STATE BOARD OF ALLIED MEDICAL SCIENCES, ODISHA

B.Sc. EMERGENCY MEDICAL TECHNOLOGY

(BEMT)

Preface: Emergency medicine Technology helps to diagnose and prevent disease through clinical laboratory tests. It is complementary to medical science. It involves analysis of body matter such as fluid, tissue, and blood. It also covers micro-organism screening, chemical analyses, and cell count.

Emergency medicine Technologists are an integral part of the medical profession. These professionals get involved in practical and technical work to aid correct diagnosis and effective functioning of Biochemical Laboratories.

With adequate knowledge and experience, Emergency Medicine Laboratory Technologists having B.Sc. EMT qualification can work in supervisory or management positions in laboratories and hospitals. They can also work as Laboratory Manager/Consultant/supervisor, health care Administrator, Hospital Outreach coordination, laboratory information system Analyst/Consultant, educational consultant/coordinator etc. Additional opportunities are available in molecular diagnostics, molecular biotechnology companies and in vitro fertilization laboratories as well as in research labs.

Programme: B.Sc. in Emergency medicine technology

Duration: Three years (Six semesters) full-time programme with 6 months internship in the last semester.

Eligibility: +2 Science with Physics, Chemistry & Biology or equivalent degree

Examination: Examination rules will be as per guideline of State Allied Board. Government of Odisha.

Internship: A candidate will have to undergo internship for a period of six calendar months in a hospital/Diagnostics Centre equipped with modern pathology laboratory facility or in a fully equipped pathology laboratory, which fulfils the norms decided by the University.

Dissertation will be compulsory to all students. Students will carry out dissertation work individually or in the group of not more than three students. The format for dissertation/Internship report will be similar to the research thesis style; incorporating chapters on: Introduction, Materials and Methods, Results and Discussion and References / Bibliography. The dissertation will be submitted in a typewritten and bound form.

Plan of Classes & Examination Pattern for Degree course

- Total duration of each course is 3 years (6 Semesters).
- Each semester is of 6months duration.
- In each semester the classes will be of 5months duration & internal assessment will be conducted in the last month of each semester except 3rd & 6th semester .
- University examination will be conducted at the end of 3rd & 6th Semester.
- In each semester, the classes will be of 500 hours including theory and practical/clinical.
- **Distribution of classes**: There will be 5 hours of classes / day for 5 days in a week, 25 hours / week, 100 hours /month and 500 hours in each semester.
- Of the 500 hours of classes, 200 hours will be dedicated for the theory classes; rest 300 hours will be practical / clinical.
- **Attendance in Class:** A Student will be eligible to appear in the semester and university examination if he/she has attended minimum75% theory classes and 85% practical classes.

EXAMINATION PATTERN

- **Internal assessment:** Internal assessment will be conducted in the last month of each semester except 3rd & 6th semester(where there will be University examination.)
- **Mark Distribution:** 50 marks per each subject (30 Theory and 20 practical/clinical).Minimum qualifying mark: 50 % in each theory and practical/clinical.
- **Question Pattern for Theory (Semester Examination):**
  i. Short questions of 2 marks each X 5 = 10
  ii. Multiple choice question1 mark each X 5 = 5
  iii. Fill in the blanks 1mark each X 5 = 5
  iv. Match the following 1 mark each X 5 = 5
  v. Long Question (Choice) 1 X 5 = 5
- **University Examination:** Candidate has to pass two university examinations to be conducted at the end of 3rd Semester & 6th Semester, of 100 marks/ subject. A student will be eligible to appear in the university examination if he/she has secured 50% in internal assessment done at the end of 1st, 2nd, 4th & 5th semester.

Degree: On successful completion of three years programme, the candidate will be awarded with **"Bachelor of Science in Emergency Medicine Technology (B.Sc.-EMT)"** .

BACHELOR OF SCIENCE IN EMERGENCY MEDICINE TECHNOLOGY

FIRST YEAR		
Sl. No.	**Subject**	**Subject type (The+Prac+Proj)**
1	General Anatomy	3+2+0
2	General Physiology	3+2+0
3	Biochemistry	3+1+0
4	Cell Biology	3+0+1
5	Microbiology	3-2-0
SECOND YEAR		
1	Medical Terminology & Record keeping(including anatomical term)	2-0-1
2	Basic principles of Hospital management	3-0-1
3	Hospital and clinical pharmacy	3-2-0
4	Introduction to emergency services- Part I	2-2-0
5	Emergency Department Equipment Part – I	2-2-0
6	Emergency Department Pharmacology Part-I	2-2-0
7	Basic Computer and Information Science	0-2-0
8	Pharmacology	3-0-1
THIRD YEAR		
1	Introduction to emergency services - Part II	2-2-0
2	Emergency department equipment -Part II	2-2-0
3	Emergency Department Pharmacology-Part II	2-2-0
4	Medical Psychology	2-0-1
5	Psychiatric, Geriatric & Obstetric Emergencies	2-0-0
6	Medical emergencies - Part I	3-1-0
7	Medical emergencies- Part II	3-1-0
8	Medical Laboratory Management	3-0-2
9	Introduction to Quality and Patient Safety	3-0-2
10	Medical Law and Ethics	2-0-1
11	Clinical Pathology	3-1-0
PROJECT		
INTERNSHIP		

Courses: The- Theory, Prac- Practicals, , Proj -Project

FOUNDATION COURSE

Introduction to Health care Delivery System in India	Basic computers and information Science	Communication and soft skills	Introduction to Quality and Patient safety (including Basic emergency care and life support skills, Infection prevention and control,	Medical Terminology and Record keeping (including anatomical terms)
Biomedical waste management	Disaster management and Antibiotic resistance)	Professionalism and values	Biostatistics & introduction to Research methodology	Medical Law and Ethics Biostatist methodol

GENERAL ANATOMY

Description

Subject Name	Type of course
GENERAL ANATOMY	Theory

- General anatomy deals with the entire human anatomy with emphasis on different tissues, blood vessels, glands, nerves and the entire central nervous system in particular.

Learning outcome

At the end of the semester, the student should be able to:

1. Comprehend the normal disposition, inter-relationships, gross, functional and applied anatomy of various structures in the human body.

2. Identify the microscopic structures of various tissues, and organs in the human body and correlate the structure with the functions.

3. Comprehend the basic structure and connections between the various parts of the central nervous system so as to analyze the integrative and regulative functions on the organs and systems.

Module -1 INTRODUCTION TO ANATOMY AND SKELETON
Introduction to Anatomy: Sub division of anatomy, terms and terminology, systems of the Body.
Skeleton: Bones: function of bones, classification of bones, parts of young bone, development of bone, classification of bones, blood supply bone, cartilage, clinical anatomy

Module –2 MUSCLES & JOINTS
Muscle: types of muscles, structure of striated muscle, naming of muscle, fascicular architecture of muscle, actions of muscle, nerve supply.
Joints: Classification, structures of joints, movements, mechanism of lubrication, biomechanics, levers, blood supply, nerve supply, and applied anatomy.

Practice: - Identification of different joints and bones from Charts and Human Skeleton.

Module -3 CIRCULATOTY SYSTEM, LYMPHATIC SYSTEM & SKIN
Circulatory system: Types of circulation of blood, arteries, veins, capillaries, end arteries, applied aspect.
Lymphatic system: components, lymph nodes, clinical anatomy
Skin: structure of skin, superficial facia, deep facia, clinical aspects
Module -4 UPPER LIMB & LOWER LIMB

(A)**Upper extremity**: Bony architecture Joints – structure, range of movement Muscles – origin insertion, actions, nerve supply Major nerves – course, branches and implications of nerve

injuries Development of limb bones, muscles and anomalies Radiographic identification of bone and joints Applied anatomy
(B) **Lower extremity**: Bony architecture Joints – structure, range of movement Muscles – origin, insertion, actions, nerve supply Major nerves – course, branches and implications of nerve injuries Development of limb bones, muscles and anomalies Radiographic identification of bone and joints Applied anatomy

Module -5 THORAX, ABDOMEN &; BACK MUSCLES

Thorax: skeleton of thorax, intercostal spaces, pleura, lung, mediastinum, heart: morphology, blood supply, interior of heart, general information about upper respiratory tract (trachea, oesophagus, pharynx and larynx) clinical anatomy.
Abdomen: Anterior and posterior abdominal wall, general information about viscera: stomach, liver, pancreas, duodenum, kidney, ureter, urinary bladder, uterus and its adnexa.
Practice: -identification of structure, position, and different parts of Lungs, Heart, Kidney from charts, Models.
Back muscles: Superficial layer, Deep muscles of back, their origin, insertion, action and nerve supply. Vertebral column – Structure & Development, Structure & Joints of vertebra Thoracic cage. Radiographic identification of bone and joints Applied anatomy

Practice: - Radiography identification of different architecture joins, structure and position of Bones from Skeleton, Model or PPT.

Module -6 NERVOUS SYSTEM ; SPECIAL SENSE ORGANS

Nervous system: parts of nervous system, neurons, peripheral nerves, spinal nerves, summary of cranial nerves, parasympathetic nervous system.
Special sense organs: Structure and function of Visual system, auditory system, gustatory system, olfactory system.

Module -7 HEAD AND NECK ; CENTRAL NERVOUS SYSTEM
Head and neck: scalp, facial muscles, cranial skeleton, triangles of neck, parotid region, temporomandibular joint, muscles of mastication, applied.
Central nervous system: General idea about spinal cord, brainstem, cerebrum, cerebellum, ventricular system, diencephalon, blood supply of brain and its applied, meninges and cerebrospinal fluid.

Practice: -Identification of structure and different parts of Central nervous system from chart.
Identification of different blood supply in brain from PPT.
Demonstration of dissected parts (upper extremity, lower extremity, thoracic &
abdominal viscera, face and brain).

Subject Name	Type of course	The+Prac+Proj	Prerequisite
General Physiology	Theory+ Practice	3-2-0	Fundamental Science

General Physiology

Course Outline

Module -I

Scope of physiology. Definition of various terms used in physiology. Structure of cell, the function of its components with special reference to mitochondria and microsomes. Elementary tissues: Elementary tissues of the body, i.e. epithelial tissue, muscular tissue, connective tissue, and nervous tissue.

Module -II

Cardiovascular System: Composition of the blood, functions of blood elements. Blood group and coagulation of blood. Brief information regarding disorders of the blood. Heart: myocardium– innervations– transmission of cardiac impulse- Events during the cardiac cycle–cardiac output. Structure and functions of various parts of the heart.

Module-III

Circulation: General principles, Peripheral circulation: peripheral resistances–arterial blood pressure–measurements–factors, Regulation variations–capillary circulation–venous circulation. Special circulation: coronary cerebral–miscellaneous, Arterial and venous system with special reference to the names and positions of main arteries and veins. Brief information about cardiovascular disorders.

Module -IV

Respiratory system: Various parts of the respiratory system and their functions, physiology of respiration. Mechanics of respiration–pulmonary function tests–transport of respiratory gases-neural and chemical regulation of respiration–hypoxia, cyanosis, dyspnoea–asphyxia.

Module-V

Urinary System: Various parts of the urinary system and their functions, structure, and functions of the kidney, the structure of nephron– mechanism of urine formation, composition of the urine and abnormal constituents, urinary bladder & micturition. Pathophysiology of renal diseases and edema.

Module-VI

Digestive System: names of various parts of the digestive system and their functions. structure and functions of the liver, physiology of digestion- functions, and regulations of Salivary digestion, Gastric pancreatic digestion, Intestinal digestion, and absorption.Lymphatic system: Name and functions of lymph glands, Reticuloendothelial system: Spleen, lymphatic tissue, Thymus

Module-VII

Nervous System: Neuron–Conduction of impulse– synapse–receptor. Sensory organization–pathways and perception, Reflexes–the cerebral cortex– functions. Thalamus–Basal ganglia Cerebellum, the hypothalamus. Autonomic nervous system– motor control of movements Reproductive system. Structure and function of Male reproductive system–control & regulation, Female reproductive system– uterus–ovaries–menstrual cycle–regulation–pregnancy & delivery–breast–family planning

Practice:

1. Identification of different organs and systems from charts
2. Identification of different blood cells, their normal and abnormal morphology from slides.
3. Examination of pulse, B.P., Respiratory rate.
4. Reflexes
5. Spirometry to measure various lung capacities & volumes, Respiratory rate, Tidal volume, IRV, IC
6. ERV, EC, residual volume on Spirometry.
7. An estimate of Hemoglobin, R.B.C., W.B.C., TLC, DLC, ESR count.
8. Blood indices, Blood grouping, Bleeding & Clotting time

Cell Biology

Subject Name	Type of course	The+Prac+Proj	Prerequisite
Cell Biology	Theory+ Project	3-0-1	Fundamental Science

Objective

- .Determine the parts of the cell membrane and the cell wall
- Distinguish the types and mechanism of mutation
- Compare and contrast the events of cell cycle and its regulation
- Understand the dynamic character of cellular organelles

Learning outcome

- Describe the fundamental principals cellular biology
- Develop a deeper understanding of cell structure and how it relates to cell functions.
- Understand how cells grow, divide, and die and how these important processes are regulated.
- Understand cell signaling and how it regulates cellular functions. Also how its dis-regulation leads to cancer and other diseases.

Course Outline

Module –I

An Overview of Cells: History, Cell theory, Structure and Function of Cell and its Organelles: Biological membranes - Nucleus - Nuclear envelope, Nucleolus, Mitochondria, Chloroplasts, Lysosomes, Gloxysomes and Peroxisomes, endoplasmic reticulum, ribosomes, Golgi complex (Structural organization, function, marker enzymes of the above organelles), Cell types: prokaryotes vs. eukaryotes; from single cell to multi-cellular organism; Different molecules of cell- water, salt and mineral ions etc.

Module- II

Cell cycle and its regulation, Cellular communication and cell mobility: Cell cycle: G0/G1, S, G2 and M phages (Cell Division: Mitosis, meiosis and cytokinesis); regulation of cell cycle; cell adhesion and roles of different adhesion molecules, gap junctions, Extra- Cellular Matrix (ECM), Cell-cell interaction and cell- ECM interaction, The cytoskeleton, Microtubule- based movement and microfilament -based movement.

Module-III

Cell signaling, Programmed Cell Death (Apoptosis) and Cancer: Hormones and their receptors, cell surface receptor, signaling through G-protein coupled receptors (G-PCR), Tyrosine Kinase, signal transduction pathways, second messengers, regulation of signaling pathways, bacterial and plant two-component systems, bacterial chemotaxis, Intrinsic and Extrinsic apoptotic pathway, Caspase enzyme, Biology and elementary knowledge of development and causes of cancer; Tumor viruses, Oncogenes and tumor suppressor genes.

Basic Computer and Information Science

Subject Name	Type of course	The+Prac+Proj	Prerequisite
Basic Computer and Information Science	Practice	0-2-0	Fundamentals of Computer

Objective

- Identify the function of computer hardware components.
- Identify the factors that go into an individual or organizational decision on how to purchase computer equipment.
- Identify how to maintain computer equipment and solve common problems relating to computer hardware.
- Identify how software and hardware work together to perform computing tasks and how software is developed and upgraded
- Identify different types of software, general concepts relating to software categories, and the tasks to which each type of software is most suited or not suited.

Learning outcome

- Understand the fundamental hardware components that make up a computer's hardware and the role of each of these components.
- **Understand the difference between an operating system and an application program, and what each is used for in a computer.**
- Describe some examples of computers and state the effect that the use of computer technology has had on some common products

Course Outline

Module- I

Introduction to computer: introduction, characteristics of computer, block diagram of computer, generations of computer. Types of Input output devices. Processor and memory: The Central Processing Unit (CPU), main memory. Storage Devices.

Module- II

Introduction to MS-Word: introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document,

spell checking, printing the document file, creating and editing of table, mail merge. Introduction to Excel: introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs. Introduction to power-point: introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.

Module- III

Introduction to MS-DOS: History of DOS, features of MS-DOS, MS-DOS Commands (internal and external). Introduction of windows: History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.). Computer networks: introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid).Internet and its Applications: definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet.

Introduction to emergency services- Part I

Subject Name	Type of course	The+Prac+Proj	Prerequisite
Introduction to emergency services- Part I	Theory+ Project	3-0-1	Fundamental Science

Unit-I

1. Structure and organization of a hospital and its departments
2. Functioning of an ideal emergency medicine department
3. Concept of triage
    a) Components of triage
    b) Triage officer
    c) Triage procedure
4. Multiple and mass casualties

a. Difference between multiple and mass casualties b. Triage
c. Scenarios d. Equipment
e. Disaster preparedness

Unit- II

Ambulance services(A)

1. Preparation of anambulance

a. **EQUIPMENT**

I. Medical

1. Basic supplies
2. Patient transfer equipment
3. Airways
4. Suction equipment

5. Artificial ventilation devices
6. Oxygen inhalation equipment
7. Cardiac compression equipment
8. Basic wound care supplies
9. Splinting supplies
10. Childbirth supplies
11. Medications
12. Automated external defibrillator

II. Non-Medical

1. Personal safety equipment as per local, state, and central standards
2. Pre-planned routes or comprehensive street maps

b. **PERSONNEL**

1. Daily inspections
   a) Inspection of vehicle systems
   b) Equipment
2. Utilization of safety precautions and seat belts

Unit- III

Ambulance services (B)

1. Responding to a call
2. Emergency vehicle operations
3. Position and Transport of patient:
   a. Patient position, prone, lateral, dorsal, dorsal recumbent, Fowler's positions, comfort measures, bed making, rest and sleep.
   b. Lifting and transporting patients: lifting patients up in the bed, transferring from bed to wheel chair, transferring from bed to stretcher.
4. Loading patients to an ambulance
   a) Wheeled ambulance stretcher
   b) Portable ambulance stretcher
   c) Scoop stretcher
   d) Long spine board
5. Transferring patients
6. The phases of an ambulance call
7. Disinfection of ambulance following ambulance usage
8. Air ambulances

Unit- IV

Prehospital care

1.Introduction
2.Vehicles
3.Communications
4.Patient record

5.Personal protective equipment

6.Multiple/ mass casualty - pre-hospital life support

Unit-V

Communication

1. Communication with doctors, colleagues and other staffs.
2. Non-verbal communication, Inter-personnel relationships.
3. Patient contact techniques, communication with patients and their relatives

Practicals:

Preparation of an ambulance Problems based on triage

Basic life support skills

Basic Principles of Hospital Management

Name of the Subject	Subject Type The+Prac+Proj
Basic Principles of Hospital Management	3 0 1

Course Objects:

- To impart knowledge about the Principles of Hospital Management and Organization
- To familiarize the student with the importance and different functions of Management.
- To learn about the concepts of inventory control and get awareness regarding the National Programmes of Health and disease eradication/control.

Learning Outcomes:

- The student acquires knowledge about the Principles of Hospital Management and Organization.
- The student understands the importance and different functions of the Management.
- The student gets familiarize thoroughly with the concepts of inventory control and gets awareness regarding the National Programmes of Health and disease eradication/control

Module I: Introduction to management & Organization:

The evolution of Management, Definition and importance of Management. Planning – Organizing – staffing – Motivating – Leading – Controlling. Management of health care units (in brief).

Module II: Individual behaviour in organization; organizational functioning (Group/Individual); Perception; Motivation MBO; Organizational Development.

Module III: Planning and Management of Hospitals & Clinical Services:

Building and physical layout – space required for separate function – Planning of infrastructure facilities, clinical services, equipment & Human resources – Types of Hospitals.

Module IV: Organization and administration of various clinical services; outpatient services. In-patient services, emergency services, operation theatres, ICU's and super specialty services.

Module V: Organizing of support clinical services & Hospital management:
Imaging – CSSD – Laboratory – Blood Bank – diet – Medical Records – Mortuary. Housekeeping – Maintenance (Water, Electricity, Civil, air Conditioning, Lift)-Pest Control-transport-Security. Forecasting-Purchasing & procurement (Sourcing, methods and procedures)

Module VI: Storing& issuing, Concept of inventory control, Maintenance of equipment and contracts (with special reference to major biomedical equipment). Trends in financing of Health and Hospital Services – Classification of Hospitals depending on source of financing – roles of financial institutions.

Module VII: National Programmes of Health and disease eradication / control

A. ***Health Programmes:***

i. Family Welfare Programme
ii. National Programme for water supply and sanitation.
iii. Nutritional Programmes.
iv. Immunization and universal immunization programme.

B. ***Disease Eradication programme***: Leprosy & Guinea worm, poliomyelitis.
C. ***Disease control programmes***: Tuberculosis, Malaria, Filaria, S.T.D, Goitre, Cholera and other diarrhoeal diseases and National Programme for prevention of blindness including trachoma, vector bone disease.

Biochemistry

Subject Name	Type of course	The+Prac+Proj	Prerequisite
Biochemistry	Theory+ Practice	3-1-0	Fundamental Science

Objective

- To understand the concept of metabolism of carbohydrates
- To understand the significance of amino acids, proteins
- Use of enzymes in enhancing metabolic reactions
- Role of lipids

Learning outcome

- After completion of the course the student will be developed a very good understanding of various biomolecules which are required for development and functioning of cells.
- Would have understood the significance of carbohydrates in energy generation and as storage food molecules for cells.
- They would have understood the significance of proteins and enzymes in accelerating various metabolic activities.
- The conceptual understanding of the subject provides opportunities for skill

enhancement and scopes for higher education.

Course Outline

Module- I

Structure of enzyme: Apoenzyme and cofactors, prosthetic group, coenzymes , metal cofactors, Classification of enzymes.

Mechanism of action of enzymes: active site, transition state complex and activation energy. Lock and key hypothesis, and Induced Fit hypothesis.

Enzyme inhibition, enzyme kinetics.

Diagnostic value of serum enzymes: Creatinine kinase, Alkaline phosphatase, Acid phosphatase, LDH, SGOT, SGPT, Amylase, Lipase, Carbonic anhydrase etc.

Practice:- Study of effect of temperature on enzyme activity
-Study of effect of pH on enzyme activity

Module- II

Carbohydrates: Biomedical importance & properties of Carbohydrates, Classification,

Families of monosaccharides: aldoses and ketoses, trioses, tetroses, pentoses, and hexoses. Stereo isomerism of monosaccharide, epimer, Haworth projection formulae for glucose; chair and boat forms of glucose.

Metabolism: Glycogenesis & glycogenolysis, Glycolysis, citric acid cycle & its significance, Components of respiratory chain, energy relationships during cell respiration, types of respiration. HMP shunt & Gluconeogenesis, regulation of blood glucose level.

Practice:- Estimation of Glucose in urine
-Estimation of Glucose in blood

Module- III

Amino acids: Classification, essential & non-essential amino acids. Chemistry of Proteins & their related metabolism, Classification, biomedical importance.

Metabolism: Ammonia formation & transport, Transamination, Decarboxylation, Urea cycle, metabolic disorders in urea cycle, catabolism of amino acids.

Practice: Estimation of Protein in urine
Estimation of Protein in blood

Module- IV

Chemistry of Lipids & their related metabolism: Classification, biomedical importance, essential fatty acids. Brief out line of metabolism: Beta oxidation of fatty acids, fatty liver, Ketogenesis, Cholesterol & it's clinical significance, Lipoproteins in the blood composition & their functions in brief, Atherosclerosis.

Diabetes mellitus: its types, features, gestation diabetes mellitus, glucose tolerance test, glycosuria, Hypoglycaemia& its causes.

Practice: Estimation of Bile pigment in urine
Estimation of Bile salts in urine

Clinical Pathology

1. Subject Name	2. Type of course	3. The+Prac+Proj	4. Prerequisite
Clinical pathology	5. Theory+ Practice	6. 3-1-0	7. Fundamental Science

Objective

1. Analyze body fluid for diagnosis of disease
2. Analyze waste product for diagnosis of disease
3. Understanding DOT Policy
4. Understand Physiological disorder and infectious disease
5. Analysis of pregnancy

Learning outcome

1. Able to collect pathological specimen
2. Able to detect diabetes, ketosis, nephritis, jaundice and other physiological disorder
3. Able to detect infectious disease (UTI, Hematuria, Filaria, Dysentery, Ulcer, TB, etc.)
4. Preservation and processing of pathological sample.
5. Identification of Parasites
6. Analysis of Infertility disorder

Course Outline

Module-I (16 Hrs)

Introduction of clinical pathology, Composition, collection and preservation of urine, Physical examination of Urine, Chemical Examination of Urine - Sugar and Ketone bodies, Diabetes and Ketosis, Nephritis and UTI, Albumin, Phosphate, BJP, Bile Salt and Bile pigment, Chemical Examination of Urine - Multistix reagent strip, Jaundice, Microscopical Examination of Urine, Operation of Urine Analyzer, Pregnancy test, Report writing and report analysis of Urine

Practice: Operation of Urine analyzer, Benedict Test, Heat and Acid Test, Rothera's Test, Benzidine Test, Fouchet's Test

Lab:-

Urine Analysis: Collection and Physical Examination, Specific Gravity, Benedict's Qualitative test, Acetone Rothera's Test, Protein and BJP Test, Hay's Test and Fouchet's test, Benzidine test, Microscopical Examination, Pregnancy Test, Auto-mentation by Urine analyzer

Module-II

Respiratory Tract Infection: Gram Staining and ZN Staining, Basic of DOT Centre, Report writing and report analysis of sputum, Sputum for the diagnosis of Mycobacterium tuberculosis, Clinical significance and Report writing of Stool, Difference between Amoebic, Dysentery and Bacillary Dysentery, Microscopical Examination of Stool, Physical and Chemical examination of Stool, Composition, collection and preservation of stool

Practice: Microscopic finding of stool, Morphology of stool parasite -

Lab: Stool Analysis: Collection and physical examination, Chemical Examination, Occult test and reducing sugar, Microscopical Examination: Protozoa, Microscopical Examination: Helminthes,Sputum Analysis: Collection and physical examination, Tuberculosis (ZN Stain), Respiratory infection (Gram Stain)

Module-III

Routine laboratory investigation of Pleural Fluid, Routine laboratory investigation of Pericardial Fluid, Routine laboratory investigation of Synovial Fluid, Synovial fluid: Collection and preservation, Examination of CSF related to Meningitis, Brain Tumour and other disorder, CSF: Composition, Collection, Preservation and physical examination, Report analysis and report writing of Semen, Semen examination for male infertility disorder, Semen: Composition, function, collection and physical examination

Practice: Gram stain, ZN Stain, General consideration on specimen collection

Lab:-

Semen Analysis: Collection and physical / Chemical & Microscopical examination

CSF Analysis: Collection and Routine Examination

Synovial Fluid: Collection and Routine examination

Pleural Fluid: Collection and routine examination

Pericardial Fluid: Collection and routine examination

Bacteriological Examination of throat swab

Introduction to Quality and Patient Safety

Subject Name	Type of course	The+Prac+Proj	Prerequisite
Introduction to Quality and Patient Safety	Theory+ Project	3-0-2	Fundamental Science

Objective

- Knowing patient safety
- Report Distribution system
- Laboratory infection control Policy
- Bio-Medical waste management
- Understanding Patient rights
- ISO Policy for medical laboratory

Learning outcome

- Know about rights and duties of patient
- Know about right and duties of lab technician
- Understand various policy to manage lab
- Understand infection control procedure

Course Outline

Module-I

Human factor Engineering, Patient safety, Health literacy, Report distribution system,

Error in reporting system, responding to adverse events, Investigation of error/ Root cause analysis, Medical Error, The science of safety

Practice: Safety precaution in laboratory, Report distribution, Prescription reading

Module-II

Team work and communication, Leadership, Quality control policy, Major development and evaluation in diagnostic division, Clinical establishment act policy, National accreditation board of laboratory, ISO Policy for medical laboratory, Fire and safety policy for medical laboratory

Practice: Fire Safety in lab, Documentation for Lab establishment

Module-III

Personal protective equipment in the laboratory, AIDS and laboratory safety, Safety protection in lab in STD and other infectious disease., Biomedical waste management, Patient care in medical laboratory, Patient rights., Counselling of patient during phlebotomy, First aid in medical laboratory service.

Practice: PPE, Bio-Medical waste management, First-Aid, Patient Counselling

Microbiology

Subject Name	Type of course	The+Prac+Proj	Prerequisite
Microbiology	Theory+ Practice	3-2-0	Fundamental Science

Objective

- To know various Culture media and their applications and also understand various physical and chemical means of sterilization
- To know General bacteriology and microbial techniques for isolation of pure cultures of bacteria, fungi and virus
- To master aseptic techniques and be able to perform routine culture handling tasks safely and effectively

Learning outcome

- This study demonstrates the theory and practical skills in microscopy and their handling techniques and staining procedures.
- Understanding the details of microbial cell organelles.
- Provides knowledge on growth of microorganism.
- Provides knowledge Culturing microorganism.

Course Outline

Module -1

Microbiology: Definition, history, host- microbe relationship, and safety measures in a microbiology laboratory. Morphology of bacterial cell wall, Bacterial anatomy (Bacterial cell structure: including spores, flagella, pili and capsules). Sporulation. Classification of bacteria according to cell wall and shape (arrangement), Classification of micro-organisms.Growth and Nutrition of Microbes**:** General nutritional requirements of bacteria, Bacterial growth curve

Practice:

1. Handling of Microscope

2. To learn techniques for Inoculation of bacteria on culture media.
3. To isolate specific bacteria from a mixture of organisms.

Module-2

Sterilization: Definition, sterilization by dry heat, moist heat (below, at & above 100° C), Autoclave, Hot air oven, Radiation and Filtration, preventive measures, controls and sterilization indicators. Use of laminar flow in sterilization.

Antiseptics and Disinfectants: Definition, types, properties, mode of action and use of disinfectants and antiseptics, efficiency testing of disinfectants.

Practice:

1. To demonstrate simple staining (Methylene blue)
2. Bacterial identification: To demonstrate reagent preparation and procedure forGram stain, Z-N staining, Capsule staining, Demonstration of flagella by staining methods, Spore staining, To demonstrate spirochetes by Fontana staining procedure

Module-3

Staining techniques: Methods of smear preparation, Gram stain, AFB stain, Albert's stain and special staining for spore, capsule and flagella, Culture Media, Liquid and solid media, defined and synthetic media, routine laboratory media (basal, enriched, selective, enrichment, indicator, and transport media). Different Culture, media their preparation and uses in microbial growth.

Practice:

1. Biochemical tests for identification of bacteria
2. Preservation of stock cultures of bacteria
3. Antibiotic susceptibility test

Medical Terminology and Record keeping (including anatomical Terms)

Subject Name	Type of course	The+Prac+Proj	Prerequisite
Medical Terminology and Record keeping (including anatomical Terms)	Theory+ Project	2-0-1	Fundamentals of Computer

This course introduces the elements of medical terminology. Emphasis is placed on building familiarity with medical words through knowledge of roots, prefixes, and suffixes. Topics include: origin, word building, abbreviations and symbols, terminology related to the human anatomy, reading medical orders and reports, and terminology specific to the student's field of study. Spelling is critical and will be counted when grading tests

Course Outline

1. Derivation of medical terms.
2. Define word roots, prefixes, and suffixes.

3. Conventions for combined morphemes and the formation of plurals.
4. Basic medical terms.
5. Form medical terms utilizing roots, suffixes, prefixes, and combining roots.
6. Interpret basic medical abbreviations/symbols.
7. Utilize diagnostic, surgical, and procedural terms and abbreviations related to the integumentary system, musculoskeletal system, respiratory system, cardiovascular system, nervous system, and endocrine system.
8. Interpret medicalorders/reports.
9. Data entry and management on electronic health record system.

(Medical) Psychology

Subject Name	**Type of course**	**The+Prac+Proj**	**Prerequisite**
(Medical) Psychology	Theory+ Project	2-0-1	General biology

Unit-I:

Introduction to Psychology; Meaning and Definitions psychology. Evolution of modern psychology. Scope of Psychology. Branches of psychology. Concept of normality and abnormality.

Unit-II:

Identifying psychological disorders. Anxiety disorders (panic, phobia, OCD, PTSD

Signs symptoms and management).

Unit-III.:

Stress, Hans Selye Model of stress. Lazarus and Folk man model of stress. Sources of stress. Stress, disease and health. Changing health-impairing behavior.

Unit-IV:

Learning; Meaning, definition, Theories of learning. Pavlov's classical conditioning

.Skinner's operant conditioning.

Unit-V:

Therapeutic Techniques. Counselling-meaning and definition.Psychotherapy- meaning and definition. Relaxation- types. (Brief introduction to psychoanalytical, behavioural and cbt techniques)

Medical emergencies - Part I

Subject Name	Type of course	The+Prac+Proj	Prerequisite
Medical emergencies - part I	Theory+ Practice	3-1-0	General biology

Unit- I:

Cardiovascular Emergencies

1. Approach to Chest pain-possible differential diagnosis, clinical assessment and point of care investigations in the emergency department
2. Acute coronary syndrome-presenting symptoms, clinical assessment and point of care investigations in the field and emergency department, emergency management, ACLS protocols
3. Acute decompensated heart failure - presenting symptoms, clinical assessment and point of care investigations in the field and emergency department, basic initial management
4. Bradyarrythmia -presenting symptoms, clinical assessment and point of care investigations in the field and emergency department, ACLS protocols
5. Tachyarrhytmia -presenting symptoms, clinical assessment and point of care investigations in the field and emergency department, ACLS protocols
6. Aortic dissection-presenting symptoms, clinical assessment and point of care investigations in the field and emergency department, basic initial management
7. Deep vein thrombosis-presenting symptoms, clinical assessment and point of care investigations in the emergency department, basic initial management
8. Pulmonary thrombo embolism-presenting symptoms, clinical assessment and point of care investigations in the field and emergency department, basic initial management

Unit- II:

Pulmonary Emergencies :Approach to the patient with breathlessness and possible differential diagnosis; presenting symptoms, clinical assessment and point of care investigations in the emergency department of

1. Respiratory failure
2. Upper airway obstruction
3. Pneumothorax
4. Acute asthma
5. Acute exacerbation of COPD
6. Hemoptysis
7. Pleural effusion and empyema
8. Pneumonia

Unit- III

Fluid and Electrolyte Disturbances: Fluid compartments; possible causes, presenting symptoms, clinical assessment and point of care investigations in the field and emergency department, basic initial management of

1. Hypovolemia
2. Fluid overload states
3. Hyperkalemia
4. Hypokalemia
5. Hypernatremia
6. Hyponatremia
7. Hypocalcemia

Unit- IV:

1. Neurological Emergencies
2. Approach to the unconscious patient
3. Seizure disorder and Status epilepticus - possible causes, presenting symptoms, clinical assessment and point of care investigations in the field and emergency department, basic initial management
4. Ischemic stroke -presenting symptoms, clinical assessment and point of care investigations in the field and emergency department, ACLS protocol
5. Intracerebral hemorrhage-presenting symptoms, clinical assessment and point of care investigations in the field and emergency department, ACLS protocol
6. Meningoencephalitis-presentingsymptoms,clinicalassessmentandpointofcare investigationsinthefieldandemergencydepartment,basicinitialmanagement

Unit-V:Shock and sepsis

1. Definition and types of shock
2. Cardiogenic shock - possible causes, investigations and emergency management
3. Anaphylaxis and anaphylactic shock - possible causes, investigations and emergency management
4. Sepsis - presenting symptoms, clinical assessment and point of care investigations in the field and emergency department, basic initial management

Practical:

1. Medical Emergencies
2. Preparing an ambulance for medical emergency
3. Responding to a call and scene management of medical emergency Receiving and resuscitating a patient with a medical emergency in the emergency department

Medical Emergencies – II

Subject Name	Type of course	The+Prac+Proj	Prerequisite
Medical emergencies - part II	Theory+ Practice	3-1-0	General biology

Unit- I:Gastrointestinal Emergencies:

Presenting symptoms, clinical assessment and point of care investigations in the field and emergency department, basic initial management of

1. Acute gastroenteritis
2. Upper GI bleed
3. Lower GI Bleed
4. Acute pancreatitis

Unit- II: Endocrine and Metabolic Emergencies:

Presenting symptoms, clinical assessment and point of care investigations in the field and emergency department, basic initial management of

1. Hypoglycemia
2. Hyperosmolar hyperglycemic state
3. Diabetic ketoacidosis
4. Adrenal crisis
5. Myxedema coma
6. Thyroid storm

Unit- III: Renal Emergencies

Presenting symptoms, clinical assessment and point of care investigations in the field and emergency department, basic initial management of

1. Urinary tract infections
2. Acute renal failure
3. Acute pulmonary edema in renal failure

Unit- IV: Bites and Stings

Snake bites- common Indian venomous snakes, presenting symptoms, clinical assessment and point of care investigations in the field and emergency department, basic initial management

1. Animal bites - dog bites, wild animal bites, early management and rabies prophylaxis
2. Bee, wasp, spider, scorpion and other stings - initial management

Unit-V:Other Medical Emergencies

1. Fever - assessment of the patient, early identification of warning signs of sepsis, early management
2. Poisoning and drug overdose - Decontamination, common poisons encountered, basic initial management
3. Purpura, Urticaria, Fixed drug eruptions, Toxicepidermo necrolysis, Steven Johnson's syndrome

Practicals:

- Preparing an ambulance for medical emergency
- Responding to a call and scene management of medical emergency
- Receiving and resuscitating a patient with a medical emergency in the emergency department 20 marks

Medical Laboratory Management

Subject Name	Type of course	T-P-Pj	Prerequisite
Medical Laboratory Management	Theory+ Project	3-0-2	Fundamental Science

Objective

- Explain and apply principle of effective test utilization
- Interpret, implement and complying law, regulation, accrediting standards and guidelines of Govt. and NG organizations.
- Design, implement and evaluate resources in lab
- Communicate effectively with laboratory personnel and health care professional.
- Explain and apply the major principle and tactics of laboratory administration.

Learning outcome

- Become professional competent in medical laboratory
- Exhibit a sense of commitment to the ethical and human aspect of patient care
- Recognize the role of clinical laboratory scientist in the assurance of quality health care
- Application of safety and governmental regulation and standards as applied to medical laboratory practice.

Course Outline

Module-I

Ethics of pathological clinics, Code of conduct for medical laboratory personal, Safety measure in the laboratory, Organization of Pathology laboratory under board of quality control, Clinical laboratory science, Functional components of the clinical laboratory, A Standardized clinical laboratory set up, Various types of laboratories, PPE in labs, Important instruction to minimize infection in laboratory workers

Practice:PPE Practice, Lab Setup, Sample collection and preservation.

Module-2

Release of laboratory reports, Clinical alerts ,Reporting results: Basic format of pathology reports, Transportation and preservation of lab sample, Patient management for clinical sample collection, National and international agency for clinical laboratory accreditation, Good

laboratory practice, Medical legal problems,Laboratory regulation,Factors affecting productivity of laboratory, Responsibility of lab worker

Practice: Report writing, Lab record management

Module-3

Quality management system, NABL Policy, Clinical establishment act policy, Annual maintenance contact for laboratory, General safety precautions in case of STD and drug resistant tuberculosis, Procurement and supply management, Different types of laboratory record management, Laboratory information management system (LIMS), Profit and loss analysis, WHO Policy for medical lab

Practice: Management information system, Procurement management, Profit and loss analysis

Medical Law and Ethics

Subject Name	Type of course	T-P-Pj	Prerequisite
Medical Law and Ethics	Theory+ Project	2-0-1	Fundamental Science

Objective

- The course provides an introduction to ethics generally and more specifically to medical ethics, examining in particular the principle of autonomy, which informs much of medical law. The course then considers the general part of medical law governing the legal relationship between medical practitioners and their patients. It considers the legal implications of the provision of medical advice, diagnosis and treatment. Selected medico-legal issues over a human life are also examined. These may include reproductive technologies, foetal rights, research on human subjects, organ donation, the rights of the dying and the legal definition of death.

Learning outcome

- The ethical underpinnings of the law as it relates to medicine,
- The law of negligence in the context of the provision of healthcare,
- Legal and ethical issues surrounding end and beginning of life decisions,
- The maintenance of professional standards in the healthcare profession, and
- The role of policy in the formation of law as it relates to medicine.

Course Outline

Module-I

1. Medical ethics - Definition - Goal - Scope
2. Introduction to Code of conduct
3. Basic principles of medical ethics – Confidentiality

Module-II

4. Malpractice and negligence - Rational and irrational drug therapy
5. Autonomy and informed consent - Right of patients
6. Care of the terminally ill- Euthanasia
7. Organ transplantation

Module-III

8. Medico legal aspects of medical records – Medico legal case and type- Records and document related to MLC - ownership of medical records - Confidentiality Privilege communication - Release of medical information - Unauthorized disclosure - retention of medical records - other various aspects.
9. Professional Indemnity insurance policy
10. Development of standardized protocol to avoid near miss or sentinel events
11. Obtaining an informed consent

Pharmacology

Subject Name	Type of course	T-P-Pj	Prerequisite
Pharmacology	Theory+ Project	3-0-1	Fundamental Science

Course objectives:

- To make the students learn about various drugs acting on different body systems

Learning outcomes:

At the end of the course students will be be knowledgeable in the following areas:

- Pharmacokinetics and pharmacodynamics of drugs
- Drugs and their actions on different body systems

- Detailed study about different anesthetic drugs

Course Outlines

Module -I: General Pharmacology Part I

Introduction, Routes of Drug Administration, Pharmacokinetics - membrane transport, absorption, bioavailability, metabolism, plasma half life, excretion and distribution of drugs, Routes of drug administration (local and systemic).

Module -II: General Pharmacology Part II

Pharmacodynamics – Mechanisms of drug actions, drug synergism and antagonism. Adverse Drug Reactions, Drug Interactions

Module -III: General Pharmacology Part II

Receptor pharmacology, Drug Nomenclature and Essential Drugs Concept

Module -IV: Drugs for ANS

Autonomic nerves system – sympathetic and parasympathetic nervous system. Basic Anatomy & functional organisation. List of drugs acting an ANS including dose, route of administration, indications, contra indications and adverse effects.

Module -V: Cholinergic System

Cholinergic system – acetyl choline, cholinergic drugs, anticholinesterases, Irreversible Anticholinesterases. Anticholinergic drugs – classification, mechanism of action, uses, adverse effects

Module -VI: Skeletal Muscle Relaxants

Skeletal muscle relaxants – classification, mechanism of action, uses, adverse effects. Adrenergic system – adrenergic receptors, drug classification, mechanism of action, uses, adverse effects

Module VII: Chemotherapy agents and other antibiotics

Chemotherapy of infections, Definition - Classification and mechanism of action of antimicrobial agents. Combination of antimicrobial agents. Chemoprophylaxis. Classification, spectrum of activity, dose, routes of administration and adverse effects of penicillin

Internship

Subject Name	Type of course	T-P-Pj	Prerequisite
Internship	Project	0-0-12	Basic Medical science

Internship Thesis Guideline

This Guideline is designed to provide students the knowledge and practice of public health research activity, to enable them to carry out researches and solve research related problems and to help them in writing thesis and defend their work. Upon successful completion of the course, the students shall be able to:

1. Search relevant scientific literature
2. Develop a research proposal
3. Employ appropriate data collection techniques and tools
4. Manage collected data
5. Analyze data with appropriate statistical techniques
6. Write thesis
7. Defend the findings

Proposal Development:
At the ending of third year (Sixth Semester), students individually consultation with designated faculties and extensive literature survey will develop research proposal during the initial 6 months period.

Data Collection/ Thesis Writing:

Students will carry out data collection, data management, data analysis, and thesis writing during the remaining period (Six Semester).
The Dissertation should have following format:

1. Title
2. Introduction
3. Materials and Methods
4. Results
5. Discussion
6. Conclusion
7. Recommendation
8. References
9. Appendix

Internship

1. Case record
2. Lab management and ethics
3. Evaluation -Guide(internal)
    a. -Industries guide(external)
    b. -University-project report/ Viva

Project

Subject Name	Type of course	T-P-Pj	Prerequisite
Project	Project	0-0-12	Basic Medical science

INTERNSHIP

For a period of 6 months in the department of Medicine , Surgery ,O & G, ICU and Paediaric emergency

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