

Maulana Abul Kalam Azad University of Technology, West Bengal
(Formerly known as West Bengal University of Technology)
Syllabus of B.Sc. (Dietetics and Nutrition)
Effective from academic session 2023-2024

Semester-III

FYBDN 301 Human Physiology-I
3 credits, Total-30 hours + 15 Tutorial hours

Course Objectives

1. To impart basic knowledge about the organelles of a typical cell and to describe their functions.
2. To develop an idea on Circulatory and Excretory system, Digestive System, Respiratory System, Immune System

Sl. No.	Course Outcome (CO)
1.	Explain and recall the structure of cells and its different parts including their functions.
2.	Construct the knowledge on chromosome, Chromosomal and mitochondrial DNA, DNA packing,
3.	Illustrate the structure, function and mechanism of Circulatory and Excretory system, Digestive System, Respiratory System, Immune System.

UNIT-I 5hrs

Cell - Structure and functions, Cellular transport-active and passive, ion channels & ionophores, Intercellular communication: basic idea about tight junction, gap junctions, adherens junction, extracellular matrix, Chromosome structure: Morphology, chromosomal DNA packing, Chromatin, Human genome, Mitochondrial DNA, Epistasis, Penetrance, Expressivity, Pleiotropism, Karyotyping. Cell cycle, Cell division, Crossing- over, Linkage.

UNIT-II 5hrs

Digestive system - Anatomical consideration – structure & functions, Digestive glands and its structure and function, Enterohepatic circulation, Movement of alimentary canal, Brief study of the organization of the digestion, absorption and assimilation of food, Defecation.

UNIT-III 5hrs

Tissues Structure and functions, Blood, RBC, WBC, Platelets and Lymph. Blood coagulation, blood grouping and

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Rh factor.

Circulatory system - Heart structure and functions - cardiac cycle, cardiac output, electrocardiography, cardiovascular homeostasis, blood pressure, pulse, coronary circulation, baroreceptors, chemoreceptors.

UNIT-IV 5hrs

Excretory system - Excretory organs - structure of kidney and functions, formation of urine, renal regulation-acid base balance, composition of urine. Renal function tests, Non-excretory functions of kidney, Structure and functions of skin, Sweat gland, regulation of body temperature, hypo & hyperthermia, concept on pyrogens, pyrexia.

UNIT-V 5hrs

Respiratory system - Basic anatomy of the respiratory system, mechanism of breathing, spirometry process of respiration, transport and exchange of oxygen and carbon dioxide in the body. Regulation of respiration, Disorders of breathing,

UNIT VI 5hrs

Immune system: adaptive immunity, innate immunity, role of different W.B.Cs in immunity, cell signalling

Reference Books:

1. Chaterjee, C.C., Human Physiology, Vol-I&II Medical allied agency, Calcutta 13th Edition,2020
2. Best and Taylor, Living body. Mc.Graw hill company, Newyork.
3. Sathya Narayana, Essentials of Biochemistry (2000).
4. Saratha Subramanian, Text of Human Physiology (2000).
5. Stuart Ira Fox, Human Physiology (2003)
6. Guyton & Hall Textbook of Medical Physiology_3rd SAe-E-Book: Third South Asia Edition,2020

FYBDN 391Human Physiology-I Practical

2 credits, Total-30 hours + 20 self-paced practice hours

1. Identification of tissues
2. Bleeding time, Clotting time, Blood groups –identification
3. Measurement of Hemoglobin by cyanmethemoglobin method
4. Measurement of Radial Pulse Rate
6. Measuring of Blood Pressure by Sphygmometer
7. Measurement of height, weight and calculation of BMI
8. Determination of Packed Cell Volume (PCV)
9. Measurement of Physical Fitness Index by Harvard Step Test

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FYBDN 302 Biochemistry-I

3 credits, Total-30 hours + 15 Tutorial hours

Course Objectives:

1. To acquaint the students with the basic concepts of Biochemistry and metabolism.
2. To acquaint the students with the basic concepts and functions of enzymes, coenzymes.
3. To acquaint the students with the basic structures and functions of carbohydrates, proteins & amino acids.

Sl. No.	Course Outcome (CO)
1	Demonstrate the basic concepts and functions of different enzymes and various coenzymes.
2	Apply basic knowledge about the structure, function and metabolism of carbohydrate
3	Relate basic knowledge about the structure, function and metabolism of amino acid, protein.

UNIT 1 7hrs

Introduction to Biochemistry: Definition, objectives, scope and inter-relationship between biochemistry and other biological sciences. Introduction to Enzymes; Introduction to enzymes, Coenzymes, Classification of enzymes, Enzyme Inhibition. Factors affecting the enzyme activity. Coenzymes and their functions in the metabolism of carbohydrates, lipids and proteins.

UNIT 2 8hrs

Carbohydrates; Definition, Structure and general properties of: Monosaccharides glucose, fructose, galactose, ribose. Disaccharides – maltose, lactose, sucrose. Polysaccharides – dextrin, starch, glycogen. Metabolism of Carbohydrates: Introduction, anabolism, catabolism, metabolism. Glycogenesis, Glycogenolysis, Glycolysis, Krebs' cycle, energy output, Homeostasis of blood sugar-role of hormones, Glucose Tolerance Test.

UNIT 3 7hrs

Proteins: Definition, classification, elementary knowledge of structure of proteins, biomedical importance.

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UNIT 4 8hrs

Amino acids; Definition, classification, Essential and non- essential amino acids, structure of important amino acids. Metabolism of proteins: Dynamic equilibrium, nitrogen balance, essential Amino acids, Glycogenic, Ketogenic, and both glycol-ketogenic amino acids. Oxidation of amino acids- Transamination, Deamination-Oxidative, Non-oxidative, Decarboxylation. Metabolism of carbon skeleton, Metabolism of ammonia -Urea cycle.

Reference Books:

1. Lehninger A L, Nelson D L and Cox M M (2009). Principles of Biochemistry, 6th Ed. CBS Publishers and Distributors.
2. Murray R.K, Granner D K, Mayes P A and Rodwell V W (2009).Harper’s Biochemistry, 28th Ed, Lange Medical Book.
3. Hawk PB, Oser BL and Summerson WH (1954). Practical Physiological Chemistry, Mcgraw Hill, New York.
4. Sundararaj P and Siddhu A (2006). Qualitative Tests and Quantitative Procedures in Biochemistry. Elite Publishing House Pvt. Ltd., New Delhi.

FYBDN 392 Biochemistry-I Practical
2 credits, Total-30 hours + 20 self-paced practice hours

Qualitative Methods

1. Qualitative tests for mono, di and polysaccharides and their identification in unknown mixtures
2. Qualitative tests for proteins

Quantitative Methods:

1. Estimation of total carbohydrates by Anthrone method.
2. Quantitative estimation of reducing sugars by Dinitro Salicylic acid (DNS) method.
3. Estimation of total protein by Lowery’s method
4. Quantitative estimation of glucose by GOD/POD method
5. TLC/Paper Chromatography of protein

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Semester-IV

FYBDN 401 Human Physiology-II
2 credits, Total-20 hours + 10 Tutorial hours

Course Objectives

1. To impart basic knowledge about the nervous system and its functions.
2. To develop an idea on Reproductive system and Sense organ, Endocrine glands, and Musculoskeletal system

Sl. No.	Course Outcome (CO)
1	Define the structure and functions of the nervous system.
2	Relate the structure, function and mechanism of Reproductive system and Sense organ, Endocrine glands, and Musculoskeletal system

UNIT-I 4hrs

Nervous System: Structural organization of different parts of brain and spinal cord, Reflex action-definition, reflex arc, classification, and properties. Autonomic nervous system: Organization, outflow, ganglia, centers and functions, Chemical transmission in autonomic nervous systems. CSF: Formation, circulation and functions, Blood-CSF and Blood-Brain barrier, Ascending and descending tracts, Functions of the spinal cord, Muscle spindle and golgi tendon organ, Brain: Structure, nerve connections and functions of brain, Thalamus, Hypothalamus, Physiology of sleep, learning, memory and emotions, cerebral circulation and stroke.

UNIT-II 4hrs

Reproductive System: Primary and accessory sex organs and secondary sex characteristics. Spermatogenesis, Histology of ovary and testis, Oogenesis and ovulation, Physiology of puberty. Menstrual cycle and its regulation, Onset of menopause and postmenopausal changes, Structure and function of placenta, Pregnancy, Parturition, Development of mammary gland, lactation and their hormonal control

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UNIT-III 4hrs

Sense organs - Structure and function of eye, ear, nose, tongue and skin.

UNIT-IV 4hrs

Endocrine glands - Hypothalamus as neuroendocrine organ, Structure and function of pituitary, Pineal gland, Thyroid and Parathyroid gland, Adrenal cortex and medulla, Pancreatic islets of langerhans. Gastro-intestinal hormones.

UNIT-V 4hrs

Muscles - physiology of muscular action. Structure of skeletal, smooth and cardiac muscles, The sarco-tubular system, Muscle group, excitability, contractility, summation of stimuli, summation of contractions, Muscle proteins.

Reference Books:

1. Chaterjee, C.C., Human Physiology, Vol-I&II Medical allied agency, Calcutta 13th Edition,2020
2. Best and Taylor, Living body. Mcgraw hill company,Newyork.
3. Saratha Subramanian, Text of Human Physiology (2000).
4. Stuart Ira Fox, Human Physiology (2003)

FYBDN 491 Human Physiology Practical-II

2 credits, Total-30 hours + 20 self-paced practice hours

1. Preparation and staining of blood film with Leishman's stain
2. Cell viability study by Trypan Blue staining
3. Identification of blood cells
4. Total count of W.B.C and R.B.C
5. Differential count of W.B.C
6. Microscopic structure of various Glands-Thyroid, pituitary, adrenal, liver
7. Microscopic structure of reproductive Organs-Ovary, uterus, mammary gland, testis

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FYBDN 402 Biochemistry II
2 credits,
Total-20 hours + 10 Tutorial hours

Course Objectives:

1. To acquaint the students with the basic concepts of vitamin, hormone and mineral metabolism.
2. To acquaint the students with the basic structures and functions of lipids and nucleic acids.

Sl. No.	Course Outcome (CO)
1	Apply basic knowledge about the structure, function, and metabolism of lipids.
2	Interpret basic knowledge about the structure, function of vitamins & minerals.
3	Explain basic knowledge about the structure, synthesis & metabolism of nucleic acid.

UNIT 1 4hrs

Lipids: Definitions and classification of lipids. Types and properties of fatty acids Composition and properties of fats. Significance of acid value, iodine value and saponification value Metabolism of lipids: Introduction, β - oxidation of fatty acids, Biosynthesis of fatty acids, Synthesis of triglycerides, Synthesis of cholesterol and atherosclerosis (in brief).

UNIT 2 4hrs

Vitamins: Structure and biochemical role

Fat soluble vitamins – A, D, E, K.

Water soluble vitamins – B1, B2, niacin, pantothenic acid, pyridoxine, folic acid, B12 and C

UNIT 3 4hrs

Minerals: Biological role and occurrence of inorganic elements – iron, calcium, phosphorous, iodine, selenium and zinc

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UNIT 4 4hrs

Integration of carbohydrate, lipid and protein metabolism. Bioenergetics-Exergonic and endergonic reactions, Electron Transport Chain and Oxidative Phosphorylation

UNIT 5 4hrs

Nucleic acid and Nucleotide– DNA & RNA, Synthesis and Metabolism, DNA-replication, Transcription, Translation

FYBDN 492 Biochemistry II Practical

2 credits, Total-20 hours + 20 self-paced practice hours

1. Properties of Fats (Acrolein Test, Baudouin Test)
2. Estimation of iodine value of fat/ free fatty acid value (sesame oil, groundnut oil, or coconut oil)
3. Estimation of Ash and moisture content from food
3. Estimation of calcium using EDTA by titration
4. Estimation of ascorbic acid by using 2, 6 dichloro phenol indophenols method

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FYBDN 403 Public Health

3 credits, Total-30 hours + 15 Tutorial hours

Course Objectives:

1. To identify individuals or population groups at risk of becoming malnourished
2. To know the steps and methods involved in nutrition and health education.
3. To evaluate nutrition and health education programs.

Sl. No.	Course Outcome (CO)
1	Explain the concept of the community
2	Apply the concept of the nutritional assessment
3	Familiarize with the different nutritional assessment methods
4	Relate basic knowledge of diet survey methods
5	Identify some nutritional deficiency clinically
6	Examine the concept regarding the regional agencies and organizations and their duties.

UNIT I: 5hrs

Concept of Community Health & Nutrition

Concept of Community- types of community, factors affecting health of the community. Health Care- Levels of health care- Primary Health Care- Primary health care, health care delivery, National immunization schedule, Role of public nutritionist in health care delivery.

UNIT II: 5hrs

Nutritional Problem of Community

Nutritional and Non- nutritional- Incidence of nutritional problems, signs, symptoms and treatment- Protein Energy Malnutrition- Micronutrient deficiencies (Vitamin-A, Iron, Iodine), Fluorosis. Impact of NCDs on public health: Obesity, DM 2, CVD, Cancers and Osteoporosis and hip fractures.

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UNIT III: 5hrs

Demography, nutrition and quality of life

Demographic cycle- Population trends in India- Population structure- sex composition- Age composition- Fertility behavior- Vital statistics in vulnerable groups, population growth (Maternal Mortality rate, Infant Mortality Rate, Net Reproduction Rate).

Causes of malnutrition, consequences of malnutrition, Intervention in malnutrition- Food security- PDS, Food production- Food Pricing

UNIT IV: 5hrs

Method and Assessment of Nutritional Status

Identification of risk groups (random and purposive) Direct assessment – Diet surveys methodology (weighment and 24-hour recall method), Anthropometry, Clinical and Biochemical Estimation- Indirect assessments- Food balance sheets and Agricultural Data.

Use of growth charts.

UNIT V: 5hrs

National and International agencies and Intervention Programmes:

a) FAO, WHO, UNICEF, ICMR, CSIR, NIN, CFTRI

b) ICDS, Mid-Day Meal Programme, NIDDCD Fortification and Enrichment of foods.

UNIT VI: 5hrs

Nutritional epidemiology

An Introduction to epidemiology, Historical aspects, definition, aim and uses - Descriptive epidemiology -Determinants of disease, Natural history of disease - Epidemiological principles in prevention and control of disease.

FYBDN493 Public Health (Practical)

2 credits, Total-20 hours + 20 self-paced practice hours

1. Measurement of the height and weight, and determination of the BMI of adolescents /adults and comment on their nutritional status.
2. Determination of MUAC of under 5 children.
3. Diet survey of a family by 24 hour recall method
4. Development of a Pictorial Dietary Ready Reckoner of some of the common standardized recipes for community use.
5. Development and demonstration of following aids for health education- for adolescent girls/rural women/school going children/pregnant woman/lactating woman:

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1. Bamji SM, Rao NP and Reddy V, Textbook of human nutrition, oxford and IBH publishing co., New Delhi.
2. Gopalan C, Combating under-nutrition-basic issues and practical approaches, Nutrition Foundation of India, 1987.
3. Gopalan C, Women and nutrition in India, NFI, New Delhi, 1992.
4. Jelliffe D.D. 1966. The assessment of Nutritional Status of the Community. WHO, monograph series.
5. Jelliffe D.D. 1966. The assessment of Nutritional Status of the Community. WHO, monograph series.
6. Michael J.G, Barrie M.M: Public health nutrition, Blackwell publishing, 2005.
7. Nweze Eunice Nnakwe., Community Nutrition – planning health promotion and disease prevention., Jones And Bartlett publishers, 2009.
8. Park K., Park's textbook of preventive and social medicine., 12th edition. M/S Banarsidas bhanot publishers, 2009.
9. Reddy V, Prahlad Rao N, Sastry G and Nath KK, Nutrition trends in India, Hyderabad, NIN, 1993