

MANGALORE



UNIVERSITY

Office of the Registrar
Mangalagangothri - 574 199

No.: MU/ACC/CR.32/2013-14/A2

Date: 13.03.2014

NOTIFICATION

Sub: Revised Syllabus of **B.Sc. (FND)** degree programme
Ref: Academic Council decision No. 3:33 (2013-14), dated 10.01.2014.

The revised Syllabus of B.Sc. (FND) degree programme which approved by the Academic Council at its meeting held on 10.01.2014 is hereby notified for implementation with effect from the academic year 2014-15.


REGISTRAR.

To:

- 1) The Principals of the Colleges concerned.
- 2) The Registrar (Evaluation), Mangalore University.
- 3) The Chairperson, BOS in FND, Mangalore University.
- 4) The Superintendent (ACC), O/o the Registrar, Mangalore University.
- 5) Guard File.

Hours of instruction for week, scheme and examination and credit assigned B.Sc., (FND) course.

Semester	Subjects	Paper	Instruction hours	Duration of exam (hours)	Marks for final exam	Marks for internal assignment	Total Marks	Credits
First	Plant food science	BSCFND 101	Theory-04	03	80	20	100	02
			Practical-03	03	40	10	50	01
	Principles of nutrition	BSCFND 102	Theory-04	03	80	20	100	02
			Practical-03	03	40	10	50	01
	Human physiology-I	BSCFND 103	Theory-04	03	80	20	100	02
			Practical-03	03	40	10	50	01
Second	Animal food science	BSCFND 151	Theory-04	03	80	20	100	02
			Practical-03	03	40	10	50	01
	Human nutrition	BSCFND 152	Theory-04	03	80	20	100	02
			Practical-03	03	40	10	50	01
	Human physiology-II	BSCFND 153	Theory-04	03	80	20	100	02
			Practical-03	03	40	10	50	01
Third	Life span nutrition	BSCFND 201	Theory-04	03	80	20	100	02
			Practical-03	03	40	10	50	01
	Dietetics	BSCFND 202	Theory-04	03	80	20	100	02
			Practical-03	03	40	10	50	01
	Chemistry-I	BSCFND 203	Theory-04	03	80	20	100	02
			Practical-03	03	40	10	50	01
Computer application-I	BSCFND 204	Theory-04	03	80	20	100	02	
		Practical-03	03	40	10	50	01	
Fourth	Nutrition through life cycle	BSCFND 251	Theory-04	03	80	20	100	02
			Practical-03	03	40	10	50	01
	Diet therapy	BSCFND 252	Theory-04	03	80	20	100	02
			Practical-03	03	40	10	50	01
	Chemistry-II	BSCFND 253	Theory-04	03	80	20	100	02
			Practical-03	03	40	10	50	01
Computer application-II	BSCFND 254	Theory-04	03	80	20	100	02	
		Practical-03	03	40	10	50	01	

Microbiology-I	BSCFND 301	Theory-03	03	80	20	100	02
		Practical-03	03	40	10	50	01
Nutritional biochemistry-I	BSCFND 302	Theory-03	03	80	20	100	02
		Practical-03	03	40	10	50	01
Therapeutic diet	BSCFND 303	Theory-03	03	80	20	100	02
		Practical-03	03	40	10	50	01
Food laws and food standards	BSCFND 304	Theory-03	03	80	20	100	02
		Practical-03	03	40	10	50	01
Principles of food preservation	BSCFND 305	Theory-03	03	80	20	100	02
		Practical-03	03	40	10	50	01
Chemistry - III	BSCFND 306	Theory-03	03	80	20	100	02
		Practical-03	03	40	10	50	01
Food microbiology -II	BSCFND 351	Theory-03	03	80	20	100	02
		Practical-03	03	40	10	50	01
Nutritional biochemistry-II	BSCFND 352	Theory-03	03	80	20	100	02
		Practical-03	03	40	10	50	01
Clinical dietetics	BSCFND 353	Theory-03	03	80	20	100	02
		Practical-03	03	40	10	50	01
Quality control	BSCFND 354	Theory-03	03	80	20	100	02
		Practical-03	03	40	10	50	01
Food preservation	BSCFND 355	Theory-03	03	80	20	100	02
		Practical-03	03	40	10	50	01
Chemistry-IV	BSCFND 356	Theory-03	03	80	20	100	02
		Practical-03	03	40	10	50	01
Internship		Project report		30	10	50	01
		viva		20		50	01



Office of the Registrar
Mangalagangothri – 574 199

No.: MU/ACC/CR.32/2013-14/A2

Date: 28.06.2014

CORRIGENDUM

Sub: Correction in the scheme of examination of B.Sc. (FND) degree programme.

- Ref: 1) This Office Notification of even No., dated 13.03.2014
2) This Office Corrigendum of even No., dated 6.05.2014
2) Letter from the Chairperson, UG BOS in FND, dated 4.06.2014.

In continuation to this office Corrigendum cited under reference (2) above, it is hereby informed to delete the scheme provided for III and IV semester Computer Application I and II – Practical (40+10+50) in the revised syllabus of B.Sc. (FND) degree notified vide notification cited under reference (1) above.

Corrected scheme of examination and instruction hours is enclosed herewith.

REGISTRAR.

To:

- 1) The Principals of the Colleges concerned.
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- 4) The Superintendent (ACC), O/o the Registrar, Mangalore University.
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First	Plant food science	BSCFND 101	Theory-04	03	80	20	100	02
			Practical-03	03	40	10	50	01
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			Practical-03	03	40	10	50	01
	Diet therapy	BSCFND 252	Theory-04	03	80	20	100	02
			Practical-03	03	40	10	50	01
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			Practical-03	03	40	10	50	01
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		Practical-03	03	40	10	50	01
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		Practical-03	03	40	10	50	01
Chemistry-IV	BSCFND 356	Theory-03	03	80	20	100	02
		Practical-03	03	40	10	50	01
Internship		Project report		30		50	01
		viva		20			

I B.Sc FND I SEMESTER
PLANT FOOD SCIENCE
THEORY

OBJECTIVES

Total 48hrs
4hours/week

This course will enable the students to-

1. Understand factors to be considered during selection of basic commodities, raw and processed and various aspects of their products and distribution.
2. Understand the principles underlying changes in food characteristics during cooking.
3. Be familiar with evaluation of food products for their quality characteristics

UNIT- I: FOOD GROUPS

12 Hours

- Introduction to Food Science
 - Food as a source of nutrients
- Food groups
 - ICMR Five Food Group System
 - Eleven Food Group System
- Nutritional classification of foods
- Advantages of cooking
- Methods of cooking
 - Moist heat Method-Boiling, Simmering, Poaching, Stewing , Steaming and Pressure cooking
 - Dry heat Method-Grilling, Roasting and Baking
 - Fat as media of cooking- Sautéing, Shallow and Deep fat frying
 - Its Merits and demerits
- Microwave cooking

UNIT- II: CEREALS

12 Hours

- Structure of a cereal grain
- Nutritive value and milling of rice and wheat
- Parboiling- its merits and demerits
- Characteristics of starch- Amylose and Amylopectin
- Gelatinization of starch
- Modified starch

UNIT III: PULSES, NUTS, OILSEEDS, FATS AND OILS 12 Hours

- Nutritive value
- Processing of pulses- effects of ^{DECORICATION,} soaking, germination and fermentation
- Types of fats and oils
 - Vegetable oil-Coconut, Groundnut, Sunflower and Soybean
 - Animal fats- Lard, margarine and butter
- Processing of fats and oils-Rendering, Pressing, Solvent extraction, Hydrogenation and Refining.
- Changes during cooking and storage

UNIT IV: FRUITS AND VEGETABLES 12 Hours

FRUITS

- Classification and Nutritive value
- Post harvest changes and storage
- Pectin substances
- Ripening of fruits

VEGETABLES

- Classification, Nutritive value
- Vegetable cookery
 - a. Preliminary preparation-Washing, Peeling and Blanching
 - b. Changes during cooking- Oxidation , chemical composition, water content and cellulose
 - c. Role of nutrients- Mechanical losses, solvent action of water, oxidation and chemical composition
 - Enzymes and non enzymatic browning, its prevention
 - Flavor compounds

PRACTICALS

36 Hours
3 Hours/week

1. Food Groups
2. Methods of measuring ingredients
3. Determination of the percentage of edible portion
4. Cereal cookery
 - Methods of cooking fine and coarse cereals
 - Preparation of selected Indian Cereal recipes
5. Pulses cookery
 - Cooking of soaked and raw pulses
 - Effects of adding salt, acid and alkali on cooking
 - Preparation of selected common recipes
6. Vegetables and fruits
 - Browning reaction
 - Effect of acid and alkali
 - Preparation of selected common recipes

REFERENCES

1. Levies, (1988) Food Commodities, Heinemann Ltd, London
2. Hughes and Bennion, M (1970) Introductory Foods, Macmillan & Co, New York
3. Dowell, P. , Bailey , A (1980) : The Book Of Ingredients , Dorlingkinderley Ltd ., London
4. Roseville, L.J And Viera , E.R.(1992) Elementary Food Science , 3rd Edition, Chapman and Hall, Newyork
5. Charley, H.(1982) Food Science, 2nd Edition, John Wiley & Sons.
6. Potter, N.N., Hotchkiss J.H. (1966) Food Science, Edition 5, CBS Publishers and Distributors, Delhi.

I YEAR B.Sc. FND I SEMESTER
HUMAN PHYSIOLOGY- I
THEORY

4 Hrs /week
48 Hours

OBJECTIVES:

This course will enable the students to-

1. To understand the homeostatic status of the human body.
2. Understand the physiological processes and functions as applicable to human nutrition.

UNIT I:

i) INTRODUCTION:

4 Hours

Cell- structure and organs, nucleus, chromosomes, genes, cell division, types of cell tissue transport, homeostasis, and body fluids,
Cell Junctions.

ii) BLOOD

12 Hours

- Red blood cells- Erythropoiesis, stages of differentiation function, count, physiological variation
- Haemoglobin- structure, function, concentration, physiological variation
- White blood cells- production, function, life span, count, differential count
- Platelets- origin, normal count, morphology, functions
- Plasma proteins- production, concentration, types, albumin, globulin, fibrinogen
- Haemostasis and Blood coagulation:
- Haemostasis- definition, normal haemostasis, clotting factors, mechanism of clotting, disorders of clotting factors

Blood Bank

- Blood groups- ABO system, Rh system, Blood grouping and typing, cross matching
- Rh system- Rh factor, Rh incompatibility
- Blood transfusion- Indication, universal donor and recipient concept. Complications of blood transfusion & Crossmatching
- Selection criteria of a blood donor, transfusion reactions
- Anticoagulants- classification, examples and uses
- Anaemia- classification- morphological and etiological effects of anemia on body
- Blood indices- colour index, MCH, MCV, MCHC
- Erythrocyte sedimentation rate (ESR) and Packed Cell Volume

- Blood Volume- Normal value, determination of blood volume and regulation of blood volume
- Lymph- Lymphoid tissue formation, circulation, composition and function of lymph
- Types of immunity

UNIT III: CARDIOVASCULAR SYSTEM

10 Hours

- **Heart-** Physiological anatomy, nerve supply, properties of cardiac muscle, cardiac cycle- systole, diastole, conduction system
- Cardiac output
- Heart sounds: Normal heart sounds, areas of auscultation
- **Blood Pressure-** Definition, normal value, clinical measurement of blood pressure
- Physiological variations, regulation of heart rate, cardiac shock, hypotension, hypertension, radial pulse
- **Heart Sounds-** Normal heart sounds, characteristics and signification, heart rate
- **Electrocardiogram (ECG)** - significance, coronary, cerebral circulation and capillary circulation

UNIT IV: DIGESTIVE SYSTEM

10 Hours

- Physiological anatomy of gastro intestinal tract, functions of digestive system
- **Salivary glands-** structure and functions, deglutition, mastication- stages and regulation of saliva, functions of saliva
- **Stomach-** structure and functions
- **Gastric secretion-** composition, function, regulation of gastric juice secretion
- **Pancreas-** structure, function, composition, regulation of pancreatic juice
- **Liver-** functions of liver
- **Bile secretion-** composition, function, regulation of bile secretion, bilirubin metabolism, types of bilirubin, Jaundice- types, significance
- **Gall bladder-** functions
- **Intestine-** small intestine and large intestine
- **Small intestine-** functions, digestion, absorption, movements
- **Large intestine-** functions, digestion and absorption of carbohydrates, proteins, fats, lipids
- **Defecation**

UNIT V: RESPIRATORY SYSTEM

12 Hours,

- Functions of respiratory system, physiological anatomy of respiratory system, respiratory tract, respiratory muscles, respiratory organ- lungs, alveoli, respiratory membrane, stages of respiration

- Mechanism of normal and rigorous respiration, forces opposing and favouring expansion of the lungs, intra pulmonary pleural pressure, surface tension, recoil tendency of the wall
- **Transportation of the respiratory gases:** Transportation of oxygen: direction, pressure gradient, forms of transportation, oxygenation of Hb, quantity of oxygen transported
- Lung volumes and capacities
- Regulation of respiration, mechanisms of regulation, nervous and chemical regulation, respiratory centre
- Hypoxia, cyanosis, asphyxia, dyspnea, dysbarism, artificial respiration, apnoea.

PRACTICALS

36 Hours

3 Hrs/week

1. **Spotters (tissue slide)**
 Cartilage
 Bone
 Adipose tissue
 Skin
 Muscle
 Identify and write description
2. **Record of blood pressure**
 Sphygmomanometer
 Palpatory method
 Auscultatory method
 Variation of B.P
3. **Haemoglobin estimation**
4. **Blood grouping**

REFERENCES

- ^ C. Hall, J. E. (1996): Textbook of Medical Physiology, 9th Ed. Pvt Ltd., Bangalore
- ^ Jhandi Charan (1988): London, W. B
- ^ (1989): Anatomy and Physiology in Health and Illness, Edinburgh, Livingstone
- ^ k of medical physiology by sembulingam

I B.S.C F.N.D - I SEMESTER
PRINCIPLES OF NUTRITION
THEORY

OBJECTIVES:

48 hours
4 Hours/week

This course will enable the students to-

1. Understand the functions and sources of nutrients.
2. Apply the knowledge in maintenance of good health for the individual and the community.
3. Be familiar with factors affecting availability and requirements.

UNIT 1: NUTRITIONAL STATUS

12 Hours

- The relation of good nutrition to normal physical development and sound health
- Methods of assessing nutritional status-Population sampling, Collection of data on the nutritional adequacy of diet consumed, Anthropometric measurements, Clinical examination, Biochemical assessment
- Diet surveys -methods

ENERGY:

- Definition of health and nutrition
- Definition of calorie and joule
- Measurement of calorific values of foods
- Basal Metabolic Rate (BMR)
- Specific Dynamic Action (SDA) of foods
- Energy needs of the body
- Measurement of energy balance of the body
- Direct and indirect calorimetry
- Calculation of energy requirements
- The ideal proportion of calories from protein, carbohydrates and fats.

UNIT 2: CARBOHYDRATES

12 Hours

Classification, chemistry, digestion, absorption, brief overview of metabolism, functions, sources and requirements

UNIT 3: PROTEINS

12 Hours

Classification, chemistry, digestion, absorption, brief overview of metabolism, functions, sources and requirements, Essential amino acids, Evaluation of protein quality, Supplementation and deficiency state

UNIT 4: LIPIDS/ FATS

12 Hours

Classification, chemistry, digestion, absorption, brief overview of metabolism, functions, sources and requirements, Saturated and unsaturated fatty acids and effects of deficiency.

PRACTICALS

36 Hours

3 Hrs /week

1. Qualitative test for proteins
2. Quantitative estimation of glucose.
3. Estimation of total lipid in egg yolk

REFERENCES

1. Guthrie, A. H., (1986) Introductory Nutrition. 6th Edition, The C.V. Mosby Company.
2. Swaminathan, M., (1985) Essentials of Food and Nutrition, Vol I and II, Ganesh & Co. Madras.
3. Gopalan, C., (1991) Nutritive value of Indian foods, Indian Council Of Medical Research.
4. WHO Technical Reports Series for Different Nutrients.
5. Robinson. C. H., Lawler, M. R., Chenoweth, W.L and Garwick, A.E., (1986) Normal and Therapeutic Nutrition, 17th edition, Macmillan Publishing Co.

I B.Sc FND II SEMESTER
ANIMAL FOOD SCIENCE
THEORY

Total 48 HOURS
4 Hours/week

OBJECTIVES

This course will enable the students to-

1. Understand factors to be considered during selection of basic commodities, raw and processed and various aspects of their products and distribution.
2. Understand the principles underlying changes in food characteristics during cooking.
3. Be familiar with evaluation of food products for their quality characteristics

UNIT I: MILK AND MILK PRODUCTS

12 Hours

- Composition and Nutritive value
- Properties of milk
- Effect of heat on milk constituents
- Processing of milk- clarification, pasteurization and homogenization
- Preparation of Cheese, butter , curd and Ice cream
- Problems encountered in cooking milk
- Milk products-Vitamin D milk, Skim milk ,concentrated milk and cream

UNIT II: EGG

12 Hours

- Structure and nutritive value
- Composition- Egg-white and Egg- yolk proteins
- Egg Quality- Evaluation of egg quality, Egg grading and Deterioration of egg quality
- Egg beating and Factors influencing Foaming
- Egg cookery-
 - Egg prepared in the shell
 - Egg prepared out of the shell- Poached egg, fried egg, scrambled egg and Omelette
- Products based on egg as thickening agent- Custard
- Products based on egg as emulsifying agent- Meringues
- Storage of egg

12 Hours

UNIT III: MEAT

- Structure and Composition of meat
- Classes of meat
- Gelatin
- Cuts and grades of meat and their selection
- Post mortem changes, storage and changes during cooking
- Ageing of meat and curing of meat
- Factors affecting tenderness of meat

UNIT IV: POULTRY AND FISH

12 Hours

- Classification and nutritive value
- Processing and preservation
- Selection and storage
- Methods of cooking poultry and fish cookery
- Spoilage of fish

MISCELLANEOUS:

- Spices and condiments-Composition, Flavoring extracts ,adulteration and medicinal values
- Processing and uses of major spices-Pepper(white and green), cardamom, ginger and turmeric

PRACTICALS

TOTAL: 36 HOURS

3 hours/ week

1. Fats and oils
 - a. Smoking point
 - b. Preparation of common recipes

2. Milk cookery
 - a. Experimental cookery on milk
 - b. Common preparations with milk cheese and curds

3. Egg cookery
 - a. Evaluation of fresh egg
 - b. Experimental cookery- boiled egg, poached egg, omelette and custard
 - c. Preparation of selected common recipes with milk

REFERENCES

1. Levies, (1988) Food Commodities, Heinemann Ltd, London
2. Hughes and Bennion, M (1970) Introductory Foods, Macmillan & Co, New York
3. Dowell, P. , Bailey , A (1980) : The Book Of Ingredients , Dorling Kinderley Ltd ., London
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6. Potter, N.N., Hotchkiss J.H. (1966) Food Science, Edition 5, CBS Publishers and Distributors, Delhi.

I YEAR B.Sc. FND II SEMESTER
HUMAN PHYSIOLOGY- II
THEORY

4 Hrs /week
48 Hours

OBJECTIVES:

This course will enable the students to-

- a. To understand the homeostatic status of the human body.
- b. Understand the physiological processes and functions as applicable to human nutrition.

Unit 1: ENDOCRINE SYSTEM

10 Hours

- Definition, classification of endocrine glands and their hormones, properties of hormones
- Thyroid gland hormones- regulation of secretion. Disorders- hypo and hyper secretion of hormone
- Adrenal gland, adrenal cortex, physiological anatomy of adrenal gland.
- Adrenal cortex, cortical hormones- functions and regulation
- Adrenal medulla- hormones, regulation and secretion
- Functions of adrenaline and nor-adrenaline
- Pituitary hormones- anterior and posterior pituitary hormones, secretion, function
- Pancreas- hormones of pancreas
- Insulin- secretion, regulation, function and action
- Diabetes mellitus- regulation of blood glucose level
- Parathyroid gland- function, action, regulation of secretion of parathyroid hormone
- Calcitonin- function, action, calcium metabolism and hormones regulating calcium metabolism

UNIT II:

i) SPECIAL SENSES AND NERVOUS SYSTEM

4 Hours

- Vision- structure of eye, function of different parts, Light reflex
- Structure of retina, Refractive errors, Colour blindness, Night blindness, Accommodation.
- Hearing- structure and function of ear, mechanism of hearing, deafness, vestibular apparatus
- Taste- taste buds functions, smell physiology, receptors

ii) NERVOUS SYSTEM

12 hours

- Functions of nervous system, neuron structure, classification and properties, neuroglia

- Nerve fibre, classification, conduction of impulses, factors affecting conduction
- Synapse- structure, types, properties
- Receptors- definition, classification, properties
- Reflex action- reflex arc, properties of reflex action, Babinski's sign
- Spinal cord nerve tracts- classify tracts and describe their function
- Functions of Medulla, pons, Hypothalamus
- Cerebral cortex, lobes and functions, sensory cortex, motor cortex
- Cerebellum- functions of cerebellum
- Basal ganglion- functions, EEG, Parkinson's disease .
- Cerebro Spinal Fluid (CSF) - formation, circulation, properties, composition and functions, lumbar puncture, sleep, Types of sleep.

2 Hours

iii) AUTONOMIC NERVOUS SYSTEM

- Sympathetic and parasympathetic distribution and functions. Comparisons of functions

UNIT III:

10 Hours

i) EXCRETORY SYSTEM

- Classify excretory organs
- **Kidneys:** functions of kidneys, structural and functional unit nephrons, vasarecta, cortical and juxtamedullary nephrons- comparison, juxta glomerular apparatus- structure and function.
- Renal circulation peculiarities.
- Mechanism of urine formation- ultrafiltration criteria for filtration, GFR, plasma fraction, determination of GFR
- Selective reabsorption- sites of reabsorption, substance reabsorbed, mechanisms of reabsorption.
- Tubular secretion, properties and composition of normal urine output
- Abnormal constituents in urine.
- Counter- current mechanisms: micturition, innervations of bladder, cystourethrogram.
- Diuretics: water, diuretics, osmotic diuretics, artificial kidney, renal function tests

ii) SKIN-

- Structure and function
- Body temperature measurement, physiological variation, regulation of body temperature by physical, chemical and nervous mechanisms
- Role of hypothalamus, hypothermia and fever

UNIT IV: REPRODUCTIVE SYSTEM

5 Hours

- Function of reproductive system, Puberty

- Male reproductive system- functions of testes, spermatogenesis stages, factors influencing semen, endocrine functions of testes.
- Androgens- Testosterone structure and functions
- Female reproductive system- ovulation, menstrual cycle, physiological changes during pregnancy, pregnancy test
- Lactation: Composition of milk factors controlling lactation
- Contraception.

5 Hours

UNIT V: MUSCLE NERVE PHYSIOLOGY

- Classification of muscle, structure of skeletal muscle, sarcomere, contractile proteins
- Neuromuscular junction, Transmission across, Neuromuscular junction, excitation contraction coupling. Mechanism of muscle contraction muscle tone, fatigue
- Rigor Mortis, Isometric and Isotonic contraction

PRACTICALS

36 Hours

3 Hrs/week

1. Spotters- instruments used in haematology
2. Minor experiments- Bleeding time
Clotting time
3. Major experiments- Total leucocyte count
RBC count
Differential WBC count

REFERENCES

1. Guyton, A. C. Hall, J. E. (1996): Textbook of Medical Physiology, 9th Ed. Prism Books Pvt Ltd., Bangalore
2. Chatterjee Chandi Charan (1988): London, W. B
3. Wilson (1989): Anatomy and Physiology in Health and Illness, Edinburgh, Churchill Livingstone
4. Text book of medical physiology by Sembulingam

I B.Sc. F.N.D- II Semester
HUMAN NUTRITION

OBJECTIVES:

48 Hours
4 Hours/week

This course will enable the students to

1. Understand the functions and sources of nutrients
2. Apply the knowledge in maintenance of good health for the individual and the community.
3. To be familiar with factors affecting availability and requirements

UNIT 1: MACRO MINERALS

12 Hours

Calcium, Phosphorus, Magnesium, Sodium, Potassium, Chlorine and Sulphur- functions, sources, requirements and effects of deficiency.

UNIT 2: MICRO MINERALS

12 Hours

Copper, Cobalt, Zinc, Iodine, Manganese, Fluorine, Molybdenum, Selenium, Chromium, Iron- Functions, Sources, Requirements and Effects of deficiency.

UNIT 3: VITAMIN

12 Hours

Classification on the basis of solubility, Vitamin-A, D, E, K, Ascorbic acid, Thiamin, Riboflavin, Niacin, Folic acid, Vitamin B12, Pantothenic acid, Pyridoxine- functions, sources, absorption, requirements and deficiency.

UNIT 4: WATER AND FIBRE

12 Hours

Water: Importance, Distribution in the body, functions, oedema, dehydration, sources, water balance and requirements.

Fibre: Definition, classification, sources and role of fibre in human nutrition

PRACTICALS

36 Hours

3 hours/week

1. Qualitative test for minerals
2. Quantitative estimation of ascorbic acid using any two different samples.
3. Preparation of ash solution and Quantitative estimation of calcium, phosphorus, iron using any two different samples
4. Estimation of calcium from types of milk

REFERENCES

1. Guthrie, A. H., (1986) Introductory Nutrition. 6th Edition, The C.V. Mosby Company.
2. Swaminathan, M.,(1985) Essentials of Food and Nutrition, Vol I and II, Ganesh & Co. Madras.
3. Gopalan,C., (1991) Nutritive value of Indian foods, Indian Council Of Medical Research.
4. WHO Technical Reports Series for Different Nutrients.
5. Robinson. C. H., Lawler, M. R., Chenoweth,W. L and Garwick, A.E., (1986) Normal and Therapeutic Nutrition, 17th edition, Macmillan Publishing Co.

II B.SC (F.N.D) III SEMESTER
LIFE SPAN NUTRITION
THEORY

Total: 48 hrs
4 hours/ week

OBJECTIVES:

This course will enable the students to-

1. Understand the process of growth and development from birth till adolescence
2. Familiarize with nutritional needs at different stages of growth
3. Understand the concept of growth promotion.

UNIT 1: BASIC PRINCIPLES OF MEAL PLANNING 12 hours

- Explanation of terms: Health, RDA, Adequate intake, Balanced diet
- Food Exchange list, Food guide pyramid
- Vegetarian diets-classification of vegetarianism
- Quality of various nutrients-Proteins, fat, minerals, vitamins, fibres and antioxidants
- Principles of planning meals
- Factors affecting meal planning

UNIT 2: NUTRITION DURING INFANCY 12 hours

- Growth and development
- Use of growth chart to monitor development
- Advantages of breast feeding
- Nutrition factors of human milk
- Difference between human and animal milk
- Artificial feeding
- Factors to be considered in bottle feeding.
- Feeding problems
- Nutritional requirements

Weaning: Need and use

- Points to be considered in introducing weaning foods
- Problems in weaning
- Types of supplementary foods.

UNIT 3: NUTRITIONAL NEEDS FOR PRE SCHOOL AND SCHOOL CHILDREN

12 hours

Pre School:

- Factors to be considered in planning meals for Preschool children
- Factors affecting nutritional status
- Pica
- Dietary guidelines
- Nutritional requirements
- Diet planning

School children:

- Meal planning for school children
- Feeding problems
- School lunch programmes
- Factors affecting feeding programmes
- Nutritional requirements
- Diet planning

UNIT 4: NUTRITIONAL NEEDS FOR ADOLESCENTS

12hours

- Special needs for girls during menarche
- Food habits
- Dietary guidelines
- Nutritional problems- obesity, Eating disorder, osteoporosis, anemia, Under nutrition, premenstrual syndrome
- Nutritional requirements
- Diet planning

PRACTICALS

36 hours

3 hours/week

Planning, preparing and calculating the major nutrients of the following:
(Standard with two planned diets with different calories)

- Weaning
- Normal diet
- Infancy
- Preschool child
- School going child
- Adolescents

REFERENCES

1. Ghosh. (1992) The Feeding and Care of Infants and Young Children, VHAI, 6th Edition, New Delhi
2. WHO (1978) A Growth Chart for International Use in Maternal and Child Health Care, Geneva.
3. Gopalan, C. (1993) Recent Trends in Nutrition, 9th Edition, Oxford and University Press.
4. McLaren, D. S., Meguid, M. M. (1998) Nutrition and It's Disorders, Churchill Livingstone
5. Swaminathan, M. (1985) Essentials of Food and Nutrition, Vol. I and II, Ganesh & Co., Madras.

II B.SC F.N.D III SEMESTER

DIETETICS

THEORY

Total 48 hours

4hours/week

OBJECTIVES:

This course will enable the students to –

1. Know the principles of diet therapy.
2. Understand the modification of normal diet for therapeutic purposes.
3. Understand the role of dietician.

UNIT 1: CONCEPT OF DIET THERAPY AND MEAL PLANNING

12 hours

- Reference man and woman
- Balanced diet
- Recommended dietary allowances [RDA] and its approaches of assessing nutrients requirements.
- Objectives of diet therapy
- Growth and scope of dietetics
- Characteristics and role of dietician
- Food prescription

UNIT 2: ROUTINE HOSPITAL DIETS.

12 hours

- Liquid diet, semi –solid, regular and bland diet
- Modification of normal diets
- Types of feeding – Oral feeding and tube feeding- Enteral and Parental

UNIT 3: DIETS IN OBESITY & UNDERWEIGHT

12 hours

Obesity:

- Etiology, assessment, types
- Regional distribution of fat in the body
- Metabolic changes in obesity.
- Modification, dietary treatment

Under weight:

- Aetiology
- Symptoms and complications
- dietary management

UNIT 4: DIET IN FEBRILE CONDITIONS

12 hours

Fever: Development, Types and Metabolic changes.

Causes and Dietary management of Typhoid, influenza, Malaria, tuberculosis and AIDS

PRACTICALS

36 Hours

3hrs/week

Planning, preparing and serving of the following diets (Standards with two different planned diets)

- Fluid Diets
- Obesity
- Underweight
- Febrile conditions

REFERENCES

1. Anderson, L., Dibble, M. V., Turkki, P. R., Mitchall, H. S., and Rynbergin, H. J. (1982): Nutrition in Health and Disease, 17th Ed., J. B. Lippincott & Co. Philadelphia
2. Antia, F. P. (1973): Clinical Dietetics and Nutrition, Second edition, Oxford University Press, Delhi
3. Williams, S. R. (1989): Nutrition and Diet therapy, 6th Ed. Times Mirror/ Mosby College Publishing St. Louis
4. Raheen Begum. (1989): A textbook of Foods, Nutrition and dietetics, Sterling Publishers, New Delhi
5. Joshi, S. A. (1992): Nutrition and Dietetics, Tata Mcgraw Hill Publications, New Delhi
6. Srilakshmi, B. (2011) Dietetics, 6th edition, New age international publishers, New Delhi

II YEAR B.Sc. FND III SEMESTER
CHEMISTRY - I
THEORY

4 Hours/week
Total 48 hours

OBJECTIVES:

1. To enrich the knowledge about the basic principles, fundamental concepts and unique mechanistic steps involved in chemical and biochemical reactions.
2. To provide an introduction to key concepts of modern analytical methods and to equip the students to handle the modern analytical instruments.
3. To expose the students to the rapid development and enormous expansion of every phase of chemistry.

UNIT I:

1. Periodic table and periodicity

04 Hours

Modern periodic table, classification of elements into s,p,d and f blocks, Periodic properties: atomic size, ionization energy, electron affinity and electro negativity, factors influencing variation in a group and period explanation for observed trend.

2. Structure and Bonding

05 Hours

Chemical bonding, types of chemical bonds ionic, covalent, coordinate Hybridization- sp, sp² sp³, bond length and bond angles, bond energy, Vander Waals interactions, Hydrogen bonding-inter and intra molecular and their significance-anamolous properties of water .

3. Solvents

03 Hours

Types of solvents and their characteristics, Weak I nteractions in aqueous Solutions, Interaction between water and polar solutes, Solubility of ionic solids and its dependence on lattice energy and solvation energy, Explanation for solubility of alcohols and sugars in water

UNIT II:

1. Methods of analysis

06 Hours

Qualitative, Quantitative volumetry, gravimetry and instrumental methods of analysis Errors in quantitative analysis, minimization of errors Accuracy, precision, significant figures, measurement of accuracy-absolute error, relative error, measurement of precision –standard deviation, variance

2. Viscosity and surface tension

02 Hours

Definition, effect of temperature, Determination, applications

3. Reaction kinetics:

04 Hours

Molecularity and order of reactions, second order reactions, differential and integral equations, methods of determining order of a reaction, theories of reaction rates – collision theory and transition state theory, parallel and consecutive reactions with example

UNIT III:

1. Acids and Bases:

06 Hours

Arrhenius, Bronsted Lowry, solvent system and Lewis concept of acids and bases, Hard and soft acids and bases Ionic product of water, common ion effect and applications, pH scale, buffers, buffer capacity, Henderson's equation, preparation of acidic and basic

buffers, buffers in biological system-blood plasma,RBC and tissue fluids, theory of acid - base indicators, pH titration curves and isoelectric pH of amino acids .Choice of indicators in acid base titrations.

2. **Binary Liquid mixtures:** **06 Hours**

3. Liquid- Liquid mixtures, ideal liquid mixtures, non ideal liquid mixtures

Azeotropes: HCl – water, ethanol-water systems. Principle of fractional distillation,Partially miscible liquids -phenol water system. Trimethyl amine – water and nicotine water systems.

Lower and upper consolute temperature. Effect of impurity on consolute temperature ,steam distillation-principle and applications, Nernst distribution law and applications. Solutions of gases in liquids-Henry's law and its limitations

UNIT IV:

1. Introduction of Organic chemistry **03 Hours**

Classification, unique characteristics, IUPAC nomenclature of organic compounds, isomerism

2. Investigation of organic compounds. **03 Hours**

Detection and quantitative estimation of elements Nitrogen, Sulphur, Phosphorous and Halogens (problems to be solved) 03hours

3. Field effects and reaction intermediates **03 Hours**

Resonance, hyper conjugation, aromaticity inductive and field effects, hemolytic and heterolytic bond breaking. Electrophiles, nucleophiles, Energy consideration. Reactive intermediates, carbo – cations, carbanions free radicals ,carbenes with examples.

4. Arenes: **03 Hours**

Structure of benzene. Mechanism of nitration and Fridel – Crafts reaction. Electronic interpretation of orienting influence of the substituents in the electrophilic substitution of chlorobenzene, toluene, nitrobenzene and phenol.

PRACTICALS

36 Hours

3 Hrs/ week

1. Qualitative analysis of the organic compounds

Urea, benzamide, Aniline, Acetophenone, O-cresol, nitro benzene, chlorobenzene, Benzoic acid, resorcinol benzyl alcohol, benzaldehyde.

2. Chromatography experiments

1. Ascending paper chromatography of aminoacids

2. Separation of natural lipids by TLC

CHEMISTRY - I

REFERENCE

1. Soni, P L 1998; A Text book of Inorganic Chemistry, Sulthan Chand & Sons
2. Lee , JD 1998; Cocise Inorganic Chemistry, Black Well Science Ltd.,
3. Skoog, West & Hollar, 1993; Fundamental Analytical Chemistry ,NY – CBS publishers.
4. Gurudeep Raj,2001; A Text book of Inorganic Chemistry, Goel Publishing house, Meerut
5. Soni ,PL,2000; A text book of Organic Chemistry ,Sulthan Chand & Sons.
6. Bahl Arun , B.S. Bahl BS,2000; Sulthan Chand & Sons ,Advanced Organic Chemistry.
7. Bansal k Rj,2000. A Laboratory Manual of Organic Chemistr.Sulthan Chand & Sons.
8. Vogel AL E.L. B.S edition, 1994
9. Agarwal OP,1998; Chemistry Of Natural Produces ,Goel Sulthan Chand & Sons Publishing House, Meerut.
10. Madan RL, Tuli.G D,2001 Physical Chemistry Sulthan Chand & Sons,
11. Raj Gurudeep,2001; Text book of Advanced Physical chemistry, Goel Publishing House, Meerut.
12. Lehniger, A.L., Nelson, D.L. and Cox, M.M (1993); 2nd Ed. Principles of Bio-Chemistry, CBS Publishers and distributors.

II YEAR B. Sc. FND III SEMESTER
COMPUTER APPLICATIONS-I
THEORY

4 Hrs/week
Total 48 hours
12 Hours

UNIT I:

- Characteristics of Computers, Computer generations, Applications of Computer
- **Amazing computers:** The parts of computer system, looking inside machine, software: brings the machine to life.
- **The shapes of computer today:** Super computers, Mainframe computers, Minicomputers, Workstations, Microcomputers or Personal computers—DeskTop Models, Notebooks computers, or Laptops computers, Network computers, Handheld Personal computers.

UNIT II:

12 Hours

- **Processing Data:** Transforming data into information the difference between data and information, How computer represent data, bits and bytes, text codes, how computer process the data, memory, factors affecting processing speed, cache memory.
- **Storing Information in a computer:** Types of storage devices, Hard Disks, Optical Storage Devices, CD-ROM, DVD ROM, CD-Recordable, CD-ReWritable, and Photo CD.
- **Operating System Basics-** The Role of Operating system, functions, The User Interface, Command Line Interface, Running Programs, Sharing Information, Managing files, Utility software, typical operating systems in use- (UNIX, DOS, WINDOWS)

UNIT III:

12 Hours

- **MS Windows :** Introduction to Windows XP; Features of Windows; Desktop, structure, Windows Explorer, the search, Recycle bin, configuring the screen and mouse, adding or removing programs, adding new hardware, system tools, scandisk, Windows XP media player, help, Windows Vista, Windows 7.
- Lab Demonstration on Ms Windows
- **MS Word:** Introduction, starting with MS Word, MSWord screen and its components, the office button, the ribbon, solved examples.
- Lab Demonstration on MS Word.
- **MS Excel:** Introduction, Starting with MS Excel, basics of MS Excel, the office button, the ribbon, solved examples.
- Lab Demonstration on MS Excel

UNIT IV:

12 Hours

- **Working with images--**Types of graphics files, getting images in to computers.
- **Graphics software-** Paint programs, photo manipulation programs, draw programs, computer aided design programs.3d modeling programs, animations.

REFERENCE

Introduction to coputer 6th edition by Peter Norton, TATA McGraw-Hill Edition
Anita Goel, Computer Fundamentals, Pearson Education, 2011

II B.SC (F.N.D) IV SEMESTER
NUTRITION THROUGH LIFE CYCLE
THEORY

Total 48 hours
4hours/week

OBJECTIVES

This course will enable the student to-

1. Understand the process of growth, development and the concept of growth promotion
2. Get familiar with nutritional needs at different stages of growth

UNIT 1: NUTRITIONAL NEED FOR ADULTS **12 hours**

- Reference man and reference woman in relation to Occupation
- Dietary guidelines to reduce the cost of a meal
- Nutritional requirements
- Diet planning

UNIT 2: NUTRITIONAL NEEDS DURING PREGNANCY **12 hours**

- Normal growth and weight gain
- Physiological changes
- Dietary modifications
- General dietary problems
- Complications during various stages of pregnancy
- Nutritional requirements
- Diet planning

UNIT 3: NUTRITIONAL NEEDS DURING LACTATION **12 hours**

- Physiology of lactation
- Milk output and factors affecting it
- Dietary guidelines
- Nutritional requirements
- Diet planning

UNIT 4: NUTRITION DURING OLD AGE

12 hours

- Effects of ageing
- Meal planning
- Dietary guidelines
- Modification of diet
- Nutritional problems and their management
- Nutritional requirements
- Diet planning

PRACTICALS

36 Hours

3 hrs/week

Planning, preparing diets and calculating the major nutrients of following (Standard with two planned diets of different calories and activities)

- Adult
- Pregnancy
- Lactation
- Old age

REFERENCES

1. Ghosh. (1992) The Feeding and Care of Infants and Young Children, VHAJ, 6th Ed., New Delhi.
2. WHO (1978): A Growth Chart for International Use in Maternal and Child Health Care, Geneva.
3. Gopalan, C (1993): Recent Trends in Nutrition, 9th edition, Oxford, University Press.
4. McLaren, D. S and Meguid, M. M. (1998): Nutrition and its Disorders, Churchill Livingstone.
5. Swaminathan, M. (1985): Essentials of Food and Nutrition, Vol I and II. Ganesh & co. Madras.
6. Srilakshmi, B. (2011) Dietetics, 6th edition, New age international publishers, New Delhi

II YEAR B.SC (F.N.D) IV SEMESTER
DIET THERAPY
THEORY

Total 48 hours
4hours/week

OBJECTIVES

This course will enable the student to

1. Know the principles of diet therapy.
2. Understand the modifications of normal diet for therapeutic purposes.
3. Understand the role of the indication.

UNIT- 1: DIETS IN BURNS INJURY AND SURGERY CONDITIONS

12 hours

Nutritional care and Modification of Diets in Burns, Injury and Surgery conditions

DISEASE OF GASTRO - INTESTINAL TRACT

Aetiology, complication and Dietary Management of the following

- Peptic Ulcer
- Gastritis- Acute and Chronic gastritis
- Diarrhoea and Constipation

UNIT -2. FOOD ALLERGY

12 hours

- Definition, Types of Allergy, Common food as allergens
- Signs and Symptoms, Tests for Allergy
- Dietetic Treatment

UNIT -3 NUTRITIONAL DEFICIENCY DISEASE

12 hours

- Aetiology, Dietary treatment and Prevention
- Protein - Energy Malnutrition
- Vitamin - A Deficiency

UNIT -4: NUTRITIONAL ANAEMIA

12 hours

- Types and Dietary treatment
- Prevention of Iron Deficiency Anaemia/Disorder (IDD)
- Megaloblastic Anaemia, Folate Deficiency
- Pernicious Anaemia

PRACTICALS

36 Hours

3 hours/week

Planning, preparing and serving of the following Diets

(Standard with two variations)

- Constipation
- Peptic Ulcer
- Protein – Deficiency
- Iron – Deficiency
- Vitamin – A Deficiency

REFERENCES

1. Anderson. L., Dibble, M.V., Turkki, P.R., Mitchall, H.S., and Rynbergin, H.J (1982): Nutrition in Health and Disease, 17th Ed., J.B Lippincott & Co Philadelphia
2. Antia, F.P (1973): Clinical Dietetics and Nutrition, Second Edition, Oxford University Press, Delhi. Williams, S.R. (1989): Nutrition and Diet Therapy, 6th Ed. Times Mirror/Mosby College Publishing, St. Louis
3. Raheen Begun, (1989): A Text book of Foods, Nutrition and Dietetics, Sterling Publishers, New Delhi.
4. Joshi. S.A (1992): Nutrition and Dietetics, Tata McGraw Hill Publications, New Delhi.
5. Srilakshmi,B. (2011)Dietetics, 6th edition, New age international publishers, New Delhi

II YEAR B.Sc FND IV SEMESTER
CHEMISTRY -II
THEORY

4 Hrs/week
Total 48 hours

OBJECTIVES:

1. To enrich the knowledge about the basic principles, fundamental concepts and unique mechanistic steps involved in chemical and biochemical reactions.
2. To provide an introduction to key concepts of modern analytical methods and to equip the students to handle the modern analytical instruments.
3. To expose the students to the rapid development and enormous expansion of every phase of chemistry

UNIT I:

1. Bioinorganic chemistry

06 Hours

Essential and trace elements in biological systems, Functions of Sodium, potassium, calcium, magnesium, Importance of compounds of sulphur and Selenium in biological system. Toxicity of lead, mercury, cadmium and arsenic. Importance of phosphorus and nitrogen compounds in biological systems, nitrogen and phosphorus cycles.

2. Metal ions in Biological systems

06 Hours

Examples of naturally occurring complex compounds in living systems, Role of iron in haemoglobin, myoglobin and cytochromes, copper in haemocyanin, magnesium in chlorophyll, cobalt in vitamin B12, molybdenum in nitrogenase, metalloenzymes-example and importance

UNIT II:

1. Adsorption

02 Hours

Types, Freundlich adsorption isotherm, Langmuir's adsorption isotherm applications of adsorption, adsorption indicators in precipitation titrations.

2. Colloidal State

04 Hours

Solid in liquids (sols): properties, kinetic optical and electrical, stability of colloids. Protective action, Hardy Schulze law, Gold number. Liquids in Liquids- (emulsions), Types of emulsions, preparation, emulsifiers. Liquids in solids -(gels). Classification, preparation and properties, inhibition of gels -general application of colloids

3. Radio chemistry

06 Hours

Nuclear stability, n/p ratio, Natural radioactivity, characteristics of radio active elements, radioactive decay series, artificial transmutation using protons neutrons, deuterons, induced radio activity, disintegration constant, half life. Detection of radioactivity by G.M. Counter. Application of radio isotopes in medicine, agriculture and study of reaction mechanism, and C^{14} dating, Biological effects of radiation, safety measurements in handling radio isotopes.

UNIT III:

1. Photochemistry

06 Hours

Laws of Photochemistry-Grothus and Draper law, Einstein's law of photochemical equivalence, Quantum efficiency, high and low quantum efficiency, photosensitisation, photoinhibition, Fluorescence, phosphorescence, Chemiluminescence. Bioluminescence with examples, photosynthesis. Radiation chemistry-radiolysis of water, radiation dosimetry, Fricke and ceric sulphate dosimeter.

2. Instrumental methods of analysis

06 Hours

Lambert's law, Beer's law, Beer-Lambert's law, molar absorption, molar extinction coefficient, transmittance and optical density, Their relationship, photoelectric colorimeter, determination of Cu in the unknown solution spectrophotometer-construction, working, applications. Flame photometry-instrumentation working, applications

UNIT IV:

1. Alkenes

03 Hours

Preparation of alkenes: Chemical reactions of alkenes: oxidation, ozonolysis, hydration, hydroxylation, Polymerization, Addition of HBr to propene markownikoffs rule.

2. Dienes

03 Hours

Classification, types with examples butadiene, methods of preparation. Chemical reactions mechanism of addition of Br₂ and HBr. Polymerization, Diels alder reaction.

3. Alkynes

02 Hours

Acidity of alkynes, ozonolysis, Polymerization.

4. Alkyl halides

04 Hours

SN1 and SN2 reactions. Mechanism with one example for each. Concept of Elimination reactions. E1 and E2 mechanisms.

PRACTICALS

36 Hours

3 Hrs/week

VOLUMETRIC ANALYSIS

1. Use of analytical balance and calibration of pipette.
2. Preparation of standard sodium carbonate solution and estimation in the given solution.
3. Preparation of standard oxalic acid solution. Standardization of NaOH and estimation of H_2SO_4 in the given solution [phenolphthalein]
4. Preparation of standard oxalic acid. Standardization of $KMnO_4$ and estimation of H_2O_2 in the given solution
5. Preparation of $K_2Cr_2O_7$. Standardisation of $Na_2S_2C_3$ and estimation of $CuSO_4$ in the given solution [starch]
6. Preparation of $ZnSO_4$. Standardisation of EDTA and estimation of total hardness of water using Eriochrome black T indicator
7. Preparation of standard $K_2Cr_2O_7$ solution. Estimation of Ferrous/Ferric ions in a mixture using diphenylamine indicator.
8. Preparation of standard potassium bisulphate. Standardisation of NaOH and estimation of HCl in the given solution [phenolphthalein]
9. Estimation of alkali content in antacid tablet by using hydrochloric acid.
10. Estimation of Vitamin C
11. Estimation of glucose
12. Estimation of amino acid

CHEMISTRY - II

REFERENCE

1. Soni, P L 1998; A Text book of Inorganic Chemistry, Sulthan Chand & Sons
2. Lee, JD 1998; Concise Inorganic Chemistry, Black Well Science Ltd.,
3. Skoog, West & Holler, 1993; Fundamental Analytical Chemistry, NY - CBS publishers.
4. Gurudeep Raj, 2001; A Text book of Inorganic Chemistry, Goel Publishing house, Meerut
5. Soni, PL, 2000; A text book of Organic Chemistry, Sulthan Chand & Sons.
6. Bahl Arun, B.S. Bahl BS, 2000; Sulthan Chand & Sons, Advanced Organic Chemistry.
7. Bansal K Rj, 2000. A Laboratory Manual of Organic Chemistry. Sulthan Chand & Sons.
8. Vogel AL E.L. B.S edition, 1994
9. Agarwal OP, 1998; Chemistry Of Natural Products, Goel Sulthan Chand & Sons Publishing House, Meerut.
10. Madan RL, Tuli G D, 2001 Physical Chemistry Sulthan Chand & Sons,
11. Raj Gurudeep, 2001; Text book of Advanced Physical chemistry, Goel Publishing House, Meerut.
12. Lehniger, A.L., Nelson, D.L. and Cox, M.M (1993); 2nd Ed. Principles of Bio-Chemistry, CBS Publishers and distributors.

II YEAR B. Sc. FND IV SEMESTER
COMPUTER APPLICATIONS-II
THEORY

4 Hours/week
Total 48 hours

12 Hours

UNIT I:

- MS PowerPoint: Introduction, Basics of MS Power point, MS Power point screen and its components, the office button, the ribbon, an example.
- MS Access: Introduction, database terminology, start MS Access, MS Access screen and its components, the office button, the ribbon, solved example .
- Network and Internet connections – Introduction, start network connection, create a new connection, manage a network connection, network setup, windows firewall, sharing of files, setup internet properties, choosing an internet connection.

12 Hours

UNIT II:

- Networks and Data Communication- Networking basics: The uses of a network, how networks are structured, network topologies for LANs, Network media and hardware, Network software.
- Internet Basics – How the internet works, major features of internet- the world wide web, Electronic Mail(e-mail), news, Telnet, FTP, IRC.
- Getting online and working online – Accessing the internet. Working on the Internet- business and firewalls, Intranets and extranets.

12 Hours

UNIT III:

- The Basics of Information system-the purpose of information system, types of information system.
- Building information System-The system development life cycle, Phase 1 to 5.
- Software programming and Development- Creating a computer programs, What is a computer program, how program solve problems, Structured and object oriented programming.
- The evolution of programming languages-Categories of languages, machine and Assembly level languages, Higher-level languages.

12 Hours

UNIT IV:

- Living with computers – Ergonomics and health issues-Repetitive stress injuries, eyestrain, electromagnetic fields, Privacy issues-Junk fax and emails
- Computing issues that affect us all- Computer crime, Software piracy, Anti piracy, Computer viruses – Categories of viruses, Preventing infections, Theft.
- Computers and the Environment-Planned Obsolescence-Use of Power- Ethical Issues in computing

REFERENCE :

Introduction to computers 6th edition by Peter Norton, TATA McGraw-Hill Edition
Anita Goel, Computer Fundamentals, Pearson Education, 2011.

III YEAR B. SC FND V SEMESTER

GENERAL MICROBIOLOGY-I

THEORY

3 Hours/week

Total 48 hours

OBJECTIVES

This course will enable the students to:

1. Understand the nature of microorganisms involved in food –spoilage , food infections and intoxications
2. Understand the importance of microorganisms in food biotechnology.

UNIT I: INTRODUCTION AND HISTORY OF MICROBIOLOGY

12 Hours

- Definition and history of microbiology – contributions of Antony Van Leeuwenhoek, Louis Pasteur, Lazzaro Spallanzani , Robert Koch, Joseph Lister, Edward Jenner, Alexander Fleming, M. W. Beijerinck and Ivanowsky to the development of microbiology.
- Culture medias used in the isolation and Culturing of microorganisms.
- The common nutrient requirement for bacteria-Macro and micronutrients.

UNIT II: INSTRUMENTS AND STERILIZATION

12 Hours

- **Instrumentation in microbiology-**
Construction and working principles of autoclave , hot air oven , pH meter, Laminar air flow, incubator, bacterial Colony counter, spectrophotometer and Membrane Filter unit.
 - Sterilization: Physical methods – heat, irradiation, filtration, solarization, ultra sonic vibration.
 - Chemical methods - alcohol, aldehydes, dyes, halogens, phenols, metallic salts, surface active agents, gases.

UNIT III: BACTERIA AND VIRUSES

12 Hours

- Bacteria – classification according to Bergey's manual up to levels of section, Ultra structure, reproduction -asexual and sexual methods, importance of Bacteria in food.
- Viruses-structure and classification- Plant, animal, bacterial and Cyanophycean viruses; life cycle in Virus- lytic and lysogenic cycle.

UNIT IV: YEAST AND MOLDS

12 Hours

- Yeast- morphology, reproduction-haplobiontic, Diplobiontic and haplodiplobiontic cycle; Physiology and Nutrition in yeast; importance of yeast in food.
- Mold - outlines of classification and Reproduction- asexual and sexual modes; Type study of *Aspergillus*, *Penicillium*, *Rhizopus* and *Mucor*; importance of molds in food.

PRACTICALS

36 Hours

3 Hrs/week

1. Introduction -good laboratory practices.
2. Preparation of culture media - nutrient agar, sabouraud's agar media.
3. Culturing of microorganisms - point inoculation, streak inoculation, spread plate method, pour plate method and swab method.
4. Simple staining of bacteria.
5. Gram staining of bacteria.
6. Negative staining technique.
7. Wet mounting of yeast and fungi using lacto phenol cotton blue stain.
8. Sampling of air by Plate Exposure Method.
9. Sampling of Water - Membrane Filtration Technique.
10. Sampling of soil - Serial Dilution Method.
11. Coliform count for milk and water samples.
12. Sampling of food handlers.
13. Standard plate count for milk sample.
14. Standard plate count for water sample.
15. Study of bacterial motility by hanging drop technique

REFERENCES

1. Frazier, W.C. and Westhoff, D.C. [1988]:4th Ed., Food Micro Biology, Mcgraw Hill Inc.
2. Jay James, M. [1986]: 3rd Ed., Modern Food Micro Biology, Van No Strand Reinhold Company Inc.
3. Pelezer, M. I. And Reid, R.D. [1978]: Microbiology, Mcgraw Hill Book Company, New York.
4. Benson Harlod, J. [1990]: Microbiological Methods, Butterworth, London.

III YEAR B.SC FND V SEMESTER
NUTRITIONAL BIOCHEMISTRY-I
THEORY

3 hours/week
Total 48 hours

OBJECTIVES:

This course will enable the students to

1. Understand the principles of biochemistry (as applicable to human nutrition).
2. Obtain an insight into the chemistry of major nutrients and physiologically important compounds.
3. Understand the biological processes and systems as applicable to human nutrition.
4. Apply the knowledge acquired to human nutrition and dietetics.

UNIT I: CARBOHYDRATES

12 Hours

Nomenclature, Classification of carbohydrates- monosaccharides, oligosaccharides, polysaccharides, Examples and Structure.

Metabolism- Glycolysis, TCA Cycle, HMP Shunt; Glycogenesis, Glycogenolysis

Carbohydrate digestion and absorption

Importance of Carbohydrates

UNIT II: LIPIDS

12 Hours

Nomenclature

Classification-

Simple lipids – Fats and, oils, waxes

Complex lipids – Phospholipids, glycolipids

Derived lipids - Steroids, terpenes, carotenoids,

Examples, Structure and functions

Digestion and absorption,

Fatty acids – classification – essential and nonessential fatty acids, examples, properties and functions

Metabolism – β - Oxidation of Saturated fatty acid

Biosynthesis and Catabolism of Cholesterol

UNIT III: BIOLOGICAL OXIDATION

12 Hours

Compounds of ETC, Mechanism, Oxidative phosphorylation, High energy phosphate

ATP – ADP Cycle and Energy conservation.

UNIT IV: ENZYMES

12 Hours

Definition, Nomenclature, Types and classification of enzymes. Active site.

Definition, types of co – enzymes, specificity of enzymes, Isozymes, Enzyme Kinetics, factors affecting velocity of enzymes catalyzed reactions, Regulation of enzyme activity, enzyme inhibition.

36 Hours

PRACTICALS

3 Hrs/week

1. **Qualitative analysis for Carbohydrates:**
Glucose, Fructose, Maltose, Lactose, Sucrose, Starch and Galactose
2. **Quantitative analysis in blood and serum**
Blood glucose
Blood Cholesterol
Blood urea
3. **Enzymes:**
Effect of pH on human salivary α -amylase starch.

REFERENCES

1. West, E.S., Todd, W.R., Mason, H.S and Van Bruggen, J.T. (1974) 4th Ed. Text book of Biochemistry, Amerind Publishing Co. Pvt Ltd.,
2. Lehniger, A.L, Nelson, D.L and Cox, M.M (1993); 2nd Ed. Principles of Biochemistry, CBS Publishers and distributors.
3. Devlin, T.M (1986): 2nd Ed, Text book of Biochemistry with clinical correlations, John Wiley and sons.
4. Strayer, L (1995): Biochemistry, Freeman WH and Co.
5. Dr. J.L. Jain (2012) Fundamentals of Biochemistry, S. Chand and Company Ltd.

III YEAR B.Sc FND V SEMESTER

THERAPEUTIC DIET

THEORY

3hours/week

Total 48 hours

OBJECTIVES:

This course will enable the students to:

1. Understand the role of the dietician in preventive, promotive and curative health care.
2. Be able to make appropriate dietary modification for various disease conditions based on the path physiology.
3. Understand the role of then dietician.

UNIT 1: DIABETIS MELLITUS

16 Hours

- Definition
- Types-IDDm, NIDDM, Gestational Diabetes and MRDM
- Aetiology and Symptoms
- Diagnosis tests-Glycosuria, RBS, GTT
- Metabolism
- Complications in diabetes
 - Acute complication- Hypoglycemia, Ketoacidosis,
 - Chronic complication-Diabetes and Heart diseases, Diabetes and Alcohol, Diabetes and Pregnancy, Diabetic retinopathy, Diabetic nephropathy and Diabetic neuropathy
- Diabetes and physical activity
- Diabetes and Alcohol
- Glycemic index and Nutritional requirement
- Artificial sweeteners- Low calorie sweeteners and Non calorie sweeteners
- Dietary guidelines

UNIT 2: DISEASE OF THE LIVER

12 Hours

- Functions of liver
- Damage caused to the liver
- Nutrition and liver disease
- Infective hepatitis, Cirrhosis of live-Aetiology, symptoms and Dietary treatment
- Hepatic coma-Clinical features , symptoms, complications, Nasogastric feeding and Dietary treatment

UNIT 3: DISEASES OF GALL BLADDER AND PANCREAS

08 Hours

- Gall stone disease-Biliary sludge, Cholesterol and pigment stones
Dietary management
- Pancreatitis- acute and chronic
- Cholecystitis and cholelithiasis-Aetiology, symptoms and dietary treatment

UNIT 4: DISEASE OF THE KIDNEYS

12 Hours

- Functions of kidney
- Glomerulonephritis- causes, symptoms and dietary treatment
- Renal failure- acute and chronic
 - Causes, symptoms and dietary management
- Nephrotic syndrome -symptoms and dietary treatment
- Urolithiasis (kidney stones/ uraemia)-Aetiology, symptoms and dietary treatment
- Dialysis - Types and dietary management

PRACTICALS

36 hours

3 Hours/week

Planning, preparing and calculating the major nutrient of the following:

[Standard with 2 variations]

1. 24 hours recall method
2. Diabetes mellitus
3. Liver disease
4. Renal disease

REFERENCE:

1. Anderson. L., Dibble, M.V., Turki., P.R mitchall, H.S and Rynbergin, H.J (1982). Nutrition in Health and Disease. 1st ed. JB. Lippincott and Co. Philadelphia.
2. Antia, F.P (1973); Clinical Dietetics and Nutrition, Second Edition, Oxford University Press, Delhi.
3. Williams, S.R (1989); Nutrition and Diet Therapy, 6th Ed Times Mirror/Mosby College Publishing St. Louis.
4. Raheem Begum, (1989); A Text Book of Foods, Nutrition and Dietetics, Sterling Publishers, New Delhi.
5. Joshi, S.A (1992), Nutrition and Dietetics, Tata McGraw Hill Publications, New Delhi.

III YEAR B.SC (F.N.D) V SEMESTER
FOOD LAWS AND FOOD STANDARDS
THEORY

3 Hrs/ week
Total 48 hours

OBJECTIVES:

1. Gain an insight into quality of food
2. Know the adulterants added to foods
3. Familiarize international and national food laws, regulation and standards

UNIT-I: FOOD LAWS

12 Hours

- **PFA:** Mode of work and duties of food inspectors
- **Essential commodities act:** fruit product order, milk and milk product order, Meat product order, cold storage order, the vegetable oil product order, standard and weight measurement act, the infant milk substitute, feeding bottles and infant food act.
- **Food standards:** ISI, AGMARK, Export inspection council, consumer protection act, CODEX alimentarius.

UNIT-II: HACCP

12 Hours

- Importance
- Principles
- Determination of CCP
- Problems in implementing HACCP
- Importance of TQM, GMP and GLP.

UNIT-III: ADULTERATION OF FOOD

12 Hours

- Definition
- Types
- Contamination of food by incidental adulteration by microorganisms, packing materials and other sources.
- Tests to detect common adulterants.

12 Hours

UNIV-IV: FOOD TECHNOLOGY

- Bio technology in food.
- Nutraceuticals
- Organic foods
- **Packaging of foods:** Classification, **Types of packaging materials**-paper, plastics, glass, tins and metals, **packaging of different food products**-Bakery, Dairy, Dehydrated, Fresh Fruits and vegetables, Fats and oils, Frozen food products.

PRACTICAL

36 Hours

3 hours/ week

1. Quality Evaluation of milk
 - lactometer reading
 - iodine test
 - determination of fat using butyrometer
 - other necessary tests to detect adulteration of milk
2. Quality analysis of egg
 - Candling
 - Yolk index
 - Albumin index
3. Detection of hardness of water by titration method.
4. Determination of moisture content of various food stuff.

REFERENCES

1. Keister, D.C. [1977]: Food and Beverage Control, Prentice Hall Inc., New Jersey.
2. Coltman, M.M. [1977]: Food and Beverage Cost Control, Prentice Hall Inc., New Jersey
3. Kotas, R: An Approach to Food Costing, Berrie And Rockliff Ltd. London.
4. Ranjanna, S. [1985]: Handbook of Analysis and Quality Control for Fruit and Vegetable Products.
5. Martin, E. H. [1986]: Standard Methods for the Examination of Dairy Products.
6. Lees, R. [1978]: Food Analysis; Analytical and Quality Control Methods for Food Manufacture and Buyer

III B. SC (F.N.D) V SEMESTER
PRINCIPLES OF FOOD PRESERVATION
THEORY

3 Hrs/ week
Total 48 hours

OBJECTIVES

1. To understand the basic concepts and parameters of preservation techniques.
2. To know the types and variety of foods available in the markets.
3. To learn to purchase and preserve different foods
4. To learn various quality and preservation techniques used in various foods.

UNIT 1: FOOD PRESERVATION

12 hours

- Definition, Importance of food preservation.
- Principles of food preservation
- Methods of food preservation
 - Simple methods of preservation-asepsis [keeping out of micro organisms]
- Removal of micro organisms
- Maintenance of aseptic condition, classification of food for processing

UNIT 2: PRESERVATION WITH HIGH CONCENTRATIONS

12 hours

- Sugar Concentrates- General principles
- Methods of preparation of jam, jellies and marmalade.
- Theory of gel formation
- Definition and preparation of crystallized and glazed fruits
- Preservation of squashes and syrups, type of syrups
- Temperature test for syrups and candies.
- Salt Concentrates-general principles
- Role of ingredients
- Definitions and preparation of sauerkraut, dill and common Indian pickles.

UNIT 3: PRESERVATION BY USE OF HIGH TEMPERATURE

12 hours

- Definition & methods- pasteurization and sterilization
- Canning- definition
- General principles, steps in canning/ bottling of any one fruit & vegetable.

- Advantages and disadvantages of canning
- Storage of canned foods
- Process evaluation, thermal death time and heat penetration

UNIT 4: DRYING AND DEHYDRATION

12 hours

- Definition, general principle
- Methods of drying- air convection drier, Drum/ roller drier, Vacuum drier, freeze drier
- Factors controlling drying and dehydration
- Sun drying vs. artificial drying

PRACTICALS

36 hours

3hrs/week

1. Prepare the following recipes
 - Jellies
 - Jams
 - Squashes
 - Pickles
2. To estimate the acidity of fruit juice.
3. Visit to a canning/bottling industry

REFERENCES

1. Frazier, W.C and Westhoff, D. C. (1988) Food Microbiology, 4th Edition, McGraw Hill Inc.
2. Desroier, N. V. The Technology of Food Preservation
3. Potter, M. 'Food Science'
4. Prescott Proctor, Food Technology
5. Lal and Sidappa. Preservation of Food and Vegetables.

III YEAR B.Sc FND V SEMESTER

CHEMISTRY PAPER- III

THEORY

3 Hrs/week
Total 48 hours

OBJECTIVES:

1. To enrich the knowledge about the basic principles, fundamental concepts and unique mechanistic steps involved in chemical and biochemical reactions.
2. To provide an introduction to key concepts of modern analytical methods and to equip the students to handle the modern analytical instruments.
3. To expose the students to the rapid development and enormous expansion of every phase of chemistry

UNIT 1:

1. Co-ordination compounds

08 Hours

Transition metals, properties (colour, oxidation states, magnetic properties, catalytic properties, complexation tendency) Double and complex salts -differences with examples. Postulates of Werner's theory-(to be illustrated using cobaltamine complexes). Types of ligands uni-bi and poly dentate, ambidentate with examples, co-ordination number, stability of complexes, Factors influencing stability of complexes, Valence bond theory, structure and magnetic properties of some complexes, Applications of complex formation, metal complexes as therapeutic agents-Platinum, gold, copper complexes

2. Organometallic chemistry

04 Hours

Definition, nomenclature and classification, preparation, properties, bonding and applications of alkyls and aryls of Li, Hg and Al, metal carbonyls and nature of bonding.

UNIT II:

1. Dilute Solutions

08 Hours

Dilute solutions and colligative properties Ideal and non ideal solutions, methods of expressing concentrations of solutions. Colligative properties, osmotic pressure and its measurement by Berkley and Hartley's, method laws of osmotic pressure importance of osmotic pressure on living cells. hypotonic, hypertonic, isotonic solutions. Donnan membrane equilibrium, Raoult's law, relative lowering of vapor Pressure. Molecular weight determination from osmotic pressure and relative Lowering of vapour pressure. Elevation of boiling point, depression in freezing point, experimental methods for determining various colligative properties Va'nt hoffs factor, abnormal molecular weight.

2. Phase rule :

04 Hours

Statement and meaning of the terms phase, component and degrees of freedom, phase equilibria of one component system-water system, condensed phase rule, application of phase rule to two component system-Pb-Ag system, NaCl-H₂O system, freezing mixture

UNIT III:

1. Alcohols

05 Hours

Classification, monohydric alcohols-general reactions, distinguishing reaction for 1, 2 and 3 alcohols.

Dihydric alcohols- Glycol preparation reactions and uses.

Trihydric alcohols: Glycerol, Synthesis, reactions, uses.

2. Phenols:

03 Hours

acidity of phenols, effects of substituents on acidity on phenols. Reactivity of phenols towards electrophiles, uses.

3. Carbonyl compounds:

04 Hours

Synthesis of aldehydes and ketones, structure, reactivity and properties of carbonyl group, nucleophilic addition reactions, aldol condensation, perkins reaction, cannizzaro reaction (mechanism).

UNIT IV:

1. Carboxylic acids:

06 Hours

Synthesis of monocarboxylic acids, acidity of carboxylic acids, Effect of substituents on acidity of carboxylic acids

2. Hydroxy acids and dicarboxylic acids

3. Structure, preparation, and properties of

a) Lactic acid, tartaric acid, citric acid

b) Succinic, maleic and fumaric.

c) Pyruvic, alpha ketoglutaric, oxalo acetic acid.

d) Effects of heat and dehydrating agents on hydroxy acids.

4. Amines

03 Hours

Classification, properties, synthesis of aliphatic and aromatic amines, separation of primary, secondary and tertiary amines, and structural features affecting basicity of amines. Reactions, acylation, with HNO_2 and Schiff's base formation. Distinguishing reactions of primary, secondary and tertiary amines.

4. Drugs

03 Hours

Analgesics, antipyretics, antiseptics, disinfectants, antiviral, antifungal, tranquilizers, antimalarials with example. Structure, preparation and uses of aspirin, paracetamol, barbituric acid, chloroxylenol, methyl salicylate, penicillin and chloroquin.

PRACTICALS:

3 Hrs/ week
36 Hours

1. Organic preparations 5 weeks

- a. Acetanilide from aniline
- b. M- dinitro benzene
- c. Parabromo acetanilide
- d. Benzoic acid from toluene
- e. Benzoic acid from ethyl benzoate f aspirin from salicylic acid

2. Physical chemistry experiments (non instrumental)

- a. Determination density of a liquid using specific gravity bottle, viscosity using Ostwald's method.
- b. Determination of molecular weight of non- volatile substance by Walker Lumsden method.
- c. Determination of critical solution temperature of phenol water system
- d. Determination of percentage of given electrolyte [NaCl] in water -phenol system by miscibility temperature method
- e. Determination of rate constant of decomposition of H_2O_2 using $KMnO_4$
- f. Determination of density of a liquid using specific gravity bottle and surface tension
- g. Enthalpy of ionization of weak acid

REFERENCE

1. Soni, P L 1998; A Text book of Inorganic Chemistry, Sulthan Chand & Sons
2. Lee, JD 1998; Cocise Inorganic Chemistry, Black Well Science Ltd.,
3. Skoog, West & Hollar, 1993; Fundamental Analytical Chemistry, NY – CBS publishers.
4. Gurudeep Raj, 2001; A Text book of Inorganic Chemistry, Goel Publishing house, Meerut
5. Soni, PL, 2000; A text book of Organic Chemistry, Sulthan Chand & Sons.
6. Bahl Arun, B.S. Bahl BS, 2000; Sulthan Chand & Sons, Advanced Organic Chemistry.
7. Bansal k Rj, 2000. A Laboratory Manual of Organic Chemistr. Sulthan Chand & Sons.
8. Vogel AL E.L. B.S edition, 1994
9. Agarwal OP, 1998; Chemistry Of Natural Producs, Goel Sulthan Chand & Sons Publishing House, Meerut.
10. Madan RL, Tuli. G D, 2001 Physical Chemistry Sulthan Chand & Sons,
11. Raj Gurudeep, 2001; Text book of Advanced Physical chemistry, Goel Publishing House, Meerut.
12. Lehniger, A.L., Nelson, D.L. and Cox, M.M (1993); 2nd Ed. Principles of Bio-Chemistry, CBS Publishers and distributors.

III YEAR B.Sc FND VI SEMESTER
FOOD MICROBIOLOGY-II
THEORY

3 Hours/week
Total 48 hours

OBJECTIVES:

This course will enable the students to-

1. Understand the principles of various methods used in the prevention and control of the microorganisms in foods.
2. Understand the criteria for microbiological safety in various food operations to avoid public health hazards due to contaminated foods.

UNIT I:

12 Hours

- General principles underlying spoilage of food -Fitness and unfitness of food for consumption; Causes for spoilage.
- Factors affecting kinds and numbers of microorganisms in food.
- Factors affecting the growth of microorganisms in food.

UNIT II:

12 Hours

- Contamination and kinds of organisms causing Spoilage of fruits and vegetables.
- Contamination and kinds of organisms causing spoilage of meat, poultry, fish and eggs.
- Contamination and kinds of organisms causing spoilage of milk and milk products.
- A brief account on contamination and spoilage of fats and oils, bottled beverages, spices and condiments.

UNIT III:

12 Hours

- Food poisoning -Staphylococcal poisoning, Streptococcal poisoning, botulism, salmonellas, Shigellosis.
- Food borne infections-clostridium perfringens, vibrio, EPEC, Bacillus cereus, campylobacter, Listeria, yersiniosis.
- Microbiology of air borne diseases -bacterial and fungal air borne diseases .
- Microbiology of sewage and sewage disposal.

UNIT IV:

12 Hours

- Microbiology of water- sources, bacteriological examinations, total count, test for E. coli.
- Purification of water - filtration, sedimentation, Disinfection.
- Water borne diseases - bacterial, viral, protozoan.

REFERENCES:

1. Frazier, W.C. and Westhoff, D.C. [1988]: 4th ed., Food Micro biology, McGraw Hill Inc.
2. Jay James, M. [1986]: 3rd Ed., Modern Food Micro Biology, Van No Strand Reinhold Company Inc.
3. Pelezer, M.I. and Reid, R.D.[1978]:Microbiology, McGraw Hill book company, New York.
4. Benson Harlot. [1990]: Microbiological Methods, Butterworth, London.

III YEAR B.Sc. FND VI SEMESTER

NUTRITIONAL BIOCHEMISTRY II

THEORY

3 Hours/week

Total 48 hours

OBJECTIVES:

This course will enable the students to

1. Understand the principles of biochemistry (as applicable to human nutrition).
2. Obtain an insight into the chemistry of major nutrients and physiologically important compounds.
3. Understand the biological processes and systems as applicable to human nutrition.
4. Apply the knowledge acquired to human nutrition and dietetics.

UNIT I: PROTEINS

12 Hours

Proteins – Aminoacids, chemical bonds involved in protein structure, Protein configuration- primary, secondary, tertiary and quaternary structure, biological role of proteins.

Classification of proteins - simple, conjugated proteins, derived proteins. Example, Biosynthesis

Protein digestion and absorption, protein malnutrition.

UNIT II: NUCLEIC ACIDS

12 Hours

Introduction, components, nucleosides, nucleotides

DNA, base composition, double helical structure, DNA – Denaturation, DNA replication mechanism, DNA Repair Mechanisms, Transcription- requirements and mechanism.

RNA – Types, structure and functions.

UNIT III: VITAMINS AND MINERALS

12 Hours

Vitamins : Chemistry and biochemical role of fat soluble vitamins – A,D, E and K. water soluble vitamins B1, B2, B3, B6 and C

Storage of vitamins in the body, daily human requirements, deficiency disorders.

Minerals: Biochemical role of inorganic elements, deficiency disorders.

UNIT IV: HORMONE

12 Hours

Biological role of hormones of pituitary, Adrenal Cortex and Medulla, Thyroid, Parathyroid and Pancreas.

PRACTICALS

36 Hours
3 Hrs/ week

1. Qualitative analysis for proteins
Egg albumin, Gelatin, Peptone and Casein
2. Quantitative analysis
Serum inorganic phosphate
Serum protein and A/G ratio
Creatinine in urine
Estimation of Ascorbic acid content of foods by colorimetric method
Estimation of DNA

REFERENCE

1. West, E.S., Todd, W.R., Mason, H.S and Van Bruggen. J.T (1974): 4th Ed, Text book of Biochemistry, Amerind Publishing Co. Pvt Ltd.,
2. Lehniger, A.L., Nelson, D.L. and Cox, M.M (1993); 2nd Ed. Principles of Biochemistry, CBS Publishers and distributors.
3. Devlin T.M (1986): 2nd Ed. Text book of Biochemistry with clinical correlations John Wiley and sons.
4. Strayer, L. (1995) Biochemistry, Freeman WH and Co.
5. Dr. J.L. Jain(2012), Fundamentals of Biochemistry, S. Chand and Company Ltd.

III YEAR B.SC FND VI SEMESTER

CLINICAL DIETETICS

THEORY

3hours/week
Total 48 hours

OBJECTIVES:

1. To know the principles of diet therapy
2. To understand the modifications of normal diet for therapeutic purposes

UNIT 1: DISEASES OF THE CARDIOVASCULAR DISEASE

16 Hours

- Prevalence, clinical features and Risk factors
- Role of fat in the development of atherosclerosis
 - Cholesterol, Saturated fatty acids, Trans fatty acids,
- Physical activity and heart diseases
- Hypercholesterolemia
- Functional foods
- Dietary management
- Dietary guidelines

UNIT 2: HYPERTENSION

08 Hours

- Pathogenesis, aetiology, types, symptoms
- Principles of diet and dietary treatment
- Kempner's Diet and Dash

UNIT 3: CANCER

12 Hours

- Definition, classification
- Risk factors, dietary factors
- Carcinogenic foods
- Role of food in the prevention of cancer
- Nutrition problems of cancer therapy
- Feeding problems in cancer patients
- Dietary management
- Nutritional requirements

UNIT 4: GENETIC AND MENTAL DISORDER

12 Hours

- Phenylketonuria-Prognosis, symptoms and dietary management
- Galactosemia- Aetiology and dietary management
- Mental illness- Definition and precipitating factors
- Epilepsy -pathogenesis and dietary modifications
- Ketogenic diet

PRACTICALS

36 hours
3 Hours/week

Planning, preparing diets and calculating the major nutrients of the following:

[Standard with 2 variation]

1. Atherosclerosis
2. Hypertension
3. Cancer
4. Nervous disorder.

REFERENCES:

1. Anderson. L., Dibble, M. V., Turkki. P. R., Mitchall. H.S., and Rynbergin, H.J. [1982]: Nutrition in Health and Disease, 17th ed., J.B. Lippincott & co. Philadelphia
2. Antia, F.P. [1973]: Clinical Dietetics and Nutrition, Second edition, Oxford University Press, Delhi.
3. Williams, S.R. [1989]: Nutrition and Diet therapy, 6th ed. Times Mirror/ Mosby College publishing St. Louis.
4. Raheen Begum, [1989]: Text book of Foods, Nutrition and Dietetics. Sterling Publishers, New Delhi.
5. Joshi. S.A. [1992]: Nutrition and Dietetics, Tata Mcgraw Hill Publications, New Delhi.

III YEAR B.SC (F.N.D) VI SEMESTER
QUALITY CONTROL
(THEORY)

3 hours/week
Total 48 hours

OBJECTIVES:

This course will enable the students to

1. Gain an insight into quality of food
2. Know the importance and uses of food additives
3. Know how food is fortified and enriched with certain nutrients.
4. Be familiar with the sensory evaluation of various quality parameters of food.

UNIT-I: FOOD QUALITY AND QUALITY CONTROL

12 Hours

- Definitions
- Principles of quality control
- Food quality
- Sample and sampling methods
- **Industrial quality control:** Raw material control, Process control, Finished product control and inspection.

UNIT-II: FOOD ADDITIVES

12 Hours

- Definitions
- Principles and objectives
- Classification and uses
- **Coloring agents:** Natural, Synthetic and non certified colours.
- **Leavening agents:** Classification and uses
- **Flavoring agents:** Natural and Synthetic flavors.

UNIT-III: FOOD FORTIFICATION AND ENRICHMENT

12 Hours

- Definition and importance
- Principles
- Commonly fortified and enriched foods
- **Non nutritional constituents and food safety:** naturally occurring toxicants, microbial toxins, bacterial food poisoning and contamination arising from processing.

UNIT-IV: SENSORY ASSESSMENT OF FOOD QUALITY

12 Hours

- **Sensory evaluation:** Sensory characteristics of food
Types of tests.
- **Objectives evaluation:** Types of tests
Texture evaluation
- Conducting sensory tests and preparation of evaluation card.

PRACTICAL

36 hours

3 hours/ week

1. Detection of common adulterants present in the food samples.
 - Spices and condiments
 - Food grains
 - Sugars and preserves
 - Fats and oils
2. Sensory evaluation of foods :
 - Sweet, sour, bitter, salt.
 - Different tests employed in sensory evaluation.
3. Quality of fats and oils :
 - Iodine value
 - Acid number.
4. Visit to a food industry.

REFERENCES

1. Keister, D.C. [1977]: Food and Beverage Control, Prentice Hall Inc., New Jersey.
2. Coltman, M.M. [1977]: Food And Beverage Cost Control, Prentice Hall Inc., New Jersey
3. Kotas, R: An Approach To Food Costing, Berrie And Rockliff Ltd. London.
4. Ranjanna, S. [1985]: Handbook of Analysis and Quality Control for Fruit and Vegetable Products.
5. Martin, E. H. [1986]: Standard Methods for the Examination of Dairy Products.
6. Lees, R. [1978]: Food Analysis; Analytical and Quality Control Methods for Food Manufacture and Buyer

III YEAR B.Sc (F.N.D) VI SEMESTER

FOOD PRESERVATION

THEORY

3 hours/week
Total 48 hours

OBJECTIVES

This course will enable the students to:

1. To understand basic concepts and parameters of preservation techniques.
2. To know the types and variety of foods available in the markets.
3. To learn to purchase and preserve different foods.
4. To learn various quality preservation techniques used in various foods.

UNIT: TYPES OF HEATING

12 hours

- Conduction and convection heating
- Micro wave heating – advantages and disadvantages
- Preservation and semi- moist foods/ inter mediate – moist foods.

UNIT 2: PRESERVATION BY USE OF LOW TEMPERATURE

12 hours

- Refrigeration:
- Definition, General principles, types
- Chilling and cold storage foods
- Cold storages defects

FREEZING

- Definition
- General principles
- Methods of freezing
- Air freezing, indirect freezing, direct contact freezing, immersion freezing,
- Selection and preparation of foods for freezing

- Changes during freezing, Freezer burn
- Thawing

UNIT 3: FOOD RADIATION

12 hours

- Definition
- Sources of radiation units of radiation
- Dosimetry, mode of action
- Effects on foods
- Advantages and disadvantages, uses

UNIT 4: PRESERVATION WITH CHEMICALS

12 hours

Types and mode of action of organic and inorganic preservatives, antibiotics, antioxidant anti browning, cleaning, sanitizing, and fungicidal agents

PRACTICAL

36 HOURS

3 hrs/week

Prepare the following

1. Tutti frutti
2. Ketchups and Sauces
3. Chutneys
4. Chutney powder
5. Frozen fruits and vegetables
6. Visit to wheat roller flour mill/ pulse processing mill/ oil seeds processing mill.

REFERENCE

1. Frazier, W.C. And Westshofy, D.C (1988) 4th Ed. Food Microbiology, Mcgrew Hill
2. N.V Desroier, The Technology Of Food Preservation
3. Norman Potter, Food Science
4. Prescott And Proctor, Food Technology
5. Lal And Sidappa Preservation Of Food And Vegetables.

III YEAR B.Sc. FND VI SEMESTER

CHEMISTRY PAPER -IV

THEORY

3 hours/week
Total 48 hours

OBJECTIVES:

1. To enrich the knowledge about the basic principles, fundamental concepts and unique mechanistic steps involved in chemical and biochemical reactions.
2. To provide an introduction to key concepts of modern analytical methods and to equip the students to handle the modern analytical instruments.
3. To expose the students to the rapid development and enormous expansion of every phase of chemistry

UNIT I:

1. Environmental chemistry

08 Hours

Air Pollution- air Pollutants, their Sources, effects and control. Water Pollution: Types of water Pollutants, biodegradation, dissolved oxygen level of Water, Biochemical Oxygen Demand (BOD) of water, COD of water, Determination of DO, BOD and COD of waste water, Industrial effluents, their effects, treatment of Polluted Water, and sewage treatment. Soil pollution: Pollutants, Agricultural animal manures, crop harvesting. Pesticides use of fertilizers, radioactive wastes, control of soil pollution.

2. Chromatography

04 Hours

General Principles of Chromatography, Adsorption and partition techniques. Paper Chromatography, ascending and Circular. R_f values Column Chromatography, Principles of gel Chromatography, ion exchange Chromatography, TLC and their applications

UNIT II:

Electrochemistry

09 Hours

Specific, equivalent and molar conductance, Kohlrausch's law, electrodes, electrode potential. Nernst equation. Reference electrode, Hydrogen electrode and calomel Electrode. Quinhydrone electrode, glass electrode. Determination of Equivalent Conductance of NaCl. Conductometric titrations. Galvanic Cells, EMF of galvanic cells, concentration cells, Electro Chemical Series. Potentiometric titration. Determination of pK_a values of weak acids by Potentiometric Method. Determination of pH using quinhydrone electrode.

2. Chemical equilibrium

03 Hours

Second and third law of thermodynamics, concept of entropy, Equilibrium constant and free energy, Lechateliers principle and its applications.

UNIT III:

1. STEREO CHEMISTRY OF ORGANIC COMPOUNDS

8 Hours

Stereoisomerism, types of Stereoisomerism, optical isomerism. Elements of Symmetry, asymmetric, Atom molecular dissymmetry, chirality, optical isomerism in Glyceraldehydes, Lactic acid and tartaric acid, Enantiomers diastereo- isomers. Meso compounds resolution of enantiomers and racemisation. Geometrical isomerism - condition, examples geometrical isomerism in oximes Conformational isomerism: conformational analysis of ethane and butane, Newmann Projection Difference between configuration and conformation.

2.Spectroscopy

Principle ,instrumentation and applications of UV,IR and NMR spectroscopy

UNIT IV:

1. Heterocyclic compounds

04 Hours

Occurrence, structural formula and importance of furan, pyrrole, thiophene, Pyridine, purine, indole, imidazole, quinoline and isoquinoline, aromatic characteristics of pyrrole, furan, thiophene and pyridine, reactions.

2.Terpenes

02 Hours

Classification isoprene rule, structure, occurrence and importance of limonene, menthol, camphor, santonin, phytol, lonosterol, dolichols

3.Alkaloids:

03 Hours

Classification biological functions with examples, structure and physiological action of LSD, morphine, Nicotine, Atropine.

4 .Polymers

03 Hours

Classification,polymerization process,number average and weight average molecular weights,properties of polymers,preparation and applications of Dacron,nylon66,Bakelite, pvc,polythene,epoxy resin ,polyurethane

PRACTICALS

36 Hours
3 Hrs/week

- I. Extraction of bio-molecules
 1. Starch from potato
 2. Caffeine from tea leaves
 3. Casein from milk
- II. Physical chemistry experiments (instrumental)
 1. Conductometric titration of strong acid and strong base
 2. Conductometric titration of acidmixture against strong base
 3. Verification of Beer-Lamberts law by colorimeter
 4. Potentiometric titration of Mohr's salt against potassium dichromate
 5. Determination of PH of buffer by PH meter or potentiometer
 6. Determination of equivalent conductance of strong electrolyte
- III. Chromatography experiments
 1. Identification of amino acid by circular paper chromatography
 2. Separation of green leaf pigments by column chromatography

CHEMISTRY - IV

REFERENCE

1. Soni, P L 1998; A Text book of Inorganic Chemistry, Sulthan Chand & Sons
2. Lee , JD 1998; Cocise Inorganic Chemistry, Black Well Science Ltd.,
3. Skoog, West & Hollar, 1993; Fundamental Analytical Chemistry ,NY = CBS publishers.
4. Gurudeep Raj,2001; A Text book of Inorganic Chemistry, Goel Publishing house, Meerut
5. Soni ,PL,2000; A text book of Organic Chemistry ,Sulthan Chand & Sons.
6. Bahl Arun , B.S. Bahl BS,2000; Sulthan Chand & Sons ,Advanced Organic Chemistry.
7. Bansal k Rj,2000. A Laboratory Manual of Organic Chemistr.Sulthan Chand & Sons.
8. Vogel AL E.L. B.S edition, 1994
9. Agarwal OP,1998; Chemistry Of Natural Producs ,Goel Sulthan Chand & Sons Publishing House, Meerut.
10. Madan RL, Tuli.G D,2001 Physical Chemistry Sulthan Chand & Sons,
11. Raj Gurudeep,2001; Text book of Advanced Physical chemistry, Goel Publishing House, Meerut.
12. Lehniger, A.L., Nelson, D.L. and Cox, M.M (1993); 2nd Ed. Principles of Bio-Chemistry, CBS Publishers and distributors.

VI SEMESTER
INTERNSHIP

OBJECTIVES

To enable students to

1. Assess nutritional status and dietary pattern of patients.
2. Plan and prepare therapeutic diets.
3. Develop skills in feeding patients and supervise food service.
4. Develop skills in diet counseling
5. Take up dietetics as a profession

A candidate shall undergo dietetics internship for 15 days in a reputed hospital during the midterm vacation in the VI semester and submit the report.

DISTRIBUTION OF MARKS:

Project report: 30 marks
Viva : 20 marks
Total : 50 marks.

QUESTION PAPER PATTERN

TIME: 3 HOURS

MAX MARKS: 80

PART-A

1. ANSWER ANY TEN OF THE FOLLOWING:

(10X2=20)

- a)
- b)
- c)
- d)
- e)
- f)
- g)
- h)
- i)
- j)
- k)
- l)

PART-B

ANSWER THE FOLLOWING:

(15X4=60)

2. a)
- b)
 - c)

3
5
7

OR

3. a)
- b)
 - c)

4
4
7

4. a)
- b)
 - c)

3
5
7

OR

5. a)
- b)
 - c)

4
4
7

6. a)
- b)
 - c)

3
5
7

OR

7. a)
- b)
 - c)

4
4
7

64

- 8. a)
- b)
- c)

3
5
7

OR

- 9. a)
- b)
- c)

4
4
7