Sadakathullah Appa College

(Autonomous)

(Reaccredited by NAAC at an 'A' Grade. An ISO 9001:2015 Certified Institution)

Rahmath Nagar, Tirunelveli- 11.

Tamil Nadu.

PG DEPARTMENT OF NUTRITION AND DIETETICS

CBCS SYLLABUS

Learning Outcomes-based Curriculum Framework for

Nutrition and Dietetics (M.Sc.)

(Applicable for the students admitted from June 2021 as per the Resolutions of the Academic Council Meeting held on 20.03.2021)

CONTENTS

POSTGRADUATE DEPARTMENT OF NUTRITION AND DIETETICS

CBCS SYLLABUS

M.Sc. Nutrition and Dietetics (2021-2024)

COURSE STRUCTURE

I SEMESTER				II SEMESTER		
COURSE	**H/W**	**C**		**COURSE**	**H/W**	**C**
DSC –I	5	4		DSC –IV	5	4
DSC – II	5	4		DSC –V	5	4
DSC –III	5	4		DSC –VI	5	4
DSE-I	4	4		DSE-III	4	4
Practical-I	4	2		Practical – III	4	2
Practical-II	4	2		Practical - IV	4	2
IDC – I	2	2		SEC	2	2
Library Hour	1			Library Hour	1	
TOTAL	**30**	**22**		**TOTAL**	**30**	**22**
III SEMESTER				**IV SEMESTER**		
DSC-VII	5	4		DSC –X	5	4
DSC –VIII	5	4		DSC –XI	5	4
DSC –IX	5	4		Project	8	8
DSE –III	4	4		DSE -IV	4	4
Practical-V	4	2		Practical-VII	4	2
Practical-VI	4	2		Practical-VIII	4	2
IDC -II	2	2				
Library Hour	1					
TOTAL	**30**	**22**		**TOTAL**	**30**	**24**

DISTRIBUTION OF HOURS, CREDITS, NO. OF PAPERS & MARKS				
SUBJECT	**HOURS**	**CREDITS**	**NO. OF PAPERS**	**MARKS**
DSC+Project	63	52	12	1250
Practical	32	16	8	400
DSE	16	16	4	400
IDC	4	4	2	100
SEC-SWAYAM-NPTEL Course	2	2	1	50
Library Hour	3			
TOTAL	**120**	**90**	**27**	**2200**

POSTGRADUATE DEPARTMENT OF NUTRITION AND DIETETICS

M.Sc. Nutrition and Dietetics (2021-2024)

COURSE STRUCTURE

SEM	Course	Title of the Courses	Sub. Code	H/W	C	MARKS		
						I	E	T
I	DSC 1	Advanced Food Science and Nutrition	21PCND11	5	4	40	60	100
	DSC 2	Community Nutrition	21PCND12	5	4	40	60	100
	DSC 3	Life Span Nutrition	21PCND13	5	4	40	60	100
	DSE 1A	Applied Human Physiology	21PEND11A	4	4	40	60	100
	DSE 1B	Nutrition for Fitness	21PEND11B					
	DSE 1C	Maternal and Child Nutrition	21PEND11C					
	P I	Advanced food and Nutrition and Community Nutrition Practicals –I	21PCND1P1	4	2	40	60	100/2
	P II	Life Span Nutrition Practicals - II	21PCND1P2	4	2	40	60	100/2
	IDC I	Diet Therapy – I	21PIND21	2	2	40	60	100/2
		Libraray Hour		1				
II	DSC 4	Advanced Dietetics-I	21PCND21	5	4	40	60	100
	DSC 5	Food Microbiology and Food Safety	21PCND22	5	4	40	60	100
	DSC 6	Diet Counselling	21PCND23	5	4	40	60	100
	DSE 2A	Functional Foods and Nutraceuticals	21PEND21A	4	4	40	60	100
	DSE 2B	Indian Traditional Foods and Auyrvedic Nutrition	21PEND21B					
	DSE 2C	Baking and Connfectionnary	21PEND21C					
	P III	Advanced Dietetics-I and Diet Counselling Practicals – III	21PCND2P1	4	2	40	60	100/2
	P IV	Food Microbiology and Food Safety Practicals – IV	21PCND2P2	4	2	40	60	100/2
	SEC	SWAYAM-NPTEL Course		2	2	25	75	100/2
		Libraray Hour		1				
	During Summer Vacation Dietetics Internship – 30 Days							
III	DSC 7	Advanced Dietetics – II	21PCND31	5	4	40	60	100
	DSC 8	Nutritional Biochemistry	21PCND32	5	4	40	60	100
	DSC 9	Research Methodology and Statistics	21PCND33	5	4	40	60	100
	DSE 3A	Extension Education and Communication	21PEND31A	4	4	40	60	100
	DSE 3B	Post Harvest Technology	21PEND31B					
	DSE 3C	Nutritional Assessment	21PEND31C					

	P V	Advanced Dietetics - II Practicals – V	21PCND3P1	4	2	40	60	100/2
	P VI	Nutritional Biochemistry Practicals – VI	21PCND3P2	4	2	40	60	100/2
	IDC II	Diet Therapy – II	21PIND31	2	2	40	60	100/2
		Libraray Hour		1				
	On-Job Training = Food Industry – 15 Days							
IV	DSC 10	Food Processing and Preservation	21PCND41	5	4	40	60	100
	DSC 11	Sensory Evaluation and Culinary Service	21PCND42	5	4	40	60	100
	DSC 12	Project	21PCND43	8	8	40	60	150
	DSE 4A	Textile Designing	21PEND41A	4	4	40	60	100
	DSE 4B	Clinical Laboratory Techniques	21PEND41B					
	DES 4 C	Porgrammes for Rural Development	21PEND41C					
	P VII	Sensory Evaluation and Culinary Service Practicals– VII	21PCND4P1	4	2	40	60	100/2
	P VIII	Food Processing and Preservation Practicals-VIII	21PCND4P2	4	2	40	60	100/2
			Total	**120**	**90**			**2200**

M.Sc. Nutrition and Dietetics
Programme Learning Outcomes

PLO	Upon completion of M.Sc. Degree Programmes, the graduates will be able to:
PLO 1	**Disciplinary Knowledge** • Acquire in-depth scientific knowledge in the core areas of study.
PLO 2	**Creative Thinking and Practical Skills / Problem Solving Skills** • Enrich skills of observation to draw logical inferences from scientific experiments/ programming and skills of creative thinking to develop novel ideas. • Hone problem solving skills in theoretical, experimental and computational areas and to apply them in real life situations.
PLO 3	**Sense of inquiry and Skilled Communicator / Research, Innovation and Entrepreneurship** • Develop the capability for raising appropriate questions relating to the current/emerging issues encountered in the scientific field and to plan, execute and express the results of experiments / investigations through technical writings as well as through oral presentations. • Design innovations for exploring the unexplored areas in diverse fields to accomplish socially relevant and economically beneficial innovative research projects. • Become a skilled entrepreneur for launching start-up / business ventures to improve the economy of the nation.
PLO 4	**Ethical Awareness / Team Work / Environmental Conservation and Sustainability** • Equip them for conducting work as an individual / as a member, or as a leader in diverse teams upholding values such as honesty and precision, and thus preventing unethical behaviours such as fabrication, falsification, misrepresentation of data, plagiarism etc. to ensure academic integrity. • Realise that environment and humans are dependent on one another and to know about the responsible management of our ecosystem for survival, and for the well-being of the future generation as well.
PLO 5	**Digital Literacy/Self-Directed Learning/Usage of ICT/Lifelong Learning** • Get access to digital resources, to use them judiciously for

	updation of knowledge and also to engage in remote/ independent learning. • Inculcate the habit of learning continuously through the effective adoption of ICT to update knowledge in the emerging areas in Sciences for inventions/discoveries so that the knowledge transferred from laboratory to land would yield fruitful results for the betterment of global society.

Programme Specific Outcomes (PSO)

PSO	Upon completion of M.Sc. Nutrition and Dietetics Programmes, the students will be able to:	PLOs Mapped
PSO-1	Apply the knowledge of food science to describe the various functions of ingredients in food and summarize the chemistry of the properties of various food components	PLO-1
PSO-2	Recognize the dietary requirements of individuals of various ages and devise an appropriate meal plan.	PLO-2,3,4
PSO-3	Develop skills in food, nutrition, textiles, housing, product making, communication technologies and human development.	PLO-1,5
PSO-4	Accurately interpret data and research literature to solve complex problems. Thereby, developing and validating environmentally friendly, novel food products.	PLO-2,3,5
PSO-5	Understand and appreciate the role of interdisciplinary sciences in the development and well- being of individuals, families and communities.	PLO-1,4

SEMESTER – I

Course Title	**ADVANCED FOOD SCIENCE AND NUTRITION**
Total Hrs.	90
Hrs./Week	6
Subject Code	21PCND11
Course Type	DSC-I
Credits	4
Marks	100

General Objective:

To enable students, gain in-depth knowledge of major and minor nutrients present in foods.

Course Objectives:

CO	The learners will be able to
CO-1	Estimate the importance of Macro Nutrients.
CO-2	Determine the energy value of foods.
CO-3	Categorize vitamins and their functions.
CO-4	Analyze different minerals by tracing their elements and importance.
CO-5	Assess Water and the interrelationship between Nutrients.

UNIT I Macro Nutrients

Carbohydrate - Definition, classification, functions, sources, requirements, digestion and absorption, Dietary Fibre - Definition, classification, functions, sources, requirements.

Protein - Definition, classification, functions, sources, requirements, digestion and absorption, Evaluation of protein quality - protein efficiency ratio, biological value, net protein utilization, net protein ratio.

Fat - Definition, classification, functions, sources, requirements, digestion and absorption, Essential fatty acids – functions and effects of deficiencies.

UNIT II: Energy

Energy - Definition, Units of energy, Determination of energy value of foods- Direct - Bomb Calorimetry, Indirect calorimetry - Benedict's Oxy calorimetry. Determination of energy requirements - BMR- Definition and factors influencing BMR, Measurement of Basal metabolism, Direct calorimetry – Atwater Rose Respiratory Calorimeter, Indirect calorimetry - Benedict Roth Apparatus, Determination of BMR using production

equations (ICMR), Physiological fuel value, gross energy value, Respiratory Quotient, Thermal effect of foods (SDA), Energy requirements during work, Reference man, reference women, RDA for energy, food sources.

UNIT III: Vitamins

Fat soluble and water soluble vitamins (Thiamine, riboflavin, niacin, vitamin B12, folic acid, pyridoxine, pantothenic acid, biotin and ascorbic acid) - functions, sources, requirements, absorption, storage, deficiency and toxicity.

UNIT IV: Minerals

Calcium, Phosphorus, Magnesium, Sodium, Potassium, Iron, Iodine, Fluorine, Zinc and Selenium- Introduction, functions, sources, requirements, digestion, absorption, storage deficiency and toxicity.

UNIT V: Water and Interrelationship between Nutrients

Water - Definition, distribution, functions, sources, water balance, fluid and electrolyte balance, Water Deprivation, dehydration, rehydration.

Interrelationship between Nutrients-Vitamin-vitamin interrelationship, vitamin-mineral interrelationship, mineral-mineral interrelationship.

Textbooks:

1. Mahtab S. Bamiji, Prahlad Rao. R and Vinodhini Reddy, Text book of human Nutrition, Oxford and IBH publication, 1996.
2. SwaminathanM , Text book of Food & Nutrition, Bappco 88,Bangalore,1993.

Reference books:

1. Smith J.L., and Gropper, S.S, Advanced Nutrition and Human Metabolism, 5th Edition, Cengage Learning, 2008.
2. Brown M.L., Present knowledge in Nutrition, 6th Edition, International Life Science, Institute, Nutrition Foundation, 1990
3. Smith K.T. And Dekker M., Trace Minerals in Foods Inc., New York, 1990.
4. Helen A. Guthrie, Introductory Nutrition, 7th Edition, Mosby Publications, 1989.
5. Berdanier. C.D, Advanced Nutrition Micronutrients, CRC Press, 1994.

Course Outcomes

CO. No.	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	Interpret the significance of Macro Nutrients	1	Understanding
CO-2	Determining the energy value of foods using different equipments.	1,2	Applying
CO-3	Categorize different vitamins, their functions and deficiency diseases	1,2,5	Analyzing
CO-4	Assess different minerals in food by tracing their elements and their importance	1,2,5	Evaluating
CO-5	Discuss the role of Water and Interrelationship between mineral and mineral, vitamin and vitamin, and mineral and vitamin.	1,2	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
I	21PCND11	Advanced Food Science and Nutrition	90	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓		✓				
CO-2	✓	✓	✓	✓		✓	✓			
CO-3	✓	✓	✓	✓		✓	✓			✓
CO-4	✓	✓	✓	✓		✓	✓			✓
CO-5	✓	✓	✓	✓		✓	✓			
	Number of matches (✓) = …31…. Relationship = **Medium**									

SEMESTER – I

Course Title	**COMMUNITY NUTRITION**
Total Hours	75
Hours/Week	5
Subject Code	21PCND12
Course Type	DSC-II
Credits	4
Marks	100

General Objective:

To enable students to gain in-depth knowledge of CommunityNutrition.

Course Objectives :

CO	The learners will be able to
CO-1	Understand the importance of Community Nutrition
CO-2	Determine the common diseases in India and its preventive methods
CO-3	Categorize various community nutrition programmes in India
CO-4	Distinguish the different agencies that may combat malnutrition
CO-5	Evaluate nutrition monitoring system

UNIT: I

Introduction to Community Nutrition

Definition of Community Nutrition-Concept and scope in India-Aims and Objectives of Community Nutrition.Need and Importance of Community Nutrition. Community Health Centre and Primary Health Centre and its essential Features-Factors affecting community health.

UNIT: II

Common Diseases in India and its Prevention

Nutritional Deficiencies Disorders-Vitamin A, Protein Energy Malnutrition, Goiter, Zinc and Fluorine deficiencies - prevalence, causes, signs, symptoms treatment and prevention.

Communicable Diseases-AIDS, Hepatitis, Cholera, TB, Typhoid, Malaria, Dengue - prevalence, causes, signs, symptoms treatment and prevention.

UNIT: III

Community Programmes in India

Prophylaxis Programme: Vitamin A Prophylaxis Programme, National Anemia Control Programme, National Goiter Control Programme, National Leprosy Control Programme

Meal Programme: School Lunch Programme, Mid-day meal programme, Supplementary Feeding Programme.

Applied Nutrition Programme: PoshanAbhiyan

UNIT: IV

Agencies to Combat Malnutrition

State Agencies: Umbrella Integrated Child Development Schemes, TINP.

National Agencies: NIN, CFTRI, ICMR, NIPCCD, NNMB.

International Agencies: FAO, WHO, UNESCO, CARE

UNIT: V

Nutritional Monitoring and Surveillances

Nutritional Assessment and Nutritional Education-Methods and steps in planning, evaluation and implementation.National Nutritional Policy.Kitchen garden and its role in promoting community nutrition. Food Fortification-Food security-determinants of food security

TEXT BOOKS

1. Shegal Sahail. Text Book of Community Nutrition. Published by Indian Council of Agricultural Research ISBN: 9788171640744
2. Suryatapa Das. Text Book of Community Nutrition, Second Edition, Academic Publications, Kolkata (2016). ISBN :978-83420-69-8

REFERENCE BOOKS

1. A Study Guide for Community Nutrition in Action. Cram 101 Publishers. ISBN: 9781490229669.
2. Laitha Ishwarn Punnya. Health Education and Sports Nutrition, KhelShahiya Kendra Publications, New Delhi 2017. ISBN : 978-81-7524-889-2
3. The Educational Planning Group. Food and Nutrition for Nurses, Arya Publishing Group New Delhi 2007.ISBN:81-7064-070-9
4. Ann Burgess., Marlon Bijilswa and Ismael. Community Nutrition: A Hand book Of Health And Development Workers.2009
5. Norman J Temple. Community Nutrition For Developing Countries. Au Press Publishers.2016

Course Outcomes

CO. No.	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive level
CO-1	Interpret the essential features of Community Nutrition	1,3,5	Understanding
CO-2	Identify Nutritional Deficiencies Disorders and Communicable Diseases in India and their preventive methods	1,5	Applying
CO-3	Analyze various community programmes in India to control and eradicate diseases.	3,5	Analyzing
CO-4	Estimate different National and International agencies to combat malnutrition	1,5	Evaluating
CO-5	Infer Nutritional Assessment and Nutritional Education surveillance	1,3,4,5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
I	**21PCND12**	**Community Nutrition**	**75**	**4**

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓		✓		✓		✓
CO-2	✓	✓	✓	✓		✓				✓
CO-3	✓	✓	✓	✓				✓		✓
CO-4	✓	✓	✓	✓		✓				✓
CO-5	✓	✓	✓	✓		✓		✓	✓	✓
	Number of matches (✓) = …33…. Relationship = Low/**Medium**/High									

SEMESTER – I

Course Title	**LIFE SPAN NUTRITION**
Total Hours	75
Hours/Week	5
Subject Code	21PCND13
Course Type	DSC-III
Credits	4
Marks	100

General Objectives:

Understand the importance of nutrition and health to obtain knowledge on the nutritional needs pertaining to different stages of life.

Course Objectives:

CO	The learners will be able to
CO-1	Describe RDA and dietary guidelines for Indians
CO-2	Identify eating patterns, nutritional problems and nutritional needs of expectant and lactation mothers.
CO-3	Discuss the nutritional concerns of infants and pre-school children
CO-4	Explain the nutritional needs of school going children and adolescents
CO-5	Elaborate the nutritional requirements of adults and aged people

UNIT: I

Introduction to RDA(Indians)

RDA: Definition – Uses – limitations - factors affecting RDA- Indian Dietetic Association - food exchange list - food guide pyramid.Vegetarian diet - Classifications. Methods for assessing nutritional requirements. Dietary guidelines for Indians

UNIT: II

Nutritional needs of Expectant and Lactation mothers

Expectant mothers: physiological changes in pregnancy - General problems - nutritional needs - food requirements - Effect of nutritional status on nutritional outcome - Dietary guidelines to be followed in planning a menu for expectant mothers-nutritional needs - RDA 2020

Lactating mothers: Physiology of lactation- composition of breast milk and advantages of breast milk-disadvantages of bottle feeding. Problems

encountered in lactating mothers-food requirements - Dietary guidelines to be followed in planning a menu for lactating mothers-nutritional needs in lactation - RDA 2020

UNIT: III

Nutritional needs of Infants and Pre-school children

Infants: Low birth weight-preterm babies- feeding problems - considerations in planning nutritional needs - RDA 2020 - Types for feeding methods-advantages and disadvantages

Preschool: Dietary guidelines to be followed in planning a menu for preschool -nutritional needs - factors affecting nutritional status - RDA 2020 - eating habits and behavior in preschoolers.

UNIT: IV

Nutritional needs of School going children and adolescents

School going children: Dietary guidelines to be followed in planning a menu for pre-school children-nutritional needs - factors affecting nutritional status - RDA 2020 - Nutrition related problems of preschoolers. Packed school

Adolescence: Dietary guidelines to be followed in planning a menu for preschool-nutritional needs - factors affecting nutritional status - RDA 2020 nutrition related problems of preschoolers.

UNIT: V

Nutritional needs of adults and aged people

Adult: Nutritional requirements - food requirements - Dietary guidelines to be followed in planning a menu for adult - RDA 2020

Old age: Nutritional requirements- nutritional problems - food requirements- Dietary guidelines to be followed in planning a menu for adult - RDA 2020

TEXT BOOKS

1. Suriakanthi, A. Child Development – An Introduction, 4th Education. Kavitha Publications, 2009
2. Mary Kay Mitchell. Nutrition across Life Span. Medtech Publishers. Edition 2, 2015.

REFERENCE BOOKS

1. Baker S.S. Baker R.D and Davis A.M. Paediatric nutrition support, Jones and Barlett Publishers, Sudbury, Massachusetts. 2007.
2. Chernoff R. Geriatric Nutrition, The Health professionals Hand book.4th Edition, Jones and Bartlett Learning, Burlington. 2013.
3. Devadas, R and Jaya, N. A Text book on Child Development, 2005
4. Bhavya Kumar Sahni. Nutrition for the Community. Sri Chakradhar Publications Private Limited. 2019

Course Outcomes

CO	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	Outline the RDA and assess the nutritional requirements of Indians	2,3	Understanding
CO-2	Develop menu and dietary guidelines for expectant and lactating mothers	1,2	Applying
CO-3	Analyze the nutritional support of infants and pre-school children.	1,2,5	Analyzing
CO-4	Estimate the nutritional needs and dietary guidelines for school going children and adolescents.	1,2,5	Evaluating
CO-5	Formulate dietary guidelines for adults and create diet chart for aged people.	1,2,5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
I	21PCND13	Life Span Nutrition	75	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓				✓	✓		
CO-2	✓	✓	✓	✓		✓	✓			
CO-3	✓	✓	✓	✓		✓	✓			✓
CO-4	✓		✓	✓		✓	✓			✓
CO-5	✓	✓	✓	✓		✓	✓			✓
	Number of matches (✓) = …31…. Relationship = Low/**Medium**/High									

SEMESTER – I

Course Title	**APPLIED HUMAN PHYSIOLOGY**
Total Hours	60
Hours/Week	4
Subject Code	21PEND11A
Course Type	DSE-I-A
Credits	4
Marks	100

General Objective:

To enable students associate different Organs of the human body and their functions.

Course Objectives:

CO	The learners will be able to
CO-1	Understand the importance of cell physiology
CO-2	Illustrate the various structure of brain and cardiovascular system
CO-3	Examine respiratory system and digestive system
CO-4	Assess the functioning of excretory system and endocrinology system
CO-5	Categorize reproductive system and special senses

UNIT: I

Introduction to Cell Physiology

Structure of cell and its components-functions of cell components-Tissues-definition, types and functions- difference between cells and tissues-cell transport.Body fluid compartment-intercellular communications.

UNIT: II

Nervous system and Cardiovascular System

Nervous system: Structure and different parts of a brain and its function. Difference between autonomic nervous system and parasympathetic nervous system.Structure of a nerve cell-function of a spinal cord. Disorders of nervous system

Cardiovascular system: anatomy of the heart-origin and conduction of heart-cardiac cycle-cardiac output-electrocardiography-blood pressure and the factors affecting blood Pressure-Blood its component and functions.Disorders of cardiovascular system

UNIT: III

Respiratory system and Digestive system

Respiratory system: Structure and different parts of a lungs and airways and its function. Mechanisms of breathing. Spirometer- lung volumes and capacities-dead space-transport of gaseous in the Body-Disorders of respiratory system

Digestive system: structure and different parts of digestive system-mechanism of digestion, absorption and utilization of CHO, Proteins and fats. Disorders of digestive system

UNIT: IV

Excretory system and Endocrinology system

Excretory system: Structure and different parts of a kidney and its function. Mechanisms of excretion and urine formation-structure of a Nephron-Disorder of excretory system.

Endocrinology system: Hormones –structure and functions of thyroid and para thyroid, adrenal cortex, islets of Langerhans-disorders of endocrinology system.

UNIT: V

Reproductive system and Special senses

Reproductive system-structure and functions of reproductive organs-primary and secondary sex organs and secondary sex characters-puberty-menstrual cycle and fertilization.Disorders of reproductive system

Special Senses- Eyes and Ear-structure and functions.Disorders of special senses

TEXT BOOKS

1. Sharma Abhijit. Human Physiology Adhyanan Publishers and Distributors, 2003
2. Raje. Human Physiology for First Year Diploma in Pharmacy. Third Edition. CBS Publishers and Distributors. 2002.

REFERENCE BOOKS

1. Geetha. Human Physiology for Medical Students. Jaypees Brothers for Medical Pubisher.2021.
2. Ian Peate and Muralitharan Nair. Fundamentals of Anatomy and Physiology for Nursing and Health Care Students. Second Edition. Wiley Black Well ISBN: 9781119130093 .2016
3. InduKhurana. Human Physiology for Dental Students. Second Edition. Elsevier India Private Limited. ISBN: 987-81-312-3323-8.2013
4. Jain A K. Human Physiology for BDS. Fifth Edition.2019
5. Ramesh Mariya. Fundamentals of Human Physiology. Third Edition. AITBS Publishers.2019

6. Ross and Wilson Anatomy and Physiology in Health and Illness. Eleventh Edition. ISBN: 9781119130093 .2016

Course Outcomes

CO	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	Outline thestructure of cell, its components and functions	1	Understanding
CO-2	Illustrate various structures of brain and cardiovascular system,their functions and disorders	3,4	Applying
CO-3	Infer the respiratory system and digestive system, and their functions and disorders	3,5	Analyzing
CO-4	Interpret the functioning of excretory system and endocrinology system and its disorders	1,4,5	Evaluating
CO-5	Generalize importance of reproductive system, special senses, its function and disorders	1,5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
I	21PEND11A	Applied Human Physiology	60	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓		✓				
CO-2	✓	✓	✓	✓				✓	✓	
CO-3	✓	✓	✓	✓				✓		✓
CO-4	✓	✓	✓	✓		✓			✓	✓
CO-5	✓	✓	✓	✓		✓				✓
	Number of matches (✓) = …30…. Relationship = Low/**Medium**/High									

SEMESTER – I

Course Title	**NUTRITION FOR FITNESS**
Total Hrs.	60
Hrs./Week	4
Subject Code	21PEND11B
Course Type	DSE-I-B
Credits	4
Marks	100

General Objective:

To infer the importance of diet for health and fitness

Course Objectives :

CO	The learners will be able to
CO-1	Understand the importance of health and fitness.
CO-2	Categorize the dimensions of health.
CO-3	Acquire knowledge on physical fitness.
CO-4	Evaluate Physical Fitness through different assays
CO-5	Validate Ethical Responsibilities

UNIT I

Health- Definitions, concept of health, changing concepts, dimensions of health, concept of well-being, spectrum of health, determinants of health, ecology of health, right to health, responsibility for health and indicators of health.

UNIT II

Physical -mental – social- Positive health; Spectrum of health.Millennium development goals – Primary Health Care. Health situation in India.

UNIT III

Physical fitness- definition, factor affecting physical fitness, importance of physical fitness. Assessment of physical fitness- Body Weight, Height, BMI, Broka Index, Waist circumference, Hip Circumference, Waist to Hip Ratio.

UNIT: IV

Techniques for Obtaining Relevant Information - General Profile, Medical History and Clinical Information -Dietary Diagnosis - Assessing food and nutrient intakes, Lifestyles, physical activity and stress, Nutritional Status

UNIT: V

Ethical Codes and Guidelines, The Counsellor's Ethical and Legal Responsibility. Rights of Clients and Dimensions of Confidentiality

Textbooks:

1. Srilakshmi B., Food Science, New Age International Pvt. Ltd, New Delhi. IV edition, 2007.
2. Srilakshmi. B, Nutrition Science, New Age International (P) Limited, Publishers, New Delhi, 110002, Third Edition, 2002.

Reference Books:

1. K. Park Test book of preventive and social medicine, 15th edition, MIS Banarsidas Bhano Publishers, Jabalpur, 1997.
2. Gibney MJ - Public Health Nutrition, 2nd Edn, John Wiley & Sons.
3. Jellife D.B- Assessment of Nutrition Status of the Community, 1966, WHO, Geneva.
4. Suryatapadas –Textbook of Community Nutrition,2016, Academic Publishers
5. Prabha Bisht- Community Nutrition in India, 2017, Star Publications. 44
6. B.Srilakshmi - Nutrition Science, 2006, New Age International.
7. Swaminathan.M- Advanced Textbook on Food & Nutrition Vol 1& 2, Bappco.

Course Outcomes

CO	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	Explain the importance of diet and nutrition for maintaining health and fitness	1	Understanding
CO-2	Identify the dimensions of health and health situation in India.	1,3,5	Applying
CO-3	Examine the importance of physical fitness and identify the methods to assess physical fitness.	1,3,4,5	Analyzing
CO-4	Assess the current techniques for monitoring physical fitness	1,3,5	Evaluating
CO-5	Develop Ethical Responsibilities	5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
I	21PEND11B	Nutrition For Fitness	60	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓		✓				
CO-2	✓	✓	✓	✓		✓		✓		✓
CO-3	✓	✓	✓	✓		✓		✓	✓	✓
CO-4	✓	✓	✓	✓		✓		✓		✓
CO-5	✓	✓	✓	✓						✓
	Number of matches (✓) = …32…. Relationship = Low/**Medium**/High									

SEMESTER – I

Course Title	**MATERNAL AND CHILD NUTRITION**
Total Hrs	**60**
Hrs/Week	**4**
Subject Code	21PEND11C
Course Type	DSE-I-C
Credits	**4**
Marks	**100**

General Objectives:

Understand the nutritional needs in pregnancy for the preparation of safe childbirth and to understand the importance of nutrition in the prevention of malnutrition related problems in mothers and children

Course Objectives:

CO	**The learners will be able to**
CO-1	Describe nutritional needs of pregnancy
CO-2	Identify nutritional problems and nutritional needs of nursing mothers and infants.
CO-3	Discuss the feeding of infants and young children
CO-4	Explain the assessment and management of malnutrition
CO-5	Elaborate the maternal and child nutritional policies, and programmes

Unit-I

Nutritional needs during pregnancy, common disorders of pregnancy (Anaemia,HIV infection, Pregnancy induced hypertension), relationship between maternal diet and birth outcome. Maternal health and nutritional status, maternal mortality and issues relating to maternal health.

Unit-II

Nutritional needs of nursing mothers and infants, determinants of birth weight and consequences of low birth weight, Physiology of Breast feeding, Breast feeding support and counselling

Unit-III

Infant and young child feeding and care Current feeding

practices and nutritional concerns, guidelines for infant and young child feeding, Breast feeding, weaning and complementary feeding.

Unit-IV

Assessment and managemen to moderate and severe malnutrition among children, Micronutrient malnutrition among preschool children. Child health and morbidity, neonatal, infant and child mortality, Infant Mortality Rate and Under five, Mortality Rate; link between mortality and malnutrition

Unit-V

Overview of maternal and child nutrition policies and programmes.

Reference books

1. Wadhwa A and Sharma.S (2003). Nutrition in the Community-A Textbook. Elite Publishing House Pvt.Ltd. New Delhi.
2. ParkK (2011). Park's Textbook of Preventive and Social Medicine, 21st Edition. M/s Banarasidas Bhanot Publishers, Jabalpur, India
3. Bamji MS, Krishnaswamy K and Brahmam GNV(Eds) (2009). Textbook of Human Nutrition, 3rd edition. Oxford and IBH Publishing Co.Pvt.Ltd.New Delhi

COURSE OUTCOMES

CO. No.	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive level
CO-1	Outline the nutritional needs of pregnancy	1,2	Understanding
CO-2	Discuss the nutritional problems and nutritional needs of nursing mothers and infants	1,2,3	Applying
CO-3	Examine nutritional support of infancy and young children care	1,2	Analyzing
CO-4	Validate assessment and management of malnutrition	2,3,4	Evaluating
CO-5	Formulate policies of maternal and child nutrition.	3,4,5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
I	21PEND11C	MATERNAL AND CHILD NUTRITION	60	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓		✓	✓			
CO-2	✓	✓	✓	✓		✓	✓	✓		
CO-3	✓	✓	✓	✓		✓	✓			
CO-4	✓	✓	✓	✓			✓	✓	✓	
CO-5	✓	✓	✓	✓				✓	✓	✓
	Number of matches (✓) = …33…. Relationship = **Medium**									

SEMESTER – I

Course Title	**ADVANCED FOOD SCIENCE AND NUTRITION AND COMMUNITY NUTRITION**
Total Hours	21PCND1P1
Hours/Week	4
Subject Code	21PCND1P1
Course Type	Practical - I
Credits	2
Marks	100/2

General Objective:

The students will be able to analyze foods and organise Community NutritionProgrammes

Course Objectives:

CO	**The learners will be able to**
CO-1	Observe the effects of soaking pulses and browning experiments in vegetables and fruits.
CO-2	Demonstrate the stages of sugar cookery and coagulation of egg proteins.
CO-3	Estimate the different nutrients present in food samples.
CO-4	Evaluate planning and conducting nutrition education for the community.
CO-5	Organise Community Nutrition Awareness Programmes and Camps.

PRACTICAL EXERCISES

ADVANCED FOOD SCIENCE AND NUTRITION

1. Effects of soaking pulses with acids alkaline and salts
2. Browning experiments with acids,alkaline and salts
3. Stages of sugar cookery
4. Coagulation of egg
5. Sensory evaluation and threshold experiment
6. Estimation of CHO Protein and Fat
7. Estimation of calcium iron and phosphate in food samples

COMMUNITY NUTRITION

1. Visit to different rural areas to study nutritional status of the community
2. Planning and conducting nutrition education for the community
3. Conducting food and nutrition survey for the selected groups
4. Educating good nutritional practices to school children
5. Organising a community nutrition camp.

Course Outcomes

CO. No.	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive level
CO-1	Identify the reasons for soaking and consequences of enzymatic and non-enzymatic browning	1	Understanding
CO-2	Recognize the different forms of sugar cookery and denaturation of egg proteins	1,4	Applying
CO-3	Analyzenutritive value of various foods	2,3,4	Analyzing
CO-4	Appraise the awareness programmes on nutrition among school children and people from rural areas	2,4	Evaluating
CO-5	Compile different programmes and conducting survey	4,5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
I	**21PCND1P1**	**ADVANCED FOOD AND NUTRITION AND COMMUNITY NUTRITION**	**4**	**4**

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓		✓				
CO-2	✓	✓	✓	✓		✓			✓	
CO-3	✓	✓	✓	✓			✓	✓	✓	
CO-4	✓	✓	✓	✓			✓		✓	
CO-5	✓	✓	✓	✓					✓	✓
	Number of matches (✓) = …30…. Relationship = **Medium**									

SEMESTER – I

Course Title	**LIFE SPAN NUTRITION PRACTICAL**
Total Hours	60
Hours/Week	4
Subject Code	21PCND1P2
Course Type	Practical-II
Credits	2
Marks	100/2

General Objective:

The students will be able to infer the efficiency of diet plans for various stages of human life.

Course Objectives:

CO	**The learners will be able to**
CO-1	Examine the importance of food, food groups in daily life and the link between food and nutrients.
CO-2	Tabulate menu and prepare diet for pregnant and lactating women.
CO-3	Categorize foods for Pre-school and School going children.
CO-4	Assess the different nutritional and food requirements for adults, adolescents, old people and athletes.
CO-5	Plan a school visit to observe mid-day meal programme.

PRACTICAL EXCERCISES

Plan and prepare a day's menu using food exchange list for the following

1. Menu planning for Pregnancy
2. Menu planning for Lactation
3. Menu planning for Infants-Supplementary feeding- Preparation of weaning foods
4. Menu planning for Pre-school
5. Menu planning for School going children- meals and packed lunch
6. Menu planning for Adolescence
7. Menu planning for Adult with different working category- sedentary, moderate and heavy worker
8. Menu planning for Elderly people
9. Menu planning for sports persons
10. Visits: School visit to observe mid-day meal programme

Course Outcomes

CO. No.	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive level
CO-1	Explainthe management of menu planning.	1,3,4	Understanding
CO-2	Apply the promotion of nutritional health and well-being.	1,2,3	Applying
CO-3	Examinethe nutritional and food requirements for different age groups.	4,5	Analyzing
CO-4	Determine the dietary essentials for sports persons.	3,4,5	Evaluating
CO-5	Report on the nutritional analysis of school lunch programme.	1,4,5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
I	21PCND1P2	LIFE SPAN NUTRITION PRACTICALS	60	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓		✓		✓	✓	
CO-2	✓	✓	✓	✓		✓	✓	✓		
CO-3	✓	✓	✓	✓					✓	✓
CO-4	✓	✓	✓	✓				✓	✓	✓
CO-5	✓	✓	✓	✓		✓			✓	✓
	Number of matches (✓) = …34…. Relationship = Low/Medium/**High**									

SEMESTER – I

Course Title	**DIET THERAPY-I**
Total Hours	30
Hours/Week	2
Subject Code	21PIND11
Course Type	IDC-I
Credits	2
Marks	100/2

General Objectives:

Relate the causes, symptoms and onset of various types of diseases and to plan and prepare appropriate diets for therapeutic conditions.

Course Objectives:

CO	**The learners will be able to**
CO-1	Plan and prepare hospital diets.
CO-2	Comprehend dietary principles in planning diets for different age groups.
CO-3	Prepare diet plansfor people with diseases.
CO-4	Counsel on the dietary management for obese and underweight persons.
CO-5	Develop skills in nutritional diagnosis, planning and providing suitable preventive/therapeutic diets for various diseases and disorders.

UNIT: I

Introduction to Diet Therapy

Definition of dietetics –Food Groups-Purpose of diet therapy - Factors considering planning therapeutic diets – types and role of dietitian - Routine hospital diets - clear fluid diet -full fluid diet - soft diet - regular normal diet- pre-operative and post-operative diet

UNIT: II

Balanced Diet

Balanced diet- methods of improving an ill balanced diet. Principles of planning diet for different age groups-infancy, pre-school, school going. Adolescents, adults, pregnancy lactation and aged people.Factors to be considered while planning a diet. RDA chart 2020

UNIT: III

Nutritional management of infections

Fever, Typhoid, Malaria, Influenza and Tuberculosis: Causes, Types, signs and symptoms and principles of diet – dietary guidelines in planning a menu

UNIT: IV

Weight Management

Obesity: Etiology, Types, and principles of diet- dietary guidelines in planning a menu for obese patients – complications of obesity - treatment for obesity.

Under weight: Etiology, Types, and principles of diet - dietary modifications in planning a menu for underweight patients.

UNIT: V

Nutritional Disorders

Vitamin deficiency Disorders: Vitamin A, Rickets, Scurvy, vitamin B9 deficiency and Beriberi.

Minerals deficiency Disorders: Anemia, Osteoporosis, Goiter, and Fluorosis.

TEXT BOOKS:

1. Sri Lakshmi, B., Dietetics, Wiley eastern limited, 1993.
2. Sri Lakshmi. Nutrition Science CBS Publishers and Distributors.

REFERENCE BOOKS:

1. Krause‟s text book of nutrition and diet therapy, Macmillan Publishers, 2004.
2. Guthrie and Boston, Introductory Nutrition, VIII Edition, 1989.
3. Robinson C.H. and Lawery M. Normal and therapeutic nutrition, Macmillan Publishing Co., New York, 1990.
4. Gopalan, C. Ramashasthri, B.V. and Balasubramanian- Nutritive Value of Indian Foods, NIN, ICMR, 1998

Course Outcomes

CO	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	Illustrate the concept, purpose and principles of diet therapy along with the role and types of dieticians	1,2	Understanding
CO-2	Develop the principles of planning diet for different age groups	1,2	Applying
CO-3	Discover skills and techniques in planning and preparing therapeutic diets for febrile conditions	2,3,5	Analyzing
CO-4	Explain the etiological factors and complications, assessment parameters and dietary modifications of obese and underweight patients	2, 3, 5	Evaluating
CO-5	Discuss the reasons for nutritional disorders	2,3,5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
I	21PIND11	DIET THERAPY-I	30	2

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓			✓	✓			
CO-2	✓	✓	✓	✓		✓	✓			
CO-3	✓	✓	✓	✓			✓	✓		✓
CO-4	✓	✓	✓	✓			✓	✓		✓
CO-5	✓	✓	✓	✓			✓	✓		✓
	Number of matches (✓) = …32…. Relationship = Low/**Medium**/High									

SEMESTER –II

Course Title	**ADVANCED DIETETICS I**
Total Hrs.	75
Hrs./Week	5
Subject Code	21PCND21
Course Type	DSC-IV
Credits	4
Marks	100

General Objective:

To expertise the students in therapeutic diets and the dietary modifications for different diseases.

Course Objectives:

CO	**The learners will be able to**
CO-1	Explain the importance of Therapeutic Diets and special feeding methods
CO-2	Demonstrate Diet plan during surgery and Febrile conditions
CO-3	Explain Diet in weight management
CO-4	Summarise Diet for cancer, AIDS and Food Allergy patients
CO-5	Develop Diet for patients with Burns and Trauma

Unit I:

Therapeutic Diets

Dietary management in critically ill patients - Nutritional status assessment of the critically ill patients. Recent advances in techniques and feeding substrates. Enteral Nutrition support - Site, Different tube sizes, Different types of feeds, Composition and Delivery methods and its complications. Parenteral Nutrition - Type of access, Parenteral nutrition solutions & composition - Administration methods, Monitoring & complications.

Unit II:

Diet in surgery and Febrile conditions

Dietary management in Surgery - Nutrition in wound healing, Stage of Convalescence, Dietary management for pre and post- surgical diets.

Classification and etiology of fever/infection, symptoms, diagnostic tests, Metabolic changes during infection and dietary treatment for: typhoid, tuberculosis, malaria, influenza, Covid 19.

Unit III:

Diet in weight management

Diet in weight management – Obesity: classification, etiology, metabolic aberrations, clinical manifestations and dietary management Under weight: classification, etiology, clinical manifestations and dietary management

Unit IV

Diet in cancer, AIDS and Food Allergy

Dietary management of cancer - Types, Etiology and Signs and symptoms, and diagnosis of 20 15 cancers.Cancer therapy and its complications - Chemotherapy, Radiation therapy and Surgery.Dietary management to cancer patients. AIDS etiology, clinical manifestations and dietary management

Dietary management in allergy - Definition, Symptoms and Diagnostic tests, Common food allergens and Mechanism of food allergy, Elimination diets, Milk allergy in infants and prevention of food allergy.

Unit IV

Diet in Burns and Trauma

Dietary management in Burns - Classification and Complications, Metabolic changes in protein and electrolytes, Dietary management & mode of nutrition support for burns and wound management of burns.

Dietary management in Trauma - Physiological, metabolic and hormonal response to injury, Dietary management in trauma

TEXTBOOKS:

1. Swaminathan S- Advanced Textbook On Food & Nutrition, 2015, Bappco
2. B. Srilakshmi- Dietetics, 2019, 8th Edn, New Age International Pvt. Ltd. New Delhi.

REFERENCE BOOKS:

1) L. Kathleen Mahan, Marian Thompson Arlin, Marie V. Krause, Food, Nutrition and Diet Therapy, 13th Edition, 2001, Saunders Publications.
2) Sue Rodwell Williams, Basic Nutrition and Diet Therapy, 10th Edition, 1995, Mosby Publications.
3) Ruth A. Roth and Kathy L. Wehrle, Nutrition and Diet Therapy, 12th Edition, 2016, Cengage Learning Publishers
4) Corrine Robinson, Normal and Therapeutic Nutrition, 18th Edition, 1995, Oxford and IBH publishers.
5) Davidson and Passmore, Human Nutrition and Dietetics, 1989, London Churchill and Livingston Publishers
6) J.S. Garrow, Human Nutrition and Dietetics, 1993, 9th Edition, Churchill Livingstone Publication.

7) Antia F.P, Philip Abraham, Clinical Dietetics and Nutrition, 4th Edition, 1997, Oxford University Press.
8) Cornnie H. Robinson, Donna H. Mueller and Emma S. Weigly, Basic Nutrition and Diet Therapy, 8th Edition, 1997, Merrill Publicati

Course Outcomes

CO	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	Summarize the importance of interdisciplinary approaches to the management of nutritional problems	1	Understanding
CO-2	Construct Dietary management for pre and post- surgical	1,2,3,5	Applying
CO-3	Categorize the clinical manifestations in obese patients and Dietary management for under weight patients	1,2,3,5	Analyzing
CO-4	Summarize Diet diringCancer therapy and its complications, clinical manifestations of AIDS and Mechanism of food allergy	1,2,3,5	Evaluating
CO-5	Formulate Dietary management in burns and trauma as well as mode of nutrition support for burns and wound management of burns.	1,2,3,5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
II	21PCND21	Advanced Dietetics - I	75	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓		✓	✓	✓				
CO-2	✓	✓		✓	✓	✓	✓	✓		✓
CO-3	✓	✓		✓	✓	✓	✓	✓		✓
CO-4	✓	✓		✓	✓	✓	✓	✓		✓
CO-5	✓	✓		✓	✓	✓	✓	✓		✓
	Number of matches (✓) = …37…. Relationship = High									

SEMESTER –II

Course Title	**FOOD MICROBIOLOGY AND FOOD SAFETY**
Total Hrs.	75
Hrs./Week	5
Sub.Code	21PCND22
Course Type	DSC-V
Credits	4
Marks	100

General Objective:

To enable students to under stand the Scope of food microbiology and food safety

Course Objectives:

CO	**The learners will be able to**
CO-1	Explain the Microorganisms present in Food
CO-2	Demonstrate Principles and methods of Food Preservation and Significance
CO-3	Analyze the Role of different microorganisms in food spoilage.
CO-4	Summarize different foodborne outbreaks
CO-5	Formulate Food Safety and Quality Management System

Unit I

Food and Microorganisms

Microorganisms important in Food – Industrial importance of Mould, Yeast and Bacteria.Factors Affecting Microbial Growth and Survival in Food-Intrinsic Factors Affecting Microbial Growth and Survival in Food, Extrinsic Factors Affecting Microbial Growth and Survival in Food.Microbiological Examination of Food. Advances in Isolation and Enumeration of Microorganisms in Food.

Unit II

Food Preservation

Principles and methods of Food Preservation and Significance. Preservation of Food by Physical Methods – Low and High Temperatures. Preservation of Food by Physical Methods – Radiations. Preservation of Food by Chemical Methods. Bio preservation of Food. Fermentative Microorganisms as Food and Value-Added Product. Modified Environment for Storage of Food.

Unit III

Food Spoilage

Introduction to Food Spoilage, Spoilage of Fruits, Vegetables, and their Products, Spoilage of Dairy Products, Spoilage of Canned Food, Spoilage of Bakery and Egg Products, Spoilage of Meat, Fish, and Sea Foods. Newer Methods for Controlling Spoilage of Food.

Unit IV

Foodborne Outbreaks

Bacterial Agents for Foodborne Illnesses **-** Food infection – Definition, Classification, Types – Salmonellosis, Clostridium perfringes Gastroenteritis, Bacillus cereus Gastroenteritis, E. coli infection. Food Intoxication – Bacterial food intoxication – Botulism, Staphylococcal gastroenteritis, Mycotoxins, Aflatoxin – Definition, Types. Water borne diseases – Definition – common microorganism involved in water borne diseases.

Unit V

Food Safety

Indicators of Food Microbial Quality and Safety**.**Food Safety and Quality Management System-Principles of Hygiene and Sanitation in Food Service Establishment.Food Safety Laws. The role of government in food safety, The role of the food industry in food safety, Food protection manager certification. Recent initiatives in food safety.

Text books:

1. Frazier WC and West Hoff DC. (1992). Food Microbiology. 3rd edition. Tata McGraw-Hill Publishing Company Ltd, New Delhi, India.
2. Adams, M.R and M.O. Moss - Food Microbiology, 2000, Royal Society of Chemistry, London, England.

Reference Books:

1. Adams MR and Moss MO. (1995). Food Microbiology. 4th edition. New Age International (P) Limited Publishers, New Delhi, India.
2. Banwart JM. (1987). Basic Food Microbiology. 1st edition. CBS Publishers and Distributors, Delhi, India.
3. Jay JM, Loessner MJ and Golden DA. (2005). Modern Food Microbiology. 7th edition, CBS Publishers and Distributors, Delhi, India.
4. Lund BM, Baird Parker AC, and Gould GW. (2000). The Microbiological Safety and Quality of Foods. Vol. 1-2, ASPEN Publication, Gaithersberg, MD.
5. Matthews KR, Kniel KE, and Montville TJ. (2017). Food Microbiology: An introduction. 4th edition, ASM Press.
6. Tortora GJ, Funke BR, and Case CL. (2008). Microbiology: An Introduction. 9th edition. Pearson Education.

Course Outcomes

CO	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	Explain the Important genera associated with food and microorganisms	1,3,4,5	Understanding
CO-2	Demonstrate Techniques for enumeration of microbes and methods (traditional to advanced) for preserving food	1,3,4,5	Applying
CO-3	Analyze the Role of different microorganisms in food spoilage, food fermentation and foodborne diseases	1,3,4,5	Analyzing
CO-4	Evaluate Microbiological quality control and foodborne illnesses investigation procedures for ensuring food safety and hygiene	1,3,4,5	Evaluating
CO-5	Integrate the food safety rules and regulations, Food Safety Management System (FSMS), and Microbiological Risk Assessment.	1,3,4,5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
II	21PCND22	Food Microbiology and Food Safety	75	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓	✓	✓		✓	✓	✓
CO-2	✓	✓	✓	✓	✓	✓		✓	✓	✓
CO-3	✓	✓	✓	✓	✓	✓		✓	✓	✓
CO-4	✓	✓	✓	✓	✓	✓		✓	✓	✓
CO-5	✓	✓	✓	✓	✓	✓		✓	✓	✓
	Number of matches (✓) = …45…. Relationship = High									

SEMESTER – II

Course Title	**DIET COUNSELLING**
Total Hrs.	75
Hours /Week	5
Subject Code	21PCND23
Course Type	DSC-VI
Credits	4
Marks	100

General Objective:

To expertise the students in therapeutic diets and dietary modifications for different diseases.

Course Objectives:

CO	**The learners will be able to**
CO-1	Explain the importantance of RDA
CO-2	Demonstrate Principles and methods of diet counselling
CO-3	Analyze the Role of diet counselling skills
CO-4	Summarize different diet counselling techniques
CO-5	Formulate nutritional monitoring and evaluation

UNIT: I

Introduction to Diet Approaches

IDA: Definition- Chapters – exams – dietitian – definition - types of dieticians - role and responsibilities of a dietitian-ethical code of a dietitian-difference between registered dietitian and nutritionist.

UNIT: II

Basic of diet counselling and nutrition care process

Diet counselling-meaning-definition-scope and purpose-stages of nutritional counselling-treatment-evaluation-follow up-ethical code and responsibilities of counsellor-qualities of a counselor.

Nutritional care process-steps-nutritional assessment- definition-components.

UNIT: III

Diet counselling skills

Communication skills-verbal and nonverbal communications-counsellor responses during client negotiations-types- listening-action-sharing and teaching responses-choosing the appropriate response-interveiwing clients (diet history)-conditions facilitating interviews-parts of interviews-types of questions-advantages and disadvantages.

UNIT: IV

Counselling techniques

Tactics and techniques of counselling- Behaviour modifications-classical conditioning-operant condition and modeling approaches-Assessment of the client readiness for change-Techniques for behaviour modifications-incentives and record keeping-self monitoring-changing actual eating habits-changing activity pattern reward and enforcements-enhancing emotional support.

UNIT: V

Nutritional monitoring and evaluation

Definition-components of nutritional monitoring and evaluation-steps in nutritional monitoring-and evaluation-nutritional goals and objectives-evaluation of nutritional care

TEXT BOOKS

1. Gibney JM, Elia M, Ljungqvist O and Dowsett J. Clinical Nutrition, Blackwell Publishing, IOWA, USA.2005

2. Srilakshmi,B. Dietetics New A ge International Publisher (P) Ltd, 2015

REFERENCE BOOK

1. Counselling To Promote a Healthy Diet. Create Space Independent Publishing Platform.2013
2. Mind Body and Spirit. Counselling Issues. Sebser George. George Publishers.
3. Snetselaar Linda, Nutrition counselling Skills for the Nutrition Care Process. Ones and Barlett Publishers' Incorporation. First Edition.2005.

Course Outcomes

CO	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	Understand the role and responsibilities of a dietitian, andethical code of a dietitian	1	Understanding
CO-2	Enumerate the basicsof diet counselling and nutrition care process.	1,2	Applying
CO-3	Illustrate Communication skills, counsellor responses during client negotiations and interviewing clients regarding diet history	2,3	Analyzing
CO-4	Assess Tactics and techniques of counselling	2,3	Evaluating
CO-5	Estimatenutritional goals and objectives, and evaluation of nutritional care.	3	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
II	21PCND23	Diet Counseling	75	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓		✓				
CO-2	✓	✓	✓	✓		✓	✓			
CO-3	✓	✓	✓	✓			✓	✓		
CO-4	✓	✓	✓	✓			✓	✓		
CO-5	✓	✓	✓	✓				✓		
	Number of matches (✓) = …28…. Relationship = Low/**Medium**/High									

SEMESTER – II

Course Title	FUNCTIONAL FOODS AND NUTRACEUTICALS
Total Hours	60
Hours/Week	4
Subject Code	21PEND21A
Course Type	DSE-II-A
Credits	4
Marks	100

General Objective:

To know the basic concept of functional foods and Nutraceuticals

Course Objectives:

CO	The learners will be able to
CO-1	Understand the significance of Functional foods.
CO-2	Outline the dimensions of plant food sources.
CO-3	Examinethe importance on marine sources as functional foods.
CO-4	Interpreton prebiotic, probiotic and synbiotic foods.
CO-5	Discuss on Functional foods and consumer awareness.

UNIT: I Introduction

Important Terminologies in Functional Foods: History of Functional Foods-Classification of Functional Foods. Free radicals and its effect on health.Antioxidants: Sources-types of antioxidants-working mechanism Phytochemicals: Sources-types of Phytochemicals, working mechanism-Major difference between Antioxidant and Phytonutrients. Health attributes of functional foods

UNIT: II Functional Food from Plant Sources

Plant Sources: Chlorophyll, Carotenoids, Anthocyanins, Polyphenols (Phenolic Acid, Flavonoids, Anthocyanins, Lignans), Flavonoids (Falvanols, Isoflavanones, Catechins, Flavones), Betalins, Tannins, Phytoestrogens, Omega 3 Fatty Acids, Dietary Fibre, Glucans. Spices and Condiments (Curcumin, Resveratrol, Quercetin, Capsaicin, Piperine, Gingerol, Rosemaric Acid), Vitamin C,Vitamin E.

UNIT: III Functional Food from Animal and Marine Sources

Animal Sources: Conjugated Linoleic Acid (CLA), Carnosine, Taurine, Butyric Acid, Oleic Acids,-Omega 6 Fatty Acids, Zinc, Selenium. Marine Sources: Algae as functional foods. Chitin, Chitosan

UNIT: IV

Probiotic, Prebiotic and Synbiotic Foods

Probiotic: Definition, important features of probiotic microorganisms-mechanism of action-Probiotic in various foods-fermented milk products and non-fermented milk products-health effects of probiotic organisms. ICMR guidelines for probiotics

Prebiotic: Definition, sources of prebiotics, important features of prebiotics, mechanism of prebiotics, health effect of prebiotics on human health.

Synbiotic: Definition –important features of synbiotic on human health

UNIT: V

Functional Food in Disease Prevention and Consumer Respones

Phytochemicals in Preventing CVD, Cancer, Diabetes, Obesity, Bone Health, Cataract, Lung Health-Cognitive Health-Nervous, Heart, Immune System- Digestive System, Respiratory System, Urinary System, Musculoskeletal System

Designing Functional Foods and significance for framing new product development- International and national regulatory aspects of functional foods in India-Research frontier in functional foods

TEXT BOOKS

1. Deepak Mudgil and Sheweta Barak. Functional Foods: Sources and Health Benefits. Scientific Publishing. India. ISBN: 978-93-86237-00-2. 2017
2. Dhiraj. A. Vattem Vatsala Maitin. Functional Foods Nutraceuticals and Natural Products Concepts and Applications . ISBN: 978-1-60595-101-0.2016

REFERENCE BOOKS

1. Gupta, R. C. Nutraceuticals: Efficacy, Safety and Toxicity. Academic Press 2016.
2. Colin Barrow., Fereidoon., Marine Neutraceuticals and Functional Foods.1st Edition. CRC Press. ISBN: 978-0-36720-2-804.2017
3. ILSI. Functional Foods beyond Basic Nutrition. Monograph Series.2012
4. John Shi., Giuseppe Mazza., Marc Le Maguer., Functional Foods Biochemical and Processing Aspects. Volume 2. CRC Press .ISBN: 9781566769020.2012
5. Lynnette R. Ferguson .Nutrigenomics and Nutrigenetics in Functional Foods and Personalized Nutrition.1st Edition. CRC Press .ISBN: 978-1-4398-7681-7.2014
6. Maria Saarela. Functional Foods Concept to Product. Second Edition. Wood Head Publishing. ISBN:978-1-845690-0.2011
7. Rotimi.E. Atuko., Functional Foods and Neutraceuticals. ISBN:978-1-4614-3479-5.2012

8. Vattem, D.A., and Maitin V., Functional Foods, Nutraceuticals and Natural Products, Concepts and Applications. DES Tech Publications.2016

Course Outcomes

CO	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	Paraphrase the terminologies of Functional foods	1	Understanding
CO-2	Relate the dimensions of plant food sources and health attributes of functional foods	1,2	Applying
CO-3	Point out the vital role of marine sources as functional foods on health	2,3	Analyzing
CO-4	Evaluate on prebiotic, probiotic and synbiotic foods, and their functions on various organs	2,3	Evaluating
CO-5	Formulate on Functional foods and consumer awareness towards functional foods	3	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
II	21PEND21A	Functional Foods and Nutraceuticals	60	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓		✓				
CO-2	✓	✓	✓	✓		✓	✓			
CO-3	✓	✓	✓	✓			✓	✓		
CO-4	✓	✓	✓	✓			✓	✓		
CO-5	✓	✓	✓	✓				✓		
	Number of matches (✓) = …28…. Relationship = **Medium**									

SEMESTER – II

Course Title	**INDIAN TRADITIONAL FOODS AND AYURVEDIC NUTRITION**
Total Hours	60
Hours/Week	4
Subject Code	21PEND21B
Course Type	DSE-II-B
Credits	4
Marks	100

Course Objectives:

CO	**The learners will be able to**
CO-1	Recall the values of Indian traditional foods
CO-2	Explain the dimensions of traditional food patterns
CO-3	Relate the importance on ayurvedic principles of food
CO-4	Distinguishayurvedic diet principles
CO-5	Discuss on the eight factors related to food consumption

Unit I

Indian traditional foods

History of Indian foods and food ethos; Traditional Indian food dietary patterns; Traditional ethnic cuisines of India; Traditional and modern methods of processing foods - significance to health.

Unit II

Traditional Food Patterns

Typical breakfast, meal and snack foods of different regions of India. Regional foods that have gone Pan Indian / Global. Popular regional foods; Traditional fermented foods, pickles and preserves, beverages, snacks, desserts and sweets, street foods; IPR issues in traditional foods

Unit III

Aharatathwa – Ayurvedic principles of food

Qualities of food: Shariragunas – anabolic & catabolic (20 attributes); Rasa, Virya, Vipaka & Prabhava; Anupanas of different foods; Food and the cycles of nature; Sathvic, rajasic and tamasic foods; Ayurvedic classification of dietary substances, Concept of Agra Dravyas.

Unit IV

Ayurvedic diet principles

Concept of 'Agni' (digestive fire) and 'Amma' (undigested food); Ayurvedic perspective of balanced diet; Foods-good and bad for various constitution; Diets for the various constitutions (Vata, Pitta, Kapha& their combinations); Food for various age groups and women; Ayurvedic diet for

weight gain and reduction; Foods for brain and intellect; Ayurvedic kitchen pharmacy–Therapeutic use of spices, herbs and condiments.

Unit V

Ayurvedic principles of food consumption

Ashtavidhasamskara (eight factors related to food consumption); Viruddhaahara; Regulation of food and water intake; Order of food consumption and other ayurvedic dietary rules and etiquettes.

TEXT BOOKS:

1. Smith V A. Ayurvedic Nutrition, Motilal Banarsidass, New Delhi. 2011.
2. Ranade S. Ayurvedic Nutrition and Cooking, Chaukhamba Sanskrit Pratishthan, New Delhi. 2007.

REFERENCE BOOKS:

1. Lochan K. Dietary Rules and Prohibitions in Different Diseases (based on Bhaisajya Ratnavali), Chaukhamba Publications, New Delhi, 2016.
2. Gupta L P. Biogenic Secrets of Foods in Ayurveda, Chaukhamba Sanskrit Pratishthan, New Delhi. 2011.
3. Gautam R S. Dietetic Regime in Children, Chaukhamba Sanskrit Bhavan, Varanasi. 2010.
4. Achaya K T. Indian Food-A Historical Companion, Oxford University Press, New Delhi. 1998.
5. Raghunatha Suri's Bhojanakutahalam. Edited and Translated by Institute of Ayurveda and Integrative Medicine (I-AIM), FRLHT, Bangalore.

Course Outcomes

CO	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	Understand History of Indian foods and food ethos, Traditional ethnic cuisines of India, etc	1	Understanding
CO-2	Inculcate tradition food practices involving typical breakfast, regional foods, fermented foods, etc	2,3	Applying
CO-3	AssessQualities of food, Ayurvedic classification of dietary substances, Concept of Agra Dravyas, etc	2,4	Analyzing
CO-4	Evaluate Concepts of 'Agni' and 'Amma'	3,4	Evaluating
CO-5	Examinethe Order of food consumption and other ayurvedic dietary rules and etiquettes.	4,5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
II	21PEND21B	Indian Traditional Foods	60	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓	✓	✓				
CO-2	✓	✓	✓	✓	✓		✓	✓		
CO-3	✓	✓	✓	✓	✓		✓		✓	
CO-4	✓	✓	✓					✓	✓	
CO-5	✓	✓	✓						✓	✓
	Number of matches (✓) = 30 Relationship = Low/**Medium**/High									

Semester - II

Course Title	**BAKING AND CONFECTIONERY**
Total Hrs	**60**
Hrs/Week	**4**
Subject Code	**21PEND21C**
Course Type	**DSE-II-C**
Credits	**4**
Marks	**100**

General Objectives:

Understand the principles of baking and bakery techniques.

Course Objectives:

CO	**The learners will be able to**
CO-1	Describe the principles of baking
CO-2	Identify the baking ingredients and its functions
CO-3	Discuss bread making and its defects
CO-4	Explain biscuit, cookies and pastry making
CO-5	Elaborate on the equipments used in baking

UNIT- I

Baking: Introduction, principles of baking, basic ingredients-Types of wheat flour and their baking quality-Role of water and Salt in baking.

UNIT- II

Leavening agents: Definition, physical, chemical and biological leavening agents, role of leavening agents in baking. Sugars: Types of sugars, role in baking. Fats - Types of fats, role in baking. Milk and Milk products - Role in baking. Egg – Role in baking. Dried Fruits and Nuts role in baking.Flavoring and coloring agents' role in baking. Enzymes – Role in baking.

UNIT – III

Bread – Ingredients, Types and methods of bread making, Defects in bread making. Basic concepts, batch / continuous dough mixing -Dividing, moulding, panning, proofing and baking. Cakes – Ingredients, types of cakes and preparation of cake, Common defects in cake making. Icing – Ingredients, types

UNIT – IV

Biscuits – Ingredients, preparation of biscuits. Cookies – Ingredients and different types of cookies. Pastries – Ingredients, types and preparation of pastries. Sandwiches - Ingredients, types and preparation of Sandwiches

UNIT – V

Major and Minor Equipments for constructing bakery unit-Hygiene and Sanitation in bakery unit.

TEXT BOOK:

1) Yogambal Ashokkumar, Text book of Bakery and Confectionery, 2nd Edition (Revised), Eastern Economy Edition, 2019.

REFERENCE BOOKS:

1) Vijayakhader, Text book of food science and technology, Indian council of Agricultural Research, New Delhi, 2001
2) Kumud Khannaetal, The art and science of cooking, A student manuam, 3rd Edition,. Published by Pr.Ouseph for phoenix, publishing House Pvt Ltd, 1998
3) Earl R.Palan, Judith A.Studler, preparing for the service industry, An introductory approach, AVI publishing co Ltd, 2000
4) William C practical in baking, 2000
5) Lilian Hiagland Meyer, Food Chemistry CBS publishers and Distributors, 2004.

COURSE OUTCOME

CO	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	Outline the basics of bakery	1	Understanding
CO-2	Discuss the functions of baking ingredients like leavening agents, sugar, milk, egg, dried fruits and nuts, flavouring and colouring agents, etc	1,2	Applying
CO-3	AnalyzeBasic concepts of baking breads and cakes, and their defects	2,3	Analyzing
CO-4	Explain the preparation of biscuits, cookies, pastries and sandwiches	2,3,	Evaluating
CO-5	ImproveMajor and Minor Equipments for bakery and sanitation in bakery unit	3	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
II	21PEND21C	Bakery and Confectionery	60	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓		✓				
CO-2	✓	✓	✓	✓		✓	✓			
CO-3	✓	✓	✓	✓			✓	✓		
CO-4	✓	✓	✓	✓			✓	✓		
CO-5	✓	✓	✓	✓				✓		
	Number of matches (✓) = …28…. Relationship = Low/**Medium**/High									

SEMESTER – II

Course Title	ADVANCED DIETETICS I & DIET COUNSELLING PRACTICALS
Total Hours	60
Hours/Week	4
Subject Code	21PCND2P1
Course Type	Practical-II
Credits	2
Marks	100/2

General Objective:

To derive practical skills in diet planning and counselling

Course Objectives:

CO	The learners will be able to
CO-1	Observe clinical changes which are seen in different diseases.
CO-2	Prepare and schedule diet for different diseases
CO-3	Organize the planned menu and prepare the diet
CO-4	Appraise diet counselling techniques
CO-5	Design suitable recipes for the modified diets.

PRACTICAL EXCERCISES-ADVANCED DIETETICS I

1. Planning and preparation of different therapeutic diets
2. Planning and preparation of diet for Pre and Post surgery
3. Planning and preparation of diet for Infections and Fever
4. Planning and preparation of diet for Obesity
5. Planning and preparation of diet for Underweight
6. Planning and preparation of diet for HIV and AIDS
7. Planning and preparation of diet for Different types of cancer
8. Planning and preparation of diet for Food Allergy
9. Planning and preparation of diet for Post burns
10. Planning and preparation of diet for Trauma

DIET COUNSELLING

- Persuade the patients with appropriate diet counselling techniques.

- Write suitable recipes for the above modified diets.
- Preparation and laboratory trail of formulas for enteral Feeding- Home based and commercial supplement feeds.

Course Outcomes

CO. No.	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive level
CO-1	Demonstrate practical skills in planning and management of diets for different diseases	1,2,3,4,5	Understanding
CO-2	Experiment with the planned menu to manage disease conditions	1,2,3,4,5	Applying
CO-3	Inspect the preparation of planned menu	1,2,3,4,5	Analyzing
CO-4	Convince patients with appropriate diet counselling techniques	1,2,3,4,5	Evaluating
CO-5	Facilitate patients adopt with appropriate diet counselling techniques	1,2,3,4,5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
II	21PCND2P1	Advanced Dietetics I & Diet Councelling	60	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓		✓	✓	✓	✓	✓
CO-2	✓	✓	✓	✓		✓	✓	✓	✓	✓
CO-3	✓	✓			✓	✓	✓	✓	✓	✓
CO-4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO-5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Number of matches (✓) = …46…. Relationship = High									

SEMESTER – II

Course Title	**FOOD MICROBIOLOGY AND FOOD SAFETY**
Total Hours	60
Hours/Week	4
Subject Code	21PCND2P2
Course Type	Practical - II
Credits	2
Marks	100/2

General Objective:

To derive practical skills in Food Microbiology and Food Safety

Course Objectives:

CO	The learners will be able to
CO-1	Label various classes of microbes
CO-2	Sketch morphology of bacterial cells
CO-3	Illustrate sterilization techniques
CO-4	Evaluate the microbiological quality of milk
CO-5	Speculate Serial dilution techniques

PRACTICAL EXCERCISES

1. Study of a compound microscope.
2. Spotters- Different classes of Microbes.
3. Gram Staining and Study of morphology of bacterial cells.
4. Sterilization: principles and Operations-Autoclave, Hot Air Oven, Filtration, Laminar Air Flow.
5. Study of microbiological quality ofmilk.
6. Preparation of Media-Demonstration.
7. Serial dilution techniques- Demonstration.

Course Outcomes

CO. No.	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive level
CO-1	Classify the various classes of microbes	1,4,5	Understanding
CO-2	Demonstrate morphology of bacterialcellsusing Gram Staining	1,4,5	Applying
CO-3	Differentiate various principles and operations involved in sterilization	1,3,4,5	Analyzing
CO-4	Deduct the microbiological quality ofmilk	1,3,4,5	Evaluating
CO-5	Simulate Serial dilution techniques	1,3,4,5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
II	21PCND2P2	FOOD MICROBIOLOGY AND FOOD SAFETY	60	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓	✓	✓			✓	✓
CO-2	✓	✓	✓	✓	✓	✓			✓	✓
CO-3	✓	✓	✓	✓	✓	✓		✓	✓	✓
CO-4	✓	✓	✓	✓	✓	✓		✓	✓	✓
CO-5	✓	✓	✓	✓	✓	✓		✓	✓	✓
	Number of matches (✓) = …43…. Relationship = High									

SEMESTER – II

Course Title	**SWAYAM NPTEL ONLINE CERTIFICATION COURSE**
Total Hrs.	30
Hrs./Week	2
Sub.Code	21PSND21
Course Type	SEC
Credits	2
Marks	100/2

SWAYAM-NPTEL ONLINE CERTIFICATION COURSES

GUIDELINES AND INSTRUCTIONS

1. National Programme on Technology Enhanced Learning (NPTEL) provides e-learning through online web and video courses in Engineering, Science and Humanities streams through its portal https://swayam.gov.in/ncdetails/NPTEL.
2. Enrollment to all the courses is FREE.
3. Enrollment to courses and Examination Registration can be done ONLINE only. The link is available on NPTEL Website http://nptel.ac.in/
4. SWAYAM– NPTEL Online Certification Courses are mandated for the students in the PG Programmes from the Academic year 2021-2022.
5. Candidates must have completed Examination Registration successfully within the prescribed time to receive hall tickets and to write examinations.
6. Any Eight – Week, Two-Credit Course in any discipline to offer for two hours a week be chosen by the respective Departments in the second semester of the Postgraduate Programmes.
7. The SWAYAM–NPTEL Online Certification Courses offered during the December – April Semester be chosen by the Departments. The courses may be handled by the Department Mentor or by any teacher in the respective Departments.
8. The allocation of marks for the online examination conducted by the respective IITs is 25:75 for each course.

9. A candidate should obtain a minimum of 40 marks on 100 marks (a minimum of 10 marks for Assignment and 30 marks in the final examination) to pass the Online Courses.
10. If a student fails in the Online Examination conducted by the respective IITs he/she would be permitted to write a Supplementary Examination for 75 marks by the Controller of Examinations of our College.
11. Those who registered for the Online Courses, obtained Assignment marks, appeared for the Online Examination and failed in the courses alone are eligible to apply for the Supplementary Examinations conducted by the College.
12. If a candidate fails in the Supplemenary Examinations conducted by the College, the norms followed for taking an Arrear Examination will be adopted.
13. A provision is given to candidates to reappear for Supplementary/Arrear Examinations in the same semester to facilitate them to receive their Degrees.
14. The Question paper in Multiple Choice Question Pattern for 75 marks shall be framed by the respective faculty/ by an External Examiner for conducting the Supplementary Examinations.
15. The Supplementary Examinations would be conducted for three hours.
16. Course Completion Certificate will not be issued by the respective IITs for the candidates who clear the Online Courses through the Supplementary Examinations conducted by the College. The two credits the candidate earns, if passed, would be added in the Consolidated Statement of Marks issued by the Controller of Examinations.

SEMESTER – III

Course Title	**ADVANCED DITETICS II**
Total Hrs.	75
Hrs./Week	5
Sub.Code	21PCND31
Course Type	DSC-VII
Credits	4
Marks	100

General Objective:

To enable the students to recommend and provide appropriate nutritional care for prevention and treatment of various diseases

Course Objectives:

CO	The learners will be able to
CO-1	Explain Diet in Endocrine Disorders
CO-2	Construct Diet in Cardiovascular Diseases
CO-3	Explain Diet in Renal Diseases
CO-4	Summarize Diet in Gastro Intestinal diseases
CO-5	Formulate Nutritional Support for patients with Liver and pancreatic diseases

UNIT I

Diet in Endocrine Disorders

Diabetes Mellitus - Etiology, classification, signs and symptoms, treatment, changes in metabolism during diabetes, nutritional management, food exchange systems, diabetes education and prevention program.

Hypo and Hyperthyroidism - Etiology, signs and symptoms and medical nutritional therapy.

Gout- Etiology, signs and symptoms and medical nutritional therapy.

UNIT II

Diet in Cardiovascular Diseases

Dietary management of Cardio Vascular Diseases - Prevalence, Etiology and Risk Factors, Clinical diagnostic tests and nutrition management for - Dyslipidaemias, Atherosclerosis, Myocardial Infarction (MI) and Congestive Cardiac Failure (CCF), Prevention through life style modifications, Dietary management

Dietary management of Hypertension - Definition, Classification and Causes, Signs & Symptoms and Complications, Dietary management - Diet related factors influencing hypertension, DASH diet - Lifestyle modification

UNIT III

Diet in Renal Diseases

Dietary management of Kidney Diseases - Aetiology, clinical signs & symptoms, Physiology & functions of kidney, Kidney function tests. 15 25, Types of kidney diseases - Glomerulonephritis, Nephrotic Syndrome, Acute Renal Failure (ARF), Chronic Renal Failure (CRF), End Stage Renal Disease (ESRD)-Dialysis and Kidney Transplant. Nephrolithiasis/Renal Calculi - Aetiology, Types of stones and nutritional care- acid and alkaline ash diet., Use of sodium, potassium and phosphorus exchange lists in diet planning of kidney diseases patient. syndrome, Renal failure and Kidney stones.

UNIT IV

Diet in Gastro Intestinal diseases

Dietary management of Gastro Intestinal Diseases - Etiology, signs & symptoms and complications, Dietary management for - Gastritis, Peptic ulcer, Dyspepsia, Esophagitis and Dumping Syndrome, Flatulence, Diarrhoea, Dysentery, Constipation, Celiac disease, Steatorrhea, Tropical sprue, Irritable bowel syndrome, diverticular disease, colon cancer, Ulcerative colitis and Crohn's Disease.

UNIT V

Nutritional Support in Liver and pancreatic diseases

Liver diseases- Etiology, signs and symptoms, medical nutritional therapy of Hepatitis, Cirrhosis and Hepatic coma.

Gall bladder disease – Etiology, signs and symptoms, medical nutritional therapy of Cholecystitis and Cholelithiasis.

Pancreatic disease - Etiology, signs and symptoms, medical nutritional therapy of Pancreatitis

Textbooks:

1. Swaminathan S- Advanced Textbook On Food & Nutrition, 2015, Bappco 26 z
2. B. Srilakshmi- Dietetics, 2019, 8thEdn, New Age International Pvt. Ltd. New Delhi.

Reference Books:

1. Antia F.P. And Philip Abraham-Clinical Nutrition and Dietetics, 2001, Oxford Publishing Company.
2. Mahan L.K., Sylvia Escott-Stump - Krause's Food Nutrition and Diet Therapy 10th Edition, 2001,W.B. Saunders Company London.

3. Passmore P. And M.A. East Wood - Human Nutrition and Dietetics, Churchill Living Stone.
4. Raheena M. Begum - A Text Book of Foods Nutrition and Dietetics ¸ 3 edition 2009, Sterling Publishers Pvt. Ltd
5. Robinson Ch., M.B. Lawlea, W.L., Chenoweth, And A.E., Carwick: Normal And Therapeutic Nutrition,17thEdn, Macmillan Publishing Company.
6. Shills and Young- Modern Nutrition In Health And Disease,2012, Lippincott Williams and Wilkins.
7. Whitney, E. N. and C. B.Cataldo, Understanding Normal and Clinical Nutrition, 1983, West Pub.
8. Williams S. R.Essentials of Nutrition and Diet Therapy, 4th edn, 1986, Mosby College Pub. S. Louis.

Course Outcomes

CO	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	Summarize the Etiology, signs & symptoms, complications and Dietary management for various diseases.	1,2,3,4,5	Understanding
CO-2	Discover the dietary essentials for recovery and maintenance of various diseases.	1,2,3,4,5	Applying
CO-3	List the principles of diet therapy for metabolic and degenerative diseases.	1,2,3,4,5	Analyzing
CO-4	Decide, recommend and provide appropriate nutritional care for prevention and treatment of the various diseases.	1,2,3,4,5	Evaluating
CO-5	Plan menu for the given disease condition, and compare and contrast with R.D.A.	1,2,3,4,5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
III	21PCND31	Advanced Dietetics - II	75	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓		✓	✓	✓	✓	✓
CO-2	✓	✓	✓	✓		✓	✓	✓	✓	✓
CO-3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO-4	✓	✓			✓	✓	✓	✓	✓	✓
CO-5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Number of matches (✓) = …28…. Relationship = **Medium**									

SEMESTER – III

Course Title	**NUTRITIONAL BIOCHEMISTRY**
Total Hrs.	75
Hours/Week	5
Subject Code	21PCND32
Course Type	DSC-VIII
Credits	4
Marks	100

General Objective:

To enable students to recommend and provide appropriate nutritional care for prevention and treatment of various diseases.

Course Objectives:

CO.	The learners will be able to
CO-1	Explain the importance of carbohydrate metabolism
CO-2	Demonstrate the need for proteins and amino acids, their properties and metabolism
CO-3	Examine the properties of lipids
CO-4	Summarize classification and properties of vitamins and minerals
CO-5	Formulate the importance of hormones and nucleic acids

Unit-I

Carbohydrates

Carbohydrates: Definition, classification, properties structure, & nutritional importance. Digestion, absorption, Transportation and Metabolism of carbohydrates, (glycolysis, formation and fate of pyruvate, citric acid cycle, glycogenesis, Glycogenolysis, Gluconeogenesis, hexose monophosphate pathway), Blood sugar level & its equilibrium.

Unit-II:

Proteins and Amino Acids

Proteins: Definition, classification, properties structure and nutritional importance. Digestion, absorption, Transportation and Metabolism of Proteins (Nitrogen balance, transamination and deamination of protein, denaturation of proteins urea cycle, decarboxylation Transmethylation and biosynthesis of protein),

Unit-III:

Lipids

Lipids: Definition, classification, properties, structure and nutritional importance. Digestion, absorption, Transportation and Metabolism of lipids-Oxidation of fatty acids, fatty acid synthesis, metabolism of cholesterol, triacylglycerol and phospholipids. Rancidity and its types.

Unit-IV:

Vitamins and Minerals

Vitamins: Definition, classification, properties, structure and nutritional importance. Digestion, absorption, Transportation and Metabolism of vitamins.

Minerals: Definition, classification, properties, structure and nutritional importance. Digestion, absorption, Transportation and Metabolism of minerals.

Unit V:

Hormones and Nucleic Acids

Hormones-definitions, classification of hormones according to their mechanism of action.

Nucleic acids: definition, components, nucleosides, nucleotides, structure of DNA & RNA, and types of RNA, Role of DNA & RNA in protein synthesis.Basic concepts of nutregenomics and nutrigenetics.

TEXT BOOKS

1. AmbikaShnmugam. Fundamental of Biochemistry, 9th Edition, 2001.

REFERENCE BOOK

1. A.C.Deb, Fundamental of Biochemistry, 9th Edition, New Central Book agency (P) Ltd, 2001.
2. M.N Chaterjea&RanaShinde, Text Book of Medical Biochemistry, 8th Edition, Jaypee Brothers, Medical Publishers (P) Ltd, 2011.
3. J.L.Jain, Fundamentals of Biochemistry, S.Chand& Company Ltd, 2001
4. C.C.Chaterjee, Human Physiology, Current Distributors, 1987
5. Davidson and Passmore, Human Nutrition and Dietetics, London Churchill and Livingston Publishers, 1989.

Course Outcomes

CO	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	Understand classification and properties of carbohydrates	1,3	Understanding
CO-2	Demonstrate the Transportation and Metabolism of Proteins	2,3	Applying
CO-3	Distinguish Transportation and Metabolism of lipids, Oxidation of fatty acids, etc	2,4	Analyzing
CO-4	Explain the structure and nutritional importance of vitamins and minerals	1,4	Evaluating
CO-5	Propose Harmone classification in mechanism of actions, and Basic concepts of nutregenomics and nutrigenetics	1,3,5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
III	21PCND32	Nutritional Biochemistry	75	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓		✓		✓		
CO-2	✓	✓	✓	✓			✓	✓		
CO-3	✓	✓	✓	✓	✓		✓		✓	
CO-4	✓	✓	✓		✓	✓			✓	
CO-5						✓		✓		✓
	Number of matches (✓) = …28…. Relationship = Low/**Medium**/High									

SEMESTER – III

Course Title	**RESEARCH METHODOLOGY AND STATISTICS**
Total Hours	75
Hours/Week	5
Subject Code	21PCND33
Course Type	DSC-IX
Credits	4
Marks	100

General Objectives:

To infer the basic concepts, approaches and methods in conducting research, to learn basic statistical procedures for research, and understand applications of statistical techniques for analysis and interpretation

Course Objectives:

CO	The learners will be able to
CO-1	Understand the different types of research and various tools of data collection.
CO-2	Identify the research design and its types.
CO-3	List out the types and steps in sampling.
CO-4	Interpret and justify the research tools and techniques.
CO-5	Discuss the parametric and non-parametric statistical tests.

UNIT: I

Introduction to Research Methodology

Research: Meaning, objectives, types, significance of research, research process, criteria of good research-problems encountered in research- research problems definition-selection of problem-techniques involved in problem. Limitations and delimitations of a problem.Merits and demerits of research-steps in conducting research.

UNIT: II

Research Design

Research Design: Meaning, Need, features of research design, Types of research design (Action Research Design, Case Study Design-Causal Design Cohort Design, Descriptive Design, Experimental, Exploratory Design, Historical Design). Important concept relating to research design.

UNIT: III

Sampling

Definition-types and steps in sampling design. Probability sampling techniques-definition types merits and demerits-non probability sampling techniques-definition types merits and demerits

UNIT: IV

Research Tools, Techniques and Report writing

Research Tools, Techniques: Definition, types, Uses and purpose-types of data (primary data, secondary data, qualitative data and quantitative data)

Report writing:Significance and different steps in report writing- lay out of research report-types of report-oral presentation-mechanics of writing a research report. Precaution for writing a research report

UNIT: V

Statistical Analysis

Hypothesis –define-statement, testing null hypotheses and alternative hypothesis. Definition of parametric and non-parametric tests.Merits and Demerits. Parametric test: students T tests (Independent, paired, one tailed and two tailed) ANNOVA and Z Tests. Non Parametric test: Chi Square Test, Spearman's rank correlations, H test. Difference between parametric and nonmetric tests-SPSS Packages

TEXT BOOKS:

1. Kothari, C.R., Research Methodology: Methods and Techniques, 2nd Edition, Willey Eastern Publications. 2002,
2. AkashVed . Biostatics and Research Methodology. Thakur Publications. 2021

REFERENCE BOOKS:

1. Chandrakanth. Biostatics and Research Methodology, NiraliPraskashan Publications.2021
2. Devadas, R.P. A Handbook on Methodology of Research, Sri Ramakrishna Vidyalaya Press. 1969
3. Donald, H. Mc Burney, Theresa L. White, Research Methods, Engage Learning Publications. 5th Edition, 2002,
4. Gupta, S.P., Statistical methods, , Sultan Chand and Sons Publications.31st Edition, 2002
5. Ramakrishnan, P. Biostatistics, Saras Publications. 2001,

Course Outcomes

CO	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	Define research types, their purposes, merits and demerits	4,5	Understanding
CO-2	Interpret the features and types of research design	4,5	Applying
CO-3	Categorize the sampling design and techniques	4,5	Analyzing
CO-4	Explain research tools, techniques and report writing.	4,5	Evaluating
CO5	Elaborate and differentiate the appropriate parametric and non-parametric statistical tests	4,5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
III	21PCND33	Research Methodology and Statistics	75	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1		✓	✓		✓				✓	✓
CO-2		✓	✓		✓				✓	✓
CO-3		✓	✓		✓				✓	✓
CO-4		✓	✓		✓				✓	✓
CO-5		✓	✓		✓				✓	✓
	Number of matches (✓) = …25…. Relationship = Low/**Medium**/High)									

SEMESTER – III

Course Title	**EXTENSION EDUCATION AND COMMUNICATION**
Total Hrs.	60
Hrs./Week	4
Sub.Code	21PEND31A
Course Type	DSE-III-A
Credits	4
Marks	100

General Objective:

To enumerate on Extension education and communication.

Course Objectives:

CO	**The learners will be able to**
CO-1	Understand the changing trends in Extension education and Communication.
CO-2	Interpret principles in planning extension programme.
CO-3	Demonstrate the principles and barriers of communication
CO-4	Assess the concept of blooms taxonomy and E-extension.
CO-5	Summarize basic ideas about tools for evaluation

UNIT – I CONCEPT OF EXTENSION EDUCATION

Education- Meaning, Types. Extension Education- Meaning- Definition-Objectives- Characteristics, Scope, Philosophy, Principles, Importance- Changing trends in extension education.Qualities and Role of Extension Worker- Concept of Extension Educational Process.

UNIT – II EXTENSION TEACHING METHODS

Extension Teaching Methods - Meaning- Function- Classification. Selection, Use and Combination of Extension Methods. Edgar Dale's Cone of Experience. **Extension programme planning** -Meaning of Program, Planning, Programme Planning in Extension, Objectives of the Programme. Steps/process of programme planning. Importance and principles. Five year plans and Social Welfare Programmes for Rural Development.

UNIT-III TEACHING, LEARNING AND EVALUATION

Teaching and Learning- Meaning-Definition-Principles and steps in teaching and learning. Evaluation – Meaning, types, Tools of evaluation and steps. Curriculum development and planning for extension education and development activities, Bloom's taxonomy of educational objectives and learning.

UNIT-IV COMMUNICATION

Communication- Meaning, characteristics, functions, models, elements, principles, barriers, types of communication, levels of communication. Development Communication.

UNIT –V E-EXTENSION.

E-Extension – Meaning. Need for E-Extension.Community radio, World Wide Web, Tele and Video conferencing, Internet and Electronic Mail. Computer Aided Extension- Knowledge management, information kiosks, Mobile technologies. Application of ICT in Extension Education.

Textbooks:

1. Serene Shekhar (Gote) &SantoshAhlawat (2013). Textbook of Home Science Extension Education. Daya Publishing House, New Delhi.
2. SandhyaMohanty Rani (2017). Home Science Extension Education and Rural Development.
3. Ray.G.L. (1991). Extension Communication and Management. Nayaprokash, Delhi.India.
4. Dahama, O.P. and Bhatnagar O.P. (1987), Education and Communication for Development. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi

Reference Books:

1. ChauhanJitendra (2006). Communication and Extension Management. Anjali Prakashan, Kalyanpur, Kanpur
2. Khan,P.M (2002). Textbook of Extension Education, Himansu Publication, Udaipaur.
3. Leagans J.P. (1961), Characteristics of Teaching and Learning in Extension Education,
4. Reddy, A.A. (1976), Extension Education, Shree Lakshmi Press, Baptala. Andhra Pradesh.
5. Devadas Rajammal. P(1980). Text book of Home Science, NCERT, New Delhi.

Course Outcomes

CO	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	Explain the concept of Extension Education and Communication.	1	Understanding
CO-2	List the rural problems to choose suitable social welfare programmes for beneficiaries.	2,3	Applying
CO-3	Classify Extension Teaching methods	2,3	Analyzing
CO-4	Evaluate the suitable programme to implement in village.	4,5	Evaluating
CO-5	Develop ICT module for Rural community	3,4,5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
III	21PEND31A	Extension Education and Communication	60	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓		✓				
CO-2	✓	✓	✓		✓		✓	✓		
CO-3	✓	✓	✓	✓			✓	✓		
CO-4	✓	✓	✓						✓	✓
CO-5	✓	✓	✓		✓			✓	✓	✓
	Number of matches (✓) = 29 Relationship = Medium									

SEMESTER – III

Course Title	**POST HARVEST TECHNOLOGY**
Total Hrs.	60
Hrs./Week	4
Sub.Code	21PEND31B
Course Type	DSE-III-B
Credits	4
Marks	100

General Objective: To understand the Pre and Post-harvest losses and packaging technology that protects the quality of fresh fruits and vegetables.

Course Objectives:

CO	**The learners will be able to**
CO-1	Discover the causes of post-harvest food losses and its prevention.
CO-2	Administer the changes during maturity and ripening, use of chemicals to increase the shelf life of fruits and vegetable.
CO-3	Analyze the factors responsible for deterioration of fruits and vegetables.
CO-4	Evaluatevarious packaging technology.
CO-5	Develop attributes of Halal packaging, certification and standards.

Unit I Concepts of Post-harvest Technology (PHT)

Post Harvest Technology -Definition- Objectives –Importance – Principles- causes of postharvest foodlosses and prevention measures. Harvesting –Hand & Mechanical Harvesting.Post Harvest Handling.

Unit IIMaturity and Ripening of fruits and vegetables

Maturity – Horticultural, Physiological, commercial & Harvest maturity. Criteria of maturity for harvesting fruits and vegetables. Factors affecting maturity- Changes during Fruit ripening-Use of chemicals for increasing shelf life- Factors affecting ripening

Unit IIIFactors responsible for Deterioration of fruits and Vegetables

Factors –Preharvest factors-During harvest factors – Post harvest factors. Primary causes of Loss-Enzymic changes, Chemical changes, Physical changes and Biological changes. Secondary causes of Loss- Site of Losses. Technologies for minimizing the losses.

Unit IV Storage and Packaging Technology

Storage objective; Storage practices: hypobaric storage, pre-cooling and cold storage, Zero energy cool chamber**.** Packaging Technology-Importance and application.Laws and regulation available for packaging methods.Packaging methods of various food products. Glimpse of packaging materials available for packaging methods. Greenhouse technology- concept and principles-types of greenhouses, classification of greenhouse, Advantages of Green house technology.

Unit VNew Trends in Fresh Produce Packaging

Types of Packaging materials (Traditional & Industrial)-Packaging materials in use- Jute Reinforced Plastics (JRP) - Modified Atmosphere Packaging (MAP)-Controlled Atmospheric Packaging (CAP)-Active Packaging-Vacuum Packaging - Edible packaging-Biodegradable packaging. Halal packaging certification and standard. Quality control in Packaging.

Textbooks:

1. Kumar,U. (2019). Food Science Processing Technology. Random Publications, New Delhi, India.
2. Hosahalli S, Ramaswamy, P. (2015). Post harvest technologies of fruits and vetables. DES tech Publications,Inc, USA.

Reference Books:

1. Sugumar,M (2018). A Textbook of Food Packaging Techniques. Edit Venue Infoserv Private Limited, Puducherry.
2. Lisa Kitinoja and Adel A. Kader (2015) Small-Scale Postharvest Handling Practices: A Manual for Horticultural Crops (5th Edition). Postharvest Technology Research and Information Center, University of California, Davis.
3. Richard Coles, Derek Mcdowell & Mark J.Kiran (2003) Food Packaging Technology. Black well Publishing Ltd.
4. Srilakshmi,B. (2008).Food Science (Fourth Edition). New Age International (P) Limited, Publishers, New Delhi.

Course outcomes

CO	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	List the importance and principles of post-harvest technology.	1,2	Remembering
CO-2	Explain the Laws and regulation available for packaging methods.	3,4	Understanding
CO-3	Categorize primary and secondary causes of loss of fruits and vegetables	2,3	Applying
CO-4	Predict the factors affecting maturity and ripening.	2,4	Analyzing
CO-5	Discuss the novel packaging techniques.	1,3,5	Creating

Relationship Matrix

Semester	Course Code			Title of the Course			Hours		Credits
III	21PEND31B			Post Harvest Technology			60		4
Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓		✓	✓			
CO-2	✓	✓	✓		✓			✓	✓	
CO-3	✓	✓	✓	✓			✓	✓		
CO-4	✓	✓	✓				✓		✓	
CO-5	✓	✓	✓		✓	✓		✓		✓
	Number of matches (✓) = 30 Relationship = Medium									

Semester – III

Course Title	**NUTRITIONAL ASSESSMENT**
Total Hrs	**60**
Hrs/Week	**4**
Subject Code	21PEND31C
Course Type	DSE-III-C
Credits	**4**
Marks	**100**

General Objectives:

Associate the techniques applied for nutritional assessment to undertake nutrition based community surveys

Course Objectives :

CO	The learners will be able to
CO-1	Describe the objectives of nutrition assessment.
CO-2	Identify the principles of anthropometric assessment.
CO-3	Discuss the biochemical assessment and clinical signs of humans.
CO-4	Explain dietary survey.
CO-5	Elaborate on community based projects and principles.

Unit I

Objectives and goals of Nutritional Assessment, Adequate and Optimum Nutrition, Signs and symptoms of malnutrition-Under nutrition and Overnutrition.

Unit II

Anthropometric Assessment, Circumference Measurements and Body Fat Measurements-Principle and Techniques. Interpretation of the separameters with standard reference values for allages. Practical application of the setechniques.

Unit III

Biochemical Assessment- To study the estimation of common parameters used in the assessment of community surveys.

Clinical Signs- To learn the clinical signs of commonly observed deficiency disorders ofnutrients.

UnitIV

Dietary surveys –to estimate nutrients using 24-hour recall and food frequency questionnaires. To learn the use of appropriate software for nutrient estimation in the diets of People.

UnitV

To take up a small community based nutrition project and apply the principles of nutritional assessment.

REFERENCE:

1) Guthrie H.A. Introductory Nutrition C.V.Mosby Co. St.Louis.
2) Bogert, J.G.V. Briggs,D.H. Calloway Nutrition and physical fitness (1985), 11th edition, W.B.Saunders Co., Philadelphia, London, Toranto.
3) Wardlaw, G.M. Insel,P.H. Perspectivesin Nutrition (1990) Times Mirror/Mosby College Publishing Co. St.Louis, Toronto, Boston.
4) Maurice E. Shils, James A. Olson, Moshe Shike "Modern Nutrition in health and disease" (1994) eighth edition, Vol. I & II Lea & febiger Philadelphia, A waverly Company.

COURSE OUTCOME

CO	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	Outline the introduction of nutrition assessment.	1,2,3,4,5	Understanding
CO-2	Discuss the Practical application of anthropometric assessment.	1,4,5	Applying
CO-3	Analyze common parameters used in the assessment of community surveys and clinical signs of commonly observed deficiency disorders of nutrients.	1,2,3,4,5	Analyzing
CO-4	Evaluate the appropriate software for nutrient estimation in thediets of people.	1,2,4,5	Evaluating
CO-5	Originate a community based project for nutrition survey.	1,2,4,5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
III	21PEND31C	Nutritional Assessment	60	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO-2	✓	✓		✓	✓	✓			✓	✓
CO-3	✓	✓		✓	✓	✓	✓	✓	✓	✓
CO-4	✓	✓	✓	✓	✓	✓	✓		✓	✓
CO-5	✓	✓	✓	✓	✓	✓	✓		✓	✓
	Number of matches (✓) = …44…. Relationship = High									

SEMESTER – III

Course Title	**ADVANCED DIETETICS-II**
Total Hours	60
Hours/Week	4
Subject Code	21PCND3P1
Course Type	Practical-V
Credits	2
Marks	100/2

General Objective:

To enable students provide appropriate nutritional care for prevention and treatment of various diseases

Course Objectives:

CO	The learners will be able to
CO-1	Learn to prepare hospital diets
CO-2	Comprehend dietary principles in planning diets for different diseases
CO-3	Illustrate planning diets for the disease conditions
CO-4	Counsel on the dietary management of cancer, dialysis, liver and gall bladder disease
CO-5	Develop skill in nutritional diagnosis, planning and providing suitable preventive/ therapeutic diets for various diseases / disorders

Practical Excercises:

1. Planning and preparation of diets for diabetes patient
3. Planning and preparation of diet for Thyroid patient
4. Planning and preparation of diet for gout patient
5. Planning and preparation of diet for CVD patient
6. Planning and preparation of diet for Hypertension Patient
7. Planning and preparation of diet for Dialysis Patient
8. Planning and preparation of diet for ESRD Patient
9. Planning and preparation of diet for Kidney stone Patient
10. Planning and preparation of diet for Peptic Ulcer Patient
11. Planning and preparation of diet for Colon Cancer Patient
12. Planning and preparation of diet for liver diseases Patient
13. Planning and preparation of diet for gall bladder diseases

Course Outcomes

CO	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	Summarize various hospital diets	1	Understanding
CO-2	Apply appropriate dietary principles in planning diets for different diseases	1,2	Applying
CO-3	Analyze appropriate diets for various diseases	2,3	Analyzing
CO-4	Evaluate on the dietary management of thyroid, diabetes and gout diseases	2,3	Evaluating
CO-5	Formulate proper planning and providing suitable therapeutic diets for various disorders	5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
III	21PCND3P1	ADVANCED DIETETICS-II PRACTICALS	60	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓		✓				
CO-2	✓	✓	✓	✓		✓	✓			
CO-3	✓	✓	✓	✓			✓	✓		
CO-4	✓	✓	✓	✓			✓	✓		
CO-5	✓	✓	✓	✓						✓
	Number of matches (✓) = …28…. Relationship = **Medium**									

SEMESTER – III

Course Title	**NUTRITIONAL BIOCHEMISTRY**
Total Hours	60
Hours/Week	4
Subject Code	21PCND3P2
Course Type	Practical-VI
Credits	2
Marks	100/2

General Objectives:

Understand the biochemical methods and analyses used in nutritional research.

Course Objectives:

CO	The learners will be able to
CO-1	Outline the guidelines and precautions followed in biochemistry lab
CO-2	Identify the estimation of serum plasma protein
CO-3	Analyse the salivary amylase activity in different temperatures
CO-4	Estimation of physical and chemical examination of urine
CO-5	Describe the estimation of protein in urine

Practical Excercises:

1. Guidelines and precautions to be followed in biochemistry lab-

2. Spotters: colorimeter, centrifuge, spectrophotometer, microkjeldahl

3. Physical and Chemical Examination of blood

4. Determination of Glucose in Serum and Estimation of Serum Plasma Protein

5. Estimation of urea and uric acid in blood

6. Physical and chemical Examination of Urine

7. Estimation of Protein, ketone bodies and bilirubin In Urine

8. Estimation of ascorbic acid and calcium in urine

9. Microscopic examination of urine

Course Outcomes

CO	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	Demonstrate the guidelines and rules of biochemistry lab	1	Understanding
CO-2	Experiment with the determination of glucose in serum	1,3,5	Applying
CO-3	Examine the salivary amylase activity in different temperatures	1,3,5	Analyzing
CO-4	Explain the physical and chemical examination of blood	1,3,5	Evaluating
CO5	Discuss the procedure for estimation of uric acid in blood.	1,3,5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
III	21PCND3P2	NUTRITIONAL BIOCHEMISTRY	60	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓		✓				
CO-2	✓	✓	✓	✓		✓		✓		✓
CO-3	✓	✓	✓	✓		✓		✓		✓
CO-4	✓	✓	✓	✓		✓		✓		✓
CO-5	✓	✓	✓	✓		✓		✓		✓
	Number of matches (✓) = …33…. Relationship = Low/**Medium**/High									

SEMESTER – III

Course Title	**DIET THERAPY – II**
Total Hours	30
Hours/Week	2
Subject Code	21PIND31
Course Type	IDC-II
Credits	2
Marks	100/2

General Objectives:

Understand the pathology of metabolic diseases, cardiovascular , renal diseases cancer, AIDS and their dietary modification

Course Objectives:

CO	The learners will be able to
CO-1	Learn theetiology, clinical symptoms, diagnosis, treatment and dietary modifications in diabetes mellitus
CO-2	Identify the different function and dietary management of kidney diseases
CO-3	Analyze the risk factors and dietary management of cardiovascular diseases
CO-4	Estimate the dietary management for gastrointestinal, liver and gall bladder diseases.
CO-5	Describe the classification of cancer and dietary guidelines of AIDS

Unit I

Diabetes Mellitus

Definition, Etiology - IDDM, NIDDM-Environmental factors –Types Symptoms - diagnosis-GTT- Management of Diabetes - Nutritional Requirements – Dietary Guidelines –Foods to be included -Avoided-Complications.

Unit II

Diseases of kidney

Functions- Glomerulonephritis- Nephritic syndrome- Types Acute and Chronic Renal failure, Causes, symptoms of Renal disease. Principles of dietary management- dialysis and Calculi Dietary management.

Unit III

Diseases of cardio vascular system

Risk factors - Principles of dietary management inatherosclerosis, hypertension–Causes, types, principle of diet, hypercholesterolemia and management.

Unit IV

Diseases of the liver

Agents responsible for liver damage, causes, Infective Hepatitis - symptoms and Principles of dietary management, cirrhosis of the liver– Aetiology, symptoms and clinical findings, principles of diet, dietary management.

Unit V

Cancer-Classification, Risk factors, dietary factors, symptoms, Nutritional requirements and dietary guidelines.

AIDS- causes, signs and symptoms, and dietary modification.

Burns: degree of burns - Principles of dietary management in burns

TEXT BOOKS:

1. Sri Lakshmi, B., Dietetics, Wiley eastern limited, 1993.
2. Gopalan, C. Ramashasthri, B.V. and Balasubramanian- Nutritive Value of Indian Foods, NIN, ICMR, 1998.

REFERENCE BOOKS:

1. Guthrie and Boston, Introductory Nutrition, 1989, VIII Edition.
2. Robinson C.H. and Lawery M. - Normal and therapeutic nutrition, Macmillan Publishing Co., NewYork, 1990

Course Outcomes

CO	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	Understand the causes, types, biochemical changes, diagnostic tests, glycemic index, acute and chronic complications and dietary management of diabetes mellitus	1,2,3,5	Understanding
CO-2	Identify the functions of kidney and the damages, clinical symptoms and dietary modifications of various kidney diseases	1,2,3,5	Applying
CO-3	List out the etiology, complications and dietary modifications of various cardiovascular diseases	1,2,3,5	Analyzing
CO-4	Explain the functions, clinical symptoms and damages caused in various liver diseases	1,2,3,5	Evaluating
CO-5	Formulate knowledge on causes, nutritional care and treatment of cancer and HIV.	2,3,5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
III	21PIND31	DIET THERAPY – II	30	2

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓		✓	✓	✓		✓
CO-2	✓	✓	✓	✓		✓	✓	✓		✓
CO-3	✓	✓	✓	✓		✓	✓	✓		✓
CO-4	✓	✓	✓	✓		✓	✓	✓		✓
CO-5	✓	✓	✓	✓		✓	✓	✓		✓
	Number of matches (✓) = …40…. Relationship = Low/Medium/**High**									

SEMESTER – IV

Course Title	**FOOD PROCESSING AND PRESERVATION**
Total Hours	75
Hours/Week	5
Subject Code	21PCND41
Course Type	DSC-X
Credits	4
Marks	100

General Objectives:

Infer the basic concepts of food processing and preservation.

Course Objectives:

CO	The learners will be able to
CO-1	Describe basic food preservation and food processing.
CO-2	Illustrate on the basic processings on cereals and millets.
CO-3	Explain the process of preserving fruits and vegetables.
CO-4	Estimate on the Preservation of milk, meat, egg and seafoods.
CO-5	Discuss on processing of nuts and oil seeds.

UNIT: I

Introduction to Processing and Preservation

Food Processing: Definition, need and objectives for food processing. Indian food Industry. Category of food processing industries. Challenges of food processing sectors in India. Recent development and growth in the food industry. Procedures to start a food industry.

Food Preservation: Definition, need and objectives for food Preservation. Types and methods of food preservation. Recent Methods of preservation (irradiation, pulsed electric field processing, ohmic heating, microwave heating)

UNIT: II

Processing and Preservation of Cereals, Pulses and Millets

Production, composition, types, milling, Pre-processing and Processing and storage of Cereals, Millets and Pulses.Breakfast and extruded products. Ready to eat foods.

UNIT: III

Processing and Preservation of Fruits and Vegetables

Production, composition, Pre-processing, Processing, storage of fruits and vegetables. Preservation by sugar, salt, Chemicals, preservation of high temperature (canning).steps involved in canning. preservation of low temperature (refrigeration, freezing) preservation by removing moisture (dehydration, drying and solar drying)

UNIT: IV

Processing and Preservation of Milk, Meat Egg and Sea Foods

Production, composition, types, Pre-processing and Processing, storage of milk meat, egg and sea foods. Preservation using- high temperature (pasteurisation) Preservation of low temperature (refrigeration, freezing)

UNIT: V

Processing and Preservation of nuts, oil seeds and spices and condiments

Production, composition, types, Pre-processing, Processing storage of Nuts and Oils Seeds. Production, composition, types, Pre-processing, Processing storage of Spices and Condiments.

TEXT BOOKS

1. Sivasankar B. Food Processing and Preservation. PHI Learning Private Limited. New delhi-110001 (20090.878-81-203-2086-4
2. Subbulakshmi G, Shobana A Udipi. Food processing and Preservation. New age Publishers Private Limited. (2017). ISBN: 9788122412833

REFERENCE BOOK

1. Jacobs. M.B. The Chemical Analysis of Foods and Food Products (2006). ISBN: 97881223906430
2. James G. Brenan. Food Processing Principles and Application. John Wiley and Sons.(2014)
3. Srivastava and Sanjeev Kumar. Fruits and Vegetable Preservation. Principles and Practices. Third Edition. CBS Publishers and Distributors.(2000)
4. Stephanie Clark, Stephanie Jang Buddhi Lamshal. Food Processing Principles and Application. John Wiley and Sons.(2014)
5. Subulakshmi Shoba A Udupi. Food Processing and Preservation. New Age International Publishers.(2006)
6. Summan Bhatti and Uma Varma. Fruits and Vegetable Processing. CBS Publishers and Distributers.ISBN:9788123904047
7. Vijay Kader and Kumar. Preservation and Processing of Fruits and Vegetables. Kalyani Publishers. (2000)

Course Outcomes

CO	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	Distinguish Category of food processing industries, Types and methods of food preservation.	1	Understanding
CO-2	Demonstrate Pre-processing and Processing and storage of Cereals	1,2	Applying
CO-3	AnalyzeProduction, composition, Pre-processing, Processing, storage of fruits and vegetables	3,4	Analyzing
CO-4	Evaluate Production, composition, Preservation of milk, meat, egg and sea foods, and their preservation using high temperature and low temperature.	3,4	Evaluating
CO-5	Discuss on Pre-processing, Processing storage of Spices and Condiments.	3	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
IV	21PCND41	FOOD PROCESSING AND PRESERVATION	75	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓		✓				
CO-2	✓	✓	✓	✓		✓	✓			
CO-3	✓	✓	✓	✓				✓	✓	
CO-4	✓	✓	✓	✓				✓	✓	
CO-5	✓	✓	✓	✓				✓		
	Number of matches (✓) = …28…. Relationship = Low/**Medium**/High									

SEMESTER – IV

Course Title	**SENSORY EVALUATION AND CULINARY SERVICE**
Total Hours	75
Hours/Week	5
Subject Code	21PCND42
Course Type	DSC-XI
Credits	4
Marks	100

General Objective:

To clarify the significance of sensory analysis for the techniques it provides in product development and culinary services.

Course Objectives:

CO	The learners will be able to
CO-1	Understand the sensory attributes of foods
CO-2	Discuss sensory evaluation and its methods of foods
CO-3	Identify the objective and instrumental evaluation of foods
CO-4	Evaluate the diversity of Indian food culture
CO-5	Discuss regional cuisines of Tamil Nadu.

UNIT I

Concepts in sensory evaluation of foods

Sensory attributes of foods: Chemical senses (olfactory and gustatory); physical, kinaesthetic and tactile senses (appearance, colour, texture, & overall taste). Planning and conducting sensory evaluation: Physical setup for conducting sensory analysis; Panel development for sensory evaluation-selection and training; performance appraisal of panel. Preparation and presentation of samples; Score card development.Role of sensory analysis in product development & quality control.

UNIT II

Sensory evaluation methods

Subjective and objective methods- Definition, advantages and disadvantages. Subjective tests: Analytical tests (sensitivity tests, difference tests, ranking tests), descriptive tests, consumer/ preference tests.

UNIT III

Objective evaluation methods

Objective methods for appearance, size, shape, volume, specific gravity, refractive index, moisture, fat and others. Instrumental methods for evaluation of colour, viscosity, texture & aroma.

UNIT IV

Regional Cuisines of India

Diversity of Indian Food Culture - Types of Indian Cuisine, Punjabi Cuisine, Rajasthani Cuisine, Bengali Cuisine, Tamilian Cuisine, Kerala Cuisine, Andhra Pradesh Cuisine, Telangana Cuisine, North Indian Cuisine, South Indian Cuisine.

UNIT V

Regional Cuisines of Tamilnadu

Tamil Cuisine – Regional Influences and Culinary Diversity of Tamil Nadu. **Origins of Tamil Cuisine** Regional Cuisines of Tamilnadu – Chettinadu cuisine, Nanjil Nadu Cuisine, Kongu Nadu Cuisine. Ethnic fermented foods and beverages.

TEXT BOOKS:

1. Sensory evaluation of food: Principle & practices by Harry L. Lawless, Hildegarde, Heymann, 1999
2. A Historical Dictionary of Indian Food by K.T Achaya,(2002)

REFERENCE BOOKS:

1. Sensory evaluation of Food, H.T. Lawless, H. Heymann, Springer, ISBN 978-1-4419-6488-5
2. Introduction to Chemical Analysis of Foods. By Nielsen, S.(Eds), Jones & Bartlett, 1994.
3. Spectral method in food analysis by MagdiMossoba, 1999
4. Sensory evaluation technique by Morton C. Meilgaard, 2007
5. Food Chemistry by W. Grosch by Belitz, H.D., Grosch, W. 2nd ed., 1999

Course Outcomes

CO	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	Outline the concepts of sensory evaluation and role of sensory analysis in food product.	1,3,5	Understanding
CO-2	Identify the subjective and objective methods of sensory evaluation.	1,3,5	Applying
CO-3	Categorize the objective methods and instrumental methods of sensory evaluation.	1,3,5	Analyzing
CO-4	Interpret the regional cuisines of India	1,3,5	Evaluating
CO5	Elaborate the regional influences and culinary diversity of Tamil Nadu	1,3,5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credit
IV	21PCND42	SENSORY EVALUATION AND CULINARY SERVICE	75	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓		✓		✓		✓
CO-2	✓	✓	✓	✓		✓		✓		✓
CO-3	✓	✓	✓	✓		✓		✓		✓
CO-4	✓	✓	✓	✓		✓		✓		✓
CO-5	✓	✓	✓	✓		✓		✓		✓
	Number of matches (✓) = …35…. Relationship = Low/Medium/**High**									

SEMESTER – IV

Course Title	**PROJECT**
Total Hrs.	120
Hrs./Week	8
Sub.Code	21PCND43
Course Type	Project
Credits	4
Marks	150

The following are the guidelines to be adhered to by the Postgraduate students :

- Individual Projects should be taken.
- The Project should be written in English only.
- The Minimum number of pages should be 60.
- Project observations, suggestions and summation/conclusion shall form part of the Project Report.
- The Projects will be evaluated by the Internal Examiner and the External Examiner for 150 marks. The distribution of mark should be 90 marks for the Project Report and 60 marks for the Viva-Voce Examination. The Division of marks for the Project Report is as follows:

Particulars	**Internal Examiner**	**External Examiner**
Wording of Title	5	5
Objectives / Formulation including Hypothesis	10	10
Review of Literature	15	15
Relevance of the Project to Social Needs	10	10
Methodology / Technique / Procedure Adopted	30	30
Summary / Findings / Conclusion / Summation	10	10
Bibliography / Annexure / Foot notes / Works Cited / Works Consulted	10	10
Total	90	90

- The Internal Examiner and the External Examiner will award the marks for each candidate. The average mark obtained by the candidate is considered marks for the Project Report.

SEMESTER – IV

Course Title	**TEXTILE DESIGNING**
Total Hrs.	60
Hrs./Week	4
Sub.Code	21PEND41A
Course Type	DSE-IV-A
Credits	4
Marks	100

General Objective: Outline the basic concepts of textiles

Course Objectives:

CO	The learners will be able to
CO-1	Understand the importance of textiles
CO-2	Organize the different garment enrichment
CO-3	Identify the colour schemes in dress
CO-4	Practice different types of embroidery
CO-5	Formulate the mending process of dress

UNIT – I

Introduction to Textile designing

Introduction to Needle craft, tools and materials used in needle craft, drafting tools - Motif Selection - Design Transfer.

Basic Hand stitches – Techniques used, Application of Basting, running, tacking, hand overcast, button hole, hemming stitches.

UNIT – II

Garment Enrichment

Garment Enrichment - Structural decoration - Darts - Gatherings - Pleats – Tucks- Smocking Applied Decoration – Introduction, Methods, Types and application of Braiding, Hooking, Macrame knotting, Bead work - Sequins - Cut work - zardosi work - mirror work - Thread work - Ribbon work - Stone work.

UNIT- III

Colour scheme in dress

Colour-Definition – colour theories – Prang colour chart, Munsell colour system -Dimensions of colour hue, value, and intensity - Standard colour harmonies-COLOUR SCHEMES IN DRESS-Colour and age, colour and occasions, Colour and emotion, Colour and character, colour and personality

UNIT – IV

Embroidery

Free style Embroidery: Patch work -Braiding - appliqué - quilting and shadow work.Traditional embroideries of India - Kutch work- Kathiawar - Kasuthi of Karnataka -Chikankari of Lucknow –Kantha of Bengal - Kashida of Kashmir –Phulkari of Punjab, Gota of Rajasthan, Toda of Nilgiri hills (TamilNadu)

UNIT – V

Mending

Mending – Introduction – Definition – Types - Visible and invisible stitches– Mending with fusible web, glue, rip in the seams, Patch mending, darning, decorative or ornamental patching

TEXTBOOKS:

1. Jenny Davis, (2006). A Complete Guide to Fashion Designing, First Edition, Abhishek Publications, Chandigarh.
2. Kathryn McKelvey and Janine Munslow ,(2005). Fashion Design: Process, Innovation and Practice, Blackwell Science Ltd., Blackwell Publishing Company, UK.

REFERENCE BOOKS

1. Shaylaja; D. Naik, Traditional Embroideries of India – APH corp, New Delhi 1996 2.
2. Sheila paine: Embroidered Textile- Thames & Hudson Ltd. 1990 3. Usha Srikant: Ethnic Embroideries of India
3. Embroidered Textile- Thames & Hudson Ltd. 1990 3. UshaSrikant: Ethnic Embroideries of India
4. HossX.P,Textiles fibers and their use.
5. Fundamentals of Textiles and their use (Orient Longman Ltd.,)
6. Danlkar and Mary Mathew, Household Textiles and laundry work.
7. Macmillan and Co, Clothing for modern.
8. Bela Kapoor, Pattern drafting and making up.

Course Outcomes

CO	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	Understand the techniques usedin Basic Hand stitches	1	Understanding
CO-2	Illustrate Structural decoration and Smocking Applied Decoration	1,2	Applying
CO-3	Analyze colour theories,Prang colour chart, Munsellcolour system, etc	2,3	Analyzing
CO-4	Estimate Free style Embroidery and Traditional embroideries of India	2,3	Evaluating
CO-5	Discuss mending with fusible web, glue, rip in the seams, Patch mending, darning, decorative or ornamental patching	3	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
IV	21PEND41A	TEXTILE DESIGNING	60	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓		✓				
CO-2	✓	✓	✓	✓		✓	✓			
CO-3	✓	✓	✓	✓			✓	✓		
CO-4	✓	✓	✓	✓			✓	✓		
CO-5	✓	✓	✓	✓				✓		
	Number of matches (✓) = …28…. Relationship = Low/**Medium**/High									

SEMESTER – IV

Course Title	**CLINICAL LABORATORY TECHNIQUES**
Total Hrs.	60
Hrs./Week	4
Sub.Code	**21PEND41B**
Course Type	DSE-IV-B
Credits	4
Marks	100

General Objective:

To enable the students to handle the equipment and apparatus of Clinical laboratory and also to know the units of measurements of body fluids and general safety measures in Laboratory.

Course Objectives:

CO	The learners will be able to
CO-1	Infer safety measures and ethics of laboratory
CO-2	Make use ofElectrophoresis and immunological techniques.
CO-3	Examine the laboratory equipments and their uses
CO-4	Estimate the uses of disinfectant and antiseptic
CO-5	Elaborate on the units of measurement and sterilization techniques

Unit-I

Introduction to Clinical Laboratory Techniques

General Safety measures, Ethics and Responsibility in Clinical Laboratory- Glassware's and plastic ware's used in laboratory, calibration of volumetric apparatus, cleaning, care and maintenanceand first aid in laboratory accidents. Units of measurement :SI unit, reference range, conversion factor, units for measurement of enzymes, protein, drugs, hormones, vitamins

Unit-II

Application of Instruments

Nature and concept of Food analysis. Principle, working, care & maintenance and calibration of Weighing balance, Hotplate, Autoclave, Water bath, Magnetic stirrer, Centrifuges, Incubator, Hot air oven, Colorimeter, Spectrophotometer, Spectrophotometer, Ultracentrifugation, Microscope and Chromatography. method of pH measurement,pH paper, pH meter.

Unit-III

Electrophoresis, Isotopic and immune techniques

Meaning-types-paper, starch, gel, Agar-gel, Polyacrylamide gel, Moving boundary Electrophoresis-principles-Components-Applications. Isotopic and immune techniques- principle and theory of isotopic method, types of measurement & detection of radioactivity, Autoradiography, Immuno-techniques, principle, antigen-antibody interaction, enzymatic immune assay-ELISA and its types. Different immune techniques of antigen detection of food sample.

Unit-IV

Sterilization and disinfection

Various physical methods of sterilization – heat, UV radiation, ionizing radiation, filtration, characters affecting sterilization, auto clave control and sterilization indicators.

Unit-V

Antiseptics & Disinfectants

Definition, types and properties, mode of action, use, qualities of good disinfectants. Chemical disinfectants – phenol and its compounds, alcohol, precautions while using the disinfectants.

Textbook:

1. Vasudevan, D .M. (2011).Text book of Biochemistry for Medical students.6th edition, Jaypee Brothers Medical Publishers (pP Ltd., New Delhi.
2. Mukherjee.L.K(2017), Medical Laboratory Technology,Vol.1-3,3rd edition, Tata McgrawHill.
3. World Health Organization (2003). Manual of basic techniques for a health laboratory. (2nd edition. World Health Organization, Geneva.

Reference books:

1. Sharma,B.K.(1981). Instrumental methods of Chemical Analysis. Krishna prakashan Media Publications, Uttar Pradesh.
2. Mahinder Singh (2003). Analytical Chemistry-Instrumental Techniques. Dominant Publishers and Distributors, New Delhi.

Course outcomes

CO	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	Compare normal and abnormal units of measurements of different body fluids.	2,3,4,5	Understanding
CO-2	Identify the laboratory equipments for appropriate disease identification	2,4,5	Applying
CO-3	Distinguish antiseptics and disinfectant with example	5	Analyzing
CO-4	Explain the sterilization techniques	3,5	Evaluating
CO-5	Discuss the immunological techniques	3,5	Creating

Relationship Matrix

Semester	Course Code		Title of the Course			Hours			Credits	
IV	21PEND41B		Textile Designing			60			4	
Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓		✓	✓		✓	✓	✓	✓
CO-2	✓	✓		✓	✓		✓		✓	✓
CO-3	✓	✓		✓	✓					✓
CO-4	✓	✓		✓	✓			✓		✓
CO-5	✓	✓		✓	✓			✓		✓
	Number of matches (✓) = 32 Relationship = Medium									

Semester - IV

Course Title	**PROGRAMMES FOR RURAL DEVELOPMENT**
Total Hrs	**60**
Hrs/Week	**4**
Subject Code	21PEND41C
Course Type	DSE-IV-C
Credits	**4**
Marks	**100**

General Objectives:

Outline rural development programmes and process

Course Objectives :

CO	**The learners will be able to**
CO-1	Describe the rural development
CO-2	Identify the approaches to rural development
CO-3	Discuss the rural development programme
CO-4	Explain the acts of rural development
CO-5	Elaborate on agencies of rural development

UNITI:

Rural Development–Meaning, Nature and Scope– Factors Affecting Rural Growth. Rural Development in India, Indicators of Rural Development.

UNITII:

Approaches to Rural Development Early Attempts For Rural Development Sectoral Approach to rural development, Target group Approach, Emloyment oriented Approach.

UNITIII:

Rural Development Programmes Prime Minister Rural Development Fellows Scheme, Sabki Yojana Sabka Vikas, Swachh Gram.

UNITIV:

National Rural Employment Guarantee Act, Bharat Nirmana,

Provisions of Urban Amenities In Rural Area, Sansad Adarsh Gram Yojana,

UNITV:

Agencies For Rural Development– Government, District Rural Developmental Agencies (DRDA), Semi Government Organisations, NGOs, Co–Operative Institutions, Voluntary Agencies For Rural Development. Role of NGOs in Rural Development–Recent Trends.

REFERENCE:

1 K Vijayakumar, Empowerment of weaker section strategies for rural development in India.

2 Vasant Desai, Rural Development in India, Himalaya Publishing House, Mumbai 2012.

Course Outcome

CO No.	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	Outline the meaning and scope of rural development .	1,3,4,5	Understanding
CO-2	Discuss early attempts for rural development and sectoral attempts to rural development.	1,3,4,5	Applying
CO-3	Analyze Prime Minister Rural Development Fellows Scheme	1,3,5	Analyzing
CO-4	Evaluate National Rural Employment Guarantee Act, Bharat Nirmana, Provisions of Urban Amenities In Rural Area, etc.	1,3,5	Evaluating
CO-5	Elaborate Government, District Rural Developmental Agencies (DRDA), Semi Government Organisations, NGOs,Co–Operative Institutions, Voluntary Agencies For Rural Development	1,3,4,5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
IV	21PEND41C	Programme for Rural Development	60	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓	✓	✓		✓	✓	✓
CO-2	✓	✓	✓	✓	✓	✓		✓	✓	✓
CO-3	✓	✓	✓	✓	✓	✓		✓		✓
CO-4	✓	✓	✓	✓	✓	✓		✓		✓
CO-5	✓	✓	✓	✓	✓	✓		✓	✓	✓
	Number of matches (✓) = …42…. Relationship = Low/Medium/**High**									

SEMESTER – IV

Course Title	**SENSORY EVALUATION AND CULINARY SERVICE**
Total Hours	60
Hours/Week	4
Subject Code	21PCND4P1
Course Type	Practical-VII
Credits	2
Marks	100/2

General Objective:

To understand the sensory evaluation methods and preparation of different regional cuisines

Course Objectives:

CO	The learners will be able to
CO-1	Understand the preparation of score card
CO-2	Organize the different test using objective methods
CO-3	Identify the sensory evaluation of different tests using ranking methods
CO-4	Estimate the regional cuisines of India and sensory evaluation of foods
Co-5	Formulate the ethnic cuisines of Tamil Nadu and sensory evaluation

PRACTICAL EXERCICES

1. Rules for conducting a score card
2. Developing a score card
3. Preparation and presentation of samples
4. Sensory evaluation of different tests using various methods
5. Sensory evaluation of different tests using objective methods
6. Preparation of regional cuisines of India and sensory evaluation
7. Preparation of ethnic cuisine of Tamil Nadu and sensory evaluation

Course Outcomes

CO	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	Demonstrate on the rules fordeveloping score card	1,3	Understanding
CO-2	Experiment the preparation and presentation of food samples	1,3,4	Applying
CO-3	Categorize the different tests using ranking methods	1,3,4	Analyzing
CO-4	Determine the sensory evaluation of different tests using objective methods	1,3,4	Evaluating
CO5	Prepare regional cuisines of India	1,3,4	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
IV	**21PCND4P1**	**SENSORY EVALUATION AND CULINARY SERVICE**	**60**	**4**

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓		✓		✓		
CO-2	✓	✓	✓	✓		✓		✓	✓	
CO-3	✓	✓	✓	✓		✓		✓	✓	
CO-4	✓	✓	✓	✓		✓		✓	✓	
CO-5	✓	✓	✓	✓		✓		✓	✓	
	Number of matches (✓) = …34…. Relationship = Low/Medium/**High**)									

SEMESTER – IV

Course Title	**FOOD PROCESSING AND PRESERVATION**
Total Hours	60
Hours/Week	4
Subject Code	21PCND4P2
Course Type	Practical-VIII
Credits	2
Marks	100/2

General Objective: Enumerate the Novel processing method and preparation of profitable value added products from fruits and vegetables.

Course Objectives:

CO	The learners will be able to
CO-1	Explain spoilage of fruits and vegetables
CO-2	Illustrate different pigments in fruits and vegetables
CO-3	Examine fruits and vegetables by Novel processing method
CO-4	Estimate value added products from fruits and vegetables
CO-5	Infer the Dehydration and Rehydration of fruits and vegetables

PRACTICAL EXERCICES

1. Identification of spoiled food.
2. Identification of pigments in fruits and vegetables
3. Dehydration of fruits and vegetables.
4. Rehydration of fruits and vegetables.
5. Extraction and Preservation of fruit juices
6. Identification of class I & class II Preservatives
7. Determination of pH and acidity of fruits and vegetable products
8. Preservation of food by canning
9. Preparation of product by using Salt, Sugar, Oil as preservative
10. Preparation of product by using Chemical as preservative
11. Estimation of Salt content in pickle
12. Preparation of dehydrated tomato powder
13. Preparation of grape raisins /dried fig
14. Preparation of dried carrot / Beetroot.
15. Testing of Packaging material
16. Visit to the food preservation unit

Reference Book

1. Sivasankar.B. (2009). Food Processing and preservation. PHI Learning Pvt limited. Eastern Economy Edition.
2. Rahman,M.S.(1999). Handbook of Food Preservation, CRC Press, Taylor & Francis Group, BocoRahon.

3. Fellow.P (2000). Food Processing Technology. CRC Press, Woodhead Publishing Limited, Cambridge England.
4. Connie.M.Weaver& James. R. Daniel (2005). The Food Chemistry Laboratory. A manual for Experimental Foods, Dietetics and Food Scientists.2nd Ed. CRC Press, Wasington.
5. Indian Institute of Food Processing Technology. (2020). Processing of Pickles. Ministry of Food Processing Industries, Government of India, Thanjavur,Tamil Nadu.
6. Food and Agriculture Organization. Fruit Processing toolkit. Food and Agriculture Organization of the United Nations.

Course Outcomes

CO	Upon completion of the course, the students will be able to	PSOs Addressed	Cognitive Level
CO-1	Classify class I and II preservatives	1,3,4,5	Understanding
CO-2	Develop knowledge on shelf life and nutritional consequences of food preservation	1,3,5	Applying
CO-3	Categorize spoilage of fruits and vegetables	1,4,5	Analyzing
CO-4	Assess the changes occured during food preservation	1,4,5	Evaluating
CO-5	Choose different novel processing methods to prepare value added products	1,3,5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credits
IV	21PCND4P2	FOOD PROCESSING AND PRESERVATION	60	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓		✓		✓		✓	✓	✓
CO-2	✓	✓		✓		✓		✓		✓
CO-3	✓	✓		✓		✓			✓	✓
CO-4	✓	✓		✓		✓			✓	✓
CO-5	✓	✓	✓	✓	✓	✓		✓		✓
	Number of matches (✓) = 38 Relationship = High									

INTERDISCIPLINARY COURSES (2021 – 2024)							
SEM	TITLE OF THE COURSE	COURSE CODE	H/W	C	MARKS		
					I	E	T
DEPT. OF ENGLISH							
II	SOFT SKILLS	**21PIEN11**	**2**	**2**	**40**	**60**	**100/2**
III	ENGLISH FOR BUSINESS COMMUNICATION	**21PIEN31**	**2**	**2**	**40**	**60**	**100/2**
DEPT. OF HISTORY							
II	INDIAN HISTORY FOR COMPETITIVE EXAMINATIONS UPTO 1707A.D	**21PIHS11**	**2**	**2**	**40**	**60**	**100/2**
III	INDIAN HISTORY FOR COMPETITIVE EXAMINATIONS FROM (1707-1947 A.D)	**21PIHS31**	**2**	**2**	**40**	**60**	**100/2**
DEPT. OF COMMERCE							
II	ENTREPRENEURIAL DEVELOPMENT	**21PICO11**	**2**	**2**	**40**	**60**	**100/2**
III	HUMAN RESOURCE MANAGEMENT	**21PICO31**	**2**	**2**	**40**	**60**	**100/2**
DEPT. OF MATHEMATICS							
II	DISCRETE STRUCTURE – I	**21PIMA11**	**2**	**2**	**40**	**60**	**100/2**
III	DISCRETE STRUCTURE – II	**21PIMA31**	**2**	**2**	**40**	**60**	**100/2**
DEPT. OF CHEMISTRY							
II	ANALYTICAL BIOCHEMISTRY	**21PICH11**	**2**	**2**	**40**	**60**	**100/2**
III	INDUSTRIAL CHEMISTRY	**21PICH31**	**2**	**2**	**40**	**60**	**100/2**
DEPT. OF COMPUTER SCIENCE							
II	DIGITAL LITERACY	**21PICS11**	**2**	**2**	**40**	**60**	**100/2**
III	DIGITAL TECHNOLOGY	**21PICS31**	**2**	**2**	**40**	**60**	**100/2**
DEPT. OF MICROBIOLOGY							
II	MICROBIOLOGY AND HUMAN HEALTH	**21PIMB11**	**2**	**2**	**40**	**60**	**100/2**
III	ENTREPRENEURSHIP IN MICROBIOLOGY	**21PIMB31**	**2**	**2**	**40**	**60**	**100/2**
DEPT. OF PHYSICS							
II	THE BASICS OF DIGITAL ELECTRONICS	**21PIPH11**	**2**	**2**	**40**	**60**	**100/2**
III	ENERGY PHYSICS	**21PIPH31**	**2**	**2**	**40**	**60**	**100/2**
DEPT. OF ZOOLOGY							
II	ORNAMENTAL FISH CULTURE	**21PIZO11**	**2**	**2**	**40**	**60**	**100/2**
III	APPLIED ZOOLOGY	**21PIZO31**	**2**	**2**	**40**	**60**	**100/2**
DEPT. OF NUTRITION AND DIETETICS							
II	DIET THERAPY-I	**21PIND11**	**2**	**2**	**40**	**60**	**100/2**
III	DIET THERAPY-II	**21PIND31**	**2**	**2**	**40**	**60**	**100/2**

THE SCHEME OF EXAMINATIONS UNDER CHOICE BASED CREDIT SYSTEM

- The medium of instruction in all the UG and PG Programmes is English and Students shall write the CIA Tests and the Semester Examinations in English. Three CIA Tests for one hour each will be conducted. For the calculation of CIA Tests marks the average of the best two tests will be taken. The portion for each test can be 1.5 units of the unitized syllabi.
- Two assignments for the Undergraduate Programmes and one assignment and one seminar for the Postgraduate Programmes are compulsory.
- Two Practical Examinations will be conducted for CIA at the end of the semester and the average will be taken.
-

Distribution of Marks for the Students admitted into the UG and PG Programmes from the academic year 2021-2022

CIA Tests and Semester Examinations

Undergraduate, Certificate, Diploma and Advanced Diploma Programmes						
Course Type	TOTAL MARKS	CIA TESTS MAX.MARKS	SEMESTER EXAMINATION Max. Marks	PASSING MINIMUM		
				CIA	SEM. EXAM	OVERALL
Theory	100	25	75	Nil	30	40
Practical (2Hrs.)	50	20	30	Nil	12	20
Practical (4Hrs.)	100	40	60	Nil	24	40
Project	100	Nil	Report- 60 Marks Viva-Voce- 40 Marks	Nil	Nil	100

Postgraduate Programmes						
Course Type	TOTAL MARKS	CIA MARKS	SEMESTER EXAM	PASSING MINIMUM		
				CIA	SEM. EXAM	OVERALL
Theory	100	40	60	Nil	30	50
Practical	50	20	30	Nil	15	25
Practical (for PG Maths only)	100	40	60	Nil	30	50
Project Report	150	Nil	Project Report- 90 Marks Viva-Voce Examination - 60 Marks	Nil	Nill	150

CIA TESTS

Distribution of Marks

Components	Tests (A)			Assignment (B)	Seminar (C)	Record Note (D)	Total (A+B+C+D)
	I	II	III	5	-	-	25
UG-Theory	20	20	20				
	The Average of the Best Two Tests:20						
PG-Theory	30	30	30	5	5	-	40
	The Average of the Best Two Tests:30						
UG-Practical (2 hrs)	15	15		-	-	5	20
	The Average of the Tests: 15						
UG-Practical (4 hrs)	30	30		-	-	10	40
	The Average of the Tests: 30						
PG-Practical	15	15		-	-	5	20
	The Average of the Tests: 15						
PG-Practical (Maths only)	30	30		-	-	10	40
	The Average of the Tests: 30						

Question Pattern for CIA Test (Theory)

Programme	Question Paper Pattern			Total (A+B+C)
	Part-A	Part-B	Part-C	
UG	MCQs-8x0.5=4 marks	Internal Choice (Either or type). 2x4=8 marks Answer should not exceed 250 words	Internal Choice (Either or type) 1x8=8 marks Answer should not exceed 500 words	20
PG	MCQs-20x0.5=10 marks	Internal Choice (Either or type) 3x4=12 marks Answer should not exceed 250 words	Internal Choice (Either or type) 1x8=8 marks Answer should not exceed 500 words	30

End Semester Examination (ESE)

The students who have put in the required number of days of attendance are eligible to appear for the End Semester Examinations irrespective of whether they have passed in the CIA Tests or not. They have to pay the examination fees for all the current courses and the arrear courses, if any,

and submit the application form before the due date specified for the purpose. For any reason, the dates will not be extended. Hall tickets will be issued only for those who have paid the fees. The question papers for the End Semester Examinations for all the theory courses of the UG and the PG Programmes will be set for 75 marks.

Question Pattern for End Semester Examinations (Theory)

Programme	**Question Paper Pattern**			**Total (A+B+C)**
	Part-A	**Part-B**	**Part-C**	
UG	MCQs- 30x0.5=15 marks	Internal Choice (Either or type) 5x4=20 marks Answer should not exceed 250 words	Internal Choice (Either or type) 5x8=40 marks Answer should not exceed 500 words	**75**
PG	MCQs- 30x0.5=15 marks	Internal Choice (Either or type) 5x4=20 marks Answer should not exceed 250 words	Internal Choice (Either or type) 5x8=40 marks Answer should not exceed 500 words	**$(\frac{x}{75}$ x 60)** **60**

The Question Paper Pattern for the End Semester Examinations (Practical)

The Question Paper Pattern is designed by the respective departments.