Maulana Abul Kalam Azad University of Technology, West Bengal
(Formerly West Bengal University of Technology)
Syllabus for M. Sc. Dietetics & Nutrition
(Effective for Academic Session 2018-2019)

Semester-I

MDN-101: HUMAN ANATOMY AND PHYSIOLOGY

Course Learning Outcomes:

Student will be able to -
1. Impart knowledge on the current state of functional organization of the human body.
2. Develop insight of normal functioning of all the organ systems of the body and their interactions.
3. Correlate physiology with various disorders and their pathogenesis.

Contents:

UNIT I: Blood and Cardio-Thoracic Physiology
- Blood and Plasma Protein -Composition and Function
- Blood formation and factors controlling Erythropoiesis.
- Pathophysiology of Anaemia and Jaundice
- Cardiac cycle, Cardiac output ,Heart sounds
- E.C.G. & its interpretation, Heart rate &regulation
- Blood pressure, Hypertension
- Coronary Artery Disease
- Hemorrhage; Compensatory changes after hemorrhage
- Transport and exchange of gases
- Control of Respiration and Respiratory function tests
- Lung volume & Capacities and COPD

UNIT II: Excretory Physiology and Exercise Physiology
- Urine formation
- Renal function tests
- Acid Base balance
- Pathophysiology of Renal Stones, Urinary Tract Infection, Glomerulonephritis
- Concept of Fitness, Adaptations to exercise
- Energy Metabolism in Sports
- Overview of Diet and Physical Performance

UNIT III: Gastrointestinal Physiology
- Functions of Stomach, Liver, Pancreas and Gall Bladder
- Composition ,function and regulation of:
    - Salivary juice
    - Gastric juice
    - Pancreatic juice

  - Bile juice
  - Intestinal juice
- GI hormones
- Pathophysiological overview of some common diseases in relation to Gastrointestinal Tract (Peptic ulcer/GERD, Cholelithiasis, Portal Hypertension, Fatty liver and Liver Cirrhosis

UNIT IV: Neuro-Endocrine and Reproductive Physiology

- Overview of organization of nervous system
- Effects of Pituitary, Thyroid, Parathyroid, Adrenal and Pancreatic hormones
- Pathophysiology of Diabetes Mellitus, Metabolic Syndrome, Hashimoto's disease. Tetany and Cushing Syndrome
- Physiology of Menstruation and Menopause
- Physiology of Ageing
- Physiology of Pregnancy, Lactation
- Pathophysiology of PCOD and Infertility

Reference

- Ganong W.F.(2003)-*Review of Medical Physiology*.21st ed. McGrawHill.
- Guyton A.C. and Hall J.E.(2000)*Textbook of Medical Physiology*.10th ed. India: Harcourt Asia..
- TortoraG.JandGrabowskiS.R.(2000)*PrinciplesofAnatomyandPhysiology*.9thed.John Wiley andSons.Inc.
- West J.B.(1996): *Physiological Basis of Medical Practice*.12th Edition. B. I. WaverlyPvt. Ltd.
- Marieb E.N(2001) *Human Anatomy and Physiology*(5th ed)Pearson Education ,Inc, publishing as BenjaminCummings.
- Jain A. K (2014) Human Physiology for BDS(5th Edition), Publisher: Avichal Publishing Company; ISBN: 9788177394337.
- Pal G.K and Pal Pravati (2016) *Comprehensive Textbook Of Medical Physiology* (2Vols) Publisher: Jaypee Brothers Medical Pub (P) Ltd.) ISBN:5551234080758;

MDN-102 : PRINCIPLES OF FOOD SCIENCE

Course Learning Outcomes

The student will be able to:

1. Impart the knowledge regarding chemistry of food components like proteins, carbohydrates and lipids.
2. Understand basic concepts of new food productdevelopment.

Contents:

- Basic concept on Food. Nutrients. Nutrition. Classification of Food. Classification of Nutrients.
- Food science & its concept
- Colloidial system, classification, its property, solgel emulsion, suspension, foam formation.
- Carbohydrates - Definition, Classification. Structure and properties, gelation,retrogradation, dextrinization, types of starch, sugar, use of carbohydrate in food preparation
- Lipids - Definition, Classification & Properties. Fatty acids - composition, properties, types, rancidity, reversion, factors leading to rancidity and its prevention, Saturated, Unsaturated FA, Effect of heat on fats and oils, polymerization and care of fats and oils, extraction of fat, refining, hydrogenation. Commercially used fats and oils.
- Proteins - Definition, Classification, Structure & properties. Amino acids - Classification, types, functions. Native protein, denatured protein, denaturation its effect and factors affecting. Functional properties of protein. Meat, Egg, Pulses, commercially used protein.
- Dietary Fibre - Classification, sources, composition, properties & nutritionalsignificance.
- Minerals & Trace Elements and Vitamins ,enzymes and pigments.
- Flavour-introduction, natural flavor, processed flavor, added flavor, spice and herbs, use of flavor in food.
- Browning reaction, introduction, types, enzymatic, non-enzymatic, role in food preparation.
- Properties of food.
- Evaluation of food-introduction ,methods & types, proximate analysis.

Reference :

1. Sunetra Roday : Food Science & Nutrition, Oxford University Press.

2. Mann and Truswell : Essentials of Human Nutrition, Oxford UniversityPress.

3.B.Srilakshmi:Food Science, New Age International Publishers

4.Sukhneet Suri,Anita Malhotra:Food Science Nutrition and Safety,Pearson

MDN 103: EPIDEMIOLOGY & CHANGING HEALTH CARE SECTOR

Course LearningOutcomes
The student will be able to :

1. Understand the concept of health disease spectrum
2. Learn the application of epidemiological methods of disease control
3. Enable to learn about the levels of healthcare - development of public & private healthcare institutions inIndia

Contents

Unit 1:

- Concepts & theories of Health & Disease, Health & Disease Spectrum , Iceberg ofDisease
- Epidemiological triad, Principles of Epidemiology, Epidemiology of communicable and non-communicablediseases
- Application of Epidemiological Methods in Disease Control (Observational & Experimental Studies)
- Discussion of Case problems on cohort & case control studies (Association/Causation)

Unit 2

- Host defense Mechanisms, Types of Immunization, Hazards of immunization, Cold Chain & Cold life, Universal & National Immunization Schedules.
- Screening and Survey of a Disease, Disease Investigation andReporting,
- Disease monitoring and Surveillance, Discussion with CaseStudies

Unit 3

- Healthcare & its Changing Scenario, Emergence of new diseases, Prevention andcontrol
- The levels of Healthcare - Development of Public & Private Healthcare Institutions inIndia

References:

1. Preventive And Social Medicine - Dr. K.Park
2. Text Book Of Community Medicine - V KMahajan
3. Epidemiology by P.V. Sathe, PopularPrakashan
4. Hospital administration - G.D.Kunders

MDN -104 : FOOD MICROBIOLOGY

Course Learning Outcomes:

Student will be able to -

1. Gather the information regarding nature of microorganisms involved in food spoilage, food infections and intoxications.
2. Comprehend principles of various preservation and controltechniques.

Contents:

- Microbiology of Food
- Occurrence and growth of microorganisms in food, Fundamentals of control of microorganism infoods.
- FoodSpoilage,Contaminationandmicroorganismsinthespoilageofdifferentkindsof foods and such as cereal and cereal products, vegetable and fruits, fish and other sea foods, meat and meat products, eggs and poultry, milk and products, canned foods.
- Contamination and microorganisms in the spoilage of different kinds of foods and such as cereal and cereal products, vegetable and fruits, fish and other sea foods, meat and meat products, eggs and poultry, milk and products, canned foods.
- Food borne infections and intoxications: Symptoms, mode of transmission and methods of prevention, investigation and detection of food borne diseaseout-break.
- Cultivation of microorganisms, Nutritional requirements of micro organisms, types of media used, methods ofisolation.
- Food Adulteration & Food Additives

Reference :

1. Peleezar, M.I. and Reid, K. D. (1978): Microbiology, McGraw Hill Company, New York.
2.Prazier, W. C. and Westhoff, D. C. (1988): 4th edition, Food Microbiology, MaGraw HillInc.

MDN 105: NUTRITIONAL BIOCHEMISTRY

Course Learning Outcomes:
Student will be able to -

1. Understand the basic concept of carbohydrate protein fat.
2. Impart the knowledge of different metabolism (Protein, fat, carbohydrate)
3. Understand antioxidants, vitamins, minerals and their role in biochemistry.

Contents:

- **Carbohydrate**

Introduction to Nutritional Biochemistry

Meaning and Importance of Nutritional Biochemistry
Development of Nutritional Biochemistry
Contemporary Interests in Nutritional Biochemistry
Chemistry of Carbohydrates
Monosaccharides
Isomerism of Monosaccharides
Properties of Monosaccharides
Oligosaccharides, Polysaccharides

- **Lipids and Proteins:**

Introduction, Lipids structure and classification, Fatty acids, Neutral fats, Phospholipids,Steroids, Eicosanoids, Chemical properties of fatty acids and neutral fats.

Amino acids-structure, classification and properties, Proteins-Structure, Classification and properties. Structure and classification of nucleic acids.

- **Enzymes and Coenzymes:**

Introduction to Enzymes and Coenzymes, Nomenclature and Classification of Enzymes, Specificity of Enzymes, Mechanism of Enzyme Action ,Enzyme Kinetics, Factors Affecting Enzyme activity, Enzyme Inhibition, Role of Enzymes and Coenzymes in Metabolism, lsozymes, Enzymes in Clinical Diagnosis

- **Carbohydrate Metabolism:**

Introduction, Glycolysis, Protein sparing action of carbohydrate Pathway of glycolysis & its regulation, Energetics & Role of hormone, Path way of TCA cycle & its regulation, Energetics & Role of hormone, Glycogen metabolism & its regulation, Energetics & Role of hormones, HMP Shunt pathway & its regulation, regulation of blood glucose level, Electron transport chain, Transfer of electrons, Oxidative Phosphorylation.

- **Lipid Metabolism:**

Oxidation of Fatty Acids, Lipogenesis-synthesis of fatty acids, Metabolism of Eicosanoids, Metabolism of triacylglycerols, synthesis of phospholipids, Metabolism of cholesterol, Lipoprotein metabolism. Hyperlipoproteinemias, Ketosis.

Protein Metabolism:
AminoacidMetabolism,Deamination,Transamination&Transmethylation,Ureacycle,Biosynthesisof nonessential amino acids, non-protein functions of amino acids

Nucleic acid Metabolism

Metabolism of Purine and Pyrimidine, Diseases due to abnormal nitrogen base metabolism, DNA replication, mutation, repair& recombination

Antioxidants:

Antioxidants and free radicals, Role of oxygen free radicals, free radical in human pathology and disease, Natural and diet derived antioxidants, Physiological mechanism to limit free radical damage.

Vitamins & Minerals:

Introduction to Vitamins, Fat-soluble vitamins (A,D,E,K),Water-soluble vitamins (B vitamins, Biotin, C,

Folic acids etc),

Introduction to minerals,Calcium,Phosphorous,Magnesium,Iron,Iodine,Zinc,Selenium,Copper,Cobalt,Magnanese.

Inborn Errors of Metabolism:

Introduction, General concept, Disorders of protein metabolism, Disorders of carbohydrate

metabolism, Disorders of lipid metabolism, Haemoglobinopathies.

Nutrigenomics and its application.

Introduction, General concept, Application in food industry.

Referrenses:

- Berg JM, Stryer L, Tymoczko JL and Gatto GJ. (2015) *Biochemistry* 8thed. W.H. Freeman.
- Devlin TM. (2010) *Text Book of biochemistry with Clinical Correlations* 7thed. John Wiley andSons.
- RodwellVW,BenderDA,BothamKM,KennellyPJandWeilPA.(2015) *Harper's Illustrated Biochemistry*. 30th ed. McGraw-Hill. Asia.
- Nelson DL and Cox MM. (2017) *Principles of Biochemistry*. 7th ed. W.H.Freeman.
- Wilson K and Walker J. (2000) *Practical Biochemistry*. 5th ed. CambridgeUniversity Press.

Practical Syllabus

MDN 191: NUTRITIONAL PHYSIOLOGY & BIOCHEMISTRY

1. **Determination of-**

Body mass index

Arm circumference

Head circumference

Waist hip ratio

BMR, anthropometric analysis of under nutrition and obesity

2. **Estimation of -**

Plasma protein

Plasma lactate

Serum hemoglobin

Serum calcium

Serum triglyceride

Cholesterol

Lipoprotein assessment

3. **Dialysis ofProtein**
4. **Estimation of-**

Vitamin-A

Vitamin C

Vitamin-D

Vitamin-E

Vitamin-B l2 & B6 from food extract and from serum using spectro flurometer and spectrophotometer

5. Plasma glucose assessment by enzymatic method
6. Electrophoresis of protein.

MDN 192: BIOMETRIC ASSESSMENT OF NUTRITIONAL STATUS

- Weight for age, height for age, weight for height in Pre-adolescence group in different communities and its comparison with reference value.
- BMI,Miduppercircumference,headcircumference,chestcircumferenceof different age groups and comments on result.
- Body fat assessment in different zone, skin fold thickness in different age groups.
- Resting energy expenditure from height, weight and others parameters
- Use of Laboratory data and its application on its nutritional status assessment.
- BMR computation using primary and secondary data.
- Nutritionalstatusassessmentofpreschoolgoingchildrenusinggrowthcurve.