervous system, Structure of nerve cell and Spinal cord, Basic Knowledge of different parts of the brain – anatomy and functions of cerebrum, cerebellum and medulla oblongata.
- b. **Sense Organs:** Structure and function of eye ear, taste, smell and cutaneous sensations.

UNIT IV

DIGESTIVE SYSTEM AND EXCRETORY SYSTEM

(18Hours)

- a. **Digestive system:** General Anatomy, Digestion in the mouth, stomach and intestines. Movements of the intestine, Role of Liver and Pancreas – Structure and Functions.
- b. **Excretory system:**[#] Physiology of the Urinary System- Structure of kidney and nephron[#], Formation of urine, micturition.

UNIT V

ENDOCRINE AND REPRODUCTIVE SYSTEM

(18Hours)

- a. **Endocrine System:** Structure and functions of thyroid, pituitary, parathyroid, Adrenals, islets of langerhans of pancreas
- b. **Reproductive System:** anatomy of the male and female reproductive organs, menstrual cycle, mammary glands, Fertilization, Development of Embryo, Pregnancy and parturition. # - #:Self study

Text Books

S.No.	Author name	Year of publication	Title of the book	Publishers name
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., NewDelhi

Reference Books

S.No	Author name	Year of publication	Title of the book	Publishers name
1.	Guyton	2000	Guyton and Hal Textbook of Medical 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, NewDelhi

Journals

- Human Physiology, MaikNauka / Interperiodica Publishing, Russian Federation.
- Indian Journal of Clinical Anatomy and Physiology, Innovative publication PvtLTD, India.
- American Journal of Physiology - Endocrinology and Metabolism, American Physiological Society, UnitedStates.
- Canadian Journal of Physiology and Pharmacology, Canadian Science Publishing, Nrc Research Press, Canada.

Web links

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

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

Course Designers

- Ms.S.Fathima
- Ms.B.Thanuja

SEMESTER – II	HUMAN PHYSIOLOGY - PRACTICAL	HOURS / WEEK – 3	
CORE PRACTICAL - II		CREDIT – 2	
COURSE CODE – 19UND2CC2P		INTERNAL 40	EXTERNAL 60

Objectives

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

Course outcomes

On the successful completion of the course, students will be able to:

CO Number	CO Statement	Knowledge Level
CO1.	Identify cells present in the body	K1
CO2.	Describe cellular arrangement in tissues and organs	K2
CO3.	Illustrate the methods to be adapted for the measurement of various blood parameters	K2
CO4.	Explain Cellular arrangement in tissues and organs	K2
CO5.	Predict number of cells present in blood	K3

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1.	S	M	S	M	S
CO2.	S	M	S	M	S
CO3.	S	M	S	M	S
CO4.	S	M	S	M	S
CO5.	S	M	S	M	S

S- Strong; M-Medium

Syllabus

- 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, Bleeding time, Clotting time
- Measurement of Blood pressure – before and after exercise
- Determination of Pulse rate – before and after exercise.
- Determination of Bloodgroup.
- Determination of Rhfactor.
- Enumeration of Red blood cells –Demonstration.
- Enumeration of White blood cells –Demonstration.
- Differential Leucocyte count –Demonstration

Text Books

S.No.	Author name	Year of publication	Title of the book	Publishers name
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., NewDelhi

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1.	Waugh Anne Ross and Wilson	2003	Anatomy andPhysiology in Health and Illness	Churchill Livingston, New York
2.	MurugesN	2011	Anatomy and Physiology	Sathya Publishers, Madurai
3.	Wilson, Ross	2014	Anatomy andPhysiology in Health and Illness	Reed Elsevier India Private Limited, New Delhi
4.	G.K.Pal and Parvati Pal	2016	Textbook of practical physiology	Universities press (India) private limited.

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

Course Designers

- Ms.S.Fathima
- Ms.B.Thanuja

SEMESTER – II	FOOD MICROBIOLOGY & FOOD CHEMISTRY – PRACTICAL	HOURS / WEEK – 3	
FIRST ALLIED COURSE - II PRACTICAL		CREDIT – 3	
COURSE CODE – 19UND1AC1P		INTERNAL 40	EXTERNAL 60

Objectives

- To acquire knowledge on cultivation of microorganisms.
- To understand the chemical changes in food.

Course outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Identify the instruments and match their application in Microbiological laboratory.	K1
CO2.	Describe the pure culture and staining techniques.	K2
CO3.	Illustrate the microbiological analysis of water.	K2
CO4.	Explain the chemistry of various nutrients present in food.	K2
CO5.	Predict the physical and chemical changes that take place during cooking.	K3

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1.	S	M	S	M	S
CO2.	S	M	S	M	S
CO3.	S	M	S	M	S
CO4.	S	S	M	M	S
CO5.	S	S	M	M	S

S- Strong; M-Medium

Syllabus

FOODMICROBIOLOGY

- Instrumentation in microbiology laboratory and their function (microscope, autoclave, hot air oven).
- Preparation of culture media.
- Pure culture techniques (spread plate, streak plate and pour plate methods).
- Staining techniques (simple and differential)
- Microbiological analysis of water.
- Isolation of spoilage organisms from different food commodities.

FOOD CHEMISTRY

- **Chemistry of Starches:** Gelatinization properties of food starches, microscopic examination of uncooked and gelatinized starch.
- **Chemistry of Sugars:** Stages of sugar cookery, sugar crystallization in preparation of fondant, fudge, and caramel
- **Chemistry of Proteins:** Gluten formation. Soaking, germination and malting of pulses, coagulation of egg white and egg yolk (Boiled Egg, Poached Egg, Omelet), coagulation and precipitation of milk, preparation techniques on meat tenderization using curd, papaya and ginger garlic paste.
- **Chemistry of Fats and Oils:** Determination of smoking temperature of different fats and oils, factors affecting absorption of fat in deep fat frying of foods.
- **Chemistry of Plant Pigments:** Effect of acids, alkali and heat on water-soluble and fat-soluble pigments, enzymatic browning in apples, banana, brinjal and raw banana and preventive measures

TextBooks

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Iqbal, Syed Aftab	2011	Advanced Food Chemistry,	Discovery Publishing House, New Delhi
2.	Chopra H,K and Panesar P,S	2015	Food Chemistry	Narosa Publishing House (P) Ltd, New Delhi

ReferenceBooks

S.No	Author name	Year of publication	Title of the book	Publishers name
1.	A.S.Rao	2001	Introduction to Microbiology	Prentice-Hall of India Private Ltd, NewDelhi
2.	BhartiArora, D.R.Arora	2007	Practical Microbiology	CBS Publishers &Distributors, NewDelhi
3.	Satarkar, Archana	2008	Food Science and Nutrition	ABD Publishers, Jaipur
4.	Shubhangini, A. Joshi	2010	Nutrition and Dietetics with Indian case studies	McGraw Hill Education (India) Pvt., Ltd., New Delhi

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

Course Designers

- Ms.B.Thanuja
- Ms.S.Preethi

SEMESTER – II	FOOD CHEMISTRY	HOURS / WEEK – 4	
FIRST ALLIED COURSE – III		CREDIT – 2	
COURSE CODE – 19UND2AC2		INTERNAL 25	EXTERNAL 75

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 outcomes

On the successful completion of the course, students will be able to:

CO Number	CO Statement	Knowledge Level
CO1.	State physical and chemical properties of water present in food	K1
CO2.	Interpret the structure of starch molecules	K2
CO3.	Explain the process of denaturation of proteins	K2
CO4.	Illustrate the changes that take place during temperature modifications in fats and oils.	K2
CO5.	Classify types of plant pigments	K3

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1.	S	M	M	M	S
CO2.	S	M	M	M	S
CO3.	S	M	M	M	S
CO4.	S	M	M	M	S
CO5.	S	M	M	M	S

S- Strong; M-Medium

Syllabus

UNIT I

(12Hours)

a. Water and solutions

Water-Types and properties. Water activity in foods. Solutions, Solubility.

b. Colloidal system

Types of colloidal dispersions, sols, gels, emulsion and foams.

c. Leavening agents

Types-Physical, chemical and biological leavening agents. Mechanism of action.

d. Food additives

Classification and uses.

UNIT II

(12Hours)

a. Starch

Components of Starch, swelling of starch granules, gel formation, retrogradation, effect of Sugar, acid, alkali, fat and surface-active agents on starch.

b. Sugars

Stages of sugar cookery, crystal formation and factors affecting crystallization. Crystalline and non crystalline candies.

Chemistry of milk sugar, non-enzymatic browning and method of prevention.

UNIT III

(12Hours)

a. Proteins

Components of proteins, coagulation and denaturation of proteins. Effect of soaking, fermentation and germination of pulse proteins. Properties of egg protein. Chemistry of milk protein. Action of heat, acid, alkalis on vegetable and animal proteins.

UNIT IV

(12Hours)

a. Fats and oils

[#]Physical and chemical properties of fats and oils[#]. Rancidity, hydrogenation, winterization, decomposition of triglycerides. Shortening power of fats. Changes in fats and oils during heating. Factors affecting absorption of fat in foods.

UNIT V

(12 Hours)

a. Pectin substances

Pectins, phenolic components, enzymatic browning in fruits and vegetables.

b. Plant pigments

Types of plant pigments - water and fat soluble pigments. Volatile compounds in fruits and vegetables.

- #: Self study

Textbooks

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Yadav, Seema	2006	Food Chemistry	Anmol Publications (P) Ltd, New Delhi
2.	Iqbal, Syed Aftab	2011	Advanced Food Chemistry,	Discovery Publishing House, New Delhi
3.	Chopra H,K and Panesar P,S	2015	Food Chemistry	Narosa Publishing House (P) Ltd, New Delhi
4.	Srilakshmi B	2016	Food Science	New Age International Publishers, New Delhi

Referencebooks

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Satarkar, Archana	2008	Food Science and Nutrition	ABD Publishers, Jaipur
2.	Shubhangini, A. Joshi	2010	Nutrition and Dietetics with Indian case studies	McGraw Hill Education (India) Pvt., Ltd., New Delhi

Journals

- Food and Nutritional Components in Focus, Royal Society of Chemistry, United Kingdom.
- Food & Function, Royal Soc Chemistry, England.
- Food Structure, Elsevier Bv, Netherlands.
- Journal of Agricultural and Food Chemistry, American Chemical Society, United States

Web Links

<https://www.sciencedirect.com/journal/food-chemistry/issues>
<https://www.scribd.com/doc/61893349/Effect-of-Heat-pH-on-Color-Texture-of-Green-Vegs>
<https://www.uoguelph.ca/foodscience/book/export/html/1953>

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

Course designers

- Ms.S.Preethi
- Ms.B.Thanuja