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

(2020-2021)

B.Sc NUTRITION AND DIETETICS

PROGRAMME EDUCATIONAL OBJECTIVES

PEO 1: The graduates will successfully serve as Dieticians, 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 2020-2021)

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	Ikkala Ilakkiyam	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	60	100
		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	100
			TOTAL		**30**	**19**				**600**

II	I	Language Course – II (LC) – Tamil/Other Languages	Idaikala ilakkiyamum pudhinamum	19ULT2	6	3	3	25	75	100
			Prose, Dramma, 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
		Core Practical – II (CP)	Human Physiology – Practical	19UND2CC2P	3	2	3	40	60	100
		First Allied Course – II Practical (AP)	Food Microbiology and Food Chemistry –Practical	19UND1AC1P	3	3	3	40	60	100
		First Allied Course – III (AC)	Food Chemistry	19UND2AC2	4	2	3	25	75	100
	IV	Environmental Studies	Environmental studies	19UGES	2	2	3	25	75	100
	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 forthose who studied Tamilupto +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	2	2	3	25	75	100
			I.B.Basics in Food Production	19UND4SBE1B						
	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	6	6	3	25	75	100
			II.B. Principles of Resource Management	19UND6MBE2B						
		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	Extension Activities	19UGEA	-	1	-	-	-	-
		Gender Studies	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. CerealsandCerealproducts: Structure,composition,nutritivevalueandmillingofwheat, 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–trypsininhibitors,lathyrogens,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, UnitedKingdom.
- 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.htmlhttps://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 40	EXTERNAL 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,nitratesandnitrites,sulphurdioxide 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 anddistributors,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/ijscai/papers/3214ijscai01.pdfhttps://www.ncbi.nlm.nih.gov/books/NBK216688/https://www.fda.gov/files/food/published/Evaluation-and-Definition-of-Potentially-Hazardous-Foods.pdfhttps://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

- Instrumentationinmicrobiologylaboratoryandtheirfunction(microscope,autoclave,hotai r 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.
- **ChemistryofPlantPigments:**Effectofacids,alkaliandheatonwater-solubleandfat-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.Pree

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 ANDCIRCULATORYSYSTEM (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 ANDRESPIRATORYSYSTEM (18Hours)

a. HeartandCirculation: Structureofheartandbloodvessels,Propertiesofcardiacmuscle, 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 ANDSENSEORGANS (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 ANDEXCRETORYSYSTEM (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 ANDREPRODUCTIVESYSTEM (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,mammaryglands,Fertilization,DevelopmentofEmbryo,Pregnancyandparturition. **# - #:**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 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, 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

Reference Books

S.No	Author name	Year of publication	Title of the book	Publishers name
1.	Waugh Anne Ross and Wilson	2003	Anatomy andPhysiology in Health and Illness	Churchill Livingston, New York
2.	MurugeshN	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

FOOD MICROBIOLOGY

- Instrumentation in microbiology laboratory and their function (microscope, autoclave, hotair 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.
- **ChemistryofPlantPigments:**Effectofacids,alkaliandheatonwater-solubleandfat-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,decompositionoftriglycerides.Shorteningpoweroffats.Changesinfats 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 Educatior (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.
- JournalofAgriculturalandFoodChemistry,AmericanChemicalSociety,United States

Web Links

https://www.sciencedirect.com/journal/food-chemistry/issueshttps://www.scribd.com/doc/61893349/Effect-of-Heat-pH-on-Color-Texture-of-Green-Vegshttps://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

SEMESTER - III	PRINCIPLES OF NUTRITION	HOURS / WEEK - 6	
CORE COURSE – III		CREDIT - 5	
COURSE CODE – 19UND3CC3		INTERNAL 25	EXTERNAL 75

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 outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	Identify food sources of macro and micro nutrients.	K1
CO2.	Explain the inter– relationship between health and nutrition.	K2
CO3.	Interpret the excess and deficiency disease with a particular nutrient	K2
CO4.	Describe the evaluation of macro nutrients.	K2
CO5.	Relate water and electrolyte balance	K3

Mapping with Programme Outcomes

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

S- Strong; M-Medium; L-Low

SEMESTER - III	PRINCIPLES OF NUTRITION	HOURS / WEEK - 6	
CORE COURSE – III		CREDIT - 5	
COURSE CODE – 19UND3CC3		INTERNAL 25	EXTERNAL 75

Syllabus

UNIT I **(18 Hours)**

a. **Introduction to Nutrition**– Definition of nutrition, health, nutritional status and #malnutrition#. Inter-relationship between health and nutrition.

b. **RDA**– Definition, factors affecting RDA, general principles of deriving RDA (2017),Determination of RDA of different nutrients.

UNIT II **(20 Hours)**

a. **Carbohydrates** – Definition, nutritional classification, functions, RDA, sources and deficiency and excess effects. Dietary Fibre – definition, Classification, components of dietary fibre, physiological and metabolic effect, role of fibre in prevention of diseases, RDA and sources.

b. **Energy** –Forms of energy, units of measurement, determination of energy value of food, total energy requirement, energy requirements during work, thermic effect of food.

UNIT III **(18 Hours)**

a. **Proteins** – Definition, nutritional classification of proteins and amino acids, functions of proteins and amino acids, RDA, sources, and deficiency and excess. Evaluation of protein quality.(PER, BV, NEU, CS)

b. **Lipids** – Definition, nutritional classification of lipids, functions, RDA, sources. Essential fatty acids – Definition, functions, sources, deficiency and excess effects, omega fatty acids-functions and food sources.

UNIT IV **(18 Hours)**

a. **Vitamins** - Fat Soluble Vitamins(A,D,E&K) - Functions, RDA, sources, deficiency and excess. Water Soluble Vitamins(B&C) - Functions, RDA, sources, deficiency and excess.

b. **Minerals**-Macro Minerals (Calcium, Phosphorus, Magnesium, Potassium, Sodium) - Functions, RDA, sources, deficiency and excess effects.

Micro Minerals (Iron, Zinc, Iodine Selenium, Copper, Fluorine, Manganese) - Functions, RDA, sources, deficiency and excess effects.

UNIT V **(16 Hours)**

Water – Definition, distribution of water, function, requirements, sources, water balance, maintenance of water balance, distribution of electrolytes, maintenance of electrolyte balance.

#-# : Self study

Text Books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Swaminathan M	1999	Handbook of Food and Nutrition	Bangalore Publishing Co Ltd, Bangalore
2.	Srilakshmi B	2000	Nutrition Science	New Age International(p)ltd, New Delhi
3.	T.Longvah R.Anandhan K.Bhaskarachary K.Venkaiah	2017	Indian Food Composition Table	National Institute of Nutrition

Reference Books

S.No.	Author name	Year of publication	Title of the book	Publishers name
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	2009	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.	Henry Clapp Sherman	2009	Essentials of Nutrition	The Macmillan Company
6.	Martin Eastwood	2013	Principles of Human Nutrition	Wiley Publishing
7.	Mahtab S. Bamji	2017	Textbook of Human Nutrition	Oxford & IBH Publishing Co Pvt Ltd

Journals

- Journal of Nutrition and Health, The Korean Nutrition Society, South Korea
- Indian Journal of Nutrition and Dietetics, Scientific publishers, India
- British Journal of Nutrition, Cambridge Univ Press, England

Web Links

http://www.fao.org/3/W8079E/w8079e07.htm

https://www.healthline.com/nutrition/micronutrients#deficiencies-and-toxicities

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

Course designers:

- Ms.M.Vinothini
- Ms.S.Fathima

SEMESTER - III	PRINCIPLES OF NUTRITION – PRACTICAL	HOURS / WEEK - 3	
CORE PRACTICAL - III		CREDIT - 2	
COURSE CODE – 19UND3CC3P		INTERNAL 40	EXTERNAL 60

Objectives

- To gain knowledge on nutritive value of Indian foods.
- To understand the importance of nutrients.
- To know about the methods of analysis of macronutrient.

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	State the comparison of measurement of raw and cooked volume of food	K1
CO2.	Explain the food sources of macro and micro nutrient	K2
CO3.	Give examples of macro and micro nutrient rich recipe	K2
CO4.	Interpret the nutrient content of the recipe	K2
CO5.	Apply the procedure involved in estimation of fibre, fat and nitrogen	K3

Mapping with Programme Outcomes

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

S- Strong; M-Medium

Syllabus

1. Plan, prepare and calculate the nutrients of macro nutrient rich dishes

   a. Energy – High Calorie and Low Calorie

   b. Carbohydrate – High Carbohydrate and Low Carbohydrate

   c. Protein – High Protein and Low Protein

   d. Fat – High Fat and Low Fat

   e. Dietary Fibre – High Fibre and Low Fibre

2. Plan, prepare and calculate the nutrients of micro nutrient rich dishes

Vitamins: Vitamin A, Vitamin C, Thiamine, Riboflavin, Niacin, Pyridoxine, Folic Acid and Cyanocobalamine.

Minerals: Calcium, Iron, Zinc, Phosphours, Sodium and Potassium.

3. Demonstration on estimation of energy using Bomb Calorimeter.
4. Analysis of crude fibre in food using fibre plus method.
5. Demonstration on estimation of nitrogen in food using Kjeldahl method.
6. Demonstration on estimation of total fat in food using soxhlet method.

Text Books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Srilakshmi B	2014	Dietetics	New Age International
2.	Gajalakshmi R	2014	Nutrition Science	CBS Publishers and Distributors Pvt. Ltd
3.	Gopalan.C, Rama Sastri.V.B and Balasuramanian.S.C	2016	Nutritive Value of Indian Foods	National Institute of Nutrition(ICMR) Hyderabad

ReferenceBooks

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Kathleen Mahan	2008	Krause's Food and Nutrition Theraphy	Saunders Elsevier,Missouri
2.	Graham Dodgshun and Michel Peters	2010	Cookery for the Hospitality Industry	Cambridge University Press,NewDelhi
3.	ThangamE.Philip	2015	Modern Cookery for Teaching and the Trade Volume-I	Orient Blackswan Private Limited, New Delhi
4.	Food Safety and Standards Authority of India	2015	Manual of Analysis of Foods	Food Safety and Standards Authority of India

Pedagogy: Lecture, Demonstration

Course Designers

- Ms.M.Vinothini
- Ms.S.Fathima

SEMESTER – III	NUTRITIONAL BIOCHEMISTRY	HOURS / WEEK - 4	
SECOND ALLIED COURSE -I		CREDIT - 4	
COURSE CODE – 19UND3AC3		INTERNAL 25	EXTERNAL 75

Objectives

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

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	Identify the types of enzymes involved in metabolism.	K1
CO2.	Explain the role of hormones in human body.	K2
CO3.	Describe the structure, properties, classification, function, synthesis and metabolism of macronutrients and micronutrients.	K2
CO4.	Illustrate the sugar inter-conversions	K2
CO5.	Compute ATP synthesis formed during the metabolism	K3

Mapping with Programme Outcomes

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

- S- Strong; M-Medium, L- Low

Syllabus

UNIT I **(10 Hours)**

Cell: Introduction, cell organelles, cell membrane, movement of the substances and water through the cell membrane, bioelectric potentials.

Enzymes: Definition, #classification of enzymes#, specificity of enzymes, factors affecting enzyme activity, enzyme inhibition.

UNIT II **(10 Hours)**

Protein: Amino acids classification, structure, properties, protein structure, peptide linkage, covalent backbone, three-dimensional conformation, quaternary structure of oligomeric proteins. Determination of –N and –C terminal amino acids, protein functions. Metabolism- synthesis of proteins and metabolism of amino acids.

Nucleotides and nucleic acids: Structure of purine and pyrimidines nucleotides, RNA – structure and types, double helical structure of DNA, biosynthesis and catabolism of purine and pyrimidine nucleotides.

UNIT III **(14 Hours)**

Carbohydrates: Classification, structure, properties and functions, carbohydrate metabolism – metabolic pathway – glycolysis, TCA cycle, HMP shunt pathway, gluconeogenesis, from TCA intermediates/ amino acids/ acetyl CoA, concept of glycogenesis and glycogenolysis.

UNIT IV **(14 Hours)**

Lipids: Classification, structure, properties, biological significance, Bioenergetics – electron transport and oxidative phosphorylation, redox potential, high energy compounds, ATP and significance, Lipid metabolism – beta oxidation of fatty acids, biosynthesis of fatty acids.

UNIT V **(12 Hours)**

Vitamins: Fat Soluble Vitamins – Classification (A, D, E, K) and its metabolism. Water Soluble Vitamins – Classification (Vitamin B1, B2, B3, B5, B6, B9, B12 and Vitamin C) and its metabolism.

Minerals: Macro Minerals – Classification (Calcium, Phosphorus, Sodium, Potassium, Magnesium) and its metabolism.

Micro Minerals – Classification (Iron, Fluorine, Zinc, Iodine, Selenium)and its metabolism.

#-# : Self study

Text Book

S.No.	Author name	Year of Publication	Title of the book	Publishers name
1.	Sucheta P Dandekai	2000	Medical Biochemistry	B.I. Churchill Livingstone
2.	Lauralee Sherwood	2007	Human Physiology 6th Edition	Thomson Brooks/cole,
3.	AmbikaShanmugam	2008	Fundamentals of Biochemistry for Medical students	Lippincott Williams & Wilkins
4.	Rafi MD, Dr NTR	2015	Textbook of Biochemistry for Medical Students	University of Health Sciences, Universities Press

Reference Books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Patricia Trueman,	2007	Nutritional Biochemistry,	MJP Publishers
2.	MallikarjunaRao N,	2008	Medical Biochemistry	New Age International Publishers, New Delhi
3.	Jain, J L	2008	Fundamentalsof Biochemistry	S.Chandand Company Ltd., New Delhi
4.	Robert K.Murray	2009	Harper's Illustrated Biochemistry	McGraw Hill
5.	John E. Hall	2013	Guyton & Hall Text Book of Medical Physiology	Elsevier India Private Limited, New Delhi
6.	Agarwal, G R, Meerut	2014	Text Book of Biochemistry	Krishna Prakashan Media (p) Ltd
7.	Satyanarayanan U	2014	Biochemistry,	Elsevier India Private Limited, New Delhi

Journals

- Journal of Nutritional Biochemistry, Elsevier Science Inc, United States
- Biochemistry, American Chemical Society, United States

Web links

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

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

Course designers:

- Ms.M.Vinothini
- Ms.S.Fathima

SEMESTER –III & IV	NUTRITIONAL BIOCHEMISTRY & CLINICAL BIOCHEMISTRY – PRACTICAL	HOURS / WEEK - 3	
SECOND ALLIED COURSE II - PRACTICAL		CREDIT - 3	
COURSE CODE – 19UND3AC2P		INTERNAL 40	EXTERNAL 60

Objectives

- To develop skills in handling analytical equipments.
- To understand procedures for qualitative and quantitative analysis.
- To learn the collection of blood and urine

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	Name the chemicals used in qualitative and quantitative analysis	K1
CO2.	Explain the procedure for quantitative analysis	K2
CO3.	Interpret the analytical results	K2
CO4.	Describe the analysis of blood and urine abnormalities in relation to diseased conditions	K2
CO5.	Apply calorimetry and chromatography techniques	K3

Mapping with Programme Outcomes

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

S- Strong; M-Medium

Syllabus

NUTRITIONAL BIOCHEMISTRY

- Qualitative tests for Sugars – Glucose, Fructose, Lactose, Maltose, Sucrose, Starch
- Qualitative tests for Proteins.
- Qualitative tests for Minerals.
- Quantitative estimation of Glucose.
- Quantitative estimation of Iron.
- Quantitative estimation of Calcium.
- Quantitative estimation of Ascorbic acid.

CLINICAL BIOCHEMISTRY

- Qualitative analysis of Urine for normal constituents.
- Qualitative analysis of urine for abnormal constituents.
- Estimation of blood glucose (Folin-Wu method).
- Estimation of urine glucose (Benedicts method)
- Estimation of blood urea and creatine (DAM-TSC Method).
- Estimation of urine urea (DAM-TSC Method).
- Electrophoretic pattern of blood proteins (Demonstration).
- Estimation of Serum Cholesterol (ZAK'S Method).
- Estimation of Serum Bilirubin
- Techniques of Chromatography (Paper)

Text Books

S.No.	Author name	Year of Publication	Title of the book	Publishers name
1.	Ambika Shanmugam	2008	Fundamentals of Biochemistry for Medical students	Lippincott Williams & Wilkins
2.	Rafi MD, Dr NTR	2015	Textbook of Biochemistry for Medical Students	University of Health Sciences, Universities Press

Reference Books

S.No	Author name	Year of publication	Title of the book	Publishers name
1.	Pattabiraman .N.T	2001	Laboratory Manual in Biochemistry	All India Publishers and Distributors Regd,Chennai
2.	Shanmugam.S, Sathishkumar,T, PanneerSelvam.K	2010	Laboratory handbook on biochemistry	PHI learning Private Ltd,Chennai.
3.	Murray, Robert K	2012	Harper`sIllustrated Biochemistry	Mcgraw Hill Irwin Companies, New York
4.	Das Lajja	2014	Medicinal Biochemistry,	Venus Books, New Delhi
5.	Evangeline Jones	2016	Manual of Practical Medical Biochemistry,2nd Edition	Jaypee Brothers Medical Publishers(p) Ltd.

Pedagogy: Lecture,Demonstration

Course Designers

- Ms.S.Fathima
- Ms.M.Vinothini

SEMESTER - III	BASICS IN NUTRITION	HOURS / WEEK - 2	
NON MAJOR ELECTIVE I		CREDIT - 2	
COURSE CODE – 19UND3NME1		INTERNAL 25	EXTERNAL 75

Objectives

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

Course Outcomes

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

CO Number	CO statement	Knowledge level
CO 1	Define principles in basic nutrition	K1
CO 2	Explain nutrient classifications and deficiency disorders of macro nutrients	K2
CO 3	Illustrate the sources, requirement and functions of micro nutrients	K2
CO 4	Interpret the assessment of nutritional status	K2
CO5	Apply techniques in nutritional education	K3

Mapping with Programme Outcomes

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

S- Strong; M-Medium

Syllabus

UNIT I **(4 Hours)**

Basics in Nutrition - Definition of Nutrition, Importance of nutrition for health, Basic five food groups, portion size of foods and the functions of food, Food pyramid, Definition and classifications of nutrients, RDA, factors affecting RDA.

UNIT II **(8 Hours)**

a. Carbohydrates – Nutritional classification, functions, Sources, requirement and deficiency effects. Role of fibre in human Nutrition

b. Protein – Nutritional classification, functions, sources, requirement and deficiency disorders.

c. Lipids – Classification, functions, sources, requirement, excess and deficiency effects.

UNIT III **(8 Hours)**

a. Vitamins – Fat soluble vitamins A, D, E and K - functions, sources, requirements and deficiency diseases, Water soluble vitamins – B vitamins like thiamine, Riboflavin, Niacin, Pyridoxin, Folic acid, B12 and Vitamin C - functions, sources, requirements and deficiency diseases.

b. Minerals – Calcium, phosphorus, Sodium, Potassium, Iron, Iodine, Flourine - functions, sources requirements and deficiency diseases.

c. Water – Need and Importance

UNIT IV **(6 Hours)**

Basics of assessing nutritional status – Anthropometric measurements (BMI, WHR, Broka's Index), Biochemical, Clinical and Dietary (24 hour recall method and Food Frequency Method)

UNIT V **(4 Hours)**

Nutrition Education –Tools, Steps, Nutrition education for Prevention of underweight, overweight, obesity, anaemia and diabetes mellitus

Text Books

S.No.	Author name	Year of Publication	Title of the book	Publisher name
1.	Srilakshmi B	2012	Nutrition Science	New Age International Publishers, New Delhi
2.	SwaminathanM	2012	Hand book of Food and Nutrition	Bangalore printing and publishing co., Ltd, Bangalore
3.	Raheena Begum M	2012	A Text Book of Foods, Nutrition and Dietetics	Sterling publishers private Limited,

Reference Books

S.No.	Author name	Year of Publication	Title of the book	Publisher name
1.	Gajalakshmi R	2014	Nutrition Science	CBS Publishers and distributors Pvt Ltd, New Delhi,
2.	Indrani T.K	2008	Nursing Manual of Nutrition and Therapeutic Diet,	Jaypee Brothers, Medical publishers (p) Ltd, New Delhi,
3.	Shubhangini Joshi A,	2014	Nutrition and Dietetics	MC Graw Hill Education (India) (P) Ltd, New Delhi,
4.	Srilakshmi B,	2014	Nutrition Science	New Age International Publishers, New Delhi

Journals:

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

Web links:.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3995129/
http://www.tuscany-diet.net/carbohydrates/classification-functions/
https://www.nia.nih.gov/health/vitamins-and-minerals
Pedagogy: E-content, Lecture, Power point presentation, Seminar, Assignment
Course Designers

- Ms.E.Agalya
- Ms.S.Fathima

SEMESTER - IV	NUTRITION THROUGH LIFE CYCLE	HOURS / WEEK - 5	
CORE COURSE - IV		CREDIT - 5	
COURSE CODE – 19UND4CC4		INTERNAL 25	EXTERNAL 75

Objectives

- To understand the importance of nutrition and health.
- To obtain knowledge on the nutritional needs pertaining to different stages of life.
- To plan diet for various age groups.

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	List nutritional requirements for all age groups	K1
CO2.	Explain the balanced diet and food groups	K2
CO3.	Explain the physiological changes that take place during pregnancy and lactation.	K2
CO4.	Give examples of weaning foods and low cost supplementary foods.	K2
CO5.	Compute nutritive value for different age groups according to RDA.	K3

Mapping with Programme Outcomes

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

S- Strong; M-Medium

Syllabus

UNIT I **(15 Hours)**

a) Introduction to Nutrition - #Balanced diet, Basic five food groups#, RDA, factors affecting RDA.

b) Menu planning - Definition, principles of menu planning, points to be considered in menu planning, steps involved in planning menu.

UNIT II **(15 Hours)**

a) Nutrition for Pregnancy –Physiological changes, 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.

UNIT III **(15 Hours)**

a) Nutrition for Infants- Growth and development, importance of breast feeding, advantages of breast feeding, food and nutritional requirements. Weaning – Definition, types of supplementary foods, points to be considered in introducing weaning foods.

b) Nutrition for Preschoolers – Growth and development, food and nutritional requirements, factors affecting nutritional status, low cost supplementary foods and nutritional problems among preschoolers.

UNIT IV **(15 Hours)**

a) Nutrition for school going children – Growth and development, food and nutritional requirement, 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.

UNIT V **(15 Hours)**

a) Nutrition for adulthood – Food and nutritional requirements, dietary guidelines, nutritional problems.

b) Nutrition for old age –Process of ageing, food and nutritional requirement, dietary guidelines, nutrition related problems, degenerative diseases.

#-# : Self study

Text Books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Srilakshmi B	2014	Dietetics	New Age International , New Delhi.
2.	Gajalakshmi R	2014	Nutrition Science	CBS Publishers and Distributors Pvt. Ltd

Reference Books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Sari Edelstein	2009	Life cycle nutrition	Jones and Bartlett Publisher
2.	Barasi, Mary E, Great Britain	2002	Human Nutrition: Health Perspective	Hodder and Stoughton
3.	Swaminathan M	2012	Handbook of Food and Nutrition	Bangalore Publishing Co Ltd
4.	Townsend, Carolynn E	2000	Nutrition and Diet Therapy	London: I.T.P an International Thomson Publishing Company
5.	Gopalan.C, Rama Sastri.V.B and Balasuramanian.S.C	2016	Nutritive Value of Indian Foods	National Institute of Nutrition(ICMR) Hyderabad

Journals

- Journal of Nutrition and Metabolism, Biomed central, United kingdom
- Pregnancy Hypertension, Elsevier Bv,

Netherlands **Web links**

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5104202/

https://www.ncbi.nlm.nih.gov/books/NBK525242/

https://www.health.gov.il/English/Topics/SeniorHealth/HealthPromo/Pages/nutrition-elderly.aspx

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

Course Designers

- Ms.M.Vinothini
- Ms.S.Fathima

SEMESTER - IV	NUTRITION THROUGH LIFE CYCLE - PRACTICAL	HOURS / WEEK - 3	
CORE PRACTICAL - IV		CREDIT - 2	
COURSE CODE – 19UND4CC4P		INTERNAL 40	EXTERNAL 60

Objectives

- To gain knowledge on nutritive value of Indian foods.
- To understand the importance of nutrients.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	Identify the physiological changes take place during all age group	K1
CO2.	Explain the importance of RDA for all age group	K2
CO3.	Describe the meal plan according to the age group	K2
CO4.	Interpret the nutrient content of the planned recipe with RDA	K2
CO5.	Prepare a planned meal based on the RDA for all age group	K3

Mapping with Programme Outcomes

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

S- Strong; M-Medium

Syllabus

NUTRITION THROUGH LIFE CYCLE -PRACTICAL

Plan, calculate nutritive value and prepare meal for

- Pregnant women
- Lactating women
- Infant
- Preschooler
- School going children
- Adolescent
- Adult
- Old age

Text Books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Srilakshmi B	2014	Dietetics	New Age International
2.	Gajalakshmi R	2014	Nutrition Science	CBS Publishers and Distributors Pvt. Ltd
3.	Gopalan.C, Rama Sastri.V.B and Balasubramanian.S.C	2016	Nutritive Value of Indian Foods	National Institute of Nutrition(ICMR) Hyderabad

Reference Books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Graham Dodgshun and Michel Peters	2010	Cookery for the Hospitality Industry	Cambridge University Press, New Delhi
2.	ThangamE.Philip	2015	Modern Cookery for Teaching and the Trade Volume-I	Orient Blackswan Private Limited, New Delhi
3.	Kathleen Mahan	2008	Krause's Food and Nutrition Therapy	Saunders Elsevier, Missouri

Pedagogy: Practical,Demonstration

Course Designers

- Ms.M.Vinothini
- Ms.S.Fathima

SEMESTER – IV	NUTRITIONAL BIOCHEMISTRY & CLINICAL BIOCHEMISTRY – PRACTICAL	HOURS / WEEK - 3	
SECOND ALLIED COURSE II - PRACTICAL		CREDIT - 3	
COURSE CODE – 19UND3AC2P		INTERNAL 40	EXTERNAL 60

Objectives

- To develop skills in handling analytical equipment.
- To understand procedures for qualitative and quantitative analysis.

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	Name the chemicals used in qualitative and quantitative analysis	K1
CO2.	Explain the procedure for quantitative analysis	K2
CO3.	Interpret the analytical results	K2
CO4.	Describe the analysis of blood and urine abnormalities in relation to diseased conditions	K2
CO5.	Apply colorimetry and chromatography techniques	K3

Mapping with Programme Outcomes

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

S- Strong; M-Medium

Syllabus

NUTRITIONAL BIOCHEMISTRY

- Qualitative tests for Sugars – Glucose, Fructose, Lactose, Maltose, Sucrose, Starch
- Qualitative tests for Proteins.
- Qualitative tests for Minerals.
- Quantitative estimation of Glucose.
- Quantitative estimation of Iron.
- Quantitative estimation of Calcium.
- Quantitative estimation of Ascorbic acid.

CLINICAL BIOCHEMISTRY

- Qualitative analysis of Urine for normal constituents.
- Qualitative analysis of urine for abnormal constituents.
- Estimation of blood glucose (Folin-Wu method).
- Estimation of urine glucose (Benedicts method)
- Estimation of blood urea and creatine (DAM-TSC Method).
- Estimation of urine urea (DAM-TSC Method).
- Electrophoretic pattern of blood proteins (Demonstration).
- Estimation of Serum Cholesterol (ZAK'S Method).
- Estimation of Serum Bilirubin(Ehrlich's Diazo reagent method)
- Techniques of Chromatography (Paper)

Text Books

S.No.	Author name	Year of Publication	Title of the book	Publishers name
1.	AmbikaShanmugam	2008	Fundamentals of Biochemistry for Medical students	Lippincott Williams & Wilkins
2.	Rafi MD, Dr NTR	2015	Textbook of Biochemistry for Medical Students	University of Health Sciences, Universities Press

Reference Books

Pedagogy: Lecture, Demonstration, Practical

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Pattabiraman .N.T	2001	Laboratory Manual in Biochemistry	All India Publishers and Distributors Regd,Chennai
2.	Shanmugam.S, Sathishkumar,T, PanneerSelvam.K	2010	Laboratory handbook on biochemistry	PHI learning Private Ltd,Chennai.
3.	Murray, Robert K	2012	Harper`sIllustrated Biochemistry	Mcgraw Hill Irwin Companies, New York
4.	Das Lajja	2014	Medicinal Biochemistry	Venus Books, New Delhi
5.	Evangeline Jones	2016	Manual of Practical Medical Biochemistry,2nd Edition	Jaypee Brothers Medical Publishers(p) Ltd.

Course Designers

- Ms.S.Fathima
- Ms.M.Vinothini

SEMESTER - IV	CLINICAL BIOCHEMISTRY	HOURS / WEEK - 3	
SECOND ALLIED COURSE - III		CREDIT - 2	
COURSE CODE – 19UND4AC4		INTERNAL 25	EXTERNAL 75

Objectives

- To enable the students to gain knowledge on regulation of metabolism.
- To understand the relationship of biochemical changes to health and diseases.

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	Identify Biochemical data	K1
CO2.	Explain Carbohydrate disorders	K2
CO3.	Assess Protein disorders	K2
CO4.	Illustrate fat disorders	K2
CO5.	Prepare appropriate technique to evaluate various organ Functions	K3

Mapping with Programme Outcomes

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

S- Strong; M-Medium

Syllabus

UNIT I **(9 Hours)**

Biochemical Data Acquisition, Interpretation and Laboratory Techniques

General lab information, #units of measure-enzymes, hormones, electrolytes#, uses of biochemical data in clinical medicine. Acquisition and interpretation of biochemical data. Tools of biochemistry.

UNIT II **(9 Hours)**

Disorders of carbohydrate metabolism

Glucose homeostasis, Diabetes mellitus, ketone bodies, macro angiopathy and microangiopathy. Glucose tolerance tests and glycosylated hemoglobin. Inborn errors of carbohydrate metabolism, Glycogen storage diseases, Galactosemia,

UNIT III **(9 Hours)**

Disorders of Protein metabolism

Phenylalanemia, homocystinuria, tyrosinemia, MSUD, phenylketonuria, alkaptonuria, albinism and animoacidurias. Disorders in purine/ pyrimidine metabolism

UNIT IV **(9 Hours)**

Disorders of Fat metabolism

Disorders in lipids-Gaucher, Tay-Sach, Niemann-Pick, Farber's, Gangliosidosis, Steatorhea, Dyslipidemia, Atherosclerosis, Coronary Artery Disease, Disorders of Lipoproteins.

UNIT V **(9 Hours)**

Organ Function Tests

Kidney function test –Clearance test (Urea and creatinine clearance test), Measurement of Osmolality (ADH test, Dilution test)

Liver function test –Tests based on excretory function, based on metabolic capacity of liver, Tests based on serum enzymes, and synthetic function of liver.

Gastric function test –Fractional test meal, Stimulation test, Estimation of free acidity and total acidity

Pancreas Function test –Amylase and Lipase test

#-# : Self study

Text Books

S.No	Author name	Year of Publication	Title of the book	Publishers name
1.	Satyanarayana.U	2016	Fundamentals of Biochemistry	ks and Allied (p) Ltd, Kolkata
2.	AmbikaShanmugam,	2016	Fundamentals of biochemistry for medical students,8th Edition	Lippincott Williams and Wilkin

Reference Books

S.No	Author name	Year of publication	Title of the book	Publishers name
1.	Das Lajja	2014	Medicinal Biochemistry,	Venus Books, New Delhi
2.	Murray, Robert K	2012	Harper`sIllustrated Biochemistry	Mcgraw Hill Irwin Companies, New York

Journals

- CPD Bulletin Clinical Biochemistry,Rila Publications, Ltd, United Kingdom.
- Annals of Clinical Biochemistry, Sage Publications Inc, England.
- Clinical Biochemistry, Pergamon-Elsevier Science Ltd, Canada.
- Indian Journal of Clinical Biochemistry, Association of Clinical Biochemists of India.
- Journal of Clinical Biochemistry and Nutrition Japan.

Web Links

https://ncdc.gov.in/
http://aiihph.gov.in/department-of-biochemistry-and-nutrition/

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

Course Designers

- Ms.M.Vinothini
- Ms.S.Fathima

SEMESTER - IV	NUTRITION FOR THE FAMILY	HOURS / WEEK - 2	
NON MAJOR ELECTIVE II		CREDIT - 2	
COURSE CODE – 19UND4NME2		INTERNAL 25	EXTERNAL 75

Objectives

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

Course Outcomes

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

CO Number	CO statement	Knowledge level
CO 1	Identify the inter relationship between health and nutrition	K1
CO 2	Explain menu planning principles for different stages of life cycle	K2
CO 3	Explain importance of RDA	K2
CO 4	Interpret nutritional problems throughout life cycle	K2
CO 5	Apply basic therapeutic principles in menu planning	K3

Mapping with programme outcomes

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

S- Strong; M-Medium

Syllabus

UNIT I **(6 Hours)**

a) **Principles of Nutrition**–#Classification and functions of Nutrients#. Inter relationship between health and nutrition, malnutrition, over nutrition, under nutrition. Principles of meal planning, RDA.

b) **Nutrition for Pregnancy** - Physiological changes and complications during Pregnancy, food and nutritional requirements during pregnancy.

c) **Nutrition for Lactation-** Physiology of Lactation, food and nutritional requirements of lactating women.

UNIT II **(6 Hours)**

a) **Nutrition for Infants -**Importance of breast milk, food and nutritional requirements for infants, weaning and supplementary foods for infants.

b) **Nutrition for Preschoolers** Food habits of preschoolers, food and nutritional requirements for preschool children.

UNIT III **(6 Hours)**

a) **Nutrition for School Age -**Food and Nutritional requirements for school going children, nutritional problems.

b) **Nutrition for Adolescents**-Food and Nutritional requirements for adolescence and eating disorders.

UNIT IV **(6 Hours)**

a) **Nutrition during Adulthood -**Reference man and Reference woman, Food and nutritional requirements for adults.

b) **Nutrition during Old age** - Nutritional requirements, nutritional problems and dietary management.

UNIT V **(6 Hours)**

Basics in therapeutic menu planning – Characteristics of clear fluid, full fluid soft diet. Therapeutic dietary principles - Energy – High calorie and Low calorie, Carbohydrate – High carbohydrate and Low carbohydrate, Protein – High protein and Low protein, Fat – High fat and Low fat, Dietary fibre – High fibre and Low fibre.

#-# : Self study

Textbooks

No.	Author name	Year of Publication	Title of the book	Publisher name
1.	Srilakshmi B	2012	Nutrition Science	New Age International Publishers, New Delhi
2.	SwaminathanM	2012	Hand book of Food and Nutrition	Bangalore printing and publishing co., Ltd, Bangalore
3.	Raheena Begum M	2012	A Text Book of Foods, Nutrition and Dietetics	Sterling publishers private Limited

Reference Books

S.No.	Author name	Year of Publication	Title of the book	Publisher name
1.	Gajalakshmi R	2008	Nutrition Science	CBS Publishers and distributors Pvt Ltd, New Delhi,
2.	Indrani T.K	2008	Nursing Manual of Nutrition and Therapeutic Diet	Jaypee Brothers, Medical publishers (p) Ltd, New Delhi
3.	Shubhangini Joshi A	2014	Nutrition and Dietetics	MC Graw Hill Education (India)
4.	Srilakshmi B	2014	Dietetics	New Age International Publishers, New Delhi

Journals

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

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

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

Course Designers

- Ms.B.Thanuja
- Ms.E.Agalya

SEMESTER – IV	I.A.REGIONAL CUISINES	HOURS / WEEK - 2	
SKILL BASED ELECTIVE – I		CREDIT - 2	
COURSE CODE – 19UND4SBE1A		INTERNAL 25	EXTERNAL 75

Objectives

- To gain knowledge on Indian regional cuisines.
- To understand the basic culinary terms.

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	Identify role of spices in Indian cookery	K1
CO2.	Describe the characteristics of regional cuisines	K2
CO3.	Describe the food habits of various Indian region	K2
CO4.	Categorize cooking methods applied in Indian regional cuisines	K3
CO5.	Categorize speciality cuisines of Indian festivals	K3

Mapping with programme outcomes

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

S- Strong; M- Medium

Syllabus

UNIT I **(6 Hours)**

Introduction to Indian Cuisines

Introduction to Indian food, Philosophy of Indian cooking, influence of the invaders and travellers on Indian cuisine. #Spices and Condiments used in Indian cookery#, masala and Pastes. Basic gravies- Makhni gravy, Tomato onion gravy, Hariyali gravy, White gravy, Regional gravies.

UNIT II **(6 Hours)**

Famous cuisines - North and West Regions of India

Origin of tandoor and dum cooking, special equipment and their uses, workflow, tenderizing agents used in Indian cooking. Introduction to North Indian cuisine - Kashmir Cuisine, Punjabi Cuisine, MughalaiandAwadh Cuisine, Rajasthani Cuisine. West region cuisine -Gujarati Cuisine, Maharastrian Cuisine, Vidharbha, Kohlapur, Maratwada, Konkan, Goan Cuisine.

UNIT III **(6 Hours)**

Famous cuisines - North Eastern India

Introduction to North Eastern Indian cuisine - Staple foods, special food habits, various cooking methods and characteristics of Assamese, Arunachal Pradesh, Bihar, Manipuri, Meghalaya, Mizoram, Nagaland, Sikkim, Tripuri Cuisines.

UNIT IV **(6 Hours)**

Famous cuisines - Central India

Introduction to Central Indian cuisine – Staple foods, food habits, special occasion foods and characteristics of Madhya Pradesh and Odissi cuisines.

UNIT V **(6 Hours)**

Famous cuisines- South India

Heritage of South Indian cuisines, Factors that affect eating habits in south Indian region, Speciality cuisines for festivals and special occasions. Characteristics of Tamil Nadu Cuisine, Hyderabad and Andhra Cuisine, Kerala cuisine and Karnataka cuisine.

#-# : Self study

Text books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Krishna arora	2011	Theory of cookery	Frank bros&co, Noida
2.	Graham Dodgshun	2008	Cookery for the hospitality industry	Cambridge university press Graham Dodgshu Peters

Reference books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Linda Civitello	2011	Cuisine and culture	John Wily & sons, New jersey
2.	ParvinderS.Bali	2014	Food Production Operations	Oxford University Press, New Delhi
3.	ParvinderS.Bali	2012	International Cuisines and Food production Management	Oxford University Press, New Delhi

Journals:

- Journal of Culinary Science and Technology

Web links:

- http://www.tasteofindiabtown.com/menu/TOI_webmenu_082410.pdf
- https://en.wikipedia.org/wiki/South_Indian_cuisine
- https://www.indianembassybeirut.gov.in/pdf/Introduction_to_Indian_Cuisine.pdf
- http://www.itrhd.com/magazine/special-issue1.pdf
- https://www.academia.edu/32998366/Indian_cuisines_representing_Indian_culture
- https://www.tandfonline.com/doi/full/10.1080/1743873X.2013.767818?src=recsys

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

Course Designers

- Ms. S. Fathima
- Ms. T.R. Revathi

SEMESTER – IV	I.B.BASICS IN FOOD PRODUCTION	HOURS / WEEK - 2	
SKILL BASED ELECTIVE - I		CREDIT - 2	
COURSE CODE – 19UND4SBE1B		INTERNAL 25	EXTERNAL 75

Objectives

- To acquire knowledge on environmental set up for cooking.
- To learn various methods and techniques of Cooking.

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	Identify uses of equipment in food production	K1
CO2.	Explain pre - preparation techniques for Cooking	K2
CO3.	Illustrate basic preparation of **s**alads, soups and sauces	K2
CO4.	Describe egg, fish and meat cookery	K3
CO5.	Apply bakery principles and techniques in the preparation of cakes, cookies and biscuits	K3

Mapping with programme outcomes

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

S- Strong; M-Medium

Syllabus

UNIT I **(6 Hours)**

Organization of Kitchen, Storage and Service Spaces

Size and type of kitchens, designing kitchens, layout of kitchens (General layout of kitchen in various organizations).Location of storage spaces, types of storage, planning storage spaces. Location and planning service areas.

Equipment – Classification, #uses of equipment in food production#.

UNIT II **(6 Hours)**

Pre-preparation

Pr**e**-Preparation-Meaning of terms -Washing, peeling, paring, Cutting, mirepox, mincing, meringue, mandolin, macedoine, shredding, slicing, slitting, grating, grinding, mashing, pureeing, sieving, rendering, filtration, flavouring, folding, homogenization, beating, blending, creaming, kneading, marinating, whipping, stirring.

Cooking

Cooking -Objectives and methods of cooking (Moist heat, Dry heat, Fat as a medium of cooking, Microwave and Solar cooking)

UNIT III **(6 Hours)**

Preparation of Salads, Soups and Sauces

Classification of salad, parts of salad, salad dressings. Stocks, classification of soups, garnishes for soups. Classification of sauces, importance in food preparations.

UNIT IV **(6 Hours)**

Fish, Egg and Meat Cookery

Fish Cookery-Classification of fish with examples, selection of fish, pre-preparation of fish for cooking , Cooking of fish **.**Egg cookery –Uses of egg in food preparations, methods of cooking. Meat Cookery- Methods of tenderization of meat **,**meat cookery.

UNIT V **6 Hours)**

Fundamentals in the preparation of Cakes, Cookies and Biscuits

Role of ingredients, principles involved in preparation of cake, balancing of cake formula, cake faults and their causes .Difference between cookies and biscuits, Role of ingredients, principles involved in preparation of cookies, types of cookies, faults and their causes in making cookies.

#-# : Self study

Text books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Krishna Arora	2005	Theory of cookery	Fronk Bros and co.Publishers, New Delhi
2.	R.Singaravelavan	2006	Food & Beverage Service	Oxford University press
3.	Yogambal Ashokkumar	2009	Text book of Bakery and Confectionary	Prentice-hall of India Pvt. Ltd
4.	V.Cessarani and R.Kinton	2002	Practical Cookery	Hodder and Stoughton publishers

Reference books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Thangam Philip	2005	Modern Cookery	Orient Longmam Limited, Bangalore
2.	Vijay Dhawan	2007	Food & Beverage Service	Frank Bros&co, New Delhi

Journals

- Journal of Food Industry, Macro think Institute**,** United States.
- Journal for Food Processing and beverages, Avens Publishing Group, India.

Web links

- http://esu-services.ch/projects/lcafood/
- https://www.tutorialspoint.com/
- http://www.yourarticlelibrary.com/home-science/food-production/soup-meaning-and-classification-food-production/86444https://sielearning.tafensw.edu.au/toolboxes/KitchenOps/tools/kitchen/hfood/soupshtml https://getrevising.co.uk/revision-notes/pastry_making

Pedagogy: E-content, Lecture, Power point presentation, Seminar, Assignment, Demonstration, Visit to food production units.

Course Designers

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

SEMESTER - V	DIET THERAPY I	HOURS / WEEK - 5	
CORE COURSE – V		CREDIT - 5	
COURSE CODE – 19UND5CC5		INTERNAL 25	EXTERNAL 75

Objectives

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

Course Outcomes

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

Co Number	CO statement	Knowledge level
CO 1	Identify the role and responsibilities of dietitian	K1
CO 2	Explain the special feeding methods	K2
CO 3	Define the causes, symptoms and complications of diseases	K2
CO 4	Interpret causes and symptoms of diseases	K3
CO 5	Apply dietary principles in planning and preparing diet for various diseases and compute nutritive value	K3

Mapping with Programme Outcomes

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

S- Strong; M-Medium

Syllabus

UNIT I **(15 Hours)**

a)Dietitian

- Definition and classification of dietitian
- Qualities and responsibilities of dietitian
- Role of dietitian in hospitals and community
- Professional ethics and code of conduct of dietitian

b)Diet therapy

- Definition, purposes of a therapeutic diet,
- Routine Hospital diets and progressive modifications - Clear fluid diet, Full fluid diet, Soft diet, regular normal diet, bland diet, pre-operative diet, post-operative diet.
- Specially modified therapeutic diets – High and low calorie, high and low protein, high and low residue diets, high and low fat diets, high and Low sodium diet, Restricted potassium diet and ketogenic diet.

UNIT II **(15 Hours)**

a)Drug nutrient interaction

Modification of diet according to medical prescription – Diet effects on drug disposition, drug effects on nutrients and interaction of drugs.

b)Special feeding methods

Enteral Nutrition – Types of feeds, feeding requirements. Parenteral Nutrition – Formula , feeding requirements

UNIT III **(15 Hours)**

a)Nutritional care for diseases of gastro intestinal tract

Peptic ulcer, Diarrhoea, Constipation, Haemorrhoids and Malabsorption syndrome –Meaning, aetiology, symptoms ,clinical findings and dietary modifications.

b)Nutritional care for febrile condition

Metabolic changes during fever and types of fever.

- **Fevers of short duration:** Typhoid, Influenza and Malaria - Meaning, metabolic changes, causes, clinical features and dietary management.
- **Fevers of long duration:** Tuberculosis – Causes, clinical features and dietary management.
- Dietary treatment and nutritional care for pandemic fevers.

UNIT IV **(15 Hours)**

a)Nutritional care for diseases of biliary system

Fatty liver, hepatitis, cirrhosis and Hepatic coma: Meaning, etiology, symptoms and clinical findings and dietary management.

Cholelithiasis and Cholecystitis: Meaning, etiology, symptoms and dietary management.

b)Nutritional care in obesity and underweight

Obesity and overweight: Definition, etiology, theories of obesity, types, metabolic changes, assessment, complications, prevention and dietary treatment , fad diets.

Under weight: Definition, etiology, prevention and dietary treatment.

UNIT V **(15 Hours)**

a)Nutritional care for allergy

Definition, food allergens, clinical manifestations, diagnosis of food allergy and dietary advice.

b)Nutritional care for the children with special needs

Down's syndrome, Cerebral Palsy, Autism, Attention Deficit Hyperactivity Disorder - Overview of the disability and nutritional care, feeding difficulties and special feeding equipment.

Text Books

S.No.	Author name	Year of Publication	Title of the book	Publisher name
1.	Antia F P	2005	Clinical Dietetics and Nutrition	Oxford University Press, New Delhi
2.	SrilakshmiB	2009	Dietetics	New Age International Publications, New Delhi
3.	Shubhangini A Joshi	2010	Nutrition and Dietetics	McGraw Hill Education Private Limited, New Delhi
4.	Joshi Y K	2003	Basis of Clinical Nutrition	Jaypee Brothers, Medical Publishers, New Delhi
5.	MahanKathleen.L	2004	Krause's Food, Nutrition and Diet Therapy	Pennysylvania; Saunders (2004)
6.	Raheena Begum M	2005	Textbook of Foods, Nutrition and Dietetics	Sterling Publishers, New Delhi

Reference Books

S.No.	Author name	Year of Publication	Title of the book	Publisher name
1.	AnjalliSaxena	2007	Therapeutic Nutrition,	Aavishkar Publishers
2.	Bhardwaj and Kalpana	2006	Food and Nutrition,	Vista International Publishing house, New Delhi
3.	Indrani T K	2008	Nursing Manual of Nutrition and Therapeutic Diet	Jaypee Brothers medical publishers (P) Ltd.
4.	Maity S P	2016	Pharmocology for Second Professional Students	Books & Allied Pvt Ltd
5.	Mary Marian	2008	Clinical Nutrition for surgical patients	Jones and Barlett Publishers
6.	Sari Edelstein	2015	Life Cycle Nutrition – An Evidence based Approach	Jones and Barlett Publishers, London

Journals

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

Web links

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

Pedagogy: Lecture, Seminar, Assignment, E-Content, PowerPoint presentation, Quiz.

Course Designers:

- Ms. S.Agalya
- Ms.B.Thanuja

SEMESTER - V	DIETARY FOOD SERVICE MANAGEMENT	HOURS / WEEK - 5	
CORE COURSE – VI		CREDIT - 5	
COURSE CODE – 19UND5CC6		INTERNAL 25	EXTERNAL 75

Objectives

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

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	Identify different types of food service institutions	K1
CO2.	Describe steps involved in purchasing, receiving and storage	K2
CO3.	Explain effective use of leftover foods	K2
CO4.	Apply principles of management in managerial process	K3
CO5.	Classify components of hygiene and sanitation in food service institutions	K3

Mapping with Programme Outcomes

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

S- Strong; M-Medium

Syllabus

UNIT I **(15 hours)**

a) Classification of food service institutions: Objectives and types - profit oriented, service oriented and public health facility oriented.

b) Menu Planning: Definition, functions and types of menu, Principles of menu planning, menu writing, designing and format, Standardization of recipes -Definition, standard recipe format and uses. Portion control and portioning equipment.

c) Equipment: Classification, selection, materials used for construction (bases and finishes), care and maintenance of equipment.

UNIT II **(15 hours)**

a) Purchasing: Food buyer, purchasing procedure, methods of purchasing, standard purchase specification.

b) Receiving: Receiving area - Location, space allocation, floor planning and layout, records maintained in storage area,process and methods.

c) Storage: Storage area - Location, Space allocation, planning and layout, general procedure for storage, store keeping records, maintenance of food quality in different type of storage.

UNIT III **(15 Hours)**

a) Food Production: Location, Space allocation, planning and layout, Pre preparation techniques, objectives and methods of cooking, effective use of leftover foods.

b) Food Service systems: Conventional system, commissary system ready prepared (cook –chill, cook –freeze) and fast food service systems.

c) Dietary Food Distribution and Service-Patient meal service (Tray assembly, Centralised, and Decentralised Assembly Systems), Tray delivery, Insulated tray, Hot and cold cart, Tray cart, Chill delivery system, Tray service. Non –patient meal services-Cafetaria services, Counter service.

d)Cooking fuel: Types, uses, merits, limitations, fuel economy.

UNIT IV **(15 hours)**

a) Introduction to Management: Definition, principles, functions and tools of management.

b) Human Resource Management: Man power planning –definition, steps and benefits. Sources of recruitment, selection process, induction, orientation. Training – Benefits and types. Performance appraisal process and methods.

c) Financial Management: Budget - Importance, types (Master, Cash, Operating and Capital budget), steps in budget planning. Components of costs, behaviour of costs, food cost control, methods of controlling food costs. Cost calculation - break even and contribution and standard dish costing. Book keeping, systems of book keeping, books of accounts

UNIT V **(15 Hours)**

a) Hygiene and Sanitation: Environmental hygiene and sanitation, hygiene in food handling, personnel hygiene. Food Waste management- Food waste disposers.

b) Safety: Accident from structural inadequacies, accidents from improper placement of equipment , accidents due to nature and behavior of people at work, accidents from improper selection, maintenance and storage of equipment. Safety- "3 Es of safety" (safety engineering, safety education, safety enforcement), legal responsibilities of a food service manager.

c) Laws Governing food service establishments: Labour laws governing working conditions, welfare, health and safety, harmonious working relations, payments. Food laws, Food standards in India, role of consumers in maintaining standards.

Text Books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Dr.Premavathy N	2008	Principles of Management (Business management)	Sri Vishnu Publications
2.	Anil Bhat	2016	Principles of Management	Oxford university press
3.	Sudhir Andrews	2009	Hotel front office A training Manual	Tata McGraw-Hill Publishing company ltd
4.	SingaravelanR	2016	Food and beverage service	Oxford University Press

Reference Books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	MalhotraR.K	1998	Food Service and Catering Management	Anmol Publications Pvt.Ltd
2.	Dr.ChakravartiB.K	2011	Hotel and Hospitality management	A.P.H.Publishing Corporation
3.	Parvinder.S.Bali	2011	Quantity food production operations and Indian cuisine	Oxford University Press
4.	Raphael.R.Kavanaugh	1995	Hospitality Supervision	Educational Institute
5.	Ruby P .Puckett	2004	Food Service Manual for Health Care Institutions	Jossey-Bass

Journals

- Non-profit Management and Leadership, Wiley Periodicals, Inc, United States
- Journal of General Management, Mercury House Publications, United Kingdom

Web link

https://djubo.com/blog/different-styles-service/

https://www.mgtsystems.com/tools

https://managementhelp.org/humanresources/index.htm

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

Course Designers

- Ms.B.Thanuja
- Ms.S.Agalya

SEMESTER - V		HOURS / WEEK - 5	
CORE COURSE – VII		CREDIT - 5	
COURSE CODE – 19UND5CC7	DIETARY INTERNSHIP	INTERNAL 40	EXTERNAL 60

Objectives

- To study the importance and role of dietitian in hospitals.
- To gain knowledge in the formulation of therapeutic diet.
- To gain experience in diet counselling with different health conditions

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	State principles of diet therapy	K1
CO2.	Explain the disease conditions of the patients with the help of case sheet	K2
CO3.	Illustrate the nutritive value of therapeutic diets	K2
CO4.	Describe the different types of diet counseling tools	K2
CO5.	Prepare diet formula for different diseased conditions.	K3

Mapping with Programme Outcomes

Cos	PO1	PO 2	PO 3	PO 4	PO 5
CO1.	S	S	S	M	S
CO2.	S	S	S	M	S
CO3.	S	S	S	M	S
CO4.	S	S	S	M	S
CO5.	S	S	S	M	S

S- Strong; M-Medium

Syllabus

- The Practical work consists of internship in a multispecialty hospital for 10-15 days.
- Visits to different wards to observe patients requiring special diets.
- Experience in calculating and planning modified diets.
- Supervising and handling the food preparation and service in the dietary department of the hospital.
- Calculating the diet according to medical prescription.
- Accompanying the doctor while visiting the patient.
- Counsel the patient with different health condition.
- Case study- Selecting and observing 5 patients requiring a therapeutic diet in relation to Patient's dietary history - income, occupation, food habits and social factors.

Preparation of the report should include

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

Text books

S.No.	Author name	Year of Publication	Title of the book	Publisher name
1.	Shubhangini A Joshi	2010	Nutrition and Dietetics	McGraw Hill Education Private Limited, New Delhi
2.	Anne Payne, Hellen Barker	2010	Advancing Dietetics and Clinical Nutrition	Churchill Livingstone Elsevier, UK
3.	Srilakshmi B	2015	Dietetics	New Age International Publications, New Delhi
4.	Gopalan C, Rama Sastri B V and Balasubramaniyan S C	2016	Nutritive value of Indian Foods	National Institute of Nutrition, Hyderabad
5.	Sharma A	2017	Principles of Therapeutic Nutrition and Dietetics	CBS Publishers & Distributors

Reference Books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Park. A	2007	Park's Textbook of Preventive and Social Medicine	Bharat Publishers, Jabalpur
2.	Gibney. M.J, Margetts,B.M. Kearney. J.M. Arab. L	2004	Public Health Nutrition	Blackwell Publishing Co. UK
3.	Carolyn D. Berdanice	2009	Advanced Nutrition	CRC Press
4.	C.R. Pennington	2013	Therapeutic Nutrition – A Practical Guide	Springer, US

Pedagogy: Internship,E-content, Lecture, Seminar, Assignment, Demonstration

Course Designers

- Ms.M.Vinothini
- Ms.E.Agalya

SEMESTER - V	DIET THERAPY I - PRACTICAL	HOURS / WEEK - 4	
CORE PRACTICAL – V		CREDIT - 3	
COURSE CODE – 19UND5CC5P		INTERNAL 40	EXTERNAL 60

Objectives

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

Course Outcomes

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

Co Number	CO statement	Knowledge level
CO 1	Define therapeutic diet and state characteristics of routine hospital diets such as clear liquid diet, full liquid diet and soft diet and compute nutritive value	K1
CO 2	Describe the process of planning and preparing diet for gastro intestinal tract diseases such as peptic ulcer, diarrhoea and constipation and compute nutritive value	K2
CO 3	Interpret the process of planning and preparing diet for febrile conditions like typhoid and tuberculosis and compute nutritive value	K2
CO 4	Describe the process of planning and preparing diet for obesity and underweight and compute nutritive value.	K2
CO 5	Prepare diet for liver diseases such as hepatitis and cirrhosis by applying principles of menu planning	K3

Mapping with Programme Outcomes

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

S- Strong; M-Medium

Syllabus

- Planning and Preparation of Therapeutic diets –
  - Clear liquid diet
  - Full liquid diet
  - Soft diet

- Planning , Preparation of diet and diet counseling for
  - Peptic ulcer, Diarrhoea, Constipation
  - Fevers - Typhoid and Tuberculosis ; Pandemic Fevers
  - Obesity and Under weight
  - Hepatitis and Cirrhosis

Text books

S.No.	Author name	Year of Publication	Title of the book	Publisher name
1.	V.Vimala	2009	Advances in Diet Therpy: A Practical Manual	New Age International Pvt Ltd, New Delhi
2.	Shubhangini A Joshi	2010	Nutrition and Dietetics	McGraw Hill Education Private Limited, New Delhi
3.	Staci Nix	2013	William's Basic Nutrition and Diet Therapy	Elsevier, Missouri
4.	Gopalan C, Rama Sastri B V and Balasubramaniyan S C	2016	Nutritive value of Indian Foods	National Institute of Nutrition, Hyderabad

Reference Books

S.No	Author name	Year of Publication	Title of the book	Publisher name
1.	Joshi Y K	2003	Basis of Clinical Nutrition	Jaypee Brothers, Medical Publishers, New Delhi
2.	David H.Alpers William F. Stenson Beth E. Taylor Dennis M. Bier	2008	Manual of Nutritional Therapeutics	Lippincot Williams & Wilkins, USA
3.	C.R. Pennington	2013	Therapeutic Nutrition – A Practical Guide	**Springer, US**

Pedagogy: Lecture, Demonstration,Practical,E-Module.

Course Designers:

- Ms. S.Agalya
- Ms. B.Thanuja

SEMESTER - V		HOURS / WEEK - 5

MAJOR BASED ELECTIVE - I	I.A.FOOD STANDARDS AND QUALITY CONTROL	CREDIT - 5	
COURSE CODE – 19UND5MBE1A		INTERNAL 25	EXTERNAL 75

Objectives

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

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	Define food safety and food regulations in India and cite examples for quality checking of raw food materials	K1
CO2.	Describe specification for different food products and give examples for food additives	K2
CO3.	Explain and demonstrate the method of sensory and objective evaluation for assessing food quality indices	K2
CO4.	Interpret the possible food toxins and microbes for quality deterioration of food	K 2
CO5.	Apply and compute quality management systems to food processing unit	K 3

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1.	S	M	S	S	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

FOOD SAFETY AND QUALITY- AN INTRODUCTION (15 Hours)

Introduction to Food Safety, History of food regulations in India, Quality features of foods, quality checking of raw material and processed foods, Food quality indices – cereals, pulses, nuts and oil seeds, vegetables, fruits, milk and milk products, non – vegetarian foods, oils, spices and condiments, processed foods – canned foods, baked products and preserved foods.

UNIT II (15Hours)

QUALITY CONTROL MEASURES

a) Advantages of quality control and stages of quality control.

b)Food specifications: objectives and advantages, Food specifications for various food products – starchy foods, milk and milk products, fruit products, beverages, spices and condiments, oils and fats.

c)Food Additives and their specifications: - Classification of food additives, usages and optimal level recommended for usage as specification – Food colors, Flavoring agents, leavening agents, preservatives, Acidity regulators, Anticaking agent, Antifoaming agent, Bulking agent, Foaming agent, Artificial sweeteners, Emulsifier and Stabilizers.

UNIT III (15 Hours)

QUALITY EVALUATION OF FOOD

a)Subjective evaluation: Sensory characters of food, organs involved in assessment –physiological process, types of sensory tests - Scoring Tests**,** Paired Comparison Tests 1, Paired Comparison Tests 2, Triangle Test, Duo Trio Test, Ranking test, requirements to conduct sensory evaluation, Role and defects in sensory evaluation – panel member, essential qualities of a panel member, procedure of sensory evaluation, popular centers for sensory evaluation in India and their role.

b)Objective evaluation: objectives, requirements, different tests and instruments used for objective evaluation: sugar content - Refractometer, acidity - Ph meter, viscosity - Rheometer, moisture - Moisture balance, colour - Colorimetry, Texture – Penetrometer, advantages and limitations.

c)Score card: Hedonic Rating Scale, Importance of score card and Points to be remembered while preparing score card and Sample Construction of score card.

UNIT IV **(15 Hours)**

FOOD CONTAMINANTS AND ADULTERANTS

a)Food Toxins: Mycotoxins – aflatoxins, aspergillus and pencillium species, mushroom poisoning, sea food toxins.Other toxins naturally occurring in foods: Lathyrogens, haemagglutinins, goitrogens.

b)Toxic minerals and other inorganic compounds in food and water; selenium, fluorine, nitrates and nitrites, oxalates and phytates.

c)Food adulteration: Definition, Common food adulterants; tests for detecting food adulterants, contamination with toxic metals, pesticides and insecticides; effects of food adulteration and contamination, measures to control food adulteration.

UNIT V **(15 Hours)**

FOOD STANDARDS AND FOOD LAWS

- Voluntary standards and Certification system – BIS and AGMARK
- International Food Standards - Codex Alimentarius Commission (IFS)
- Food Safety and Standards Authority of India (FSSAI)
- Hazard Analysis Critical Control Point (HACCP)
- Good Manufacturing Practice (GMP)
- Food and Drug Administration (FDA)

RELATED EXPERIENCE

- Detect food adulterants by simple tests
- Application of Statistical techniques in sensory evaluation

Text books

S.No.	Author name	Year of Publication	Title of the book	Publishers name
1.	Dr.A.N.Jha	2009	Environmental Regulation and Food Safety	ALP Books, New Delhi
2.	Swaminathan, M	2014	Essentials of Food and Nutrition	BAPCO, Bangalore
3.	Swaminathan, M	2018	Hand Book of Food Science and Experimental Foods	BAPCO, Bangalore

Reference books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Neal D. Fortin	2016	Food Regulation Law, Science, Policy, and Practice	Wiley
2.	Hui, Y.H	2003	Food Plant Sanitation,	Marcel Dekker, Inc.
3.	Potter N, and Hotchkiss J.H	2008	Food Science	CBS Publications and Distributors, Daryaganji, NewDelhi
4.	Srilakshmi B	2016	Food Science	New Age International Publishers, NewDelhi

Journals

- Food Analytical Methods, Springer, United States
- Food and Drug Law Journal, Food Drug Law Inst, United States

Web Links

https://www.ams.usda.gov/selling-food/product-specs
https://link.springer.com/chapter/10.1007/978-1-4615-6998-5_39

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

Course designers:

- **Ms.S.Fathima**
- **Ms.T.R.Revathi**

SEMESTER - V	I.B.TECHNIQUES OF FOOD EVALUATION	HOURS / WEEK - 5	
MAJOR BASED ELECTIVE – I		CREDIT - 5	
COURSE CODE – 19UND5MBE1B		INTERNAL 25	EXTERNAL 75

Objectives

- To gain knowledge on food quality evaluation.
- To study the various types of sensory tests.
- To understand the importance of objective evaluation of food quality.

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	Identify the importance of evaluating the food quality	K1
CO2.	Describe the sensory characteristics of food	K2
CO3.	Illustrate the techniques of objective evaluation	K2
CO4.	Interpret the various food analysis techniques	K3
CO5.	Predict the microbiological examinations of foods	K3

Mapping with Programme Outcomes

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

S- Strong; M-Medium

Syllabus

UNIT I **15 hours)**

Introduction to Food Evaluation and Food Samples

Definition, objectives, importance of evaluating the food quality, Reasons for testing quality, Methods of food Evaluation. Factors affecting food evaluation

Types of Sampling, requirements, Collection of food samples, Preparation, Sampling procedure for various food items, Sampling techniques or methods, problems in sampling**.**

UNIT II **(15 hours)**

Sensory Evaluation

a. Sensory characteristics of food – Appearance, colour, flavour, texture and psychological factors.

b. Role and defects in sensory evaluation – panel member, essential qualities of a panel member, procedure of sensory evaluation, popular centers for sensory evaluation in India and their role.

Sensory tests

a. Types of test - Different test, Rating tests, Sensitivity tests and Descriptive test. Conducting Sensory test - Training panel members, testing laboratory, preparation of samples, testing time, design of experiment.

b. Score card - Hedonic Rating Scale, Importance of score card and Points to be remembered while preparing score card and Sample Construction of score card.

UNIT III **(15 hours)**

Objective Evaluation

a. Basic guidelines, Tests used for Objective evaluation – Chemical methods, Physico – chemical methods, Microscopic examination and Physical methods

b. Objective evaluation: objectives, requirements, different tests and instruments used for objective evaluation: sugar content - Refractometer, acidity - Ph meter, viscosity - Rheometer, moisture - Moisture balance, colour - Colorimetry, Texture – Penetrometer, advantages and limitations of objective evaluation.

UNIT IV **(15 hours)**

Analysis of Food

a. Moisture analysis -Oven drying method, distillation method, Karl-Fischer Titrationmethod,San – Pan Technique.Ash analysis- Dry, wet, Low temperature, plasma ashing, soluble and insoluble in water

b. Carbohydrate analysis –Starch analysis, Fibre analysis – Crude fibre analysis, dietary fibre analysis by AOAC method

c. Protein analysis –Kjeldahl method, Biuret method, Lowry method, BCA method, Barford's method, Ninhydrin method, Amino acid analysis

d. Fat analysis – Continuous solvent extraction, non solvent wet extraction method.

UNIT V **(15 hours)**

Evaluation of Microbial quality of foods and Basic Food Analytical Techniques

a. Methods of Analysis – Dilution, Pour Plating , Microbiological examination of different foods– Monoclonal Anti bodi Test, Biosensor, Polymerase Chain Reaction (PCR) method, Hybridization Assays, DNA Probes, Types of contaminating organisms, sampling and microbiological limits.

b. Methods of Shelf life Analysis – Methods used to predict the microbial quality.

c. Analytical and Testing Instruments for Food – Basic principles and Function – Calorimetry, pH meter, lactometer, spectrometers, chromatographs (e.g. GC and HPLC), titrators, spectrometers, particle size analyzers, rheometers, elemental analyzers, thermal analyzers.

Text books

S.No.	Author name	Year of Publication	Title of the book	Publishers name
1.	Andrew L.Winton Kate Barber Winton	2001	Techniques in Food Analysis	Agrobios. India
2.	Harry T.Lawless	2010	Sensory Evaluation of Food Principles and Practices	Springer Science
3.	S.M Reddy	2015	Basic Food Science and Technology	New Age International (P) Ltd, Chennai
4.	B.Srilakshmi	2016	Food Science	New Age International (P) Ltd, Delhi

Reference books

S.No.	Author name	Year of Publication	Title of the book	Publishers name
1.	Adrian Jones	2012	Shelf life Evaluation of foods	Springer science and Business Media
2.	SemihOtles	2011	Methods in Analysis of food Components and Additives	CRC Press
3.	Yolanda Pico'	2012	. Chemical Analysis of Food: Techniques and Applications	AcedemicPress
4.	S.Suzanne Nielsen	2010	Food Analysis	Springer New York Dordrecht Heidelberg London
5.	Rui M.S. Cruz et.al.,	2014	Methods in Food Analysis	CRC Press

Journals

- Journal of Food Science, Wiley-Blackwell, United Status
- Journal of Food and Nutrition Research, Vup Food Research Inst, Bratislava, Slovakia

Web links

- http://samples.jbpub.com/9781449694777/9781449603441_CH03.pdf
- https://www.researchgate.net/publication/8182058_Microbiological_quality_of_food_samples_from_restaurants_and_sweet_shops_in_developing_countries_A_case_study_from_the_Occupied_Palestinian_Territory
- https://www.researchgate.net/publication/37889931_Manuals_of_Food_Quality_Control_Microbiological_Analysis
- https://delishably.com/food-industry/Three-Common-Methods-for-Microbiological-Testing-of-Food-Products#:~:text=Different%20methods%20are%20involved%20in,used%20to%20differentiate%20various%20organisms.
- http://www.old.fssai.gov.in/Portals/0/Pdf/15Manuals/MICROBIOLOGY%20MANUAL.pdf

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

Course designers

- Ms.S.Agalya
- Ms.T.R.Revathi

SEMESTER - V	II.A.BAKERY AND CONFECTIONARY- PRACTICAL	HOURS / WEEK - 2	
SKILL BASED ELECTIVE - II		CREDIT - 2	
COURSE CODE – 19UND5SBE2AP		INTERNAL 40	EXTERNAL 60

Objectives

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

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	Identify role of equipment in bakery units	K1
CO2.	Explain basic bakery preparation requirements	K2
CO3.	Illustrate different types of bakery products	K2
CO4.	Prepare different confectionary products	K2
CO5.	Demonstrate practical application of field visit	K3

Mapping with Programme Outcomes

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

S- Strong; M-Medium

Syllabus

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

Text books

S. No.	Author name	Year of publication	Title of the book	Publishers name
1.	Kingslee, John	2014	Professional Text to Bakery and Confectionary	New Age International Publishers, New Delhi
2.	Samuel A.Matz	2008	Bakery Technology and Engineering	CBS Publishers
3.	A Y Sathe	1999	A First Course in Food Analysis	New Age International Publishers, New Delhi

Reference books

S. No.	Author name	Year of publication	Title of the book	Publishers name
1.	Vij, Sneha	2000	Bread Basket India	BPI (INDIA) Pvt Ltd
2.	Gisslen, Wayne	2009	Professional Baking	John Wiley &Sons, New York
3.	Kingslee, John	2014	Professional Text to Bakery and Confectionary	New Age International Publishers, New Delhi
4.	Nita Mehta	1997	Art of Baking	Snab Publishers, New Delhi
5.	YogambalAshokkumar	2012	Text book of Bakery and Confectionary	PHI Learning
6.	Parvinder S. Bali,	2018	Theory of Bakery and Patisserie	Oxford University Press, New Delhi

Journals

- Confectionery, Science Direct, Elsevier, Dutch.
- Journal of Food Processing &Technology, OMICS International**, India.**

Web links

https://nios.ac.in/online-course-material/vocational-courses/bakery.aspx

https://www.fssai.gov.in/dam/jcr:22be15fc-8b41-4c4d-bf11-

1c49812cd4f3/Draft_Special_Bakery_Units_Manual_English_08_11_2017.pdf

https://aissmschmct.in/wp-content/uploads/2020/07/Chapter1-Introduction-to-bakery-confectionery.pdf

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

Course designers

- MS.S.Fathima
- MS.T.R.Revathi

SEMESTER - V	II.B. COMPUTER APPLICATIONS IN NUTRITION AND DIETETICS - PRACTICAL	HOURS / WEEK - 2	
SKILL BASED ELECTIVE -II		CREDIT - 2	
COURSE CODE – 19UND5SBE2BP		INTERNAL 40	EXTERNAL 60

Objectives

- To understand the basics of computer
- To know the role of computers in nutrition and dietetics
- To acquire knowledge on developing e -content.

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	State basic applications of computer	K1
CO2.	Illustrate text formatting	K2
CO3.	Describe nutritive value calculation by Excel	K2
CO4.	Prepare power point presentation	K3
CO5.	Predict role of computer in nutrition and dietetics	K3

Mapping with Programme Outcomes

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

S- Strong; M-Medium

Syllabus

- Typing a text and alignment with different format using MS-word, inserting a table with proper alignment using MS- word for menu planning.
- Inserting pictures and tables, preparing a slide show with transition, animation and sound effect using MS-Power point as a tool for Nutrition Education.
- Creating a worksheet using MS-Excel for Nutritive Value Calculation and preparing a chart and pie diagrams using MS-Excel
- Using internet for data exploration, uploading files, downloading files related to Nutrition and Dietetics.
- Development of Nutrition Education Materials such as E Poster, E Pamphlets, etc.
- Development of e-content using animation.
- Usage of Nutrify India Now App developed by NIN – ICMR, Department of Health Research, Ministry of Health and Family Welfare, Govt.of India.

Text Books

S.No.	Author name	Year of Publication	Title of the book	Publisher name
1.	Nagpal, D.P. A.H.	2000	Mastering Microsoft Office	Wheeler Publishing Co. Limited
2.	Singh P.K	2008	Basics of computer.	V.K. Enterprises publishing limited, New Delhi
3.	Balagurusamy,E	2009	Computer fundamentals and C programming.	Tata McGraw Hill publishing, New Delhi.
4.	Anita Goel	2010	Computer Fundamentals	Pearson, New Delhi
5.	John Orta	2018	Computer Applications in Nutrition and Dietetics	Routledge, USA

Reference Books

S.No.	Author name	Year of Publication	Title of the book	Publisher name
1.	K.L. James	2008	The Internet-The user guide	PHI Learning Private Limited, New Delhi
2.	Peter Norton	2008	Introduction to computers	Tata McGraw Hill Education Private Limited NewYork
3.	Ashok Arora	2015	Computer Fundamentals	VIKAS Publishing House Pvt Ltd, West Bengal

Web links

http://www.noblenet.org/salem/reference/wp-content/uploads/2017/01/word.pdf

http://www2.eit.ac.nz/library/Documents/Working_With_PowerPoint_Combined.pdf

http://imm.demokritos.gr/publications/Nutrition_Science.pdf

https://play.google.com/store/apps/details?id=com.ionicframework.myapp863035

Pedagogy : Lecture **,** Demonstration, E-content, Practical .

Course Designers

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

SEMESTER - V	III.A.FOOD PRESERVATION -PRACTICAL	HOURS / WEEK - 2	
SKILL BASED ELECTIVE – III		CREDIT - 2	
COURSE CODE 19UND5SBE3AP		INTERNAL 40	EXTERNAL 60

Objectives

- To understand importance of food preservation.
- To develop insight on the practical aspects of food preservation.
- To know the principles of food preservation.

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	Define the importance of pH meter	K1
CO2.	Classify the different preservation techniques	K2
CO3.	Discuss the preservation techniques using chemical preservatives	K2
CO4.	Apply drying and dehydration in food preservation	K2
CO5.	Prepare raw mango powder using hot air oven	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

- Introduction to food preservation - Principles and techniques.
- Determination of pH of different foods using pH meter.
- Preparation of products by using sugar as preservative - Jams, Jellies, Marmalades and Squashes. Testing for doneness of jam preparation (Evaluation of pectin quality and sheet test).
- Preservation by using chemical preservatives - Tomato ketchup and Tomato sauce.
- Preparation of products by using drying method – Vathal (Bitter gourd vathal) and Vadam (rice vadam).
- Preparation of products by using salt and oil as preservative – Pickles.
- Preparation of raw mango powder by dehydration using hot air oven.

Text Books

S. No.	Author name	Year of publication	Title of the book	Publishers name
1.	Sivasankar B	2007	Food Processing and Preservation	Phi Learning, New Delhi
2.	S.M Reddy	2015	Basic Food Science and Technology	New Age International (P) Ltd, Chennai

Reference Books

S. No.	Author name	Year of publication	Title of the book	Publishers name
1.	Triveni, Prakash	2010	Food Preservation	Aadi Publications, New Delhi
2.	Mc Williams	2000	Modern Food Preservation	Surjeet Publications, New Delhi
3.	Board, Niir	2000	Modern Technology on Food Preservation	Asia Pacific Business Press Inc., New Delhi

Web links

https://www.verywellhealth.com/eat-it-with-a-grain-of-salt-1958878

https://reporter.mcgill.ca/

http://www.iitmandi.ac.in/istp/projects/2014/reports/Group%2007%20Food%20Preservation.pdf

Pedagogy: Lecture method, Practical, Power point presentation, Assignment, Demonstration, Industrial visits.

Course designers

- Ms. S.Agalya
- Ms. Pavithra R C

SEMESTER - V	III.B. FOOD PRODUCT DEVELOPMENT - PRACTICAL	HOURS / WEEK – 2	
SKILL BASED ELECTIVE– III		CREDIT – 2	
COURSE CODE 19UND5SBE3BP		INTERNAL 40	EXTERNAL 60

Objectives

- To gain knowledge on food product development.
- To develop skills in food product development**.**
- To understand and apply practices to develop food products from farm to table.

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	Define food product development	K1
CO2.	Explain the materials used for the preparation of millet and pulse based products	K2
CO3.	Summarize the methods used for the preparation of milk and fruit based value added products	K2
CO4.	Classify the spices and condiments	K2
CO5.	Use skill in the application of standard methods for the measurement and evaluation of sensory differences	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

- Introduction to phases of food product development, marketing strategy.
- Preparation of Traditional foods - Sesame balls, Roasted bengal gram balls.
- Preparation of Weaning foods and Supplementary foods – Malted finger millet powder and multi grain mix.
- Preparation of ready to eat foods – Spread Cheese, Vathakolambu Mix, Kongura chutney.
- Preparation of ready to cook foods – Upma mix, Gulab Jamun mix and Soup mix.
- Preparation of cereal and pulse based products – Noodles and Adai mix.
- Preparation of milk based food products – Butter, Ghee and Paneer .
- Preparation of fruit based food products – Fruit Preserves and fruit bars.
- Preparation of spices and condiments based products – Sambar Powder and Rasam powder (varieties).
- Development of score card for sensory evaluation – Hedonic rating scale and Composite scoring scale.
- Mini Project – Development of food product

Text books

S. No.	Author name	Year of publication	Title of the book	Publishers name
1.	Gordon W. Fuller	2016	New Food Product DevelopmentFrom Concept to Marketplace	Third Edition, CRC Press, US
2.	Mary Earle, Mary D. Earle, Richard Earle, Allan Anderson	2001	Food Product Development Maximizing Success	Wood Head Publishing, UK

Reference books

S. No.	Author name	Year of publication	Title of the book	Publishers name
1.	Howard R. Moskowitz	2009	An Integrated Approach to New Food Product Development	CRC Press, US
2.	M Earle, R Earle	2007	Case Studies in Food Product Development	Elsevier Science, Netherlands

Journals

- International Journal of Food Science and Technology, Wiley Black Well, England
- Journal of Food Science, Wiley Online Library

Web links

- https://www.academia.edu/Documents/in/Food_Product_Development
- https://nzifst.org.nz/resources/foodproductdevelopment/Chapter-3-1-2.htm
- https://youtu.be/zGyOTVtc12s

Pedagogy: Lecture method, Practical, Power point presentation, Assignment, Demonstration, Industrial visit.

Course Designer

- Ms.M.Vinothini
- Ms.Pavithra R C

SEMESTER - VI	DIET THERAPY II	HOURS / WEEK - 6	
CORE COURSE – VIII		CREDIT - 6	
COURSE CODE – 19UND6CC8		INTERNAL 25	EXTERNAL 75

Objectives

- To learn role of dietary treatment in the management of disease conditions.
- To train students to plan appropriate nutrition intervention approaches and diet therapy.
- To know the role of Computers in Management of Nutrition Practice.

Course Outcomes

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

CO Number	CO statement	Knowledge level
CO 1	Define the causes, symptoms and complications of diseases.	K1
CO 2	Explain the application of dietary principles in the management of various diseases and compute nutritive value	K2
CO 3	Interpret the use of nutraceuticals in the prevention of diseases.	K2
CO 4	Illustrate the process and steps in diet counselling	K2
CO 5	Predict the importance of computers in nutrition practice.	K3

Mapping with Programme Outcomes

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

S- Strong; M-Medium

Syllabus

UNIT I **(18 Hours)**

a)Nutritional care for Diabetes Mellitus: Diabetes mellitus: Meaning, aetiology and predisposing factors, symptoms, types, diagnostic and screening criteria, complications, food exchange list, glycemic index, treatment and dietary modifications.

b)Nutritional care in Hormonal diseases: Meaning, aetiology, symptoms, and dietary modification for – Cushing's syndrome, Addison's disease, hypothyroidism and hyperthyroidism.

UNIT II **(18 Hours)**

a)Nutritional care in cardiovascular diseases: Hyperlipidaemia, Hypertension, Atherosclerosis and Congestive cardiac failure - aetiology, clinical findings and dietary management.

b)Nutritional care for Patients with Cancer: Definition, causes, types, carcinogenesis –steps, clinical symptoms, treatment , effect of treatment on nutritional status, and dietary modifications.

UNIT III **(18 Hours)**

a)Nutritional care in diseases of the musculoskeletal system: Arthritis, Osteoporosis, Gout and Rheumatism - meaning, symptoms, causes, treatment and dietary management

b)Nutritional care for patients having Metabolic stress: Surgery – Pre -operative and Post-operative nutritional care, Burns – pathophysiology, medical nutrition therapy.

UNIT IV **(18 Hours)**

a)Nutritional care in Renal diseases: Predisposing factors, symptoms and dietary management - Nephritis, Nephrosis, Renal failure and Urinary calculi, dialysis -types, and modification of diet in dialysis. Renal replacement therapies - meaning, need, types, complications of procedure, dietary changes needed.

b)Nutritional care in Inborn errors of metabolism: Phenylketonuria, Galactosemia and Fructosuria – overview, meaning, prognosis, symptoms, treatment and dietary management.

UNIT V **(18 Hours)**

a)Functional foods and Nutraceuticals: Definition, types, role as Immune boosting source, role in the prevention and treatment of- obesity, diabetes mellitus, cardiovascular diseases and cancer.

b)Dietary Counseling - clients and counselors, client responsibility, attributes of a successful counselor, steps in counseling process, counseling guidelines.

c) Computers in Management of Nutrition Practice: General information – data input, data output, data analysis, data communication, clinical care – communication in patient care and nutritional therapy.

Text Books

S.No.	Author name	Year of Publication	Title of the book	Publisher name
1.	Joshi Y K	2003	Basis of Clinical Nutrition	Jaypee Brothers, Medical Publishers, New Delhi
2.	Mahan, Kathleen L	2004	Krause's Food, Nutrition and Diet Therapy	Pennysylvania; Saunders (2004)
3.	ShubhanginiAJoshi	2010	Nutrition and Dietetics	McGraw Hill Education Private Limited, New Delhi
4.	Prakash S Lohar	2007	Endocrinology – Hormones and Human Health	MJP publishers, Chennai
5.	Srilakshmi B	2015	Food Science	New Age International Publishers, New Delhi
6.	Srilakshmi B	2008	Nutrition Science	New Age International Publications, New Delhi
7.	Srilakshmi B	2009	Dietetics	New Age International Publications, New Delhi

Reference Books

S.No.	Author name	Year of Publication	Title of the book	Publisher name
1.	Bakhru H K	2013	Naturopathy for Longevity	Jaico publishing house, Chennai
2.	Carroll A Lutz	2001	Nutrition and Diet Therapy	International Thomson Publishers, Philadelphia
3.	Michael J Gibney	2004	Public Health Nutrition	Blackwell Publishing house, Edeinburgh
4.	SangeethaKarnik	2010	Nutrition and Dietetics Therapy	Biotech Pharma Publications, Hyderabad
5.	Sari Edelstein	2015	Life Cycle Nutrition – An Evidence based Approach	Jones and Barlett Publishers, London
6.	Udai Veer	2007	Elements of Food Science	Anmol Publications Pvt Ltd, New Delhi

Journals

- Nutrition Research, Pergamon – Elsevier Science Ltd, United States.
- Nutrition and Diabetes, Nature Publishing Group, United Kingdom.
- Nutrition and Ageing, IOS Press, Netharlands.
- European Journal of Clinical Nutrition

Web links

https://www.nutrition.org.uk/nutritionscience/health-conditions/heart-disease.html

https://www.medanta.org/severe-burns/

https://labtestsonline.org/conditions/kidney-disease

https://www.medicinenet.com/diabetes_mellitus/article.htm

https://www.mayoclinic.org/tests-procedures/kidney-transplant/about/pac-20384777

http://www.fao.org/3/W0795T/w0795t03.htm

https://vikaspedia.in/health/nutrition

http://www.galaxycare.org/nutritious-diet-cancer-patients

Pedagogy: Lecture, Seminar, Assignment, PowerPoint Presentation, E-content, Quiz.

Course Designers

- Ms.S.Agalya
- Ms.B.Thanuja

SEMESTER - VI	PERSPECTIVES OF HOME SCIENCE	HOURS / WEEK - 6	
CORE COURSE – IX		CREDIT - 6	
COURSE CODE – 19UND6CC9		INTERNAL 25	EXTERNAL 75

Objectives

- To understand the concept and scope of home science and its components.
- To gain knowledge on different areas of home science.
- To understand the process of human developmental .

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	Define meaning and components of home science.	K1
CO2.	Classify fibres and yarns in textiles.	K2
CO3.	Compare the growth and development during Pre Natal, Post Natal, Childhood, Adolescence, Adulthood and Elderly.	K2
CO4.	Explain the principles of home management.	K2
CO5.	Organize home science extension education at various level.	K3

Mapping with Programme Outcomes

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

S- Strong; M-Medium

Syllabus

UNIT I **(18 Hours)**

Meaning and Components of Home Science

Meaning of home science education, components of home science, carrier perspectives, its relation to other disciplines- science and humanities. The home science association of India- history and objectives, achievements of the association, representation in National bodies.

UNIT II **(18 Hours)**

Textiles and Clothing

Fiber-classification(natural,synthetic), Yarn-definition, types- ply, cable, novelty. Fabric- construction method- weaving, basic steps, knitting and its importance, nonwovens and types. Clothing- origin, clothing theory, selection of clothing, Cloth finishing-dyeing, embroidery. Clothing budget, laundering and storing-cotton, wool, silk and delicate fabrics.

Interior Design

Importance of good taste, design –types, characteristics, elements and principles of design. Colour scheme, dimensions of colour. Flower arrangement-principles, requirement, types and style. Furniture-selection , arrangement principles and furnishing materials.

UNIT III **(18 Hours)**

Child and Human Development

Conception-pre natal development, pre and post natal care, growth and development during childhood and adolescence, characteristics of adulthood, characteristics and problems of elderly and emerging trends in parenting.

UNIT IV **(18 Hours)**

Home Management

Concept of home management and steps. family resources – management of resources like time, energy and money. Ergonomics – its importance and applications in home. Decision making in family, steps in decision making. Work simplification, importance of work simplification in home, Mundel's classes of change.

UNIT V **(18 Hours)**

Home Science Extension Education

Meaning , definition, objectives, philosophy, principles of Extension Education. Home Science Extension Service at Various Levels- Village, Block and District Level. Role of Home Science Extension in Rural And National Development- Welfare Programme- National Social Assistance Programme (NSAP), Mahatma Gandhi National Rural Employment Guarantee Act, Pradhan Mantri Gram Sadak Yojana, Annapoorna scheme.

Text Books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	M.A.Vargheese N.N. Ogale K.Srinivasan	2005	Home management	New Age International Private Limited, New Delhi
2.	Laura E.Berk	2012	Child Development	Pearson, United States of America
3.	Dr.S.S.Khanka	2013	Human Resource Management	S.Chand & Company Ltd, New Delhi

Reference Books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	SrivastavaSushila & Rani, Sudha K	2020	Text Book of Human Development	S.Chand & Company Limited, New Delhi
2.	Trueman Team	2019	NTA – UGC NET Home Science	Danika Publishing Company
3.	PremalathaMullick	2012	Textbook of Home Science	Kalyani Publishers

Journals

- Early child development and care, Taylor and Francis Group – UK Limited
- Journal of Textile and Clothing Science, International Licence–India
- Journal on Interior Design, John Wiley and Sons-United States

Web links

https://www.yourarticlelibrary.com/home-management/home-management-meaning-concept-and-needs/47779
https://rural.nic.in/departments/departments-of-mord/department-rural-development

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

Course Designer

- Ms.M.Vinothini
- Ms.S.Agalya

SEMESTER - VI	DIET THERAPY II - PRACTICAL	HOURS / WEEK - 5	
CORE PRACTICAL – VI		CREDIT - 4	
COURSE CODE – 19UND6CC6P		INTERNAL 40	EXTERNAL 60

Objectives

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

Course Outcomes

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

CO Number	CO statement	Knowledge level
CO 1	Identify the symptoms and complications of diabetes mellitus and management of condition through dietary planning.	K1
CO 2	Explain importance of dietary treatment in the management of gout.	K2
CO 3	Interpret the process of planning and preparing diet for cardiovascular diseases such as Hypertension and Atherosclerosis and compute nutritive value	K2
CO 4	Prepare diet for renal diseases such as Nephritis and Nephrosis	K3
CO5	Design tools for diet counselling	K3

Mapping with Programme Outcomes

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

S- Strong; M-Medium

Syllabus

Planning , preparation and diet counselling for

- Diabetes mellitus
- Gout
- Osteoporosis
- Cardiovascular disorders -Hypertension and Atherosclerosis
- Renal disorders -Nephritis and Nephrosis
- Cancer of gastrointestinal tract , oral cancer and cancer cachexia

Planning of

- Diet for Pre and Post - operative conditions
- Immuno boosters diet

Application of

- Usage of Nutrify India Now App developed by NIN – ICMR, Department of Health Research, Ministry of Health and Family Welfare, Govt.of India.

Text Books

S.No.	Author name	Year of Publication	Title of the book	Publisher name
1.	Srilakshmi B	2009	Dietetics	New Age International Publications, New Delhi
2.	V.Vimala	2009	Advances in Diet Therpy: A Practical Manual	New Age International Pvt Ltd, New Delhi
3.	Shubhangini A Joshi	2010	Nutrition and Dietetics	McGraw Hill Education Private Limited, New Delhi
4.	Staci Nix	2013	William's Basic Nutrition and Diet Therapy	Elsevier, Missouri
5.	Gopalan C, Rama Sastri B V and Balasubramaniyan S C	2016	Nutritive value of Indian Foods	National Institute of Nutrition, Hyderabad

Reference Books

S.No	Author name	Year of Publication	Title of the book	Publisher name
1.	Joshi Y K	2003	Basis of Clinical Nutrition	Jaypee Brothers, Medical Publishers, New Delhi
2.	David H.Alpers William F. Stenson Beth E. Taylor Dennis M. Bier	2008	Manual of Nutritional Therapeutics	Lippincot Williams & Wilkins, USA
3.	C.R. Pennington	2013	Therapeutic Nutrition – A Practical Guide	Springer, US

Pedagogy: Lecture, Demonstration, Practical , E-content.

Web link

https://play.google.com/store/apps/details?id=com.ionicframework.myapp863035

Course designers:

- Ms.S.Agalya
- Ms.B.Thanuja

SEMESTER - VI	II.A.COMMUNITY NUTRITION	HOURS / WEEK - 6	
MAJOR BASED ELECTIVE– II		CREDIT - 6	
COURSE CODE – 19UND6MBE2A		INTERNAL 25	EXTERNAL 75

Objectives

- To understand national nutritional problems and their implications.
- To be familiar with nutrition intervention programmes.
- To study the importance of nutrition education.

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	Identify ecological factors leading to malnutrition	K 1
CO2.	Explain nutritional problems of the community	K 2
CO3.	Interpret nutritional status of the community	K 2
CO4.	Describe role of nutrition intervention programmes	K 2
CO5.	Apply nutrition education programme and create nutrition awareness.	K 3

Mapping with Programme Outcomes

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

S- Strong; M-Medium

Syllabus

UNIT-I **(20 Hours)**

Ecology of Malnutrition

Definition of malnutrition, vicious cycle of malnutrition, ecological factors leading to malnutrition - income, family size, dietary pattern, occupation, customs, food fads, fallacies, ignorance and other factors. Synergism between malnutrition and infection.

UNIT-II **(20 Hours)**

Nutritional Problems and Nutritional Assessment

a)Prevalence, causes, consequences and prevention of common nutritional problems – Protein Energy Malnutrition (PEM), Vitamin A Deficiency Disease, Anemia, Iodine Deficiency Disorder (IDD) and Fluorosis.

b) Assessment of nutritional status -Direct method -Anthropometry, biochemical, biophysical and clinical assessment). Indirect method - Dietary Survey (24-hour dietary recall, food frequency questionnaire, diet history , dietary record),Vital statistics.

UNIT-III **(15 Hours)**

Nutrition Intervention & Immunization Programmes

a) Nutrition intervention programmes in India – School Lunch Programme, Chief Minister's Nutritious Noon Meal Program (CMNNMP), Integrated Child Development Services (ICDS), Poshan abhiyaan, Primary Health Care (PHC), Public Distribution System (PDS), National Nutritional Anaemia Prophylaxis Programme, National Prophylaxis Programme against Vitamin-A Deficiency Diseases, Goitre Control Programme, National Nutrition Policy and Food Security

b) Immunization – Universal Immunization Programmes (UIP), Immunization schedule, milestones, improving coverage, improving quality, and new vaccine introduced.

UNIT-IV **(15 Hours)**

National, International and Voluntary Agencies to Promote Community Health

a) National Organization concerned with food and nutrition – Indian Council of Medical Research (ICMR), National Institute of Nutrition (NIN), National Nutrition Monitoring Bureau (NNMB), Central Food Technological Research Institute (CFTRI), Defence Food Research Laboratory (DFRL), and National Institute of Public Cooperation and Child Development (NIPCCD), Food and Nutrition Board (FNB).

b) International Organization concerned with Food and Nutrition- Food and Agricultural Organization (FAO), World Health Organization (WHO), United Nations International Children's Emergency Fund (UNICEF), World Bank.

c) Voluntary Organizations to promote health and nutritional status of the community.

UNIT-V **(20 Hours)**

Nutrition Education

Definition, importance, principles and methods of nutrition education. Nutrition Intervention Theories - Behavioral Theory, Social Cognitive Theory Meaningful Learning Model . Role of audio-visual aids in nutrition education. Organization of nutrition education programmes, principles of planning, executing and evaluating nutrition education programmes, problems encountered in conducting nutrition education programmes.

Text Books

S. No.	Author name	Year of publication	Title of the book	Publishers name
1.	Srilakshmi B.	2014	Nutrition Science	New Age International Publication, New Delhi
2.	Swaminathan. M.	2007	Essentials of Food and Nutrition- An Advanced Textbook	The Bangalore Printing and Publishing Co. Ltd, Bangalore
3.	Bamji .M.S, PrahladRao.N, Reddy V	2016	Textbook of Human Nutrition	Oxford and PBH Publishing Co. Pvt. Ltd, New Delhi
4.	Swaminathan. M.	2014	Advanced Textbook of Food and Nutrition	The Bangalore Printing and Publishing Co. Ltd, Bangalore

Reference Books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Park. A	2007	Park's Textbook of Preventive and Social Medicine	Bharat Publishers, Jabalpur
2.	Gibney. M.J, Margetts,B.M. Kearney. J.M. Arab. L	2004	Public Health Nutrition	Blackwell Publishing Co. UK
3.	Carolyn D. Berdanice	2009	Advanced Nutrition	CRC Press
4.	Darshan Sohi	2015	A Text book of Nutrition	S.Vikas & Company Publishers

Journals

- Journal of community nutrition and health. Rural Research Institute of Physiology & Applied Nutrition RRIPAN, India .
- Journal of Nutritional Health & Food Science, PMID,USA
- International Journal of Environmental Research and Public Health, MDPI ,Basel, Switzerland,

Web links

- https://www.healthline.com/nutrition/vitamin-a-deficiency-symptoms
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3818611/
- https://vikaspedia.in/health/nutrition/malnutrition/malnutrition-causes-and-types
- https://www.ncbi.nlm.nih.gov/books/NBK11726/
- https://www.slideshare.net/DrLipilekhaPatnaik/nutrition-programmes-in-india-108900049
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3495161/
- https://niti.gov.in/
- https://icds-wcd.nic.in/nnm/home.htm
- http://www.fao.org/3/i1983e/i1983e.pdf
- https://inddex.nutrition.tufts.edu/data4diets/indicator/household-dietary-diversity-score-hdds
- https://www.fantaproject.org/sites/default/files/resources/HDDS_v2_Sep06_0.pdf

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

Course Designers

- Ms.E.Agalya
- Ms.T.R.Revathi

SEMESTER - VI	II.B. PRINCIPLES OF RESOURCE MANAGEMENT	HOURS / WEEK - 6	
MAJOR BASED ELECTIVE– II		CREDIT - 6	
COURSE CODE – 19UND6MBE2B		INTERNAL 25	EXTERNAL 75

Objectives

- To gain knowledge on process of management.
- To understand the importance of values, goals and standards of Resource Management
- To study the significance of resource management.

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	Identify the principles of management	K1
CO2.	Explain the role of housing and home management	K2
CO3.	Describe the importance of values, goals and standards	K2
CO4.	Illustrate human and non-human resources for efficient management	K3
CO5.	Apply the principles in time and energy management	K3

Mapping with Programme Outcomes

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

S- Strong; M-Medium

Syllabus

UNIT I

Management – Principles and Concept **(18 hours)**

Management –Definition, functions, principles.

Planning- Importance, steps in planning, merits and limitations of planning .

Organizing – process, importance .

Controlling – characteristics, process, requirements for effective control system, steps .

Evaluation – characteristics, methods.

UNIT II **(18 hours)**

Ethics of Management and Decision Making

Ethics of management-Meaning, ethical activities, types of management ethics, guidelines for ethical behaviour, approaches to management ethics.

Decision making- Definition, relation of decision making to management. Types of decisions – Non programmed and programmed, group and individual decision, social and economic decision, routine and conscious decision, technical, legal and political decisions, central and satellite decision.

UNIT III **(18 hours)**

Values, Goals and Standards

Values - Types -intrinsic and instrumental, factual and normative values; personal values, Parker's values.

Goals- meaning and definition, classification of goals – long term, intermediate and means end goals.

Standards- concept, classification- Quantitative and Qualitative, Conventional and Non-conventional, criteria for choosing standards.

UNIT IV **(18 hours)**

Resources

Meaning and definition, classification - money, time, energy and space, characteristics of resources, role of resources in management, factors affecting the use of resources, guide to increasing satisfaction in the use of resources.

UNIT V **(18 hours)**

Time and Energy Management

Tools in time management – work unit, peak loads and work curves, factors to be considered in making time and activity plans, steps in time plan.

Energy management-meaning, Work simplification – Definition, importance, work simplification techniques - process chart, operation chart, memo motion, cycle graph and path way chart, principles of body mechanics, Classes of Change.

Text Books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	P Seetharaman	2005	Introduction to family resource management	CBS publishers, London
2.	S.Goel	2016	Management of resources for sustainable development	Orient Blackswan Publication, India

Reference Books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Elizabeth B.Goldsmith	2005	Resource management for individuals and families	Pearson, Flourida University
2.	Sandhya Rani Mohanty	2016	Introduction to Home Management	Anchor Academic Publishing

Journals

- Journal of Human Resource Management, Science Publishing Group, USA

Web Links

- https://he.kendallhunt.com/sites/default/files/heupload/Fralick_2e_Chapter4.pdf
- https://www.academia.edu/28533999/HOUSING_NEEDS_AND_HOME_MANAGEMENT_PRACTICES_OF_RURAL_FAMILIES_OF_DIFFERENT_SIZES_AND_SOCIO-ECONOMIC_CHARACTERISTICS
- **https://www.businessmanagementideas.com/notes/management-notes/corporate-social-responsibility/management-ethics-meaning-need-and-importance/5319**

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

Course designers

- Ms.S.Agalya
- Ms.S.Fathima

SEMESTER - VI	III.A. FOOD PROCESSING	HOURS / WEEK - 6	
MAJOR BASED ELECTIVE – III		CREDIT - 6	
COURSE CODE – 19UND6MBE3A		INTERNAL 25	EXTERNAL 75

Objectives

- To understand the principles of food processing.
- To apply food processing techniques to various food groups.
- To learn the suitable methods of food preservation with special reference to our country.

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	List the methods of food processing techniques	K1
CO2.	Explain the method of processing of cereals , pulses and its by products	K2
CO3.	Alter the cereals and pulses into value added products	K2
CO4.	Illustrate the principles of preservation in fruits and vegetable products.	K2
CO5.	Classify the materials used in food packaging	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 **(18 Hours)**

Food Processing – Definition, importance, principles, classification-minimally processed foods, preserved foods, manufactured foods, formulated foods, methods and benefits of food processing, effect of food processing on nutrients, scope of food processing industry, sectors of food processing industry, future Prospects, trends in modern food processing.

Processing of Cereals-Processing of cereals-Milling process, stone milling, roller milling, cereal products- wheat, rice, corn, barley, semolina, amylase rich food, macaroni products, puffed rice, flaked rice and value added products.

UNIT II **(18 Hours)**

Processing of Pulses -Germination, fermentation, soaking, agglomeration, decortication, milling, puffing. By -products of pulses- dals and grams, processed soya.

Processing of Nuts and Oil seeds- coconut, groundnut, sesame, sunflower seeds, flaxseeds Processing – Extraction of oil and refining, meal concentrates and value addition, nutritional losses during processing, storage.

Processing of Spices and Condiments - Cumin, fenugreek, coriander, fennel, poppy, aniseed, cinnamon, chilli, cardamom, turmeric, ginger, tamarind, nutmeg, asafoetida, Black pepper- Processing , cleaning, reconditioning and grinding, packaging, storage.

UNIT III **(18 Hours)**

Processing of Milk- Filtration, homogenization, pasteurization, drying, fermentation. Milk products- cheese, panner, milk powder, ice cream, khoa.

Processing of Flesh foods- Processing of fleshy foods by freezing, smoking, drying, canning.

Processing of Fruits and vegetables -Processing of fruits and vegetables by pickling, freezing, drying and canning. Vegetable and fruit products – preserves, jams, jellies, squashes, concentrates.

.**Processing of Sugar-**Extraction of the juice, clarification, and crystallization, separation of crystals, refining of sugar, recovery of sugar molasses.

UNIT IV **(18 Hours)**

Packaging and Labelling – Functions of food packaging, requirements for effective food packaging, types of containers, food packaging materials and forms, package testing, packages with special features, aseptic packaging in composite cartons, safety of food packaging.

Food labelling-Introduction, the evolution of food labelling, standards and legal issues, labelling in relationship to new technologies, types of food labelling, International food standards- Codex Alimentarius, Indian food Standards - FSSAI, BIS, AGMARK.

UNIT V **(18 Hours)**

Food Storage– Meaning, domestic food storage , commercial food storage, importance of food storage, basic principles of food storage- traditional, modern, emerging trends in food storage, food storage safety,

Food Industrial Waste Management – Introduction, classification and characterization of food industrial waste disposal methods- physical, chemical and biological; Economical aspects of waste treatment and disposal.

Text Books

S.No.	Author name	Year of Publication	Title of the book	Publishers name
1.	Vikas Ahlluwalia,	2007	Food Processing	Paragon International Publishers
2.	Anupama Rani	2010	Food Processing Preservation and Storage	Sonali Publications

Reference Books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Norman N. Potter, Joseph H. Hotchkiss,	2007	Food Science , 5th Edition	Cbs Publishers and Distributors Pvt . Ltd
2.	Avantina Sharma	2006	Textbook of Food Science & Technology	International Book Distribution Co
3.	Shubhangini A Joshi	2010	Nutrition and Dietetics	McGraw Hill Education Pvt. Ltd
4.	Janice Albert	2010	Innovations in food labelling	Woodhead publishing ltd, New Delhi
5.	Fellows P.J	2017	Food Processing Technology Principles and Practice	Elsvier publications

Journals

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

Web Links

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

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

Course Designers

- Ms. M.Vinothini
- Ms. T.R.Revathi

SEMESTER - VI	III.B. NUTRACEUTICALS AND FUNCTIONAL FOODS	HOURS / WEEK - 6	
MAJOR BASED ELECTIVE– III		CREDIT - 6	
COURSE CODE – 19UND6MBE3B		INTERNAL 25	EXTERNAL 75

Objectives

- To familiarize with recent advances in nutraceuticals and functional foods.
- To know the classification of functional foods.
- To gain knowledge on the health benefits of nutraceuticals and functional foods.

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	Define the term functional foods and nutraceuticals	K1
CO2.	Explain the classification of nutraceuticals and functional foods	K2
CO3.	Give examples of nutraceuticals and functional foods	K2
CO4.	Describe the role of probiotics and prebiotics in health	K3
CO5.	Prepare a supplemented product using a functional food as a component	K3

Mapping with Programme Outcomes

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

S- Strong; M-Medium

Syllabus

UNIT I **(18 Hours)**

Introduction to nutraceuticals

Nutraceuticals -Definition, history, sources, classification of nutraceuticals based on food source, chemical nature and mechanism of action. Significance and relevance of nutraceuticals in the management of disease and disorders – CVD, cancer, diabetes, obesity and immune enhancement.

UNIT II **(18 Hours)**

Introduction to functional foods

Functional foods – Evolution and definition of functional foods, functional foods - dietary fibre, oligosaccharides, resistance starch, omega- 3-fatty acids, conjugated linoleic acid. Significance and relevance of functional foods in the management of disease and disorders – CVD, cancer, diabetes, obesity and immune enhancement.

UNIT III **(18 Hours)**

Probiotics and Prebiotics

Probiotics – definition, types, health benefits of probiotics in gastrointestinal health, cancer, and other diseases, challenges and regulatory issues related to probiotics. Prebiotics – definition, types, health benefits of prebiotics, recent advances in prebiotics – galacto-oligosaccharides (GOS), functional disaccharides (lactulose, lactitol and lactose), resistant starch (RS), prebiotic ingredients in foods.

UNIT IV **(18 Hours)**

Phytochemicals and Antioxidants

Phytochemicals- Definition, mode of action, classification of phytochemicals: Terpenoids, Carotenoids (Carotene, Leutein, Zeaxanthin, Lycopene), Polyphenols-Non flavonoid polyphenols, Flavonoids (Flavanols, Flavanol ,Flavan-3-ol, Flavones, Flavanones, Anthocyanidins, Phytoestrogens , Other Polyphenols(Curcumin, Tannins, Lignan and Resveratrol) Sulphur containing compounds (Sulphides and Glucosinolates).

Antioxidants- Definition and mechanism of action, classification of antioxidants- endogenous and exogenous. Role of endogenous antioxidants- Super Oxide Dismutase (SOD), Catalases, Glutathione Reductase, Peroxidases- Glutathione Peroxidase in protecting cells.

UNIT V **(18 Hours)**

Regulatory aspects of functional foods and nutraceuticals

Regulatory aspects - Regulations of nutraceutical in India (FSSAI), regulatory requirements in India, registration process in India. Regulation of nutraceutical in USA (DSHEA), registration process in USA. Regulation of nutraceutical in Japan (FOSHU), registration process in Japan.

Text books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Agarwal A	2014	Textbook of human nutrition	Jaypee Brothers Medical Publishers (P) Ltd
2.	Edward.R.Farnworth	2008	Handbook of Fermented functional foods	CRC Press
3.	Susan Sungsoo Cho, Mark L.Dreher	2001	Handbook of Dietary Fibre	CRC Press

Reference books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Nicola Graimes	1999	The practical Encyclopedia of whole foods	Anness Publishing Ltd
2.	HariNiwas Mishra, Rajesh Kapur, Navneet Singh Deora, AasthaDeswal	2016	Functional foods	New India Publishing Agency, New Delhi
3.	Robert e.C Wildman	2016	Handbook of Nutraceuticals and Functional Foods	CRC Press, Newyork
4.	Debasis Bagchi	2014	Nutraceutical and functional food regulations in the United States and around the world	Elsevier, USA

Journals

- Functional Foods in Health and Disease, Functional Food Center, Inc, United States
- Journal of Functional Foods, Elseiver, United States
- The Pharma Innovation Journal, Akinik Publications, Newdelhi
- International Journal on Nutraceuticals, Functional Foods and Novel Foods from Research to Industrial Applications, NIH, United States

Web Links

- http://www.ift.org/knowledge-center/read-ift-publications/science-reports/scientific-status-summaries/functional-foods.aspx
- https://foodrevolution.org/blog/probiotics-and-prebiotics/

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

Course Designers

- Ms.M.Vinothini
- Ms.T.R.Revathi