B.Sc NUTRITION AND DIETETICS (NON- SEMESTER)
(With effect from the Academic Year 2013-2014)

QUALIFICATION FOR ADMISSION:
- Candidate should have passed the Higher Secondary Examination conducted by the Board of Higher Secondary Education, Govt. of Tamilnadu or other examination. Bio- Maths or Computer Science or any Vocational groups are considered to eligible for this course.

DURATION OF THE COURSE:
- The students shall undergo the prescribed course of study for a period of 3 academic years.

STRUCTURE OF QUESTION PAPER:
- For all the papers the maximum marks is 100.
- Section A – Answer any 8 questions out of 12 questions (5x8 = 40 marks)
- Section B - Answer any 6 questions out of 10 questions (6x10 = 60 marks)
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OBJECTIVES
To enable the students to understand the

- Organs of the body and their functions
- Different systems of the body, their functions with special reference to the control and feedback mechanisms
- Physiological changes at different stages of life.

UNIT – I: DIGESTIVE AND EXCRETORY SYSTEM
Anatomy and functions of the organs of the digestive system: oral cavity, stomach, small intestine, large intestine, pancreas, liver; Saliva-composition, function, Bile-composition, function; process of digestion, absorption and assimilation of food. Movements of the gastro intestinal tract-deglutition, gastric tone, digestive peristalsis, Pendular, Segmenting movements, antiperistalsis, Peristalsis rush, gastro colic reflex.

EXCRETORY SYSTEM

Skin - structure and functions, regulation of body temperature.

UNIT – II: BLOOD AND CIRCULATORY SYSTEM
Composition, functions and volume of blood. Erythrocytes, Leucocytes, Thrombocytes- types, erythropoiesis, leucopoiesis, life span and fate, functions; Haemoglobin, Erythrocyte sedimentation rate, haemolysis, leucocytesis, leucopenia, leukemia, polycythaemia, anaemia.

Blood coagulation, blood grouping, transfusion, RH factor, Erythroblastosis foetalis.

Structure and functions of the heart and blood vessels. Cardiac impulse - Junctional tissues, cardiac cycle, Blood pressure- factors affecting blood pressure, ECG, heart sounds, Cardiac output, regulation of heart rate, pulse.

UNIT – III: RESPIRATORY SYSTEM
Anatomy- respiratory pathway, lungs - lung unit: Mechanism of respiration, lung volumes. Gaseous exchange in tissues, lungs; transport of $O_2$ and $CO_2$ - chloride shift; Regulation of respiration - nervous, chemical - Herring-Brewers reflex; types of breathing; modified forms of respiration- Hypoxia, Asphyxia, Cyanosis, Oxygen debt; Artificial Respiration – types - mouth to mouth, Schafer’s method, Holger Neilson’s method, Eve’s rocking method, Drinker’s mechanical method.
UNIT – IV: REPRODUCTIVE AND ENDOCRINE SYSTEM
Anatomy of male and female reproductive organs - menstrual cycle, process of reproduction and lactation, conception and contraception.
Structure and functions of pituitary, thyroid and adrenal glands.

UNIT – V: SENSE ORGANS AND NERVOUS SYSTEM
Structure and functions of Eye and Ear
Structure of neuron, synapse,
Structure and functions brain – Cerebrum, Cerebellum, Medulla oblongata Functions of spinal cord
Functions of Autonomic nervous system
Reflex Action – reflex arc. - Receptors –types.
Physiology of sleep - theories.

TEXT BOOKS:

REFERENCES
I YEAR
PAPER II
FOOD MICROBIOLOGY

OBJECTIVES
This course will enable the student to
1. Understand the nature of microorganisms involved in Food – spoilage, food infections and intoxications.
2. Understand the importance of microorganisms in food bio technology.
3. Understand the principles of various methods used in the prevention and control of the microorganisms in foods.

UNIT – I
a) Introduction to importance of microorganisms in foods – Bacteria, yeast, Virus, Fungi Classification and their role in food industry.

UNIT – II
a) Cultivation of microorganisms – Nutritional requirements of microorganisms, types of media used.
b) Primary sources of microorganisms in foods, physical and chemical methods used in the destruction of microorganisms (Sterilization and Disinfection)

UNIT – III
Fundamentals of control of microorganisms in foods. Extrinsic and intrinsic parameters affecting growth and survival of microbes, use of high and low temperature, dehydration, freezing, freeze drying, irradiation, and preservatives in food preservation.

UNIT – IV: FOOD SPOILAGE
Contamination and spoilage of different kinds of foods and their prevention. Cereal and cereal products, vegetables and fruits, fish and other sea foods, meat and meat products, eggs and poultry, milk and milk products, canned foods.

Unit – V
Public health hazards due to contaminated foods. Foods borne infections, diseases and intoxications – symptoms mode and sources of transmission and methods of prevention investigation and detection of food borne disease outbreak.

REFERENCES
OBJECTIVES
This course will enable the student to
1. Understand the Science of Food.
2. Understand the importance and characteristics of foods and their products.
3. Understand the principles of processing and the effect of heat on different kinds of foods.

UNIT – I: INTRODUCTION TO FOOD SCIENCE
Definition of food, food science, functions of food, Food groups (ICMR) – Basic 7 and Basic 5 , Cooking- Definition, Objectives, Methods of cooking – Moist heat, Dry heat, Solar cooking, Microwave cooking.

UNIT – II: CEREAL AND CEREAL PRODUCTS

UNIT – III: PULSES

UNIT – III: VEGETABLES AND FRUITS
Vegetables:
Vegetable cookery – Types of loss of nutrients and its prevention.

Fruits:
Classification, Composition, Enzymatic and Non enzymatic browning and its prevention.

UNIT – 5: SUGAR

REFERENCES
OBJECTIVES
This course will enable the student to
1. Acquire knowledge about their functions and deficiencies.
2. Gain knowledge about physiological and metabolic role of various nutrients.

THEORY
UNIT – I: INTRODUCTION
Definitions - Nutrition, Health, Nutritional Status, Socio cultural factors influencing nutrition, Balanced diet – definition, Importance, Food pyramid.

Unit – II: ENERGY
Energy- definition, Bomb calorimeter, SDA of foods. BMR, factors affecting BMR. Direct and indirect Calorimetry, Energy balance definition. Deficiency and excess of energy, RDA, sources.

Unit – III: CARBOHYDRATES

PROTEIN: Definition, classification, function, protein quality (BV, PER, NPU), protein requirements (RDA), deficiency, Novel proteins.

Unit – IV: MINERALS
Classification, Minerals (Ca, P, Fe, Fl, Se, Zn, I) and their functions, RDA, deficiency and sources.

Unit – V: VITAMINS
Classification, Vitamins – A,D,E,K, B1, B2, B3, B6, B12 Folic acid and their functions, deficiency, RDA, sources.

WATER: Functions, requirements, Water Balance, Sources.

REFERENCES
OBJECTIVES
This course will enable the student to
1. Develop an understanding of the principles of biochemistry (as applicable to human nutrition)
2. Obtain an insight into the chemistry of major nutrients and physiologically important compounds.
3. Understanding the biological process and systems as applicable to human nutrition.
4. Apply the knowledge acquired to human nutrition and dietetics.

UNIT – I: CARBOHYDRATES

UNIT – II: PROTEINS

UNIT – III: LIPIDS
a) Lipids, types and properties of Fatty acids, composition and properties of fats, significance of Acid Value, Iodine Value and Saponification value.
b) Biological Oxidation – Citric acid cycle, Electron transport chain.

UNIT – IV: ENZYMES
a) Enzymes – Definition, Types and classification of enzymes, definition and types of co-enzymes, specificity of enzymes, enzyme kinetics including factors affecting velocity of enzyme catalyzed reactions, enzyme inhibition.
b) Molecular aspects of transport – passive diffusion, facilitated diffusion, active transport.

UNIT – V: HORMONES
a) Hormones – Biological role of hormones of Pituitary, Adrenal Cortex and Medulla, Thyroid, Parathyroid, Pancreas.

REFERENCES


OBJECTIVES

This course will enable the student to

1. Understand the Science of Food.
2. Understand the importance and characteristics of foods and their products.
3. Understand the principles of processing and the effect of heat on different kinds of foods.

UNIT – I: MILK AND MILK PRODUCTS


UNIT – II: EGG

Structure, Composition, Egg cookery - effect of heat, effect of sugar, salt, acid and starch, Role of egg in cookery. Quality of egg - factors determining the quality, evaluation of egg quality.

UNIT – III: FLESH

FOODS MEAT:

Structure, Composition, Postmortem changes, Ageing, Tenderizing, Meat cookery - factors affecting the cooking quality of meat, changes during cooking.

POULTRY: Classification, Processing and Composition.
FISH: Classification, Composition, Selection.

UNIT – IV: FATS AND OILS

Composition, Refining and Processing of oil, Rancidity- Definition, types, prevention. Role of fat and oil in cooking.

UNIT – V: SPICES AND HERBS

SPICES:
Functions of spices, types, role of spices in cookery.

HERBS:
Types of herbs used in cooking and its characteristics and common uses.

REFERENCES

II YEAR
PAPER VII
NUTRITION THROUGH LIFE CYCLE

OBJECTIVES
This course will enable the student to
1. Understand the concept of an adequate diet and the importance of meal planning.
2. Know the factors affecting the nutrient needs during the life cycle and the RDA for various groups.
3. Gain knowledge about dietary management in common ailments.

UNIT – I: MEAL PLANNING
Basic principles and factors influencing meal planning, Basic meal pattern and its modification to suit different income levels, age and physiological stress.

UNIT – II: PREGNANCY AND LACTATION

Nutrition during pregnancy – Importance, Signs and symptoms, complication & Nutrient requirements during pregnancy.

Nutrition during lactation – Physiology of lactation, nutrient composition of human milk, Nutrient requirement during lactation.

UNIT – III: INFANCY AND PRESCHOOL

Nutrition during Infancy - Growth and development during infancy, Advantages of Breast feeding – Weaning and supplementary food, Nutrient requirements.

Nutrition during preschool - Growth and development, Nutrient Requirements, inculcation of good food habits, feeding programmes – school lunch programme.

UNIT – IV: SCHOOL GOING AND ADOLESCENCE

Nutrition during school going - Growth and development, Nutrient Requirements.

Nutrition during adolescence - Growth and development, Eating disorder, nutritional requirements.

UNIT – V: ADULTHOOD AND OLD AGE

Nutrition during Adulthood - Growth and development, nutritional requirements.

Nutrition during old age - Growth and development, Nutritional problems, nutritional requirements, special needs and nutritional requirements during old age.

PRACTICALS
1. Planning and preparation of diets for pregnant woman, lactating woman, infant, pre-school going, Adolescent and aged person.
2. Visit to community health centres.
II YEAR

PAPER VIII

FOOD SCIENCE PRACTICAL

UNIT - I
Methods of measuring ingredients, Preliminary preparations of cooking.

UNIT – II
Cereal Cookery: Examination of starch granules, water absorption of raw and parboiled rice, weight and volume of raw and cooked cereals.

UNIT – III
Pulse Cookery: Raw weight and cooked volume of pulses, roasting.

   Milk Cookery: Curdling, effect of time and temperature and application of culture in the process of curd preparation.

Sugar Cookery: Stages of sugar cookery, preparation of recipes for different stages of sugar cookery.

UNIT – IV
Vegetables & Fruits: Prevention of browning reaction, peeling techniques, types of cuts.

UNIT – V
EGG COOKERY: Boiled egg, poached egg, custard, mayonnaise.

   FISH COOKERY – Boiling and steaming.

REFERENCES

II YEAR
PAPER IX
FUNCTIONAL FOODS AND NUTRACEUTICALS IN HEALTH & DISEASE

OBJECTIVES
To enable students understand the relation between Functional Foods, Nutraceuticals to Food and Drugs

1. To introduce them to various functional food groups and products
2. To enable students understand the clinical role of Functional Foods and Nutraceuticals in health & disease

UNIT – I: INTRODUCTION TO FUNCTIONAL FOODS AND NUTRACEUTICALS
Functional Food and Nutraceutical-Definition, History of functional foods and classification

UNIT – II: FUNCTIONAL COMPONENTS FROM PLANT SOURCES
a. Dietary fiber - Types and sources, Physical and Physiological properties
b. Phenolic compounds – Phytoestrogens (Isoflavones, Lignans) Flavonoids – Quercetin, kempferol, Flavones – limonene, Flavols – Catechin, Phenolic acid – Ellagic acid, Caffeic acid
c. Phytosterols and phyto sterols
d. Saponins d) Tannins
e. Carotenoids - Lycopene, Beta-carotene, Lutein and zeaxanthin

UNIT – III: FUNCTIONAL COMPONENTS FROM ANIMAL SOURCES
a. Proteins – lactalbumin, lactoglobulin, lactoferrin, immunoglobulins,
b. Derived peptides – casein phospho peptides, glycomacro peptides,
c. Lactose. Fat. Mineral – zinc, selenium, Calcium
d. Dietary lipids - Conjugated Linolenic Acid, linoleic acid, oleic acid, GLA
e. Omega 3 and Omega 6 Fatty Acids
f. Structured Lipids

UNIT – IV: MICROBES AS FUNCTIONAL FOODS
Prebiotics - Definition, role of prebiotic as functional ingredient.

Probiotics- Definition, role of probiotic as functional ingredient.

Synbiotics- Definition, role of probiotic as functional ingredient.

UNIT – V: CLINICAL APPLICATIONS OF FUNCTIONAL FOODS
1. Functional foods in oral and gut health
2. Functional foods in Obesity and Cardiovascular diseases
3. Functional foods in Nervous System
4. Functional foods in Bone health and Diabetes mellitus
5. Functional foods in cancer

REFERENCES:

III YEAR
PAPER X

FOOD SERVICE MANAGEMENT

Objectives
To enable the student to:
1. Understand the management aspects of food service and
2. Gain knowledge about various types of food service.

Theory
UNIT – I: ORGANIZATION AND MANAGEMENT
Organisation, types and management tools.

UNIT – II
PERSONNEL MANAGEMENT
Recruitment, Selection, induction, training and supervision of personnel, labour policies and legislation.

UNIT – III: QUANTITY FOOD SERVICES
Types of food service, styles of service.

UNIT – IV
FINANCIAL MANAGEMENT
Cost account and keeping, inventory maintenance of account books, balance sheets, food costing.

UNIT – V: SANITATION
Sanitation of plant, garbage disposal, pest control.
REFERENCES

III YEAR
PAPER XI
DIETETICS

Objectives
To enable students to
1. To describe the roles the responsibilities of a dietitian in a Hospital.
2. To plan and prepare therapeutic diets for patients.
3. To organize diet counseling to patients and family.

UNIT - I
Definition of dietetics and Diet theraphy, Purpose and principles of therapeutic diets, factors considered in planning therapeutic diets,Dietitian-Definition,Classificationand Responsibility.

UNIT – II
1. Routine Hospital diets – clear fluid diet, full fluid diet, soft diet, regular normal diet, pre-operative
diet, post-operative diet.
2. Special feeding methods, Tube feeding types, advantages and disadvantages, parenteral feeding.

UNIT – III: Causes, symptoms and dietary management of:
1. Obesity and Under weight.
2. Febrile diseases – Typhoid, influenza, Malaria, Tuberculosis.
3. Gastrointestinal Disorders- Diarrhea, Dysentery,Peptic Ulcer and constipation
4. Diet in Allergy-Definition .Classification. Food allergens, test for allergy, dietary treatment

UNIT – IV:
Causes, symptoms and use of exchange list, dietary treatment for
1. Diabetes mellitus
2. Cardio Vascular diseases- Hypertension, Atherosclerosis, congestive cardiac failure,

UNIT – V:
Disease of liver-Hepatitis, Cirrhosis, choledolithiasis
1. Disease of the urinary tract- Glomerulonephritis, Nephrotic Syndrome, Urinary calculi, Acute renal failure.
REFERENCES

III YEAR
PAPER XII
DIETETICS PRACTICALS

UNIT – I
Planning and Preparation of Therapeutic diets – Soft diet, clear and full liquid diet.

UNIT – II
Planning and Preparation of diet for fevers - Typhoid, Tuberculosis and Malaria.

UNIT – III
Planning and Preparation of diet for obesity and under weight

UNIT – IV
Planning and Preparation of diet for Diabetes, peptic ulcer, constipation and diarrhea

UNIT – V
Planning and Preparation of diet for Atherosclerosis, Hypertension, Cirrhosis, Hepatitis, Nephritis, Cholelithiasis, Renal calculi

REFERENCES