

Vellalar College for Women (Autonomous), Erode -12

Bachelor of Science in Nutrition and Dietetics

2018-2019 and Onwards

Course Content and Scheme of Examinations (CBCS Pattern and OBE Pattern)

Semester I

Part	Study Components	Subject Code	Titles of The Paper	Inst. Hrs./Week	Exam.Dur Hrs.	Max.Marks			Credits
						CIA	ESE	Total	
I	Language I	15TAMU101/ 14 HINU101/	Tamil/Hindi	6	3	25	75	100	3
II	Language II	18ENLU101/ 18ENHU101	English	6	3	25	75	100	3
III	Core	18NDUC101	Human Physiology	3	3	25	75	100	4
		18NDUC102	Food Science	3	3	25	75	100	4
		18NDUCP01	Practical I Food Science	3	3	20	30	50	2
	Allied I	17CHUA101	Chemistry Paper I	4	3	20	55	75	4
		15 CHUAP01	Chemistry Practical	3	-	-	-	-	-
IV	Foundation Course	09FOCUIES	Environmental Studies	2	3	-	100	100	2
Total								625	22

Semester II

I	Language I	15TAMU 202/ 14 HINU202	Tamil/Hindi	6	3	25	75	100	3
II	Language II	18ENLU202/ 18ENHU202	English	6	3	25	75	100	3
III	Core	18NDUC203	Principles of Nutrition	3	3	25	75	100	4
		18NDUC204	Family Meal Management	3	3	25	75	100	4
		18NDUCP02	Practical II Family Meal Management	3	3	20	30	50	2
	Allied I	17CHUA202	Chemistry Paper II	4	3	20	55	75	4
		15 CHUAP01	Chemistry Practical	3	3	20	30	50	2
IV	Value Education	14VEDU2HR	Value Education & Human Rights	2	3	-	100	100	2
Total								675	24

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Course Content and Scheme of Examinations (CBCS Pattern and OBE Pattern)

Semester III

Part	Study Components	Subject Code	Titles of The Paper	Inst. Hrs./ Week	Exam.Dur Hrs.	Max.Marks			Credits
						CIA	ESE	Total	
I	Language I	14TAMU 303/ 14 HINU303	Tamil/ Hindi	6	3	25	75	100	3
II	Language II	13 ENLU303	English	6	3	25	75	100	3
III	Core	18NDUC305	Dietetics	3	3	25	75	100	4
		18NDUCP03	Practical III Dietetics	3	3	20	30	50	2
	Allied II	18NDUA301	Biochemistry I	4	3	20	55	75	4
			Biochemistry Practical	3	-	-	-	-	-
IV	Skil Based Subject I	18NDUS301	Food Chemistry	3	3	25	75	100	3
	Basic Tamil			2	-	100	-	100	2
	Advanced Tamil				3	25	75		
	Non Major Elective I				3	-	100		
Total						625	21		

Semester IV

I	Language I	14TAMU404/ 14 HINU404	Tamil/ Hindi	6	3	25	75	100	3
II	Language II	13 ENLU404	English	6	3	25	75	100	3
III	Core	18NDUC406	Food Service Management	3	3	25	75	100	4
		18NDUCP04	Practical IV Food Analysis & Quality control	3	3	20	30	50	2
	Allied II	18NDUA402	Biochemistry II	4	3	20	55	75	4
		18NDUAP01	Biochemistry Practicals	3	3	20	30	50	2
IV	Skill Based Subject II	18NDUS402	Multi Skill Development Paper	3	1*	40	60	100	3
	Basic Tamil			2	-	100	-	100	2
	Advanced Tamil				3	25	75		
	Non Major Elective II				3	-	100		
Total						675	23		

SKILL BASED SUBJECTS		
1	18NDUS301	Food Chemistry (Cafeteria-System)
2	18NDUS402	Multi Skill Development Paper

NON - MAJOR ELECTIVES		
1	14TMLU301	Basic Tamil*
	14TMLU402	
2	14ADTU301	Advanced Tamil**
	14ADTU402	
1	18NDUN301	Basic Cookery
2	18NDUN402	Diet in Diseases

* For students whose Part I in Secondary education is not Tamil.

** For students whose Part I in Higher Secondary education is not Tamil.

CODE	COURSE TITLE
18NDUC101	HUMAN PHYSIOLOGY

SEMESTER-

Category	CIA	ESE	L	T	P	Credit
Core	25	75	43	2	--	4

Preamble

The course describes about basic concepts of Human Physiology, including the structure and functions of cell and tissues. Students learn about digestive system, blood, circulatory system, excretory system, respiratory system, endocrine glands, male and female reproductive system. It explains the structure and functions of muscles and nervous system.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	Outline the anatomy and functions of human organ system.	K2
CO2.	Acquire knowledge on composition, functions and components of blood.	K3
CO3.	Understand the structure and mechanisms of action of endocrine glands.	K2
CO4.	Extend the understanding of structure and functions of male and female reproductive system with the hormonal control.	K2
CO5.	Interpret the structure, mechanism and regulation of action of muscles and nervous system.	K2

Mapping with Programme Outcomes

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

S- Strong; M-Medium; L-Low

UNIT –I**(9 Hrs.)**

Cell and its Organallae: Structure and function. **Tissues:** Structure and functions of epithelial and connective tissues Digestive system: *Organisation, digestion, absorption and assimilation of carbohydrates, proteins and fats.*

UNIT –II**(9 Hrs.)**

Blood: Composition & functions of blood, RBC, WBC and platelets – structure and functions. Blood pressure, cardiac impulse, ECG, Composition & functions of lymph, blood coagulation, blood groups and blood transfusion. Heamoglobin – Structure and function. **Circulatory System:** Heart structure and functions, blood & lymph vessels and their functions, cardiac cycle, **Excretory system:** Excretory Organs – Structure of kidney and its functions, structure of nephron, formation of Urine, *Composition of Urine, micturition.*

UNIT – III**(9 Hrs.)**

Respiratory System: Basic anatomy of the respiratory system, Mechanism of respiration, diffusion of gases in lungs. Transport of oxygen from lungs to tissues through blood, transport of CO₂ from tissues to lungs through blood, factors influencing the transport of O₂ and CO₂. **Endocrine Glands:** Structure and functions of pituitary, thyroid and parathyroid, pancreas and adrenal Gland.

UNIT – IV**(9 Hrs.)**

Male and female Reproductive System: Structure of male reproductive organ, spermatogenesis, function of testis. Female Reproductive system - Ovarian cycle, structure and hormones of ovaries, menstrual cycle, menopause, pregnancy, *parturition and lactation.*

UNIT - V**(9 Hrs.)**

Muscles and Nervous system: Structure, myosin & actin and regulatory proteins, mechanism of muscular contraction and relaxation. **Brain and Nervous System:** Functions of cerebrum, optic thalamus, midbrain, pons medulla oblongata Hypothalamus, and cerebellum. Spinal cord functions – ANS functions; sympathetic and parasympathetic, structure of neuron, resting and action potential, structure of neuromuscular junction. Defence Mechanism of the body: Types of immunity and *Immunisation.*

PHYSIOLOGY PRACTICALS

1. Cytological preparation showing various parts of the cell.
2. Detailed study of various tissues –identification of slide.
3. Dissection of mammalian viscera – study of organs.
4. Blood cells – freshly mounted and stained.
5. RBC & WBC counting – neubauer’s counting chamber.
6. Determination of Hemoglobin – Shali’s method.
7. Demonstration of coagulation of Blood.
8. Demonstration of Blood Group.
9. Recording pulse rate and measurement of blood pressure.

Distribution of Marks: 100% Theory.

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Ravikumar Patil,H.S., Makari,H.K. and others	Textbook of Human Physiology	I.K. International Publication House Pvt. Ltd.	2013 and 1 st Edition
2.	David Male, Jonathan Brostoff, David B. Roth, Ivan M. Roitt	Immunology	Elsevier	2013 and 8 th Edition
3.	Elaine N. Marieb	Essentials of Human Anatomy and Physiology	Pearson Education	2007 and 1 st Edition

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Sembulingam.K and Prema Sembulingam	Essentials of Medical Physiology	Jaypee Brothers Medical Publishers (P) Ltd.	2016 and 7 th Edition
2.	Muruges, N.	Basic Anatomy and Physiology	Sathya Publishers	2004 and 5 th Edition
3.	Bakhru, H.K.	Vitamins that Heal : Natural Immunity For Better Health	Orient Paperbacks	2014 and 1 st Edition
4.	Donald C. Rizzo	Fundamentals of Anatomy and Physiology	Thomson Delmar	2007 and 2 nd Edition
5.	Jain.A.K	Human Physiology	Arya Publishers	2017 and 3 rd Edition

Pedagogy

- Lecture, PPT, Assignment, Group Discussion, Seminar

Bloom's Taxonomy Based Assessment Pattern

Components of CIA Marks

Tests (I & II)	Assignment / Seminar / Subject Viva	Model Examination	Total
10	5	10	25

CIA

Bloom's Category	Section	Choice	Marks	Total
K1	A	Compulsory	$2 \times 2 = 4$	30
K1 & K2	B	Either / Or	$2 \times 5 = 10$	
K2 & K3	C	Open Choice (2 out of 3)	$2 \times 8 = 16$	

Model and End Semester Examination

Bloom's Category	Section	Choice	Marks	Total
K1	A	Compulsory	$5 \times 2 = 10$	75
K1 & K2	B	Either / Or	$5 \times 5 = 25$	
K2 & K3	C	Open Choice (5 out of 8)	$5 \times 8 = 40$	

SEMESTER - I

CODE	COURSE TITLE
18NDUC102	FOOD SCIENCE

Category	CIA	ESE	L	T	P	Credit
Core	25	75	43	2	--	4

Preamble

The course emphasizes the students to familiarize on the different food groups, their sources and functions. It focuses on the structure, composition, nutritive value, principles and fundamental methods of cooking various foods namely Cereals, Pulses, Vegetables and Fruits, Nuts and Oil Seeds, Sugar, Milk, Egg, Flesh foods, Beverages and Spices and Condiments.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO6.	Classify the foods, food groups and relate its functions.	K ₂
CO7.	List the objectives and different methods of cooking.	K ₁
CO8.	Interpret the structure, composition and nutritive value of different foods.	K ₂
CO9.	Identify the effect of heat and changes that occurs during cooking.	K ₃
CO10.	Apply the basic principles of cookery namely crystallization of sugars, gelatinization and dextrinization of starches, germination of pulses, browning reaction, foam formation in egg and tenderization of meat.	K ₃

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO6.	S	S	S	S	S
CO7.	S	S	M	S	S
CO8.	S	M	S	S	M
CO9.	S	S	S	S	S
CO10.	S	M	S	M	S

S- Strong; M-Medium; L-Low

UNIT –I**(9 Hrs.)**

Introduction to Food Science: Definition of Food and Food Science. **Food group:** Basic 4 (suggested by ICMR), Basic 5 & 7 food groups; functional food groups – energy yielding, body building and protective foods and *food pyramid*. **Study of various cooking methods:** Objectives of cooking, Preliminary preparations, Boiling, steaming, stewing, frying, baking, roasting, broiling, and cooking under pressure, Microwave cooking and Solar cooking – advantages and disadvantages. Physical and chemical change with reference to general and not specific cooking methods. Stages of sugar cookery, *crystallization and factors affecting crystallization*.

UNIT –II**(9 Hrs.)**

Cereals : Composition of rice, wheat, effects of cooking parboiled and raw rice, principles of starch cookery, gelatinization, dextrinization, flours-types, formation of dough and batter, *hydration and development of gluten*. **Pulses and grams:** Varieties of pulses and grams, composition, nutritive value, cooking quality of pulses, *germination and its effect*.

UNIT – III**(9 Hrs.)**

Vegetables: Classification, composition, nutritive value, selection and preparation for cooking methods and principles involved in cooking of vegetables. **Fruits** – Classification, composition, nutritive value, changes during ripening, methods and effect of cooking, *enzymatic browning*. Phytochemicals and Nutraceuticals – Concept and significance. **Milk and Milk Products:** Composition, nutritive value, kinds of milk, cooking principles and methods, changes in milk during heat processing and cooking and *preparation of ice cream*.

UNIT – IV**(9 Hrs.)**

Egg: Structure, composition, selection, nutritive value, uses of egg in cookery, methods of cooking, *foam formation and factors affecting foam formation*. **Flesh foods:** Types of flesh foods- Meat, Poultry, and fish: composition, nutritive value, selection of meat, post mortem changes in meat, aging, tenderness and methods of cooking and effects. Poultry – types, composition and nutritive value. **Fish:** Structure, composition, nutritive value, selection of fish, *methods of cooking and its effects*.

Fats – Nuts and Oils: Types of oils, function of fats and oils, shortening effects of oil, smoking point of oil, effect of heat on oil absorption and *factors affecting absorption of oil*.

Beverages and Other foods: Classification, nutritive value, milk based beverages; fruit based beverages and preparation of carbonated beverages. **Spices and Condiments:** *Uses and abuses*.

Field Visit: Visit to food industries in local areas.

Distribution of Marks: 100% Theory

Text Books				
Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Srilakshmi.B	Food Science	New Age International Publishers	2018 and 7 th Edition
2.	Shakuntala Manay.N., Shadaksharaswamy.M.	Food Facts and Principles	New Age International Publishers	2010 and 3 rd Edition
3.	Vickie.A, Vaclavik, Elizabeth.W, Christian	Essentials of Food Science	Springer	2005 and 2 nd Edition

Reference Books				
Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Bobby George	Food & Beverage Service	Jaico Publishing House	2010 and 1 st Edition
2.	Pramila Khadun	Food & Nutrition	Bhumika Creations	2014 and 1 st Edition
3.	Mahindru. S.N	Spices	APH Publication Corporation	2013 and 1 st Edition
4.	Norman.N. Potter, Joseph.H. Hotchkiss	Food Science	CBS Publishers & Distributors	2007 and 5 th Edition
5.	Bernard Davis and Others	Food and Beverage Management	Routledge	2016 and 5 th Edition

Pedagogy

- Lecture, PPT, Assignment, Group Discussion, Seminar

Components of CIA Marks

Tests (I & II)	Assignment / Seminar / Subject Viva	Model Examination	Total
10	5	10	25

CIA

Bloom's Category	Section	Choice	Marks	Total
K1	A	Compulsory	$2 \times 2 = 4$	30
K1 & K2	B	Either / Or	$2 \times 5 = 10$	
K2 & K3	C	Open Choice (2 out of 3)	$2 \times 8 = 16$	

Model and End Semester Examination

Bloom's Category	Section	Choice	Marks	Total
K1	A	Compulsory	$5 \times 2 = 10$	75
K1 & K2	B	Either / Or	$5 \times 5 = 25$	
K2 & K3	C	Open Choice (5 out of 8)	$5 \times 8 = 40$	

SEMESTER - I

CODE	COURSE TITLE
18NDUCP01	Practical I - FOOD SCIENCE

Category	CIA	ESE	L	T	P	Credit
Core	20	30	--	--	45	2

Preamble

The theoretical principles of Food Science is practically applied by the students to develop skills on the art of cooking along with a scientific approach.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO11.	Learn the nutritive value and grouping of foods.	K ₁
CO12.	Acquire knowledge on the measuring of raw ingredients and the percentage of edible portion.	K ₃
CO13.	Make use of all the foods in Basic Food Group system for the preparation of various recipes.	K ₃
CO14.	Apply the scientific principles through Experimental Cookery.	K ₃
CO15.	Develop value added products since cooking should become a passion for a food science student.	K ₃

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO11.	S	S	S	S	M
CO12.	S	S	M	S	S
CO13.	S	S	S	S	S
CO14.	S	S	S	M	S
CO15.	S	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

S.No	Topic	Practicals
1	Food groups	Grouping of foods – Nutritive value of all foods
2	Measuring ingredients	Measuring raw ingredients.
3	Edible portion	Determination of percentage of edible portions
4	Microscopic Structure of Various Starches	Rice, Wheat, Corn, Ragi and potato starch identification
5	Physical and Chemical properties of Starch	To study the physical and chemical properties of Starch
6	Gelatinization of Starch	To study the physical and chemical properties of Starch
7	Cereals and Pulses cookery	Fine and coarse cereal cookery study the effect of hard water, soft water, sodium bicarbonate, vinegar and soaking, while cooking. Study the effect of germination of green gram and recipe preparation using germinated gram as main ingredient. Extruded product preparation
8	Millets	Value added products from millets
9	Vegetable and Fruits cookery	Effect of cooking time of vegetables Effect of different methods of cooking Effect of acid and alkali on vegetables Darkening of raw fruits and its prevention Blanching of vegetables; Recipe preparation.
10	Sugar cookery	Various stages of sugar cookery.
11	Egg cookery	Effect of heat on Egg white and Yellow Effect of cooking time – boiling of egg. Whipping quality of egg white Poaching of eggs; Recipe preparation.
12	Milk cookery	Boiling of milk – skim milk preparation. Khoa preparation – Ice – cream preparation; Recipe preparation.
13	Beverages	Preparation of milk based & fruits based beverages.
14	Meat cookery	To assess tenderness of meat using papaya and Ginger. Cooking time – meat and poultry – Recipe preparation using meat and poultry.
15	Fish Cookery	Cooking time assessment. Protein change during boiling and roasting; Recipe preparation.

SEMESTER - II

CODE	COURSE TITLE
18NDUC203	PRINCIPLES OF NUTRITION

Category	CIA	ESE	L	T	P	Credit
Core	25	75	43	2	--	4

Preamble

The course explains classification, functions, digestion, absorption, effects and deficiency of macro and micronutrients. Students understand the vital link between nutrition and health.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO16.	Find out the energy value of food and energy requirements of the body.	K ₁
CO17.	Outline the classification and describe the functions, sources and requirements of macronutrients.	K ₂
CO18.	Acquire knowledge on digestion, absorption, utilization of macronutrients and their effect of deficiency.	K ₃
CO19.	Understand the functions, sources, requirements and deficiency disorders of vitamins and minerals.	K ₂
CO20.	Apply knowledge on water and electrolyte balance.	K ₃

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO16.	S	S	S	M	S
CO17.	S	S	S	S	S
CO18.	S	S	S	S	S
CO19.	S	S	S	S	S
CO20.	S	S	M	S	S

S- Strong; M-Medium; L-Low

UNIT –I**(9 Hrs.)**

Introduction to Nutrition: General introduction, Historical aspects, calorimetric studies, some important definitions. Functions of food, social function of food, psychological functions of food
Energy: Definition of Kilocalories, Joule, energy value of foods, determination, physiological fuel values, SDA of foods, Reference Man and Reference Woman. Determination of energy requirements of body, basal metabolic rate – determination, factors influencing BMR, Recommended Dietary Allowance for energy. **Carbohydrates:** Classification, functions, sources, digestion, *absorption and utilization, dietary fibre and health.*

UNIT –II**(9 Hrs.)**

Protein: Classification (chemical and biological), functions, sources and requirements, digestion, absorption and utilization. Nutritional value of proteins, and supplementary value of protein. Definition: biological value NPU, digestibility coefficient, PER-definition and measurement. Deficiency due to shortage of protein and energy – PCM, reference protein egg (FAO), essential amino acids, and mutual supplementation of dietary protein. **Fats and Lipids:** Classification, functions, sources, requirement, digestion, absorption and utilization Importance of essential fatty acids, *their requirements and deficiency.*

UNIT – III**(9 Hrs.)**

Vitamins: Fat soluble vitamins – A, D, E and K – History, functions, sources, requirements, deficiency disorders. Water soluble vitamins: The B- Complex vitamins - Thiamine, Riboflavin, Niacin, Folic acid, Biotin, Pantothenic acid, and Vitamin–C, functions, sources, *requirements and deficiency disorders.*

UNIT – IV**(9 Hrs.)**

Minerals: General functions in the body, classification – macro and micro minerals. Micro minerals – Iron, Fluorine, Zinc, Copper, Iodine and other micronutrients, - sources, functions, requirements, deficiency and toxicity. Macro Minerals: Calcium & Phosphorus – sources, functions, absorption, utilization, requirements, *deficiency, and toxicity.*

UNIT - V**(9 Hrs.)**

Water and electrolytes balance: Distribution, Functions, requirements and sources of water and electrolytes. Maintenance of water and electrolyte balance – water depletion, water excess and oedema. Requirements of salt, *regulation of acid – base balance in the body.*

Distribution of Marks: 100% Theory

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Srilakshmi.B	Nutrition Science	New Age International Publishers	2015 and 4 th Edition
2.	Gajalakshmi, R.	Nutrition Science	CBS Publishers & Distributors Pvt. Ltd	2015 and 1 st Edition
3.	Paul Insel, Don Ross, Kimberley McMahon, Melissa Bernstein	Discovering Nutrition	Jones & Bartlett Learning	2016 and 5 th Edition

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Denis M. Medeiros and Robert E.C.Wildman	Advanced Human Nutrition	Jones & Bartlett Learning	2015 and 3 rd Edition
2.	Catherine A. Geissler, Hilary J Powers	Human Nutrition	Elsevier	2013 and 12 th Edition
3.	Jain.S.C.	A Complete Book on Health and Nutrition	Cyber Tech Publications	2009 and 1 st Edition
4.	Sunetra Roday	Food Science & Nutrition	Oxford University Press	2009 and 2 nd Edition
5.	Blank.F.C	A Handbook of Foods and Nutrition	Agrobios (INDIA)	2010 and 1 st Edition

Pedagogy

- Lecture, PPT, Assignment, Group Discussion, Seminar

Bloom's Taxonomy Based Assessment Pattern**Components of CIA Marks**

Tests (I & II)	Assignment / Seminar / Subject Viva	Model Examination	Total
10	5	10	25

CIA

Bloom's Category	Section	Choice	Marks	Total
K1	A	Compulsory	$2 \times 2 = 4$	30
K1 & K2	B	Either / Or	$2 \times 5 = 10$	
K2 & K3	C	Open Choice (2 out of 3)	$2 \times 8 = 16$	

Model and End Semester Examination

Bloom's Category	Section	Choice	Marks	Total
K1	A	Compulsory	$5 \times 2 = 10$	75
K1 & K2	B	Either / Or	$5 \times 5 = 25$	
K2 & K3	C	Open Choice (5 out of 8)	$5 \times 8 = 40$	

SEMESTER - II

CODE	COURSE TITLE
18NDUC204	FAMILY MEAL MANAGEMENT

Category	CIA	ESE	L	T	P	Credit
Core	25	75	43	2	--	4

Preamble

The course disseminate knowledge on the basic principles of menu planning, RDA, Nutritional needs during various stages of life cycle namely Pregnancy, Lactation, Infancy, Pre School children, School Children, Adolescence, Adult and Old age.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO21.	Define the nutritional requirements (RDA) for all age groups.	K ₁
CO22.	Construct menu plan for different age groups.	K ₃
CO23.	Utilize the diet plan for special conditions in consideration with physiological changes.	K ₃
CO24.	Relate breast feeding and its importance with weaning and supplementary foods.	K ₂
CO25.	Outline the nutritional importance for vulnerable groups through balanced diets.	K ₂

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO21.	S	S	M	S	S
CO22.	M	S	S	S	S
CO23.	S	S	S	S	S
CO24.	S	S	S	S	S
CO25.	S	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT –I

(9 Hrs.)

Basic principles of menu planning: *Importance of menu planning.* Definition of Reference Man and Woman. RDA- for all age groups, uses and calculation of various nutrients in a day's menu. Plan a day's menu for low, middle and high income groups.

UNIT –II

(9 Hrs.)

Nutritional needs during Pregnancy and Lactation: Food Requirements, Physiological changes during pregnancy – Complications in pregnancy – physiology of lactation. Nutritional considerations in pregnancy and lactation – *Menu plan for pregnant and lactating mothers.*

UNIT – III

(9 Hrs.)

Nutritional needs during infancy : Food Requirements, Nutritional demands during infancy – advantages of breast feeding – composition of human milk – comparison of human milk with cow's milk formula – factors to be considered in bottle feeding – different milk formulas, weaning foods – meaning, need and importance, *weaning foods developed by different organizations.*

UNIT – IV

(9 Hrs.)

Nutritional needs of pre-school children and school children: Food Requirements, Factors to be considered in planning meals for pre-school children, eating problems and their management- preparation of Supplementary foods using available low-cost foods - weaning foods. Nutrition for school children: nutritional requirements and *meal planning for school children.* Packed lunch.

UNIT - V

(9 Hrs.)

Nutritional needs during adolescence, adults and old age: Food Requirements, Special demands during menarche, nutritional problems of adolescence. Nutrition needs for adults: Food Requirements, (men & women) in relation to occupation-meal planning. Nutrition during old age: Food Requirements, *nutritional problems of aged and their management.* Menu plan for various age groups.

Field Visit: Visit to maternal hospitals and clinics.

Distribution of Marks: 100% Theory

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Srilakshmi.B	Dietetics	New Age International Publishers	2014 and 7 th Edition
2.	Sara Abraham	Nutrition Through Lifecycle	New Age International	2016 and 1 st Edition

			Publishers	
3.	Raheena Begum.M	A Text Book of Foods, Nutrition and Dietetics	Sterling Publishers	2009 and 3 rd Edition

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Sari Edelstein	Life Cycle Nutrition (An Evidence -Based Approach)	Jones & Bartlett Learning	2015 and 2 nd Edition
2.	Carolyn Dunn	Nutrition Decisions Eat Smart, Move More	Jones & Bartlett Learning	2016 and 1 st Edition
3.	James Robinson, Deborah J. McCormick	Concepts In Health & Wellness	Delmar Cengage Learning	2011 and 1 st Edition
4.	Madhu Garg	Diet, Nutrition and Health	ABD Publishers	2006 and 1 st Edition
5.	Shubhangini A. Joshi	Nutrition and Dietetics	Tata Mcgraw-Hill	2016 and 4 th Edition

Pedagogy

- Lecture, PPT, Assignment, Group Discussion, Seminar

Bloom's Taxonomy Based Assessment Pattern

Components of CIA Marks

Tests (I & II)	Assignment / Seminar / Subject Viva	Model Examination	Total
10	5	10	25

CIA

Bloom's Category	Section	Choice	Marks	Total
K1	A	Compulsory	2 x 2 = 4	30
K1 & K2	B	Either / Or	2 x 5 = 10	
K2 & K3	C	Open Choice (2 out of 3)	2 x 8 = 16	

Model and End Semester Examination

Bloom's Category	Section	Choice	Marks	Total
K1	A	Compulsory	5 x 2 = 10	75
K1 & K2	B	Either / Or	5 x 5 = 25	
K2 & K3	C	Open Choice (5 out of 8)	5 x 8 = 40	

SEMESTER - II

CODE	COURSE TITLE
18NDUCP02	Practical II - FAMILY MEAL MANAGEMENT

Category	CIA	ESE	L	T	P	Credit
Core	20	30	--	--	45	2

Preamble

The practical course aims at planning and preparation of nutritious meals for individuals based on their income level, age, physical activity and dietary pattern.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO26.	Learn how to apply food facts and principles, communication techniques and meal management strategies to improve the nutritional status of individuals.	K ₁
CO27.	Plan and prepare nutritious and delicious meals for different age groups with cost calculation.	K ₃
CO28.	Demonstrate the nutritive value of the prepared menu and compare with the RDA.	K ₂
CO29.	Solve the problems of malnutrition by preparing weaning and supplementary foods.	K ₃
CO30.	Choose the locally available low cost foods in menu planning based on food preferences.	K ₁

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO26.	S	S	S	S	S
CO27.	S	M	M	S	S
CO28.	S	S	S	S	M
CO29.	S	S	S	S	S
CO30.	S	S	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

Planning, preparation and nutritional evaluation of diets in relation to physiological state.

1. Planning and preparation of a balanced diet for a pregnant woman.
2. Diet during complication of pregnancy.
3. Planning and preparation of a balanced diet for a lactating woman.
4. Preparation of weaning foods supplementary foods.
5. Planning and preparation of a balanced diet for pre-school child.
6. Balanced diet for school going child. Preparation of packed lunch.
7. Planning and preparation of a balanced diet for adolescence.
8. Planning of meals for adult belonging to different income group.
9. Planning meal for senior citizen.

SEMESTER - III

CODE	COURSE TITLE
18NDUC305	DIETETICS

Category	CIA	ESE	L	T	P	Credit
Core	25	75	43	2	--	4

Preamble

The course empowers the students on the knowledge regarding the principles of diet therapy and different therapeutic diets for various disease conditions.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO31.	Explain the etiology, symptoms and dietary management for various disorders.	K2
CO32.	Choose the specific diet therapy for different disease conditions.	K3
CO33.	Apply cutting edge technology to tailor the diet according to the individual genetic makeup.	K3
CO34.	Identify and understand the health problems that need to be approached through holistic nutrition by applying the acquired knowledge as a dietitian.	K3 & K2
CO35.	Extend their knowledge in diet counseling as Professional Medical Workers & also to establish diet clinic.	K2

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO31.	M	S	S	S	S
CO32.	S	M	S	S	S
CO33.	S	S	S	S	S
CO34.	S	S	S	S	S
CO35.	S	S	M	S	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

(9 hrs.)

Principles and importance of therapeutic diets: Different types of diet -Regular diet, clear liquid, full fluid diet, soft diet, light and bland diet. Different types of feeding, advantages of oral feeding, tube feeding - and total parental feeding. Gastrostomy feeding. Role of dietitian – Importance of whole body checkup – physical and biochemical parameters. Importance of diet counseling, Registration of IDA.

UNIT II**(9 hrs.)**

Therapeutic diets for the following disorders: Underweight-definition etiology and modifications. Obesity-Definition, etiology and dietary modifications. Disease of the gastrointestinal tract: peptic ulcer and duodenal ulcer-causes-treatment. Dumping syndrome and constipation. Acute and chronic diarrhoea-symptoms, causes and dietary management of above diseases.

UNIT III**(9 hrs.)**

Diseases of the liver and gall bladder: Jaundice, Cholelithiasis, Hepatitis, Cirrhosis, Fatty liver, Hepatic coma-Etiology symptoms, dietary management for above diseases.

Diseases of the cardiovascular system: Atherosclerosis, Hypertension, Hypercholesterolemia, congestive heart failure-causes, symptoms and dietary management.

UNIT IV**(9 hrs.)**

Diabetes mellitus: Causes, signs and symptoms, diagnosis (GTT), various types of diabetes, complications, Insulin shock, Hypoglycemic foods, prevention of diabetes – dietary management and food exchange list. **Nutrigenomics** – Definition and its applications.

Diseases of the kidney and urinary tract: Nephritis and nephrosis, acute and chronic renal failure and urinary calculi-causes, signs and symptoms and dietary management. Need for dialysis.

UNIT V**(9 hrs.)**

Diet in febrile conditions: Short duration, long duration and intermittent fevers-Causes, signs and symptoms and dietary management. Pre and Post operative diets. Diet in sensitivity-definition, classification, common food allergens and dietary management. Dietary management for gout and phenyl ketonuria. Dietary management for Cancer and HIV.

Diet for Burn: Metabolic changes and nutrition support in burn patients.

Field Visit: Visit to dietary department of multi speciality hospitals and clinics & fitness centres.

Distribution of Marks: 100% Theory

Text Books				
Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Sri Lakshmi.B	Dietetics	New Age International (P) Ltd.- New Delhi	2019, Eighth Edition
2.	Shubhangini. A. Joshi	Nutrition and Dietetics	Tata Mcgraw-Hill	2016, 4 th Edition
3.	Swaminathan.M	Principles of Nutrition and Dietetics	The Bangalore Printing and Publishing Co. Ltd, Bangalore	2001, 2 nd Edition

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Seanne Safaii - Waite	Medical Nutrition Therapy Simulation	Jones & Bartlett Learning	2019, 1 st Edition
2.	Shubhangini. A. Joshi	Nutrition & Dietetics with Indian Case Studies	Tata Mcgraw-Hill	2010, 3 rd Edition
3.	Robert Ronzio, Kennedy Associates	Encyclopedia of Nutrition and Good Health	Viva Books	2019, 2 nd Edition
4.	Jim Mann and Stewart Truswell.A	Essentials of Human Nutrition	Oxford University Press	2012, 4 th Edition
5.	John.J.B.Anderson, Martin M.Root, Sanford C.Garner	Human Nutrition Healthy Options for Life	Jones & Bartlett Learning	2015, 2 nd Edition

Pedagogy

- Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

Bloom's Taxonomy Based Assessment Pattern**Components of CIA Marks**

Tests (I & II)	Assignment / Seminar / Subject Viva	Model Examination	Total
10	5	10	25

CIA

Bloom's Category	Section	Choice	Marks	Total
K1	A	Compulsory	2 x 2 = 4	30
K1 & K2	B	Either / Or	2 x 5 = 10	
K2 & K3	C	Open Choice (2 out of 3)	2 x 8 = 16	

Model and End Semester Examination

Bloom's Category	Section	Choice	Marks	Total
K1	A	Compulsory	5 x 2 = 10	75
K1 & K2	B	Either / Or	5 x 5 = 25	
K2 & K3	C	Open Choice (5 out of 8)	5 x 8 = 40	

SEMESTER - III

CODE	COURSE TITLE
18NDUCP03	PRACTICAL III - DIETETICS

Category	CIA	ESE	L	T	P	Credit
Core	20	30	--	--	45	2

Preamble

The course aids the students in recalling the facts from the learned material in planning therapeutic diets for various disease conditions and thereby evolve as a dietitian.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO36.	Construct a balanced diet, portion table and interpret with Ideal Body Weight and the Recommended Dietary Allowances by ICMR.	K3 & K2
CO37.	Plan and calculate the nutrients for routine clinical diet for different disease conditions.	K3
CO38.	Demonstrate the types of diet for various life style disorders.	K2
CO39.	Make use of the skills during Case Study analysis and Internship programmes.	K3
CO40.	Apply the practical skills in diet counseling through diet clinic centre.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO36.	S	S	S	S	S
CO37.	S	S	S	S	S
CO38.	M	S	M	S	S
CO39.	S	S	S	S	S
CO40.	S	S	S	M	S

S- Strong; M-Medium; L-Low

Syllabus

1. Weights and measures of foods.
2. Formulation of standard balanced diets and standard food exchange table.
3. Calculation for i) Ideal body weight ii) Food portion table and iii) nutrients calculation.
4. Menu planning and the calculation for regular diet, light diet, full fluid diet, clear liquid diet and bland diet.
5. Diet for obesity, under weight and anemic conditions in adolescent and expectant mothers.
6. Diet for diseases of gastro intestinal tract. i) Diarrhoea. ii) Constipation iii) Peptic ulcer.
7. Diet for cardio vascular diseases i) atherosclerosis - middle age and geriatric ii) Hypertension.
8. Diet for kidney diseases. i) nephritis ii) nephrosis iii) chronic renal failure.
9. Diet for diabetes mellitus i) Juvenile ii) adult diabetes iii) Diabetes with kidney disorder.
10. Diet in febrile conditions. i) Short duration – Typhoid ii) long duration – Tuberculosis.
11. Diet in liver disorders i) Jaundice ii) Viral hepatitis iii) Cirrhosis.
12. Dietary charts preparation for various disease conditions.
13. Diet for cancer.
14. Diet for AIDS.

SEMESTER - III

CODE	COURSE TITLE
18NDUA301	ALLIED II – BIOCHEMISTRY I

Category	CIA	ESE	L	T	P	Credit
Allied	20	55	58	2	--	4

Preamble

The course emphasizes the students to understand the significance of biochemistry & review the chemical properties of biomolecules.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO41.	Define & classify the Carbohydrates, Lipids, Amino acids, Protein, Nucleic acids & Enzymes.	K1, K2
CO42.	List out the functions of various nutrients in the human system.	K1
CO43.	Outline the structure and interpret the properties of organic molecules.	K2
CO44.	Compare the theoretical concepts in qualitative analysis of various nutrients.	K2
CO45.	Apply the acquired knowledge in identifying the new food sources for better nutrition.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO41.	S	M	S	M	S
CO42.	S	S	S	M	M
CO43.	M	M	S	M	M
CO44.	M	S	S	M	S
CO45.	S	S	S	S	S

S- Strong; M-Medium; L-Low

Syllabus**UNIT I****(12 hrs.)**

Carbohydrates: Occurrence, biological significance, Physical & Chemical Properties - Monosaccharides – Definition, classification, structure and functions. Disaccharides – Definition, types, structure and functions. Polysaccharides – Homopoly saccharides - types, structure, and functions, hetero polysaccharides. (examples only)

UNIT II**(12 hrs.)**

Lipids: Occurrence, classification and functions, biological significance, Physical & Chemical Properties of lipids. Types of fatty acids. Compound lipids – Structure & functions of phospholipids (Lecithin & Cephalin), structure and functions of glycolipids. Steroids - Structure, functions & properties of cholesterol.

UNIT III**(12 hrs.)**

Amino acids: Classification of amino acids (examples), essential amino acids, Common properties of amino acids – zwitterions, ISO electric pH. Physical property - Color reactions of amino acids, Chemical property - reactions of amino and carboxyl groups of amino acids.

Proteins: Definition, Classification and function of proteins. Structural organization of proteins, General properties of protein, Reactions of protein – Denaturation, hydrolysis, coagulation & precipitation. Structure & biological functions of fibrous protein (Collagen), globular protein (hemoglobin) and lipoprotein.

UNIT IV**(12 hrs.)**

Nucleic Acid: Definition and Fundamental units of nucleic acid – Purine, Pyrimidine, nucleotides & nucleosides.

DNA - Double helical structure & its special features. **RNA** - Structure and role of different types of RNA. Genetic code, Protein Synthesis.

UNIT V**(12 hrs.)**

Enzymes: Classification with examples. Co enzymes and co-factors (Structure – not needed) active site. Lock and key model induced fit hypothesis. Factors affecting enzyme activity. Michaelis Menten equation only. Types of inhibitors of enzyme action. Clinical and industrial applications of enzymes.

Distribution of Marks:100% Theory**Text Books**

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Deb A.C	Fundamentals of Biochemistry	New Central Book Agency	2006, 8 th Revised edition
2.	Satyanarayana.U & Chakrapani.U	Biochemistry	Elsevier	2017, Fifth Edition
3.	Ambika Shanmugam	Fundamentals of Biochemistry for Medical Students	Ippincott Williams & Wilkins	2012, Seventh Edition

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
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1.	Rama Rao A.V.S.S	A Text book of Biochemistry	Ubs Publishers Distributors Ltd	2010, Eleventh Revised Edition
2.	Agarwal G.R., Kiran Agarwal, Agarwal O.P	Text book of Biochemistry	Goel Publishing House, Krishna Prakashan Media (P) Ltd	2007, 14 th Edition
3.	Lehninger A.L., Wilson D.C, Cox M.M	Principles of Biochemistry	W H Freeman & Co	2012, 6 th Edition
4.	Albert L. Lehninger, David L. Nelson, Cox.M.M	Principles of Biochemistry	W H Freeman & Co	2017, 7 th Edition
5.	Vasudevan D.M., Sree Kumari S	Text book of Biochemistry for Medical Students	Jaypee Brothers Medical Publishers,	2016, 8 th Edition

Pedagogy

- Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

Bloom's Taxonomy Based Assessment Pattern

Components of CIA Marks

Tests (I & II)	Assignment / Seminar / Subject Viva	Model Examination	Total
8	4	8	20

CIA

Bloom's Category	Section	Choice	Marks	Total
K1	A	Compulsory	1 x 2 = 2	20
K1 & K2	B	Either / Or	2 x 3 = 6	
K2 & K3	C	Open Choice (2 out of 3)	2 x 6 = 12	

Model and End Semester Examination

Bloom's Category	Section	Choice	Marks	Total
K1	A	Compulsory	5 x 2 = 10	55
K1 & K2	B	Either / Or	5 x 3 = 15	
K2 & K3	C	Open Choice (5 out of 8)	5 x 6 = 30	

SEMESTER - IV

CODE	COURSE TITLE
18NDUAP01	ALLIED II PRACTICAL - BIOCHEMISTRY

Category	CIA	ESE	L	T	P	Credit
Allied	20	30	--	--	45	2

Preamble

The course supports the students to apply their theoretical knowledge in clinical laboratory techniques.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO46.	Identify the reactions of various macronutrients through qualitative analysis.	K3
CO47.	Demonstrate the basic concepts with blood and urine sample.	K2
CO48.	Make use of advanced technology for both quantitative and qualitative analysis.	K3
CO49.	Utilize the scientific knowledge in scientific investigations and health care services.	K3
CO50.	Apply and practice the art in clinical settings, community and research.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO46.	S	S	S	M	S
CO47.	M	S	S	M	S
CO48.	S	S	S	S	S
CO49.	S	S	M	S	M
CO50.	S	M	S	S	S

S- Strong; M-Medium; L-Low

QUALITATIVE ANALYSIS:

1. **Reactions of Simple sugars:** Glucose, Fructose, Pentose, Sucrose, Lactose and Starch.
2. **Reactions of Aminoacids:** Tyrosine, Tryptophan, Histidine and Arginine.
3. **Reactions of Proteins:** Solubility, Biuret and Millons reaction. Xanthoproteic test
Denaturation by heat, pH change, Precipitation by heavy metals and acidic reagents.
4. **Reaction of lipids:** Solubility, Saponification: Acrolein test for unsaturation, Liber mann
Buchard test for cholesterol.
5. Qualitative analysis of urine for pregnancy.

QUANTITATIVE ESTIMATIONS:

1. Estimation of Urea.
2. Detection of sugars in a mixture by ascending paper chromatography (Group Experiment).
3. Detection of lipids by TLC.
4. Separation of Serum Proteins by Electrophoresis (Group Experiment).
5. Estimation of Glucose using glucometer.
6. Estimation of haemoglobin using haemoglobinometer.
7. Monitor of blood pressure using digital Bp apparatus.

SEMESTER - III

CODE	COURSE TITLE
18NDUS301	SKILL BASED SUBJECT I – FOOD CHEMISTRY

Category	CIA	ESE	L	T	P	Credit
Skill Based Subject	25	75	43	2	--	3

Objectives

Enable the students to

Gain knowledge on the basic principles in foods chemistry and make the students to utilize the principles in future research work.

Syllabus

UNIT – I

9 Hrs

Role of water in foods and cookery: Structure and properties of water molecule, water activity and absorption phenomena, Types of water in plant and animal tissues, bound water, capillary water and loosely bound water, role of water in food spoilage, moisture content of dehydrated foods and shelf life, role of water in cookery.

UNIT – II

9 Hrs

Carbohydrates: Chemical structures of Glucose, Fructose, Lactose, Sucrose, starch, Cellulose and Glycogen. Effect of dry heat – dextrinisation, Effect of moist heat – gelatinisation, Gel formation, syneresis, retrogradation of starch – Non – enzymatic browning reactions (Maillard reaction) - types and explanation (Chemical reactions not required), Prevention and impairment of nutritional quality.

UNIT – III

9 Hrs

Proteins: Food proteins – Functional properties, animal and plant proteins. Changes in protein properties - Denaturation and renaturation, native and denatured proteins, Colloids – sols, emulsion, gel formation – theories of gel formation, gelatin –properties and preparation, Texturised Vegetable Proteins (soya).

UNIT – IV

9 Hrs

Fats & Oils: Classification and chemical properties of fatty acids. Hydrogenation – mechanism & factors affecting. Hydrolysis – enzymatic and alkali. Oil – slipping point, smoke, flash and fire points, Rancidity – types and factors affecting rancidity, changes in fats due to heat during cooking. Emulsions and emulsifiers – Definition, types and examples.

Fruits & Vegetables: Antioxidants – Natural and synthetic, role as free radical scavengers, Pigments and polyphenols, flavour compounds in fruits and vegetables. Effect of heat on colour and flavour, enzymatic browning, Ripening of fruits – chemical changes.

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Parveen garg	Carbohydrates & Energy	Neeraj Publishing House	2018, 1 st Edition
2.	Swaminathan M	Hand Book of Food Science and Experimental Foods	BAPPCO	2011, 3 rd Edition
3.	Chopra H.K. Panesar P.S	Food Chemistry	Narosa Publishing House	2015, 5 th Edition
4.	Lillian Hoagland Meyer	Food Chemistry	CBS Publications	2004, 1 st Edition

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Meenakshi Paul E.D	Experimental Food Chemistry	Gene – Tech Books	2007, 1 st Edition
2.	Gaman P.M. Sherrington K.B	The science of Food, An Introduction to Food Science	Max Well Macmillan Publishers	2013, 2 nd Edition
3.	Iqbal S.A., Mido Y	Food Chemistry	Discovery Publishing House	2008
4.	<u>H.-D. Belitz,</u> <u>Grosch,</u> <u>Burghagen</u>	<u>W.</u> <u>P.Schieberle,</u> <u>M.M.</u>	Food Chemistry Springer	2004, 3 rd Revised Edition
5.	Seema Yadav	Food Chemistry	Cyber Tech Publications	2008, 1 st Edition

Question Paper Pattern

Five Questions out of Eight

(5 X 15 = 75 marks)

SEMESTER - IV

CODE	COURSE TITLE
18NDUC406	FOOD SERVICE MANAGEMENT

Category	CIA	ESE	L	T	P	Credit
Core	25	75	43	2	--	4

Preamble

The course prepares the students as a health care professional by providing knowledge on policies and processes in food service delivery and management.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO51.	Relate the knowledge of basic food principles in food purchase, planning and preparation.	K1
CO52.	Compare the principles of menu planning in standardization of recipes, quality and portion control.	K2
CO53.	Define the sanitation and hygienic practices in food preparation and extend the same in equipments and personnel management.	K1 & K2
CO54.	Organize a food service institution through proper utilization of human resource and financial management.	K3
CO55.	Apply nutritional standards as expected in the field of food service management.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO51.	S	M	S	S	S
CO52.	S	M	S	M	S
CO53.	S	S	S	M	S
CO54.	S	S	M	M	S
CO55.	S	S	S	S	S

S- Strong; M-Medium; L-Low

Syllabus**UNIT I****(9 hrs.)**

Management – Principles and functions of management. Tools of management. Management of resources – Money, space, equipment, materials, Human Resource Management. Personnel Management – Planning, selection and recruitment of employees – Orientation and training, job description, job specification of good human relations.

UNIT II**(9 hrs.)**

Layout of Food Plant – Principles of plant layout, features & advantages of good layout. Work simplification - Working heights and dimensions of work centers, Design for food service operations, space allowances and relationships. Lighting and Ventilation & pest and rodent control measures.

UNIT III**(9 hrs.)**

Equipments – Classification – General and functional, selection of equipments. Purchasing of equipments – Identify sources, purchasing procedures and methods, case and maintenance of equipments.

UNIT IV**(9 hrs.)**

Menu planning – Planning a menu, types of menu, essential considerations in menu planning. Menu – design, pricing and display. Styles of food service – Formal and informal services, Institutional food services. Cooking fuels – Safety measures and fuel saving techniques – Safety measures in food handling. 3 – Es of safety. Sanitation & Hygiene – Food, personal & environmental hygiene.

UNIT V**(9 hrs.)**

Cost Control: Method of food cost control – Standardization of recipes, portion control, and utilization of left over foods.

Financial Management: Pricing – factors affecting pricing, methods of pricing. Costing – Components of cost and cost control. Budget – Steps in budget preparation and types of budget.

Field Visit: Visit to food service institutions and restaurants.

Distribution of Marks: 100% Theory**Text Books**

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Mohini Sethi Surjeet Malhan	Catering Management An Integrated Approach	New Age International Publishers	2018, Third Edition
2.	Yagi, Vijay	Hotel Restaurant and Food Service	Cyber Tech Publishers	2011, First Edition

		Management		
3.	Suganthi and premakumari	Food Service Management	V.Ramesh (OPC) Pvt. Ltd.	2017

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Cousins and Gillespie	Food and Beverage Management	Pearson India Education Services Pvt. Ltd	2016
2.	Jyoti S.Sharma	Modern Techniques and Practices	Akansha Publishing House, New Delhi	2006
3.	Mohini Sethi	Institutional Food Management	New Age International Publishers	2016, Second Edition
4.	Thangam E.Philip	Modern Cooking for teaching and the trade vol I	Orient Blackswan	2010, 6th Revised edition
5.	John Cousins, Dennis Lillicrap Suzanne Weekes	Food and Beverage Service	Hodder Education	2019, 9 th Edition

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

Bloom's Taxonomy Based Assessment Pattern

Components of CIA Marks

Tests (I & II)	Assignment / Seminar / Subject Viva	Model Examination	Total
10	5	10	25

CIA

Bloom's Category	Section	Choice	Marks	Total
K1	A	Compulsory	2 x 2 = 4	30
K1 & K2	B	Either / Or	2 x 5 = 10	
K2 & K3	C	Open Choice (2 out of 3)	2 x 8 = 16	

Model and End Semester Examination

Bloom's Category	Section	Choice	Marks	Total
K1	A	Compulsory	5 x 2 = 10	75
K1 & K2	B	Either / Or	5 x 5 = 25	
K2 & K3	C	Open Choice (5 out of 8)	5 x 8 = 40	

SEMESTER - IV

CODE	COURSE TITLE
18NDUCP04	PRACTICAL IV – International Cuisine

Category	CIA	ESE	L	T	P	Credit
Core	20	30	--	--	45	2

Preamble

The course encourages the students to acquire knowledge and understanding of cuisines around the world in connection with practical experience of cooking and preparation of international classic recipes.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO56.	Identify the relationship between climate, topography, and diet of the region and the use of herbs, spices, oils and vinegars.	K3
CO57.	Interpret regional foods and related terminology which aids them in identifying the similarities and differences between the cuisines of the countries.	K2
CO58.	Solve nutritional needs of diverse clients in health care and other food service settings in collaboration with or under the direction of health care professionals.	K3
CO59.	Plan menus to accommodate the nutritional, dietary, cultural and regional requirements, and personal preferences of clients.	K3
CO60.	Demonstrate and apply their knowledge on international cooking techniques into recipe development.	K2

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO56.	S	S	S	S	S
CO57.	S	S	M	M	S
CO58.	S	S	S	S	S
CO59.	S	S	S	S	S
CO60.	S	S	S	S	S

S- Strong; M-Medium; L-Low

I. The Cuisine of India

II. International Cuisines

1. The Cuisine of Africa
2. The Cuisine of China
3. The Cuisine of Italy
4. The Cuisine of Japan
5. The Cuisine of Mexico
6. The Cuisine of Middle East
7. The Cuisine of Srilanka
8. The Cuisine of UK
9. The Cuisine of USA

SEMESTER - IV

CODE	COURSE TITLE
18NDUA402	ALLIED II - BIOCHEMISTRY - II

Category	CIA	ESE	L	T	P	Credit
Allied	20	55	58	2	--	4

Preamble

The course enables the students to familiarize about the metabolism of major nutrients & application oriented technologies.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO61.	Explain the metabolic pathways of carbohydrates, proteins & lipids.	K2
CO62.	Interpret the concept of acid base indicators.	K2
CO63.	Utilize the fact of interrelationship of carbohydrate, protein and fat metabolism in diet counseling.	K3
CO64.	Understand the application of various quantitative analysis.	K2
CO65.	Develop their employability in clinical laboratories.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO61.	M	S	S	M	S
CO62.	S	S	S	M	M
CO63.	S	S	S	S	S
CO64.	M	M	S	S	M
CO65.	S	S	S	M	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

(12 hrs.)

pH: Definition, determination of pH & its applications.

Buffers: Definition, principles, uses, buffer systems of body fluids, RBC & tissues, role in pH regulation, derivation of Henderson hasselbalch equation.

Isotopes: Definition and units of radio activity, half life period, advantages, disadvantages, safety aspects of radioisotopic technique and isotopes in biological investigations.

UNIT II

(12 hrs.)

Chromatography: Principles and applications of column, Paper and TLC.

Electrophoresis: Paper and Gel principle, instrumentation and applications.

Colorimetry – Principles, Instrumentation and applications.

UNIT III

(12 hrs.)

Metabolic pathways: Glucose metabolism - Glycolysis, TCA Cycle, Energy production. Glycogen metabolism – Glycogenesis and Glycogenolysis. Alternate pathways - HMP shunt & Gluconeogenesis. Endocrine influences on carbohydrate metabolism. Regulation of blood glucose concentration.

UNIT IV

(12 hrs.)

Lipid Metabolism: Beta-oxidation of fatty acids, synthesis of phospholipids

Plasma lipoproteins and its metabolism. Biosynthesis of cholesterol, metabolism of cholesterol.

Electron transport chain, Bioenergetic system – stages of energy production and formation of ATP, High energy phosphates.

Ketosis, ketogenesis and effects of ketosis.

UNIT V

(12 hrs.)

Protein Metabolism: General pathway, protein synthesis and turnover, deamination, transamination and decarboxylation. Urea synthesis - krebs henseleit cycle. Inborn errors – Albinism, Phenylketonuria and Cystinuria

Inter – relationship of carbohydrates, fat and protein metabolism (flow chart only).

Distribution of Marks:100% Theory

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Deb A.C	Fundamentals of Biochemistry	New Central Book Agency	2006, 8 th Revised edition
2.	Satyanarayana.U & Chakrapani.U	Biochemistry	Elsevier	2017, Fifth Edition
3.	Ambika Shanmugam	Fundamentals of Biochemistry for Medical Students	Ippincott Williams & Wilkins	2012, Seventh Edition

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Rama Rao A.V.S.S	A Text book of Biochemistry	Ubs Publishers Distributors Ltd	2010, Eleventh Revised Edition

2.	Agarwal G.R., Kiran Agarwal, Agarwal O.P	Text book of Biochemistry	Goel Publishing House, Krishna Prakashan Media (P) Ltd	2007, 14 th Edition
3.	Lehninger A.L., Wilson D.C, Cox M.M	Principles of Biochemistry	W H Freeman & Co	2012, 6 th Edition
4.	Albert L. Lehninger, David L. Nelson, Cox.M.M	Principles of Biochemistry	W H Freeman & Co	2017, 7 th Edition
5.	Vasudevan D.M., Sree Kumari S	Text book of Biochemistry for Medical Students	Jaypee Brothers Medical Publishers,	2016, 8 th Edition

Pedagogy

- Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

Bloom's Taxonomy Based Assessment Pattern

Components of CIA Marks

Tests (I & II)	Assignment / Seminar / Subject Viva	Model Examination	Total
8	4	8	20

CIA

Bloom's Category	Section	Choice	Marks	Total
K1	A	Compulsory	1 x 2 = 2	20
K1 & K2	B	Either / Or	2 x 3 = 6	
K2 & K3	C	Open Choice (2 out of 3)	2 x 6 = 12	

Model and End Semester Examination

Bloom's Category	Section	Choice	Marks	Total
K1	A	Compulsory	5 x 2 = 10	55
K1 & K2	B	Either / Or	5 x 3 = 15	
K2 & K3	C	Open Choice (5 out of 8)	5 x 6 = 30	

SEMESTER - IV

CODE	COURSE TITLE
18NDUS402	SKILL BASED SUBJECT II – MULTI SKILL DEVELOPMENT PAPER

Category	CIA	ESE	L	T	P	Credit
Skill Based Subject	40	60	43	2	--	3

Aim: To equip the students with knowledge on all topics as desirable from the point of view of brilliant success in the competitive examinations.

Objectives: To familiarize the students with various types of tests that are employed by the diverse examining bodies.

Syllabus

UNIT – I **9 Hrs.**

Communication : Question tag – Gerund and Infinitives – Spotting the errors – Vocabulary – Synonyms – Antonyms – Prepositions – Articles – One word substitution – Sentence completion.

UNIT – II **9 Hrs.**

Numerical aptitude: Problems on numbers – Problems on Ages – Percentage – Profit and loss – Ratio & Proportion – Time & Work – Time & Distance – Simple Interest – Compound Interest.

UNIT – III **9 Hrs.**

Critical Reasoning: Logical Inference Questions and Syllogism.

Analytical Reasoning: Arrangement problems – Family / Blood Relation Qualms – Sense of Directions – Age Doubts.

Verbal Reasoning: Verbal Analogy (Letter series and number series only)- Coding and Decoding.

UNIT – IV **9 Hrs.**

Self Introduction and group Discussion: Soft skills – Interpersonal Skills – Employability Skills – Soft Skills Training – Resume Preparation – Interview Tips and Questions. Importance of group discussion – Types of GD - GD Skills, Essential elements of a GD.

Research methodology and Basic Statistics: Meaning and objectives of research, types of research, Significance of research, criteria of good research, abstract and research article writing and presentation. **Statistics** – Definition, functions and applications. Measures of central Value and Dispersion - Mean, median, mode and standard deviation. Statistical Inference - Testing of hypothesis and ‘t’ test. Project report preparation and viva-voce presentation -explanation.

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Kothari C.R, <u>Gaurav Garg</u>	Research Methodology	New Age International (P) Ltd	2019, 4 th edition
2.	Gupta S.P	Statistical methods	Sultan chand and sons Educational Publisher	2012
3.	Hari Mohan Prasad & Uma Rani Sinha	Objective English for Competitive Examinations	Tata Mc Graw Hill Education Private Ltd.	2014, 5 th Edition
4.	Agarwal R.S	Quantitative Aptitude	S.Chand	2017
5.	Edgar Thorpe	Test of Reasoning for Competitive Examinations	Tata Mc Graw – Hill Publishing Company Limited	2007, 4 th Edition
6.	Rao M.S	Soft Skills Enhancing Employability – Connecting Campus with corporate	IK International Publishing House	2011

SEMESTER - III

CODE	COURSE TITLE
18NDUN301	NON MAJOR ELECTIVE I – BASIC COOKERY

Category	CIA	ESE	L	T	P	Credit
Non Major Elective	--	100	28	2		2

Objectives

To learn the basic principles behind the science of foods.

To make the students understand the concept of utilizing the basic food groups in formulating recipes.

Syllabus

UNIT – I

5 Hrs

Food & Food Science : Definitions, classification of foods – based on functions (energy yielding, body building, protection and regulation and maintenance of health), based on nutritive value (ICMR) – Four food groups. Food pyramid, My Pyramid and My Plate. Food in relation to health.

UNIT – II

5 Hrs

Cooking : Objectives of cooking, preliminary preparations – advantages and disadvantages. Cooking methods – Classification (Moist heat, Dry heat and Combination methods), advantages and disadvantages. Microwave cooking.

UNIT – III

7 Hrs

Cereals : Rice, wheat and oats – Nutritive value. Products of rice, wheat and oats. **Millets** – Nutritive value, commonly used millets in cookery. Cooking of cereals and changes occur during cooking. Best method of cooking coarse and fine cereals.

Pulses & legumes : Nutritive value. Germination and its advantages. Forms of pulses, Role of pulses in cookery.

Examples of recipes using cereals and pulses.

UNIT – IV

7 Hrs

Vegetables : Classification and nutritive value. Selection of vegetables. Vegetable Cookery – Preliminary preparation and changes during cooking. Fungi as food - Mushroom and algae as food – Spirulina. Role of vegetables in cookery.

Fruits : Classification and nutritive value. Ripening of fruits, enzymatic browning and its prevention. Serving of fruits – Points to be considered, salads.

Sugar, fats & oils : Nutritive value and role in cookery.

Examples of recipes using vegetables, fruits, sugar, fats and oils.

UNIT – V

6 Hrs

Milk : Nutritive value and role in cookery.

Flesh foods : Meat, poultry and fish - Nutritive value and selection.

Spices : General functions and commonly used spices. Role of spices in cookery.

Beverages : Classification based on functions.

Examples of recipes using milk, flesh foods, spices and beverages.

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Sri Lakshmi.B	Food Science	New age International publishers	2018, 7 th Edition
2.	Krishna Arora	Theory of Cookery	Frank Bros & Co.	2006, 5 th Edition
3.	Chinta Palli Vidya, D Bhaskara Rao	Text book of nutrition	Discovery publishing House	2010
4.	Swaminathan M	Hand Book of Food Science and Experimental Foods	BAPPCO	2011, 3 rd Edition

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Kumud Khanna, Sharda Gupta, Rama Seth, Ranjana Mahna, Tejmeet Rekhi	The Art and Science of Cooking	Elite Publishing House	2013, 5 th Edition
2.	Nirdosh KumarJain	A Complete Book on Food and Nutrition	Cyber tech publications	2008
3.	Seema Yadav	Text book of Nutrition and Health	Anmol Publications Pvt. Ltd	2002
4.	Thangam E.Philip	Modern Cookery for Teaching and the Trade vol I	Orient Blackswan	2010, 6 th Revised Edition
5.	Ronald Kinton, Victor Ceserani, David Foskett	Practical Cookery	Hodder Education	2004, 10 th Edition

Question Paper Pattern

Five Questions out of Eight

(5 X 20 = 100 marks)

SEMESTER - IV

CODE	COURSE TITLE
18NDUN402	NON MAJOR ELECTIVE – II - DIET IN DISEASES

Category	CIA	ESE	L	T	P	Credit
Non Major Elective	--	100	28	2	--	2

Objectives:

To study the aetiology and dietary management for various disease condition.

To enable the students to understand the process of planning and scheduling the intake of foods for normal and therapeutic diet.

Syllabus

UNIT – I

6 Hrs

Menu Planning : Definitions of Health, Nutrients and Balanced diet. Principles of menu Planning and Recommended Dietary Allowances (ICMR). Reference man and reference women- Definition.

Therapeutic diets : Principles, Routine Hospital Diets – clear-fluid diet, full-fluid, soft diet and regular normal diet.

UNIT – II

6 Hrs

Diet in Infections & Fevers : Aetiology, types and dietary management.

Diet in Obesity & Underweight : Aetiology and dietary management.

UNIT – III

6 Hrs

Diet in Cardiovascular diseases : Atherosclerosis, Hypertension and Hypercholesterolemia – Aetiology and dietary management.

Diet in Gastrointestinal diseases : Peptic ulcer, Constipation, Diarrhoea and Irritable bowel syndrome –Types, aetiology and dietary management.

UNIT – IV

6 Hrs

Diet in Diseases of Liver and Pancreas : Jaundice, Cirrhosis of liver and Cholelithiasis – Aetiology and dietary management.

Diet in Diabetes Mellitus : Types, aetiology and dietary management.

Diet in Diseases of Kidneys : Acute renal failure, chronic renal failure and urolithiasis - Aetiology and dietary management.

Food Sensitivity : Types, foods involved in sensitivity, symptoms and dietary treatment.

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Sri Lakshmi.B	Dietetics	New Age International Publishers (p) Ltd	2019, Eighth Edition
2.	Ashok Pande	Text Book of Food and Nutrition	Akansha Publishing House	2004
3.	Swaminathan. M	Advanced Text book on Food and Nutrition, Volume I	The Bangalore Printing and Publishing Co. Ltd	2015

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Shubhangini. A. Joshi	Nutrition and Dietetics	Tata Mc Graw – Hill Publishing Company Ltd	2016, 4 th Edition
2.	Brian A. Fox Allan G. Cameron and Michael EJ Lean	Food Science, Nutrition and Health	British Library Cataloguing in Publication Data	2006, 7 th Edition
3.	Peggy S.Stanfield and Hui.Y.H	Nutrition and Diet Therapy	Jones and Bart left Publishers, Boston-London	2009, 5 th Edition
4.	Garrow J.S and James W.P.T.,	Human Nutrition and Dietetics	Churchill Livingstone	2000, 9 th Edition
5.	Jim Mann and Stewart Truswell. A	Essentials of Human Nutrition	Oxford University Press	2012, 4 th Edition

Question Paper Pattern

Five Questions out of Eight

(5 X 20 = 100 marks)
