

2nd Semester

GENERAL MICROBIOLOGY

Subject Code: BANTS1-201

L T P C
3 1 0 4

Duration: 60 Hrs

COURSE OBJECTIVES:

To introduce basic principles and core concepts of microbiology, including the evolution and diversity of microbes; cell structure and function; metabolism; information flow and the role of microbes.

COURSE SYLLABUS

UNIT I

12 Hours

Introduction to microbiology & microscopy: Brief history of microbiology. Morphology of bacteria: anatomy of a bacterial cell including spores, flagella and capsules. Characteristics of bacteria and fungi.

Introduction, history and types of microscopes. Structure and working of simple and compound microscope. Principles of dark field, fluorescent, phase contrast and electron microscope

UNIT II

12 Hours

Nutrition and Growth of Bacteria: Nutritional Requirements and Preparation of Culture Media, Bacteria Cell Division, Growth Phase, Batch and Continuous Culture, Growth of Aerobic and Anaerobic Bacteria.

UNIT III

12 Hours

Culture media: Introduction, classification of culture media (solid media, liquid media, semisolid, Media, simple media, complex media, synthetic/defined media, routine culture media, basal media, enriched, enrichment, Selective, Indicator/differential media, sugar fermentation media, transport media, preservation media, aerobic media, and anaerobic media).

UNIT IV

12 Hours

Antiseptics and disinfectants: Definition, classification, properties, mode of action and uses of various disinfectants. Factors affecting disinfectants. Precautions while using the disinfectants.

Sterilization: Principles and Methods of sterilization, Physical (Heat, Temperature, Radiation, Filtration) and Chemical Agents (Alcohol, Aldehyde, Halogens, Phenols, Gases) to Control Growth of Microbes.

UNIT V

12 Hours

Collection and Transportation of Specimens, Disposal of Laboratory/ Hospital Waste: General Principles, Collection, Transportation (Urine, Feces, Sputum, Pus, Body Fluids, Swab and Blood), Non- Infectious Waste, Infected Sharp Waste Disposal, Infected Non- Sharp Waste Disposal.

**MRSPTU B.SC. (ANAESTHESIA TECHNOLOGY) SYLLABUS
BATCH 2021 ONWARDS (4 YEARS COURSE)**

Suggestive Readings

Text Books:

- Textbook of Microbiology by Ananthanereyan and Paniker, Universities Press
- Text book of Microbiology by Michael J. Pelczar, JR. E.C.S Chan & Noel R. Krieg, Tata Mc Graw Hill

Reference Books:

- Medical Microbiology by Paniker & Satish Gupte, Universities Press
- Text book of Microbiology by D.R Arora & B. Arora, CBS Publishers

HUMAN ANATOMY & PHYSIOLOGY-II

Subject Code: BANTS1-202

**L T P C
3 1 0 4**

Duration: 60 Hrs

COURSE OBJECTIVES:

Upon completion of this course the student should be able to: Explain the gross morphology, structure and functions of various organs of the human body. Identify the various tissues and organs of different systems of human body. Appreciate coordinated working pattern of different organs of each system.

COURSE SYLLABUS

UNIT I

15 Hours

Alimentary system: mechanism and physiology of digestion and absorption structure & function (Mouth, Tongue, Teeth, Oesophagus, Pharynx, Stomach, Intestine, Rectum, Anus; Digestive glands; physiology of digestion of carbohydrates, lipids & proteins, structure and function of liver.

Urinary system: Main parts, Structure & function of kidney, structure of nephron, physiology of excretion & urine formation, urine, additional excretory organs.

UNIT II

15 Hours

Circulatory system: Composition and functions of blood, anatomy and physiology of Heart, circulation of blood, cardiac cycle and conducting system of Heart, the blood pressure, arteries and veins

Respiratory system- Organs of respiration and their histology, Respiration (definition and mechanism), Gas exchange in the lungs, Regulation of respiration, Basal metabolic rate.

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UNIT III

15 Hours

Reproductive system-Male and female reproductive system, Histology of gonads, the ovarian cycle and ovulation, Fertilization, spermatogenesis.

Lymphatic system- Introduction, Structure and function, Lymph nodes, Spleen, Thymus gland, Tonsils.

UNIT IV

15 Hours

Body fluids and their significance: Important terms, types of body fluid, total body water, avenues by which water leaves and enters body, general principles for fluid balance, cardinal principle, how body fluids maintain Homeostasis, Electrolytes & ions Function of electrolytes, how electrolyte imbalance leads to fluid imbalance.

Suggestive Readings

Text Books:

- Basic Anatomy and Physiology by N Murgesh, Sathya.
- Anatomy and Physiology by Anne Waugh and Kathleen JW Wilson; Churchill LivingStone; London, Ross and Wilson.

Reference Books:

- Anatomy and Physiology by Pears, JP Brothers
- Anatomy and Physiology by Sears, ELBS

ANAESTHESIA TECHNOLOGY -I

Subject Code: BANTS1-203

**L T P C
3 1 0 4**

Duration: 60 Hrs

COURSE OBJECTIVES:

A primary purpose of the course is to know about uses of basic anesthetic instruments and basic anesthetic procedure.

COURSE SYLLABUS

UNIT I

10 Hours

Pre-medication

Preoperative assessment

Preoperative goals and Pre-medication Introduction to anesthesia machine and its components.

UNIT II

10 Hours

Medical Gas: Introduction to Gas Cylinders, Color coding, Cylinder valves, Cylinder storage, index safety system.

Medical gas pipeline system, Alarms and safety devices.

Simple oxygen administration devices Face mask, venturi mask and LMA, Flow meters, Regulators.

Oral and Nasal endotracheal tubes. Tracheotomy tubes.

Airway its features, Types, sizes, Indications and its complication.

UNIT III

15 Hours

Oxygen Therapy: Definition, hypoxemia, Causes and clinical signs of hypoxemia.

Goals of oxygen therapy, Hazards of oxygen therapy.

UNIT IV

10 Hours

Surgical anesthetic techniques. CVP

Oral intubation. Nasal intubation. Lumbar anesthesia.

UNIT V

15 Hours

Breathing System:

Introduction to breathing system Mapleson breathing system Jackson Rees system

Bain circuit

Non breathing valves – Ambu valves.

Gas Analyzers: Pulse Oximeter. CO₂ Monitor. Capnography.

Methods of cleaning and sterilization of anesthetic equipment's.

Suggestive Readings

Text Books:

- Textbook of Anaesthesia by G. Smith & A.R. Aitkenhead's.
- Short Textbook of Anaesthesia by Ajay Yadav, JP Brothers

Reference Books:

- Drugs & Equipments in Anaesthetic Practice by Arun Kumar Paul, Elsevier
- Equipments Drugs Waveforms in Anaesthesia Practical by P.Kumar, JP Brothers.

BIOCHEMISTRY AND METABOLISM

Subject Code: BANTS1-204

L T P C
3 1 0 4

Duration: 60 Hrs

COURSE OBJECTIVES:

In this course the student will be provided comprehensive knowledge of the Human Biochemistry and metabolism to give a basis for understanding the clinical correlation & diagnosis of biochemical disorders.

COURSE SYLLABUS

UNIT I

12 Hours

Nutrition: Balance diet, Metabolism in exercise and injury. Diet for chronically ill and terminally ill patients, Nitrogen equilibrium, biological value of protein, special dynamic action.

Carbohydrates: Introduction, Importance and Classification. Digestion and Absorption.

Metabolism: - Glycolysis, Citric acid cycle, Gluconeogenesis Glycogenolysis, Glycogenesis

UNIT II

12 Hours

Lipids: Introduction & Classification, Digestion & absorption of fats. Lipoproteins, Fatty acid biosynthesis & fatty acid oxidation

Cholesterol metabolism: synthesis, degradation, cholesterol transport. Hypercholesterolemia and its effects (atherosclerosis and coronary heart diseases) Hypo cholesterolemic agents, Common hyper lipoproteinemia, Fatty liver

UNIT III

12 Hours

Proteins: Introduction, Importance and classification, important properties of proteins, Digestion & absorption of Proteins. Protein synthesis

Metabolism of proteins

Enzymes: Introductions, Importance & Classification, Properties of enzymes, Mechanism of enzyme action and enzyme inhibitors, Factors affecting enzyme action

UNIT IV

12 Hours

Nucleic Acid: Introduction Functions of Nucleic acid, Structure and function of DNA, Structure and function of RNA, Genetic code, biologically important nucleotides.

UNIT V

12 Hours

Vitamins: Definitions, Classification, fat soluble vitamins, A, D.E & K, Water soluble vitamin B complex & C. Daily Requirements Physiological functions, Diseases of Vitamin deficiency.

Minerals: Definition, Sources, RDA, Digestion, absorption, transport, excretion, functions, disorder of Individual minerals - Calcium, phosphate, iron, Magnesium, fluoride, selenium, molybdenum, copper. Phosphate, calcium and iron in detail.

Suggestive Readings

Text Books:

- Biochemistry by U. Satyanarayan and U.Chakrapani, Elsevier
- Text book of Medical Biochemistry by M N Chaterjee and R. Shinde, Jaypee Brothers Medical Publishers (P) Ltd.

Reference Books:

- Principal of Biochemistry by A.Lehninger, WH Freeman Publisher & Co.
- CBS Quick Reviewing Biochemistry by Ahuja,Lakshmi; CBS, New Delhi, 1999
- Fundamentals of Biochemistry by Deb, A.C.; CBA, Calcutta

ENVIRONMENTAL STUDIES

Subject Code: BANTS1-205

L T P C
2 0 0 2

Duration: 30 Hrs

COURSE OBJECTIVES:

To make students aware about environment and need of maintaining it with best possible knowledge.

COURSE SYLLABUS

Unit I

6 Hours

Multidisciplinary nature of environmental studies: Definition, scope and importance, Need for public awareness.

Natural Resources: Renewable and non-renewable resources, Natural resources and associated problems : a) Forest resources b) Water resources c) Mineral resources d) Food resources e) Energy resources f) Land resources, Role of an individual in conservation of natural resources, Equitable use of resources for sustainable lifestyles.

Unit II

6 Hours

Ecosystems: Concept, Structure and function, Producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids, Introduction, types, characteristic features, structure and function of the following ecosystem:- Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

Unit III

6 Hours

Biodiversity and its conservation : Introduction – Definition: genetic, species and ecosystem diversity, Biogeographically classification of India, Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values, Biodiversity at global, National and local levels, India as a mega-diversity nation, Hot-spots of biodiversity, Threats to biodiversity:

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habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India, Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Unit IV

6 Hours

Environmental Pollution: Definition, Cause, effects and control measures of:-a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear hazards, Solid waste Management : Causes, effects and control measures of urban and industrial wastes, Role of an individual in prevention of pollution, Pollution case studies, Disaster management : floods, earthquake, cyclone and landslides.

Unit V

6 Hours

Social Issues and the Environment: From Unsustainable to Sustainable development, urban problems related to energy, Water conservation, rain water harvesting, watershed management, Resettlement and rehabilitation of people; its problems and concerns, Case Studies.

Environmental ethics : Issues and possible solutions, Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Case Studies. Wasteland reclamation: Consumerism and waste products Environment Protection Act: Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public awareness.

Human Population and the Environment: Population growth, variation among nations, Population explosion – Family Welfare Programme, Environment and human health, Human Rights, Value Education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environment and human health, Case Studies.

Suggestive Readings

Text Books:

- Environmental Biology by Agarwal, K.C. 2001, Nidi Publ. Ltd. Bikaner.
- The Biodiversity of India by Bharucha Erach, Mapin Publishing Pvt.Ltd., Ahmedabad

Reference Books:

- Environmental Science by Miller T.G. Jr. Wadsworth

GENERAL MICROBIOLOGY PRACTICAL LAB

Subject Code: BANTS1-206

**L T P C
0 0 4 2**

4 Hours/Week

COURSE SYLLABUS

- To prepare cleaning agents & to study the technique for cleaning & sterilization of glassware.
- To demonstrate the working & handling of Compound microscope.
- To demonstrate the method of sterilization by autoclave, hot air oven.
- To demonstrate the method of sterilization of media/solution by filtration.
- To prepare working dilution of commonly used disinfectants.
- To demonstrate the different morphological types of bacteria.
- Preparation of culture media from each type.
- To demonstrate aerobic culture and anaerobic culture.
- To demonstrate biomedical waste segregation.
- To plot growth curve of bacteria.

Suggestive Readings

Text Books:

- Textbook of Microbiology by Ananthanereyan and Paniker, Universities Press
- Text book of Microbiology by Michael J. Pelczar, JR. E.C.S Chan & Noel R. Krieg, Tata Mc Graw Hill

Reference Books:

- Medical Microbiology by Paniker & Satish Gupte, Universities Press
- Text book of Microbiology by D.R Arora & B. Arora, CBS Publishers

HUMAN ANATOMY & PHYSIOLOGY LABORATORY –II

Subject Code: BANTS1-207

L T P C
0 0 4 2

4 Hours/Week

COURSE OBJECTIVES:

The objective of this course is to develop a basic understanding about the structure and functions of the human body and body organs.

COURSE SYLLABUS

LIST OF PRACTICALS

1. To study the integumentary system
2. Identification of axial bones
3. Identification of appendicular bones
4. To study the special senses using specimen, models, etc.
5. To study the nervous system using specimen, models, etc.
6. To study the endocrine system using specimen, models, etc
7. To demonstrate the function of olfactory nerve
8. To examine the different types of taste.
9. To demonstrate the reflex activity
10. Recording of body temperature
11. To demonstrate positive and negative feedback mechanism.
12. Determination of bleeding time
13. Determination of clotting time.

Suggestive Readings

Text Books:

- Basic Anatomy and Physiology by N Murgesh, Sathya.
- Anatomy and Physiology by Anne Waugh and Kathleen JW Wilson; Churchill LivingStone; London, Ross and Wilson.

Reference Books:

- Anatomy and Physiology by Pears, JP Brothers
- Anatomy and Physiology by Sears, ELBS

ANAESTHESIA TECHNOLOGY LABORATORY -I

Subject Code: BANTS1-208

**L T P C
0 0 4 2**

4 Hours/Week

COURSE OBJECTIVES:

A primary purpose of the course is to know about uses of basic anesthetic instruments and basic anesthetic procedure.

COURSE SYLLABUS

LIST OF PRACTICALS

- 1) History of anesthesia, Physics in principles of Anaesthesia machine, Boyle's machine in details.
- 2) Anaesthesia gases, Vaporizers, Anaesthetic flow meter,
- 3) Different types of Endotracheal tubes and Endobroncheal tubes, Breathing circuits,
- 4) General anaesthesia, Monitoring in anaesthesia.
- 5) Practical should be conducting as per theory syllabus.

Suggestive Readings

Text Books:

- Textbook of Anaesthesia by G. Smith & A.R. Aitkenhead's.
- Short Textbook of Anaesthesia by Ajay Yadav, JP Brothers

Reference Books:

- Drugs & Equipments in Anaesthetic Practice by Arun Kumar Paul, Elsevier
- Equipments Drugs Waveforms in Anaesthesia Practical by P.Kumar, JP Brothers.