ST.PHILOMENA'S COLLEGE (AUTONOMOUS), MYSURU

(AFFILIATED TO UNIVERSITY OF MYSORE)

REACCREDITED BY NAAC WITH A GRADE

Three-year six semesters Choice Based Credit System (CBCS) with
Learning Outcome Based Curriculum framework (LOCF)
And Continuous Assessment & Grading Pattern (CAGP)
Undergraduate Programme Under Autonomous Structure

Programme - BSc

Academic year 2018-19onwards

DEPARTMENT OF FOOD SCIENCE AND NUTRITION

VISION AND MISSION OF THE COLLEGE

VISION:

The college is guided by the visionary zeal of providing value- based education to everyone irrespective of religion, caste, creed or sex by which the character is formed, intellect is explained and one can stand on his/her feet**.**

MISSION:

To transform young men and women who come to learn not from books, but also from life and to share the experience of working and playing together, this inculcates life skills to become good citizens with integrity and discipline**.**

Programme Educational Objective (PEO)

PEO-1	Graduates will be able to master and display competency and leadership to become successful professionals, employees and entrepreneurs or pursue higher education and research.
PEO-2.	Graduates will be able to demonstrate the commitment towards professional ethics, gender sensitivity, preservation of environment and sustainable development.
PEO-3	Graduates will continue to learn and advance their careers through activities such as participation in professional organizations, attainment of professional certification and seeking higher education.

Programme Outcomes (PO): BSc. Programme

PO-1	**Disciplinary Knowledge:** The BSc. graduates will acquire the knowledge with facts and figures related to pure and applied sciences. Understand the basic concepts, fundamental principles, and the scientific theories related to various scientific phenomena and their relevancies in the day-to-day life.
PO-2	**Cognitive and Communicative skills:** Students learn two languages along with three major subjects. At the end of the programme, the students would have developed reading, writing, speaking, interpretive and composition skills. They would be able to communicate with others using appropriate media; confidently share one's views and express themselves
PO-3	**Research Related Skills:** The BSc. students will acquire the skills in handling scientific instruments, planning and performing in laboratory experiments.
PO-4	**Ethics**: The BSc. students will be imbibed ethical, moral and social values in personal and social life leading to highly cultured and civilized personality.

PO-5	**Problem Solving:** The BSc. graduates will develop the ability to analyze and solve Course-related problems and also the ability to evaluate situations and react responsibly to communicate, cooperate and lead a team among peers and others.
PO-6	**Critical Thinking:** The qualities of a science student – observation, precision, analytical mind, logical thinking, clarity of thought and expression, systematic approach, qualitative and quantitative decision making are enhanced.
PO-7	**Social Interaction:** The BSc. graduates shall appreciate the role of science in society; and its personal, social and global importance.
PO-8	**Analytical Skills**: The graduates will master the skills of observations and drawing logical inferences from the scientific experiments. Analyzed the given scientific data critically and systematically and the ability to draw the objective conclusions.
PO-9	**Environment and Sustainability:** Graduates will be able to understand the issues of environment and work towards sustainable development.
PO-10	**Employability:** After completing the programme, graduates will have the competency to be employed or to be an entrepreneur.
PO-11	**Leadership Quality:** In the graduation programme students are inculcated moral and ethical values, managerial skills, adoptability, problem solving, taking initiative, decision making, risk taking to make them confident leaders.

Programme Specific Outcomes (PSO)- BSc. Programme

PSO-No	After the completion of BSc. programme by studying Chemistry, Botany and Food and Nutrition (CBFn) the students will be able to	Cognitive level
PSO-1	Develop analytical skills and problem solving skills required for the application of **chemical principles**. They will be able to perform scientific experiments skillfully by application of procedural knowledge	Analysis
PSO-2	Apply the knowledge of basic science, life sciences and fundamental process of plants to study and analyze any plant form Create, select, and apply appropriate techniques, resources, and modern instruments and equipments for **Plant Tissue** culture experiments, cellular and physiological activities of plants with an understanding of the	Apply

PSO-3	Recognize the interrelationship between **food, nutrition** and health and the food choices to make that will optimize the health and prevents diseases. Display basic and translational research skills with technical excellence and which make them research and industry ready.	Understand and apply

Mapping of Mission of the College with PEO			
Mission	PEO-1	PEO-2	PEO-3
Mission -1	✓	✓	✓

Mapping of PEOs with Programme Outcocomes(PO)											
PEO No.	**PO-1**	**PO-2**	**PO-3**	**PO-4**	**PO-5**	**PO-6**	**PO-7**	**PO-8**	**PO-9**	**PO-10**	**PO-11**
PEO-1		✓	✓		✓					✓	✓
PEO-2	✓			✓					✓		
PEO-3						✓	✓	✓			

ST. PHILOMENA'S COLLEGE (AUTONOMOUS), MYSURU-570 015

Subject: FOOD SCIENCE AND NUTRITION

Syllabus for B.Sc., under CBCS LOCF Scheme.

The Scheme of Teaching & Examination

FROM THE ACADEMIC YEAR -2018 ONWARDS

Semester	Title of the Paper	TYPE	Course Code	Teaching Hours per Week Theory/ Practical	Credits Theory/ Practical	Exam Duration in Hours Theory/ Practical	Max. Marks Theory/Practical		
							Theory/Practical	I A Theory/Practical	Total Marks
I	Paper-I Title : Human Physiology-I	DSC	MA462	03	03	03	50	20	100
	Practical Paper-I	DSC	MA462	03	1.5	03	20	10	
II	Paper-II Title : Human Physiology-II	DSC	MB462	03	03	03	50	20	100
	Practical Paper-II	DSC	MB462	03	1.5	03	20	10	
III	Paper-III Title : Principles of Nutrition-I	DSC	MC462	03	03	03	50	20	100
	Practical Paper-III	DSC	MC462	03	1.5	03	20	10	
IV	Paper-IV Title : Principles of Nutrition-II	DSC	MD462	03	03	03	50	20	100
	Practical Paper-IV	DSC	MD462	03	1.5	03	20	10	
V	Paper-V Title : Food Science	DSC	ME464	03	03	03	70	30	100
	Practical Paper-V	DSC	ME464	03	03	03	70	30	
	Paper-VI Title : Life Span Nutrition	DSC	ME466	02	01	03	35	15	100
	Practical Paper-VI	DSC	ME466	02	01	03	35	15	
VI	Paper-VII Title: Food Processing and Preservation	DSC	MF464	03	03	03	70	30	100
	Practical Paper-VII	DSC	MF464	03	03	03	70	30	
	Paper-VIII Title : Diet Therapy	DSC	MF466	02	01	03	35	15	
	Practical Paper-VIII	DSC	MF466	02	01	03	35	15	

		DSE 1		**02**	**02**	**03**	**30**	**20**	**150**
		DSE 2		**02**	**02**	**03**	**30**	**20**	
					38	**-**	**760**	**340**	**1100**

Discipline Specific Elective (DSE or Soft Core (SC)

SL.No	Title of the Paper	TYPE	Course Code	Semester	Examination Scheme				
					Theory	Exam Duration in Hours	Theory Max. Marks	I A Max Marks	Total Marks
1.	**Immunology And Genetics**	**DSE**	M46Y03	**II** Or	**3**	**03**	**30**	**20**	**50**
2.	**Advances in Nutrition**	**DSE**	M46Y04		**3**	**03**	**30**	**20**	**50**
3.	**Public Health Nutrition**	**DSE**	M46Y01	**III**	**3**	**03**	**30**	**20**	**50**
4.	**Food Safety and Quality Control**	**DSE**	M46Y05		**3**	**03**	**30**	**20**	**50**
5.	**Nutrition Education**	**DSE**	M46Y06	**V**	**3**	**03**	**30**	**20**	**50**
6.	**Nutrition Counselling**	**DSE**	M46Y02	Or	**3**	**03**	**30**	**20**	**50**
7.	**Entrepreneurship**	**DSE**	M46Y07	**VI**	**3**	**03**	**30**	**20**	**50**

Note: DSC or HC- Discipline Specific Core (DSC) or Hard Core (HC) & DSE or SC- Discipline Specific Elective (DSE or /Soft Core (SC)

FIRST SEMESTER

FOOD SCIENCE AND NUTRITION PAPER-I
Title: HUMAN PHYSIOLOGY - I
Class duration – 03 hours per week. 16 weeks = 48hrs
Marks: Theory - 50 + Internal Assessment - 20= 70

Course Objectives:

1. Obtain an insight into the structure and functions of cells, tissues and organs in human body
2. To enable the students to understand the structure and basic physiology of various organs of the body.
3. Comprehend the functions of systems of the human body
4. To obtain better understanding of the principles of Nutrition through the study of physiology.

Course learning outcome:.

CO	Upon completion of the course, students would be able to	Cognitive level
CO-01	Have an increased knowledge of human physiology and be able to appreciate its functions	Understand
CO-02	understand the role of food in health and disease	Apply
CO-03	Define the main structures composing human body. Recognize and identify principal tissue structures.	Remember
CO-04	Perform, analyse and interpret basic experiments and observations in physiology and biochemistry.	Apply
CO-05	Understand the principles and approach to experimental design.	Create
CO-07	Relate how biochemical systems interact to yield integrated physiological responses.	Analyse

48 Hours

Unit- 1 Introduction to human body		**6 hrs**
1.1	Definition of Anatomy and Physiology, Body fluids, Cell, Tissues of the body.	
Unit - 2 Skeletal system		**6 hrs**

2.1	Functions, Types of bones, Growth of long bone.	
Unit – 3 Blood and Circulatory system		**10 hrs**
3.1	Blood –composition, RBC, WBC, platelets – Structure,formation and function, coagulation of blood, blood groups and Rh factor,	
3.2	Heart – structure and function, circulation of blood and blood pressure	
3.3	Principle blood vessels	
Unit - 4 Digestive System		
4.1	Teeth and mastication	
4.2	Structure and functions of salivary glands, Pharynx, oesophagus, stomach, small and large intestine	
4.3	Duodenum, Liver and gall bladder, pancreas	
4.4	Process of digestion and absorption.	
Unit - 5 Respiratory system		**6 hrs**
5.1	Respiratory passages	
5.2	Physiology of respiration – rate and control	
Unit – 6 Organs of special senses		**6 hrs**
6.1	Tongue, nose, Ear, Eye and Skin – Structure and function	

Human Physiology Practical

Semester-1

PRACTICAL-I

Course Objectives:

1. To develop further practical biological skills introduced in Physiology of Organisms
2. Explain the role of body systems and mechanisms in maintaining homeostasis
3. Observe phenomena, record and analyze data, and infer from data.

Course Learning Outcome:

CO	Upon completion of the course, students would be able to	Cognitive level
CO-01	Understand the functions of important physiological systems including the cardio-respiratory, renal, reproductive and metabolic systems.	Understand

CO-02	Apply their knowledge to investigate clinical scenarios and debate current topics in scientific research in relation to Nutrition Science.	Apply
CO-03	have an enhanced knowledge and appreciation of mammalian physiology. They will be able to recognize and identify principal tissue structures.	Remember
CO-07	be able to perform, analyse and report on experiments and observations in physiology;	Analyse

1. Introduction to microscope
2. Identification of tissue slides – skeletal, digestive system, heart, lungs
3. Bleeding and clotting time (both methods)
4. Blood groups and Rh factor
5. Estimation of Haemoglobin (Sahli's Method)
6. Enumeration of RBC, WBC, Differential count of WBC

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SECOND SEMESTER
FOOD SCIENCE AND NUTRITION PAPER-I
Title: HUMAN PHYSIOLOGY - II
Class duration – 03 hours per week
Marks: Theory - 50 + Internal Assessment - 20= 70

48 Hours

Course Objectives:

- To gain the basic knowledge of human anatomy and physiology.
- To define the main structures composing human body.
- To explain structure and functions of cells, tissues and organs, systems of the human body
- To relate structure and functions of tissue.
- To provides excellent preparation for careers in the health professions and/or biomedical research.

Course learning outcome (CO):

CO	**Upon completion of the course, students would be able to**	Cognitive level

CO-01	Gain the basic knowledge of human anatomy and physiology	Understand
CO-02	Explain structure and functions of cells, tissues and organs, systems of the human body	Apply
CO-03	Define the main structures composing human body.	Remember
CO-04	Relate structure and functions of tissue.	Apply
CO-05	Prepare for careers in the health professions and / or biomedical research.	Create
CO-06	Relate how biochemical systems interact to yield integrated physiological responses.	Analyse

Unit- 1 Endocrine system		**14 hrs**
1.1	Structure and functions – Hypo and hyper secretary effect of pituitary thyro parathyroid, and the adrenal gland.	
1.2	Islets of Langerhans,.	
Unit - 2 Excretory system		**12 hrs**
2.1	Structure of kidney and its functions	
2.2	Structure of Nephron and its function – (formation of urine)	
2.3	Composition of urine.	
2.4	Regulation of water and acid – base balance.	
Unit – 3 Nervous system		**10hrs**
3.1	Nerve cells, nerve fiber – types, structure	
3.2	Brain and spinal cord – structure and function.	
3.3	Types of nervous system (in brief)	
Unit - 4 Reproductive system		**10 hrs**
4.1	Male and female organs of reproduction structure and function, puberty, Menarche, Reproduction (conception, fertilization) and menopause.	
4.2	Mammary glands – structure and physiology of milk production.	
Unit - 5 Human genetics		**2 hrs**
5.1	Inheritance and variations	

Semester II

PRACTICAL-II

Human Physiology Practical

Course Objectives

1. Explain the gross morphology, structure and functions of various organs of the human body.
2. Describe the various homeostatic mechanisms and their imbalances.
3. Identify the various tissues and organs of different systems of human body.
4. Perform the various experiments related to special senses and nervous system.
5. Appreciate coordinated working pattern of different organs of each system

Course Learning Outcome (CO):

CO	Upon completion of the course, students would be able to	Cognitive level
CO-01	Understand Basic concept and knowledge of structure and functioning of different systems in body.	Understand
CO-02	To promote and inculcate curiosity and skill for elective learning in the field of research	Apply
CO-03	To understand integrated aspect of functioning of the individual and all the systems in totality in body.	Remember
CO-07	To understand the integration of the combined knowledge of Physiology, Anatomy and Biochemistry.	Analyse

Contents:

1. Identification of tissues – endocrine, excretory, nervous, reproductive system.
2. Determination of ESR – demonstration
3. Determination of body temperature
4. Determination of blood pressure (under various positions) – demonstration
5. Urine analysis – microscopic observation, pH, glucose and albumin
6. Visit to anatomy and physiology units in medical college.(If Permitted)

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THIRD SEMESTER
FOOD SCIENCE AND NUTRITION PAPER-III
Title: PRINCIPLES OF NUTRITION - I
Class duration – 03 hours per week
Marks: Theory - 50 + Internal Assessment - 20= 70

48 Hours

Subject description: Principles of Human Nutrition provides an integrated overview of the physiological requirements and functions of protein, energy, and the major vitamins and minerals that are determinants of health and diseases in human populations.

Course Objectives

1. To have an understanding of principles of nutrition including the roles, metabolism, requirements, and sources of nutrients
2. To provide an overview of the major macro and micronutrients relevant to human health.
3. To recognize the essential elements/ nutrients with relation to requirement, adequacy, balance, calorie control, nutrient density, moderation and variety for Humans.

Course Learning Outcome:

CO	Upon completion of the course, students would be able to	Cognitive level
CO-01	Understand the functions and sources of macronutrients, role of nutrients in maintenance of good health.	Understand
CO-02	Optimal, balanced nutrition is a major determinant of health. It can be used to promote health and well-being, to prevent ill health and to treat disease.	Apply
CO-03	Able to identify what foods are good sources for what nutrients. Students will be familiar with factors affecting for the absorption of Nutrients.	Remember
CO-04	Develop skills to conduct simple nutrition assessments to determine risk for under-nutrition and over-nutrition.	Apply

CO-05	Evaluate Relate metabolism of macronutrients with health.	Evaluate
CO-06	Describe current health promotion strategies and dietary guidelines	Analyse

Unit- 1 Introduction to Nutrition **2hrs**

Unit - 2 Composition of the body **8 hrs**

2.1 Chemical composition, body compartments- lean body mass, fat mass, water.

2.2 Methods of studying body composition

Unit – 3 Energy **8 hrs**

3.1 Forms of energy, food as a source of energy, units of measurements.

3.2 Determination of energy content in foods (Bomb calorimeter), physiological fuel values (at water factors), energy expenditure at rest (BMR/RMR)-methods of determination of BMR.

3.3 Factors effecting energy expenditure for physical work, energy cost of physical activities, post- prandial thermogenesis.

Unit - 4 Macronutrients **2 hrs**

4.1 Introduction, classification and composition

4.2 **Carbohydrates** **10 hrs**

4.2.1 Classification (available, non-available), dietary sources and functions

4.2.2 Digestion, absorption, transport and utilization andexcretion.

4.2.3 Glycemic response and glycemic index of foods

4.2.4 Dietary fiber- types, properties, sources and its role

4.3 **Lipids** **8 hrs**

4.3.1 Classification, sources, composition, functions

4.3.2 Distribution- visible and invisible,

4.3.3 Digestion, absorption, transport, utilization, storage & excretion.

4.3.4 Essential fatty acids – sources, function and effect of deficiency.

4.3.5 Cholesterol- sources, functions and implications.

4.4 **Proteins** **10 hrs**

4.4.1 Classification, essential and non-essential amino acids,

4.4.2 Sources – animal vegetable proteins for growth, maintenance and energy

4.4.3 Digestion, absorption, transport, utilization and excretion.

4.4.4 Methods of determining protein quality- PER/growth study, NPU, BV, NDP cals, chemical score (PDCCA).

4.4.5 Protein energy malnutrition

Principles of Nutrition Practical
Semester III

PRACTICAL-III

Course Objectives:

1.To acquire cooking skill by planning nutrient dense recipes.
2. To relate metabolism of nutrients with health.
3. To comprehend the functions of macronutrients with health.
4. Associate knowledge of nutrients with their deficiencies

Course Learning Outcome:

CO	Upon completion of the course, students would be able to	Cognitive level
CO-01	Understand the role of food and nutrients in health and disease prevention	Understand
CO-02	Apply the knowledge in determining the nutritional requirements while planning the recipes.	Apply
CO-03	Identify the nutrient needs and demonstrate food choices for all the age group.	Remember
CO-05	Plan and prepare nutrient rich recipes to serve a balanced diet. Calculate the nutrients present in it.	Create
CO-06	Evaluate nutrition information based on scientific reasoning for clinical and community application.	Evaluate
CO-07	Acquire skills to analyze various nutrients.	Analyse

1 Food groups : calculation of mean energy, carbohydrates, protein, fat and fiber content of foods using ICMR tables. Preparation of a table for all the food groups and identification of their contributions to Indian diet.

2 Standardization of house hold measures and hand measures – dry and liquid measures.

3 Identification and preparation of energy and protein rich recipes and method of supplementing energy/protein/carbohydrate/fat to menu items.

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FOURTH SEMESTER
FOOD SCIENCE AND NUTRITION PAPER-IV
Title: PRINCIPLES OF NUTRITION - II
Class duration – 03 hours per week
Marks: Theory - 50 + Internal Assessment - 20= 70

48 Hours

Course Objectives:

1. To gain knowledge on aims and objectives of cooking
2. To understand the Conservation of nutrients and their importance to life
3. To understand the personal hygiene; environmental Hygiene; food storage and causes of contamination **4 hrs**

Course Learning Outcome(CO):

CO	Upon completion of the course, students would be able to	Cognitive level
CO-01	Understand the Conservation of nutrients and their importance to life	Understand
CO-02	Understand the food composition and concept of energy balance	Remember
CO-03	Evaluate Relate metabolism of micronutrients with health.	Evaluate
CO-04	Describe current health promotion strategies and dietary guidelines for micronutrient deficiencies.	Analyse

Unit - 1 Water

1.1 Functions, requirements, sources

Unit – 2 Micronutrients **19 hrs**

2.1 **Minerals**

2.1.1 Classification, functions, sources, dietary requirements

2.1.2 Biological availability, body stores, effects of deficiency, toxicity

2.1.3 Calcium, phosphorus, iron, copper, iodine, fluoride, zinc, chromium, magnesium.

2.2 **Vitamins** **19 hrs**

2.2.1 History, classification, sources functions, dietary requirement, effects of deficiency and toxicity.

2.2.2 Fat soluble vitamins – A,D,E,K.

4.2.2 Water soluble vitamins - Thiamine, riboflavin, niacin, folic acid vitamin B_{12} and ascorbic acid.

Unit – 3 Recommended dietary allowances for Indians (ICMR) **6 hrs**

3.1 Brief knowledge of derivation, uses, applications and limitations.

3.2 Food groups and their uses.

IV Semester
Principles of Nutrition
Practical -I

Course Objectives :

1. To understand significance of Micro nutrients in the diet

2. To understand their physiological functions, requirements, and sources of micro nutrients

CO	**Upon completion of the course, students would be able to**	Cognitive level
CO-01	Equip with knowledge and understanding on importance of micronutrients.	Understand
CO-02	Apply the knowledge in determining the nutritional requirements while planning the recipes.	Apply
CO-03	Identify the nutrient needs and demonstrate food choices for all the age group.	Remember
CO-04	Plan and prepare nutrient rich recipes to serve a balanced diet. Calculate the nutrients present in it.	Create
CO-05	Evaluate nutrition information based on scientific reasoning for clinical and community application.	Evaluate

Contents

1. Identification of rich sources of vitamin – A, calcium, iron and ascorbic acid.

2.Preparation of nutrient dense recipes and calculation

3.Determination of edible portions of vegetables and fruit as purchased from the market calculate percent edible portion and nutrient content (emphasize rich sources).

4. Determination of cooked weights of selected food preparations (in relation to raw weights of major ingredients and portion size).

FIFTH SEMESTER
FOOD SCIENCE AND NUTRITION PAPER-V
Title: FOOD SCIENCE
Class duration – 03 hours per week
Marks: Theory - 50 + Internal Assessment - 20= 70

48 Hours

Subject description: The Fundamental biological, chemical and physical scientific principles associated with the study of foods: topics include biological and chemical composition of food, processing techniques, factors affecting the cooking quality.

Course Objectives:

1.To obtain knowledge of different food groups and their nutritive value,

1. To understand the scientific principles underlying food preparation.
2. To develop skill and techniques in food preparation with conservation of nutrients and palatability using cooking methods generally employed.

Course Learning Outcome (CO):

CO	Upon completion of the course, students would be able to	Cognitive level
CO-01	Acquire knowledge regarding nutritional classification\of food, method and media of cooking, nutritive value and processing, storage of all the food Groups.	Understand
CO-02	Know the chemistry underlying the properties and reactions of various food components.	Remember
CO-03	Apply the scientific method to food science problem.	Apply
CO-04	Understand the principles and approach to experimental design.	Create
CO-05	Use the theoretical knowledge in various applications and food preparations.	Evaluate
CO-06	Get an overview of some of the methods of processing of plant and animal foods.	Analyse

Unit- 1.1 Cereal, Millets and products		**8 hrs**
1.1	Structure and composition of rice and wheat grains	
1.1	Starch, nature and effect of cooking	
1.1	Dough development and use in various preparations.	
Unit – 1.2 Legumes and oilseeds		**8 hrs**
1.2	Structure of bean legume	
1.2	Composition of legumes	
1.2	Factors affecting the cooking quality of pulses	
1.2	Oilseed meal and their uses.	
Unit – 2 Vegetables and fruits		**6 hrs**
2.	Classification of fruits and vegetables	
2.	Effects of cooking on colour, texture and acceptability.	
2.	Browning reaction and its prevention.	
Unit – 3.1 Milk and Milk Products		**6 hrs**
3.1	Composition of milk	
3.1	Factors affecting the quality	
3.1	Use of milk and its products.	
Unit- 3.2 Eggs		**6 hrs**
3.2	Structure, composition and grading for quality	
3.2	Factors affecting the quality	
3.2	Effect of cooking on egg quality	
3.2	Use of eggs in Indian preparation	
Unit- 3.3 Meat, poultry and fish		**6 hrs**
3.3	Structure of muscle and meat quality, Post – mortemchanges	
3.3	Factors to be considered in selection and preparation of meat, poultry and fish.	
Unit- 4 Fats and oils		**6 hrs**
4.	Physico – chemical properties of fats and oils	
4.	Functions of fat in food	
4.	Importance of smoking point and its application	
4.	Rancidity in fats substitutes/ specialty fats	
Unit- 5 Sugar and confectionary		**2 hrs**
5.	Crystallization of sugar and its application in food preparations.	

Semester V
Paper V
Food Science Practical

Course Objectives:

1. Understand the food groups and their functions.
2. Acquire knowledge on different methods of cooking
3. Apply process of different foods
4. Use combination of foods in the development of food product

Course learning outcome (CO):

CO	Upon completion of the course, students would be able to	Cognitive level
CO-01	Demonstrate skills on determination of edible portion, effect of cooking on volume and weight. Acquire skills on different methods of cooking. Understand experimental cookery.	Understand
CO-02	Identify and choose appropriate cooking method to conserve nutrients	Remember
CO-03	Apply scientific knowledge on different methods of cooking	Apply
CO-04	Develop recipes by applying knowledge on cooking methods and properties of food.	Create
CO-05	Evaluate the nutrition losses when different methods of cooking are employed.	Evaluate
CO-06	Analyze some of the methods of processing of plant and animal foods.	Analyse

	Cereals
	Microscopic examination of starch molecules
	Gelation of cereal flours (compare the time taken for gel formation)
	Observation of cooking time and quality of aged and parboiled rice.
	Pulses – Effect of soaking, sprouting, addition of acid and alkali on cooking Quality. (Any one or two pulses like green gram, Bengal gram, Cowpea etc.,)

	Vegetables and fruits	
	Effect of adding acid and alkali on Green, Red, Yellow and White vegetables.	
	Methods of preventing browning	
	Milk and milk products factors affecting curding of milk (Demonstration) Separation of cream and preparation of pannier and khoa (Demonstration)	
	Eggs	
	Demonstration of grading eggs for quality	
	Ferrous sulphide formation and prevention	
	Effect of beating egg white on stiffness of foam and its uses (custard and omelet)	
	Sugar cookery – determination of stages of crystallization and its uses	
	Oils – smoking points of oils.	
	Visit to milk processing unit – Submission of report	

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FIFTH SEMESTER
FOOD SCIENCE AND NUTRITION PAPER-VI
Title: LIFE SPAN NUTRITION
Class duration – 03 hours per week
Marks: Theory - 50 + Internal Assessment - 20= 70

48 Hours

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4 hrs

SUBJECT DESCRIPTION: This course will explore how nutrient needs vary during the lifespan, from nutrition during preconception, pregnancy and lactation, infant nutrition, childhood and adolescent nutrition, as well as adult and older adult nutrition. Also to focus on major nutrition related concerns at each stage of life.

Course Learning Objectives (CO):

1. To understand the role of nutrition in different stages of life cycle and meal planning.
2. Study the growth and development during various stages of life span.
3. Understand the basics for recommending the dietary allowances
4. Gain experience in planning adequate diets for different age groups and for different income groups.

Course outcome:

CO	Upon completion of the course, students would be able to	Cognitive level
CO-01	Explain, compare and contrast the nutritional requirements of humans during different stages of the life cycle	Understand
CO-02	Memorize the recommended dietary allowances of different age group.	Remember
CO-03	Relate foods and nutrients to the biological requirements of humans at different stages of the life cycle.	Apply
CO-04	To formulate a dietary intervention plan to address nutritional deficiencies or toxicity according to the health needs of individuals relative to age, development and disease status.	Create
CO-05	Explain and reflect upon the consequences of physical, biochemical, physiological, social and psychological factors impacting nutritional intake and status during each stage of the human life cycle	Evaluate
CO-06	Generate resources to summarise and communicate nutritional information compiled from official recommendations and scientific sources.	Analyse

Unit- 1 Food habits of family and community

1.1 factors affecting food habits and consumption pattern of different age group in India – Pregnant women, lactating mother and children.

1.2 Methods of assessing nutritional status.

1.2.1 Indirect methods – Demography, Vital statistics, Mortality and morbidity patterns, Literacy rate, unemployment rate, Socio –economic profile.

1.2.2 Direct methods – Anthropometry, Clinical assessments, Biochemical estimations, Diet survey. (Reference standards)

Unit- 2 Nutrition during pregnancy & lactation

2.1 Pregnancy- physiological stages of pregnancy complications of pregnancy, nutritional requirements, food selection.

2.2 Lactation – Physiology of lactation, nutritional requirements

Unit – 3 Nutrition during infancy & early child hood **hrs**

3.1 Infancy-Growth and development, nutritional requirements, breast feeding, Infant formula, weaning and supplementary foods.

3.2 Early child hood – (Toddler/Preschool) growth and nutrient requirements feeding patterns.

Unit – 4 Nutrition during school years & adolescence **hrs**

4.1 School children – Nutritional requirements

4.2 Importance of snacks, school lunch,

4.3 Nutritional problem in the school age child

4.4 Adolescence – growth and nutrient needs, food choices, eating habits factors influencing.

Unit- 5 Nutrition of adults & elderly **hrs**

5.1 Adult hood – food and nutrient requirements. Nutrition related problems.

5.2 Elderly – Factors affecting food and nutrient use, Nutrient needs Nutrition Related problems.

Unit- 6 Prevalence of nutrition problems & intervention programmers. **hrs**

6.1 Prevalence of nutritional problems in India with special reference to Pre-school children and women, Energy protein Malnutrition, Nutritional Anemia, Deficiency of Vitamin A, Iodine, Fluorine and other vitamin and mineral deficiencies.

6.2 Nutrition intervention programmes – Supplementary feeding, School lunch, Anemia and vitamin A prophylaxis, Goiter control programmes, Integrated child development services, Nutrition and health education, Food supplementation, Fortification & en- richment (brief)

Semester V
Paper VI
Life Span Nutrition Practical
PRACTICAL – 6

Course Objectives:

1. Comprehend the dietary guidelines in meal planning.
2. Acquainted with meal planning for all age groups.
3. Enable to familiarize with meal management appreciating the physical and physiological changes of individuals.

Course learning Outcome (CO):

CO	Upon completion of the course, students would be	Cognitive level

	able to	
CO-01	Understand the basic concept of meal management, meal planning for all age groups.	Understand
CO-02	Identify the nutritional deficiency symptoms among the population. Identify the nutrient intake/day as provided by recommended dietary allowances of different age group.	Remember
CO-03	Design / develop a healthy life style by balancing the diet. Apply the scientific knowledge to suggest dietary guidelines for different age groups.	Apply
CO-04	Develop skills in preparation of various food items using five food groups for a day. Calculate the nutrients contributed by a diet or meal. Justify the choice of food and method of cooking. Formulate weaning foods, packed lunch and age/activity specific diets adequate in quality and quantity.	Create
CO -05	Assess the nutritional status of the community	Evaluate

1. Nutritional anthropometry

a. Taking measurements of heights, weights and mid arm circumference of individual students in the class and comparing them with norms.

b. Taking the above measurements on pre-school children of a nursery school and comparing with NCHS standards, interpretation of data.

2. Planning, calculation and evaluation of normal diets for adults (men and women) pregnant women, lactating women, elderly, preschool, school adolescent (boy & girl) family.

3. Planning, preparation & evaluation of different types of weaning foods and comparing with commercial weaning foods in terms of nutritive value and cost

4. Visit to Anganwadi & other community centers to observe their activities. – Submission of report.

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SIXTH SEMESTER
FOOD SCIENCE AND NUTRITION PAPER-VII
Title: FOOD PROCESSING AND PRESERVATION
Class duration – 03 hours per week
Marks: Theory - 50 + Internal Assessment - 20= 70

48 Hours

Subject description: The aim of the course is the students to understand the basic principles of the main methods of food processing and preservation such as blanching, pasteurization, sterilization, canning, aseptic processing, extrusion, cooking, cold storage, freezing, irradiation, high hydrostatic pressure, new non-thermal processing methods and hurdle technology.

Course Objectives:

6 hrs

1. To gain knowledge on basic processing and preservation techniques
2. To know the importance of quality assurance in food industry.
3. To know the laws and standards ensuring food quality and safety.

Course Outcome:

CO	Upon completion of the course, students would be able to	Cognitive level
C-01	Explain the basic principles of food preservation processes: heating, chilling, freezing, control of water activity, acidification, chemical preservatives, packaging, etc.	Understand
CO-02	Describe the effects that intrinsic and extrinsic factors on microbial growth in food preservation	Remember

CO-03	Apply basic food science knowledge and get to know biochemical changes occurring during various processing and preservation techniques.	Apply
CO-04	Devise the appropriate application of certain conservation processes with regard to the preservation of quality and the satisfactory durability of food products	Create
CO-05	Optimize process parameters for selected conservation processes taking into account the physico-chemica properties of food products	Evaluate
CO-06	Analyze, interpret and explain complex phenomena in context of preservation principles.	Analyse

Unit- 1 Importance of Food Processing & preservation

1.1 Types and its uses of processing

1.2 Principles of preservation

1.3 Manipulative techniques involving physical and chemical changes in foods

Unit- 2 Food Spoilage **8 hrs**

2.1 Causes of food spoilage

2.2 General characteristics of Micro organisms & their importance in foods

2.3 Factors affecting their growth and destruction

Unit – 3 Contamination of Foods **10 hrs**

3.1 Sources and types

3.2 Cereal and cereal products, Sugar and sugar products, vegetable and fruits, Meat and meat products, fish and other sea foods, Canned foods.

Unit – 4 Food preservation **12 hrs**

4.1 Traditional and modern methods.

4.2 **Preservation at different temperature -**

4.2.1 Food preservation by heat – pasteurization & canning.

4.2.2 Food preservation using low temperature – freezing and refrigeration

4.3 Preservation by dehydration

4.4 Preservation using chemicals

4.5 Irradiation

Unit- 5 Food additives **4 hrs**

Unit 6 Food adulteration **4 hrs**

6.1 Classification & detection methods of Food adulterants

Unit 7 Sensory Evaluation of Foods **4 hrs**

7.1 Subjective and objective methods of evaluating food acceptability

PRACTICAL –VII

Course Objectives:

1. Gain knowledge on the importance of food quality.
2. Identify the different characteristics of foods
3. Categorize various methods for evaluating food quality
4. Ascertain the role of microorganisms in food quality.

Course Learning Outcome(CO):

CO	Upon completion of the course, students would be able to	Cognitive level
CO-01	Comprehend the nature and properties of foods Understand the principles of the various Food Processing Methods	Understand
CO-02	Know the principles of preservation behind the methods of preservation.	Remember
CO-03	Apply the knowledge/concepts to develop new products with minimal processing for better retention of essential nutrients.	Apply
CO-04	Prepare recipes focusing the principle of preservation.	Create
CO-05	Interpret the evaluation techniques and tests used in analyzing food quality	Evaluate
CO-06	Analyze and Explore the principle of preservation in food products with nutritive value.	Analyse

1. Manipulative techniques of food processing – methods of cooking, germination, Fermentation and malting

2. Study of micro organisms

a. Preparation of Bacterial smear and simple staining techniques

b. Microscopic of observation of yeast & molds

3. Sensory methods of evaluating Food Quality – Recognition, Threshold & other simple tests

4. Preparation of jam or jelly, fruit concentrate, chutneys, pickles, ketchup, dehydrated Products with demonstration on packaging (standards to be emphasized)
5. Identification of adulterants in common foods

6. Visit to food industry - Collection of information from media. Submission of Report.

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SIXTH SEMESTER
FOOD SCIENCE AND NUTRITION PAPER-VIII
Title: DIET THERAPY
Class duration – 03 hours per week
Marks: Theory - 50 + Internal Assessment - 20= 70

48 Hours

Subject description:Diet Therapy or medical nutrition therapy explores the role played by therapeutic diets in the treatment of chronic disease and other nutritional disorders. The course introduces the principles of the nutrition care process and will give knowledge and experience in nutrition assessment techniques and intervention strategies as applied to chronic disease and other nutritional disorders, this course will focus on the care of clients with pathologies caused by or causing nutritional impairments. General topics include nutrient delivery via oral, enteral, and parenteral routes, and interactions among foods, nutrients, medications, and supplements.

Course Objectives:

1. To understand the etiology, physiology and metabolic anomalies of acute and chronic disease and patient needs.
2. To learn the effect of the various disease of nutritional status and nutrient and dietary requirement

Course Learning Outcome (CO):

CO	Upon completion of the course, students would be able to	Cognitive level
CO-01	Understanding the structure of food services, nutrition departments and hospital nutritionists, and identifying and developing the functions of a nutritionist-dietician in a multidisciplinary team.	Understand
CO-02	Identifying and classifying food and foodstuffs.	Remember
CO-03	Applying scientific knowledge of physiology, pathophysiology, nutrition and food to individual or group diet planning and counseling, both in healthy (dietetics) and ill (diet therapy) clients, at every stage of life.	Apply
CO-04	Interpreting a nutritional diagnosis, evaluating nutritional aspects of a clinical record and implementing a dietary treatment plan.	Create
CO-05	Assessment of nutritional Status of individual is the systemic process of collecting and interpreting information in order to intervene the health status.	Evaluate
CO-06	Examining and evaluating the relationship between food and nutrition in health and/or illness.	Analyse

Unit- 1 Objectives of diet therapy		**6 hrs**
1.1	Definition of dietetics and clinical nutrition.	
1.2	Role of dietitian in hospital and community importance and mode dietary counseling.	
Unit- 2 Methods of assessing the nutritional status of patients		
2.1	Planning, nutritional care for hospitalized patients	
Unit – 3 Planning of Hospital diets-		**12 hrs**
3.1	Rationale for modifications of nutrients (protein, calorie, sodium, fat and fiber) and texture - soft and fluid diets, nutrition in surgical conditions and burns,	
3.2	Special feeding methods – enteral and parenteral feeding, Correction/ maintenance of fluid Balance	
Unit – 4 Dietary management of nutritional disorders		**10 hrs**
4.1	PEM, Vitamin A deficiency,	
4.2	Anemia and other related disorders – underweight and over weight.	
Unit- 5 Dietary management in disorders of organ systems		**16 hrs**
5.1	Peptic ulcer, colon disease, constipation and diarrhea	
5.2	Liver and gall bladder - hepatitis, cirrhosis	
5.3	Cardiovascular – Myocardial infarction, stroke, atherosclerosis, hypertension and Heart failure	
5.4	Renal – Nephrotic syndrome, acute / chronic renal failure	
5.5	Diabeties Mellitus	
5.6	Cancer	
Unit- 6 Organization and management of Food service in a hospital and community feeding centers.		**4 hrs**

PRACTICAL -VIII

Semester VI
Paper VIII
Diet Therapy

Course Objectives:

1.Understand the etiology and patho –physiology of metabolic and degenerative diseases
2. Know the importance and principles of dietetics as a distinct therapy for diseases
3. Gain knowledge on the types and role of dietitians
4. Understand the different therapeutic diets.
5. Relate dietary management for nutritional deficiency diseases

Course Learning Outcome:

CO	**Upon completion of the course, students would be able to**	Cognitive level
CO-01	Understand the basic principles of therapeutic nutrition involved in planning diets for different disease conditions	Understand
CO-02	Learn the formulation of different modified diets and feeding techniques.	Remember
CO-03	Categorize the diseases, disorders and deficiencies for planning suitable diets	Apply
CO-04	Prepare diets and calculate nutrient composition for dietary intervention.	Create

	Assessing the nutritional status of individual in health / sickness using Anthropometry and Diet history [dietary recall, food frequency as components]	
	Conversion of cooked weights to raw weights, calculation of mean nutritive value-energy, carbohydrate, fat, protein for the food groups and exceptional value (to be used for the diet recall)	
	Planning diets for the hospital dietary	
	Regular diet and its modification – convalescent, liquid, energy, protein, fat and sodium	

	ORT preparation	
	Visit to hospital dietary unit	
	Collection of information from media and report submission.	

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4. Srilakshmi.B. Dietetics , New age international Pvt. Ltd. New Dehli, 2001.
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DISCIPLINE SPECIFIC ELECTIVES (DSE)

FOOD SCIENCE AND NUTRITION DSE(For 2nd, 3rd&4th Semesters)

Title:- IMMUNOLOGY AND GENETICS
CLASS DURATION – 02 HOURS PER WEEK
MARKS-Theory - 30 + Internal Assessment -20= 50

Subject Description: It is a basic study of immunology and genetics which will focus on the organization of the immune system, evolution of the immune system, and cellular and molecular mechanisms used by the immune system to protect organisms from both self and disease. Genetics allows understanding normal events such as growth, development and ageing interms of studying molecular machinery of cell. This includes the development and functioning of the immune system which protects us from pathogen.

Course Objectives:

1. To promote critical thinking among students;
2. To provide students with a foundation in immunological processes
3. To provide students with knowledge on how the immune system works building on their previous knowledge from biochemistry, genetics, cell biology and microbiology;be able to clearly state the role of the immune system.

Course learning outcome (CO):

CO	Upon completion of the course, students would be able to	Cognitive level
CO-01	An understanding of humoral and cellular immunity and their relative significances to transfusion science theory and practice. The student will gain a basic understanding on human genetics and hereditary.	Understand
CO-02	Define central immunological principles and concepts. outline, compare and contrast the key mechanisms and cellular players of innate and adaptive immunity and how they relate.	Remember
CO-03	apply the acquired knowledge on the immune response to explain defense mechanisms against infectious agents and tumors	Apply
CO-04	analyze the mechanisms at the base of the immune response against the different infectious agents and against tumors	Analyse

Unit 1:Immune System **12hrs**

1.1 Introduction to the Immune System Cells and Organs of the Immune system
1.2 Innate immune responses Cells of the innate immune system, Inflammatory response
1.3 Antigen capture and presentation to lymphocytes. Antigen recognition in the adaptive immune system
1.4 Cell mediated Immune responses. Effector mechanisms of Cell mediated Immu responses
1.5 Humoral immune responses. Effector mechanisms of Humoral Immune responses

Unit 2:Immunization **7hrs**

2.1 Immunisation, vaccines, immunisation schedule
2.2 Congenital and acquired Immuno-deficiencies

Unit 3: Genetics **7hrs**

3.1 Introduction to Genetics – Concept of Genes, Chromosome, DNA structure;
3.2 Gene principles; Linkage and Crossing over
3.3 Gene Mutations; Chromosome abbreviations (Numerical and Structural variation)
3.4 Sources of variation; Sex-linked genes, genetic imprinting, polygenic inheritance.

Unit 4: Genetic disorders **6hrs**

4.1 Chromosomal and Gene-linked Syndrome – Down's syndrome, Klinefelter's syndrome, Fragile X syndrome, Turner syndrome, XYY syndrome.

References

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5. Microbiology. Prescott, Lansing M, Harely, John P, Klein, Donald A.Oxford, W M.C. Brown publishers, 1993.
6. Microbiology. Sharma, P.D. Meerut, Rastogi Publications, 1991.
7. Microbiology: An Introduction. Tortora, Gerard,J, Funke, Berdell, R, Case, Christine L.. California, Cumming Publishing Company Inc, 1992.

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FOOD SCIENCE AND NUTRITION DSE (For 2nd, 3rd&4th Semesters)
Title:- ADVANCES IN NUTRITION
CLASS DURATION – 02 HOURS PER WEEK
MARKS-Theory - 30 + Internal Assessment -20= 50

Subject Description:The online course deals with health promoting nutritional factors and bioactive constituents, their potential health implications and mechanisms of action.It covers the area of nutritional requirement during special conditions and most common drug-nutrient interactions encountered in patient care.

Course Objective: This Course is designed to:

1. Provide in depth knowledge of the physiological and metabolic role of various nutrients and their interactions in human nutrition.
2. Enable students to understand the importance of functional foods and neutraceuticals.
3. Enable students to understand the pharmacological actions of nutrients and their implications.
4. Familiarize students with the recent advances in nutrition.

Course learning outcome (CO):

CO	Upon completion of the course, students would be able to	Cognitive level
CO-01	Acquire knowledge on various bio molecules showing health benefits.	Understand
CO-02	List the characteristics/ properties of various functional foods.	Remember
CO-03	Apply their knowledge regarding extraction, isolation, characteristics and application of neutraceuticals in food industries.	Apply
CO-04	Analyze, interpret and explain complex phenomena in context of principles of nutrition during special condition.	Analyse

Unit 1: Neutraceuticals **?????**

- 1.1 Introduction & definition
- 1.2 use of neutraceuticals in health sciences
- 1.3 Their role in preventing and controlling diseases.

Unit 2: Prebiotics and probiotics **?????**

- 2.1 Usefulness of probiotics and prebiotics in gastro intestinal health and other benefits
- 2.2 Beneficiary microbes; prebiotics ingredients in foods- types of prebiotics and their effects on gut microbes.

Unit 3:Nutrition for special conditions **????**

- 3.1 Nutrition and work performance including exercise and sports.
- 3.2 Nutrition for space, mines and under water
- 3.3 Nutrition during disaster and emergency.

Unit 4: Nutrition and drug interactions **?????**

4.1 Effect of food on drug absorption, ,
4.2 Effect of drug on digestion
4.3 Absorption, storage and excretion of food/nutrients
4.4 Recent concepts in human nutrition- Nutrigenomics, metabolomines.

References:

1. Gropper, Advanced Nutrition and Human Metabolism. 7th edition. 2017.
2. Ross, Modern Nutrition in Health and Disease. 11th edition. 2012.
3. Srilakshmi.B. Dietetics , New age international Pvt. Ltd. New Dehli, 2007.
4. David L Katz. Nutrition in Clinical Practice: A Comprehensive, avid Evidence-Based Manual for the Practitioner (Nutrition in Clinical Practice), 2nd Edition
5. Carolyn D. Berdanier, Johanna T. Dwyer, Elaine B. Feldman. Handbook of Nutrition and Food, Second Edition

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FOOD SCIENCE AND NUTRITION DSE (For 2nd, 3rd&4th Semesters)

Title:- PUBLIC HEALTH NUTRITION

CLASS DURATION – 02 HOURS PER WEEK

MARKS-Theory - 30 + Internal Assessment -20= 50

Subject Description: This course covers a range of topics around nutritional issues related to population-level health. Community or public health work appeals to many graduates of Nutritional Sciences because it allows them to directly affect the nutritional status of large groups of people.

Health inequities, as explained by the social determinants of health, and their impact on nutritional health and well-being are covered in detail. Consideration is given to factors which influence consumer food choices, dietary habits and food consumption patterns including social, cultural and environmental factors.

Course Objective:

1.To provide better understanding of public health nutrition with a focus placed on the importance of building a sustainable, nutritious and healthy food supply for all.

Course learning outcome

CO	Upon completion of the course, students would be able to	Cognitive level
CO-01	Understand the significance and scope of public nutrition	Understand
CO-02	Identify the needs of the community and develop programmes.	Remember
CO-03	Apply immunological intervention programmes to overcome epidemic of communicable diseases.	Apply
CO-04	Analyze and apply research findings for the use of societal needs and contribute to nation building strategies.	Analyse

Unit 1: Common Infections and Food Borne Disease 8hrs

1.1 Infection through gastrointestinal tract
1.2 Infection through respiratory tract
1.3 Infection through skin and mucous membranes & anthropod
1.4 Food borne illnesses

Unit 2: Environmental Sanitation and Food Safety 8hrs

2.1 Environmental hazards and food chain
2.2 Control of hazards associated with different foods
2.3 food safety control programmes

Unit 3: Primary health care 8hrs

3.1 Concept of health
3.2 common health problems in India
3.3 evolution of health care delivery systems
3.4 national health policy and national health programmes

Unit 4: Demography and Population Statistics 8hrs

4.1 Health Statistics
4.2 Nutritional Epidemiology
4.3 Demographic and Socio-Economic Transitions

4.4 Nutrition and Health Transitions

References:

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12. *https://books.google.com › Science › Life Sciences › Microbiology*
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FOOD SCIENCE AND NUTRITION DSE (For 5th & 6th Semesters)
Title:- FOOD SAFETY AND QUALITY CONTROL
CLASS DURATION – 02 HOURS PER WEEK
MARKS-Theory - 30 + Internal Assessment -20= 50

Subject Description: The primary objective of this course is to develop the students' understanding of food safety and quality management, provide them with knowledge of safety and sanitation that can be applied in food preparation. This course also aims at enriching the minds of those students who have interest in learning the course in the broader context of food safety and quality management.

Course Objectives: It aims to develop a multidimensional understanding

1. Be familiar with food safety hazards.
2. Analyze hazards that might contaminate foods and causes of foodborne illnesses.
3. Apply the Hazards Critical Control Point (HACCP) system as part of food safety and quality management.

Course learning outcome

CO	**Upon completion of the course, students would be able to**	Cognitive lev
CO-01	Be familiar with food safety hazards	Understand
CO-02	Perceive the sensory evaluation techniques.	Remember
CO-03	Exemplify application of food safety and quality assurance.	Apply
CO-04	Comprehend the detection methods of the adulterants in food products.	Create
CO-05	Grasp the implementation of HACCP.	Evaluate
CO-06	Analyze hazards that might contaminate foods and causes of foodborne illnesses.	Analyse

Unit 1: Concept of food safety and quality **8hrs**

1.1 Meaning, objectives, quality dimensions of food
1.2 Assurance of food safety
1.3 International food regulatory systems
1.4 National food regulation
1.5 Food safety management tools
1.6 Food hazards

Unit 2: Food hygiene and sanitation **8hrs**

2.1 General principles of food hygiene, ,
2.2 personal hygiene and food handling habits
2.3 sanitary aspects of water supply,
2.4 Cleaning agents and waste disposal.

Unit 3: Food packaging **8hrs**

3.1 Principles and importance of packaging
3.2 food packaging materials and forms
3.3 food and nutritional labeling
3.4 packaging materials hygiene and safety

Unit 4: Food laws and standards **8hrs**

4.1 Need for food laws
4.2 Indian food laws
4.3 integrated food law
4.4 International food laws.

References:

1. Mahindra SN (2000) Food Safety-A tehno legal analysis. Tata McGraw New Publishing Company Limited, New Delhi.
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FOOD SCIENCE AND NUTRITION DSE (For 5th & 6th Semesters)
Title:- NUTRTION EDUCATION
CLASS DURATION – 02 HOURS PER WEEK

MARKS-Theory - 30 + Internal Assessment -20= 50

Subject Description: Nutrition education is a set of learning experiences designed to assist in healthy eating choices and other nutrition-related behavior. It includes any combination of educational strategies, accompanied by environmental supports, designed to facilitate voluntary adoption of food choices and other food and nutrition-related behaviors conducive to health and well-being. Nutrition education is delivered through multiple venues and involves activities at the individual, community, and policy levels. Nutrition Education also critically looks at issues such as food security, food literacy, and food sustainability

Course Objectives:

1. Utilize knowledge from foundational sciences as a basis for understanding the role of food and nutrients in health and disease.
2. Provide culturally competent nutrition services for diverse individuals and communities using a variety of communication strategies.

Course learning outcome (CO):

CO	Upon completion of the course, students would be able to	Cognitive level
CO-01	Integrate scientific information, research, and critical thinking into evidence- based practices.	Understand
CO-02	Remember and Utilize the Nutrition Care Process to deliver state-of-the-art, safe and effective nutrition care.	Remember

CO-03	Apply basic principles of entrepreneurship to Dietetics practice.	Apply
CO-04	Establish a basis for lifelong learning and interprofessional collaboration.	Create
CO-05	Implement and Evaluate strategies for food access, procurement, preparation, and safety that are relevant for the	Evaluate
CO-06	Analyze hazards that might contaminate foods and causes of foodborne illnesses.	Analyse

Unit 1: Nutrition education and challenges 8hrs

1.1 Definition, goals, objectives of nutrition education and challenges for nutrition educators
1.2 Theories of nutrition education
1.3 Need assessment for nutrition education
1.4 Planning, executing and evaluation of nutrition education programs

Unit 2: Approaches in Nutrition and Health Education **8hrs**

2.1 Approaches - Meaning and Types
2.2 Traditional Approaches, Modern Approaches.
2.3 Health Education and Nutrition Education – Definition and Objectives

Unit 3: Health and nutrition education **8hrs**

3.1 Themes and Messages in Health and nutrition education
3.2 Theme for Community Health- Communicable diseases and Infections
3.3 Non-communicable diseases
3.4 Maternal Health, Pregnancy Complications
3.5 Reproductive Health Problems
3.6 Child's Health

Unit 4: Methods of Communication in Nutrition and Health Education **8hrs**

4.1 Communication – Meaning and Influencing factors
4.2 group communication –methods and advantages
4.3 mass Communication Methods
4.4 Teaching Aids.

References:

1. Varadarajan B and Mayilvaganan S (2012). Antyodaya anna yojana sheme is to ensure food security to the poorest of the poor. International journal of business economics and management research. 2(2): 178-182.

2. National food for work program. Guidelines. A report of government of India. Ministry of rural development. 2006.
3. Brahman GNV, Nair KM and Laxmaiah A. (2000). Community trials with iron and iodine fortificationsalt (double fortified salt) proceedings of 8th world salt symposium. 1:955-60
4. Begum R (1999). Nutrition education. Foods, Nutritionand Dietetics. Sterling publishers. New Delhi. P333-349.
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FOOD SCIENCE AND NUTRITION DSE (For 5th & 6th Semesters)
Title:- NUTRITION COUNSELLING
CLASS DURATION – 02 HOURS PER WEEK
MARKS-Theory - 30 + Internal Assessment -20= 50

Subject Description: This course covers a range of topics related to providing evidence-based nutrition information to individuals as well as population-level health. It is designed to be an introductory course in nutrition education and theory within the Nutritional Sciences major. Students will explore the tenets of communication, education, and behavioral theories and models pertinent to the developmentand dissemination of nutrition information.

Course Objective: The aim of the course is to build healthy food-related practices and outlooks, as well as understanding, in communities, groups and individuals.

Course learning outcome

CO	Upon completion of the course, students would be able to	Cognitive level
CO-01	Integrate scientific information, research, and critical thinking into evidence- based practices.	Understand
CO-02	Remember and Utilize the Nutrition Care Process to deliver state-of-the-art, safe and effective nutrition care.	Remember
CO-03	Apply basic principles of entrepreneurship to Dietetics practice.	Apply
CO-04	Establish a basis for lifelong learning and inter-professional collaboration.	Create

CO-05	Implement and Evaluate strategies for food access, procurement, preparation, and safety that are relevant for the culture, age, literacy level, and socio-economic status of clients and groups.	Evaluate
CO-06	Analyze hazards that might contaminate foods and causes of foodborne illnesses.	Analyse

Unit 1: Communication in nutrition counseling

1.1 Definition and significance of communication
1.2 Communication skills
1.3 Organizational communication and training
1.4 Professional communication and team collaboration

Unit 2: Designing and counseling plans

2.1 Assessment component
2.2 Data analysis
2.3 Writing goals and objectives
2.4 planning learning experience

Unit 3: Counseling approaches and counseling application

3.1 Approaches to counseling
3.2 Counseling therapies
3.3 Models for learning
3.4 Evaluation of learning and self-management

Unit 4: Implementation and evaluation aspects of counseling

4.1 Nutrition counseling for diabetes mellitus
4.2 Nutrition counseling for cardiac problems and hypertension
4.3 Nutrition counseling for obesity
4.4 Ending counseling sessions

References

1. Dick, L. (2013) Nutrition Counseling and Education Skill Development, Second Edition, Journal of Nutrition Education and Behavior, 45: 383-388.
2. Schiller, R.M., Miller, M., Moore, C., Davis, E., Dunn, A., Mulligan, K. & Zeller, P. (1998). Patients Report Positive Nutrition Counseling Outcomes. Journal of Academy of Nutrition and Dietetics, 98 (9): 977-982
3. Monk, A., Barry, B., McClain, K., Weaver, T., Cooper, N., Franz, M.J. Practice guidelines for medical nutrition therapy provided by dietitians for persons with non-insulin-dependent diabetes mellitus. J Am Diet Assoc. 1995 ;95:999–1006
4. Rhodes, K.S., Bookstein, L.C., Aaronson, L.S., Mercer, N.M., Orringer, C.E. Intensive nutrition counseling enhances outcomes of National Cholesterol Education Program dietary therapy. J Am Diet Assoc. 1996;96:1003–1010

5. Milkererr, J., Graves, J.S. Follow-up dietary counseling benefits attainment of intake goals for total fat, saturated fat, and fiber. J Am Diet Assoc. 1992;92:603–605.
6. Weese, N., Jones, J., Miller, M.A. Successful strategies for reimbursement of outpatient nutrition services. J Am Diet Assoc. 1993;93:458–459.
7. Walker, B.H., Beman, M.K.M., Tomazic, T.J., Sawicki, M.A., Sawicki, M.A. (2000).Provision of Nutrition Counseling, Referrals to Registered Dietitians, and Sources of Nutrition Information Among Practicing Chiropractors in the United States. Journal of Academy of Nutrition and Dietetics, 100 (8): 928-933.

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FOOD SCIENCE AND NUTRITION DSE (For 5th & 6th Semesters)
Title:- ENTREPRENEURSHIP
CLASS DURATION – 02 HOURS PER WEEK
MARKS-Theory - 30 + Internal Assessment -20= 50

Subject Description: Food and nutrition entrepreneurship addresses significant and ongoing changes in the food industry by preparing students with sound nutrition principles and business acumen that will allow them to competitively participate in a growing field. It encompasses key topics for future nutrition entrepreneurs, whether they may be innovating within a company or organization or launching a food or nutrition-related business.

Course Objectives: Entrepreneurship Development in Food Processing incorporates specialized modules to cover recent trends and advances in food process, global food business, policy transitions, trade investments and safety regulations infoodbusiness.

Course learning outcome (CO):

CO	**Upon completion of the course, students would be able to**	Cognitive level
CO-01	Starting and managing a food processing organization by exploring the market. Understand the forms and practices adopted at small scale enterprises	Understand
CO-02	Know the recent concepts in food product development	Remember
CO-03	Apply basic principles of entrepreneurship to food science and Dietetics practice.	Apply

CO-04	Innovating and giving a different dimension to products.	Create
CO-05	Compile and evaluate the sales management tasks at the food based business.	Evaluate
CO-06	Analyze and Develop competencies in financial process practiced at the organizations	Analyse

Unit 1: Introduction		**8hrs**
1.1	Importance of entrepreneurship and its relevance in career growth	
1.2	entrepreneurship and enterprise	
1.3	Types of enterprise	
1.4	Charms of being an entrepreneur	
1.5	Creativity and innovation and Problem solving	
Unit 2: Business Plan		**7hrs**
2.1	Importance, Content, Preparing a business plan.	
2.2	Business Communication – importance	
2.3	Oral and written communication	
2.4	Improvement exercises.	
Unit 3: Accounting		**7hrs**
3.1	Books of accounts – Importance of accounting assessment	
3.2	Different books	
3.3	Accounting Stationery, Operating mechanism	
3.4	Financial Statements - Importance and interpret action	
3.5	Profit and loss account	
3.6	Balance Sheet, Cash – flow and fund flow	
Unit 4: Marketing Management		**10hrs**
4.1	Marketing for small business	
4.1.1	Sales promotion – Strategies	
4.1.2	Tools and techniques	
4.1.3	Pricing policy	
4.2	Export marketing	

4.2.1	Understanding international business environment,	
4.2.2	Do's and don'ts for exports	
4.3	Legal implication	
4.3.1	Income tax, Sales, excise, ,	
4.3.2	Labour laws	
4.3.3	factory act, etc	
4.4	Supporting Entrepreneurship	
4.4.1	IDBI, KSFC, KSSIDC	
4.4.2	Small scale trades	
4.4.3	Rozgar Yojana	
4.4.4	Self-employment programme for woman.	

References:

1. Small Scale Industries and Enterpreneurial Development by C.S.V. Murthy.
2. Enterpreneurship and Small Business Management by C.B. Gupta and Khanka.
3. Enterpreneurial Development by S.Anil Kumar, S.C.Poornima, M.K.Abraham and K. Jayashree
4. Small Business Management and entrepreneurship by Vasant Desai.

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