STAREX UNIVERSITY

SCHOOL OF PARAMEDICAL SCIENCE

BACHLOR IN OPERATION THEATRE TECHNOLOGY

SYLLABUS

Instruction for paper setter:

Total marks: 75

Timing: 3 hrs.

The question paper will consist of four sections A, B, C & D or four units 1, 2, 3, 4 as the case may be. Paper-Setter will set nine questions in all, selecting two questions from each section/unit.
Question no. 1 will be of 15 marks and consists of short answer type questions of 2 to 3 marks each covering the entire syllabus e.g.
Q.1 (a) Prove that a non-abelian simple group is not solvable.

(b) Give an example of a subnormal series which is not a normal series.

(c) Prove that every homomorphic image of a nilpotent group is also nilpotent.

(d) Define field extension and degree of extension.

(e) Show that C (field of complex no's) is a normal extension of R.

The duration of the examination will be of 3 hours.

Each question will carry equal marks i.e. 15

Attempt any five question out of nine question.

Question no.1st is compulsory.

SYLLABUS

Paper Code	Nomenclature of paper/course	Credit C(L-T-P)
	Semester 1st	
	General pathology (101)	6(3-1-2)
	UNIT I Introduction to Pathology & Hematology. Formation, Composition and function of Blood. Haemopoisis (Erythropoiesis, Leucopoiesis & Thrombopoisis), Anticoagulant, Mode of Action, Uses, Advantages & Disadvantages. Collection, Preservation, Transportation & Handling and disposable of Blood Sample. Standard& Universal Precautions in Hematology. Hematological Stain, Principle, Composition & procedure of Staining. Preparation of Blood Smear and their significance. Hem cytometer, principle, working procedure Care & Maintenance. **Unit-II** Haemoglobin, its synthesis and types, normal and abnormal hemoglobins, extravasccular and intravascular hemolysis. Anaemia and its classification, Morphological and etiological, pathogenesis, laboratory investigations and management, Iron deficiency anaemia, metabolism of iron, pathogenesis, laboratory investigations and management, principle and procedure of special test Megaloblastic anaemia, pernicious anaemia, pathogenesis, laboratory investigations Cell Injury and Cellular Adaptations- Normal Cell**,** Cell Injury- types of cell injury, etiology of cell injury, and morphology of cell injury, cellular swelling, and Cell death: types- autolysis, necrosis, and apoptosis. Inflammation- Acute inflammation - vascular event, cellular event, inflammatory cells Chronic Inflammation - general features, granulomatous inflammation **Unit III** Tissue Renewal and Repair, healing and fibrosis, cirrhosis, introduction of oedema, hyperaemia, congestion, haemorrhage, haemostasis, thrombosis, embolism, infarction, shock and hypertension. Neoplasia: Definition, how does it differ from hyperplasia, difference between benign tumor and malignant tumor. Healing-Definition, different phases of healing, factors influencing wound healing. **Unit IV** Infectious Diseases: pathogenesis & overview of modes of infections, prevention and control with suitable examples like Typhoid, Dengue	

Cancer: Definitions, nomenclature, characteristics of benign and malignant neoplasm, metastasis, Carcinogens and cancer, concept of oncogenes, tumour suppressor genes, DNA repair genes and cancers stem cells.

PRACTICALS

1. Collection of blood Sample by Venous & Capillary Method
2. Estimation of Hb By Sahli 's & CMG Method
3. Determination of RBC, WBC & Platelet Counts By Hem cytometer
4. Preparations of EDT & Sodium Citrate Vials
5. Preparation of thin & thick blood smear
6. Separation of Buffy Coat
7. Determination of ESR by Win Trobe& Western Green Method
8. Any other practical's based on theory paper
9. Blood group

RECOMMENDED BOOKS

1. Text Book of Pathology- Hares Mohan
2. Text Book of Pathology- Robbins
3. Practical Hematology- JV Decie & Lewis
4. Hematology- William J William, Ernest Butter
5. Lynch's MLT – Raphels
6. Atlus of Hematology – George, A Mcdolald, TCCodde
7. Blood & its Diseases- Chanari

Human Anatomy & Physiology-I (102)

6(3-1-2)

Unit I

Introduction to medical sciences. Organization of human body and integrated physiology:- Cell, Tissue, Organ, Organ system & body. Anatomical terms: - Body position, Section, Cavity & their related term.

Unit II

Respiratory system: - Anatomy & physiology of nose and nasal cavity, pharynx, larynx, trachea, lungs. Mechanism of respiration. Lungs capacity. Lobes of lungs, layers of lungs

Integumentary system: - Anatomy & physiology of skin & its layer, nails, hairs, structure and function of skin, care of skin.

Unit III

Digestive system: - Anatomy & physiology of mouths, pharynx, esophagus, stomach: parts, structure function, blood supply. intestine: parts, structure, function and blood supply. Pancreas: parts, structure, ducts, functions. Liver: structure, lobes, quadrants, blood supply and function .gall bladder: bile, duct, Mechanism of digestion.

Skeletal system:- Anatomy & physiology of bones, structure of bone, parts of bone, types of bone, blood supply of bone, Joints and its types with eg., .Upper limb, Lower limb, Vertebral column, Thorax/ chest, skull.

Unit IV

Muscular system:-skeletal muscle, cardiac muscle, smooth muscle, Physiology of muscular contraction and controlling them various types of Joints and their physiology, neuromuscular junction

Cardiovascular system: - Anatomy & physiology of blood vessels, heart structure, chambers of heart, function of heart, systematic circulation, valves, pressure, circulation in adults & fetal, blood, artery, vein, capillary.

PRACTICALS

1. Demonstration of Human cell, Cell division Mitosis & meiosis - from chart& slides.
2. Demonstration of various tissue- Epithelial, Connective, Muscular & Nervous.
3. Demonstration of Individual Bones & Respiratory System from Chart
4. Measurement of Blood Pressure, Respiration & Heart Beat
5. Demonstration of Body Organ like Eye, Nose, Tongue etc.
6. Any other practical's based on theory paper

RECOMMENDED BOOKS

1. Anatomy & physiology- Rose & Wilson
2. Anatomy & Physiology- Tortora
3. Text book of Anatomy & physiology- B D Chaurasia
4. Text book of Anatomy & physiology- CC Chaterjee
   Text book of physiology- K Sabuingum

Basics of Biochemistry (103)

6(3-1-2)

Unit I

Introduction to Clinical Biochemistry and role of Medical Lab Technologist, ethics, responsibility, safely measure and hazards in clinical biochemistry lab and first aid in laboratory accidents. Basic awareness of laboratory in respect to equipments&glasswares (Unit of Measurements, and calibration of volumetric apparatus.Colorimetry, spectrophotometery , flame photometry , analytical balance etc, (principles instrumentations & applications) Preparation and storage of reagents standard solutions, buffer solutions and pH determination. Biophysics, techniques-osmosis, dialysis, surface tension, sedimentation and viscosity – principles &applicatons.

Unit II

Henderson – Hassalbach equation and it's clinical applications. Acid base disturbances and their clinical significance Acid –base –buffer and pH-simple calculations. Concept of clinical sensitivity and specificity and factors affecting the clinical results.Collection of blood specimens avoiding Haemolysis, de- proteinization& separation of serum/plasmas.

Unit-III

Preparation of solution and reagents, normal solution, molar solutions, percent solution, buffer solution, dilutions, w/v, v/v, standard solution, aqueous solutions, concepts of acid and base

Units of measurement: SI unit, reference range, conversion factor, units for measurement of bio metabolite, enzymes, protein, drugs, hormones, vitamins

Unit-IV

Specimen collection and processing of blood, urine & CSF, separation of serum and plasma, deproteinization of sample, Handling of specimens for testing, preservation of specimen, transport of specimen, factors affecting the clinical results, effect of storage onsample

Physical, chemical and microscopic examination of urine, Bence Jones Proteinuria and its clinical significance, qualitative test of urine for reducing sugars, protein, ketone bodies, bile Salt, bile pigments, urobilinogen, occult blood, uric acid, urea and Creatinine, quantitative estimation of 24 hrs urine for protein and their clinical significance.

PRACTICALS

1. Cleaning of Laboratory Glass wares.
2. Preparation of distilled Water.
3. Preparation of 0.1N NaOH, 5M **H_2SO_4**&0.2N HCl Solution
4. Preparation of 0.2 Molar Sod Bicarbonate &70 % Ethanol Solution
5. Preparation of Hypertonic, Hypotonic & Norm tonic Solution & their Clinical Significance.
6. Collection of Blood Sample, serum & plasma separation
7. Any other practical's based on theory paper

RECOMMENDED BOOKS

1. Practical Clinical chemistry- H Varley.
2. Lynch's MLT –Raphel
3. Clinical chemistry- Principle & technique- Henry
4. Practical biochemistry- HW Cole
5. Clinical biochemistry – teiz
6. Principal of Biochemistry by Lehninger

	General Microbiology (104) **Unit I** History & Introduction of Medical Microbiology.Importance of Medical Microbiology.Discovery of Microorganism.Contribution of Robert Koch, Bordet, Paul Ehrlich, Alexander Flaming, etc.Scope& Relevance of Safety Measures of Medical Microbiology.Bacterial Structure- Cell wall, Outer membrane, Lipopolysaccharide, Cytoplasmic membrane, Nucleus and Morphology - Shape, Capsule, Flagella, fimbriae, capsule, spore. **Unit II** Growth and Nutrition requirement (Oxygen, Carbon di-oxide, Temperature, Moisture and drying, Hydrogen Ion concentration and Light) of Bacteria, Autotrophs, Heterotrophs.Bacterial Growth (Lag phase, Log phase, Stationary phase and Phase of Decline) Curve.Products of Bacterial growth and Bacterial enzymes. Different types of staining: Simple stains, Negative stain, Impregnation Method, Differential stain. Gram's stain- preparation of stain and staining methods.Ziehl–Neelsen stain. **Unit-III** General safety measures used in Microbiology laboratory, Sterilization and disinfection: Various physical methods of sterilization – heat, UV radiation, ionizing radiation, filtration, characters affecting sterilization, auto clave control and sterilization indicators. Biomedical waste management in a Medical Microbiology laboratory: Types of the waste generated, Segregation, Treatment, Disposal **Unit-IV** Antiseptics & Disinfectants: Definition, types and properties, mode of action, use, qualities of good disinfectants. Chemical disinfectants – phenol and its compounds, alcohol, halogen, heavy metals and quaternary ammonium compounds, aldehyde, gaseous compound. use and abuse of disinfectants. precautions while using the disinfectants. **PRACTICALS** 1. Preparation of smear. 2. Perform Ziehl-Neelsen staining. 3. Perform Gram's staining 4. Perform Negative staining 5. Perform capsule staining 6. Perform spore staining 7. Any other practical's based on theory paper	6(3-1-2)

RECOMMENDED BOOKS

1. Medical Laboratory Technology by Kanai Lal Mukherjee; Tata McGraw Hill Publishers, New Delhi
2. Textbook of Microbiology by Ananthanarayan and Panikar; Orient Longman, Hyderabad
3. Practical Book of Medical Microbiology by Satish Gupta; JP Brothers, New Delhi
4. Text Book of Medical Microbilogy by Satish Gupta; JP Brothers, New Delhi
5. Text Book of Medical Laboratory Technology by Praful B Godkar; Bhalani Publishing House; Mumbai
6. Medical Laboratory Science Theory and Practice by J Ochei and A Kolhatkar
7. A Textbook of Microbiology New Central Book Agency (P) Ltd By P Chakraborty

Basics of Operation Theatre and Techniques (105)

6(3-1-2)

Unit I

Introduction to the course: Operation room set up; discipline; liability and responsibility as an Operation Room Assistant.
Medic legal Aspects of Anaesthesia, consent form
Basic Priniciples of Electricity and its application in O.T., I.C.U., and C.S.S.D.
Fire and explosion hazards in the Operation Theatre.

Unit II

O.T. environment (Air flow, temperature, humidity and air-conditioning)
Transportation of unconscious patient.
Common positions for operative procedures.
O.T. tables and lighting C arm, microscopes, endoscopes.
Airway management and IPPR.
Cardio pulmonary resuscitation.
First Aid bandages, splints, plasters.

Unit III

Preparing POP splints, bandages.
Collection, handling, dispatching of tissue, fluid, blood, urine samples for laboratory investigations, pathological or microbiological exam.
Biomedical waste collection, transport, disposal and personal hazards.
Reception of patients
Pre-operative preparation of Patient
Exact Anaesthetic Technique
Post Anaesthetic Care Unit (PACU)

Unit IV

Care and transport of unconscious patient

	Positioning Anesthetic Procedures Operative Procedures O.T. Technician in surgical Assistant **PRACTICAL(403):** 1. *UROSURGERY SET:* • Cystoscopy Set • Cystostomy Set • Kidney Procedure Set • Prostatectomy set. 2. *ENT SURGERY SET:* • Laryngoscopy Set. • Tonsillectomy /Adenoidectomy set • Myringotomy set • Mastoidectomy set. • Polypectomy set. • Antrostomy set. 3. *OPHTHALMIC INSTRUMENT SET* • General eye instrument set(& iridectomy set) • Cataract surgery set • Chalazion instrument set • Dacryocystorhinostomy set. 4. *PLASTIC SURGERY SET* • Skin grafting set • Flap grafting set • Cleft lip & palate repair set. • Rhinoplasty set • Maxillofacial surgery set. **COMPUTER SCIENCE-I (106)** **Unit 1** Introduction to Computer**:** Meaning or Definition of Computer**,** Evolution of computer**,** Features of Computer**,** Main Operation of the Computer**,** Main Elements of Computer System**,** Bits, Bytes and Words**,** Device in Computer**,** Various Input & output Device. **Unit II** Applications of computer**:**advantages and limitations of computers. Memory**:**overview of storage devices.main memory,storage evaluation criteria,random access memory,read only memory,secondary storage devices. **Unit-III** Generation of Computers and their ClassificationGeneration of Computers**,** Classification of Computers.	0(0-0-0)

	Unit-IV Operating System Meaning of Operating System**,** Function of Operating System**,** Language Translators Database Meaning Of Database**,** Data Processing System**,** Function of Data Processing**,** Objectives of Database**,** Type of Database**,** Functions of Database Management System(DBMS)**,**Advantages & Disadvantages of DBMS**,**Various Database Structures or database models. **Semester 2nd** **Human Anatomy & Physiology-II (201)** **Unit I** Lymphatic system: Lymphatic organs, lymphocytes, Spleen, Bone marrow etc. primary & secondary immune response, Immunity. Primary defense mechanism of human body against pathogenic microbes. Physiology of various body fluids: CSF, peritoneal, Pericardial, Pleural and synovial fluids. Cartilage, ligaments, tendons. **Unit II** Excretory system: Anatomy & physiology of Kidney, Ureters, Bladder & Urethra. Mechanism of urine formation, GFR, mechanism of GFR, Nephrons diagram and its function. Sense organ: Anatomy & physiology of eye,diagram of eye, ear,diagram of ear, nose & tongue. **Unit-III** Nervous system: Anatomy& physiology of Neurons structure and function, Brain and its parts, Spinal cord, Central & Peripheral nervous system. Endocrine system: Anatomy & physiology of hormones, glands, Pituitary gland & hypothalamus, thyroid gland, parathyroid glands, adrenal glands, pancreas, pineal gland & mechanism of action. **Unit-IV** Reproductive system: Male- Anatomy & physiology of Primary & secondary reproductive organs, sperm diagram and its function, spermatogenesis, testis,prostate gland, Female-Anatomy & physiology of Primary & secondary reproductive organs, ovary, ovum, uterus, Oogenesis, mensuration cycle **PRACTICALS** 1. Collection of body Fluids 2. Estimation of sugar in CSF fluid 3. Demonstration of Semen	6(3-1-2)

4. Analysis of Semen
5. Estimation of Insulin Hormone
6. Examination of Urine
7. Demonstration of Reproductive System by Chart
8. Demonstration of Glands in chart in human body
9. Demonstration of Sense Organ
10. Demonstration of spinal & Cranial Nerve
11. Any other practical's based on theory paper

RECOMMENDED BOOKS

1. Anatomy & physiology- Rose & Wilson
2. Anatomy & Physiology- Tortora
3. Text book of Anatomy & physiology- B D Chaurasia
4. Text book of Anatomy & physiology -CC Chaterjee
5. Text book of physiology- K Sabuingum

Biochemistry Metabolism (202)

6(3-1-2)

Unit I

Metabolism: Introduction to metabolism, concept of catabolism and anabolism. Metabolic pathways and their significance in the living system. Metabolites: Introduction, clinical significance, physiological variation in various body fluids, pathological aspects.

Unit II

Carbohydrates: Introduction, general and structural classification, biological functions. Metabolism of carbohydrates (Glycolysis, TCA, ETS and oxidative phosphorylation). Genetic disorders related to carbohydrate metabolism, Blood glucose and its regulation, hyperglycemia, hypoglycemia and glucosuria. Vitamins: Types and their roles, deficiency related diseases.

Unit III

Amino acids: Introduction, classification, structural properties, biological functions. Proteins: Introduction, general and structural classification, biological functions. Metabolism of proteins (Digestion of proteins, General reactions of amino acids, Regulations of amino acid biosynthesis). Disorders related to proteins and amino acids metabolism. Enzymes: Introduction, properties and biological significance, structure and mechanism of action, enzyme inhibition (competitive and non competitive inhibition), concept of co-factors, prosthetic groups, apoenzyme, holoenzyme and co-enzymes (with examples) and enzyme excess or deficiency related disorders.

Unit IV

Fatty acids and fats: Introduction and biological significance, classification of fatty acids, structure of fats and fatty acids. Lipids: Introduction, classification, biological significance, metabolism of lipids. Nucleic acid: Historical prospective, types and their functions, role of nucleic acid in protein synthesis (central dogma) , double helical model of DNA, nucleic acid mutations and its related disorders. Miscellaneous – urea cycle, formation and breakdown of hemoglobin, iron metabolism.

PRACTICALS

Qualitative test:

i. Carbohydrate
   a. Molisch's Test
   b. Fehling's Test
   c. Benedict's Test
   d. Barfoed's Test
   e. Seliwanoff's Test
   f. Iodine Test
   g. Osazone Test,

ii. Qualitative test of urine for Ketone bodies

iii. Any other practical's based on theory paper

RECOMMENDED BOOKS

1. Practical Clinical chemistry- H Barley.
2. Lynch's MLT –Raphael
3. Clinical chemistry- Principle & technique- Henry
4. Practical biochemistry- HW Cole
5. Clinical biochemistry – ties

Principles of Anesthesia (203)

6(3-1-2)

Unit I

Medical gas supply

Compressed gas cylinders, Color coding, Cylinder valves; pin index.
Gas piping system, Recommendations for piping system, Alarms & safety devices, Scavenging of waste anesthetic gases

Unit II

Anesthesia machine

Hanger and yoke system, Cylinder pressure gauge, Pressure regulator, Flow meter assembly, Vaporizers - types, hazards, maintenance, filling and draining, etc.

Unit III

Breathing system

General considerations: humidity & heat, Common components - connectors, adaptors, reservoir bags. Capnography, Pulse oximetry, Methods of humidification. Classification of breathing system, Mapleson system - a b c d e f, Jackson Rees system, Bain circuit, Non rebreathing valves - Ambu valves, The circle system

Face masks & Airway laryngoscopes

Types, sizes, Endotracheal tubes - Types, sizes. Cuff system
Fixing, removing and inflating cuff, checking tube position, complications.

Unit IV

Anesthesia ventilator and working principles.

Monitoring

Electrocardiography(ECG), Pulse oximetry(Sp02), Temperature- central and peripheral, End tidal carbon dioxide(EtCO2), Anesthesia gas monitoring, Non-invasive blood pressure (NIPB) and Invasive blood pressure(IBP) Central venous pressure(CVP), PA Pressure, LA Pressure & cardiac output Anesthesia depth monitor, Neuromuscular transmission monitor.

Practical

1. Supply of compressed gases:
    a. Types of gases and their chemical and physical properties.
    b. Types of containers.
    c. Their checking and maintenance.
    d. Types of compressors.
    e. Structure and mechanism of various type of gauges, liquid oxygen storage and supply system.
2. Structure of reducing valves-
    a. Mechanism of pressure reducing valves.
    b. Their maintenance and safety checks
3. Structure and mechanism of flow meters, maintenance and safety checks
4. Volatile anaesthetic agents.
    a. Selection of material to be used for containers of the volatile anaesthetic agents.
    b. Structure of different types of vaporizers.
    c. Principles of various vaporizers, their maintenance and safety precautions.
5. Types of circuits:
    a. Open, Semi closed and closed circuits.
    b. Non-rebreathing valves.
    c. T-piece circuit and its modifications.
    d. To and fro system and circle absorber.
6. Types of valves used in the different circuits. Structure and working of Heidbrink's valve, Rubin valve nu-man valve etc.

	Microbial Technology (204) **Unit 1** Microscope: History, Introduction, different types of microscope (Compound Microscope, Phase contrast Microscope, Florescent Microscope, Electron Microscope) - Principle, components, uses and functions. **Unit II** Magnification, Numerical Aperture, Resolution, Care and maintenance of microscope. Safety Measures in Microbiology Laboratory. Occurrence of Infection, Route of lab infection, Safety Measures & precaution in microbiology lab. **Unit-III** General Instruments: Use of Distillation plant, Centrifuge Machine and Analytical Balance. Uses of Hotplate, Magnetic Stirrer and Water Bath. Microbiological Instruments: Use of Autoclave Incubator, Hot air oven and Laminar Air flow. Use of Colony Counter and Gas pack anaerobic jar. **Unit-IV** Sterilization and Disinfection: Physical method, Chemical method, Mechanical method. Sterilization by heat, dry heat, moist heat. Sterilize by filtration, Merits and demerits of heat sterilization. Temperature less than 100^0C, Temperature at 100^0C, Temperature above 100^0C. **PRACTICALS** 1. Demonstration of Compound Microscope. 2. Demonstration of Centrifuge 3. Demonstration of Analytical Balance 4. Demonstration of Incubator 5. Demonstration of Hot Air Oven 6. Demonstration of Autoclave 7. Demonstration of Water Bath 8. Demonstration of Colony Counter 9. Demonstration of Laminar Air flow 10. Any other practical's based on theory paper **RECOMMENDED BOOKS** 1. Medical Laboratory Technology by Kanai Lal Mukherjee; Tata McGraw Hill Publishers, New Delhi 2. Textbook of Microbiology by Ananthanarayan and Panikar; Orient Longman, Hyderabad	6(3-1-2)

	3. Practical Book of Medical Microbiology by Satish Gupta; JP Brothers, New Delhi 4. Text Book of Medical Microbilogy by Satish Gupta; JP Brothers, New Delhi 5. Medical Laboratory Science Theory and Practice by J Ochei and A Kolhatkar 6. A Textbook of Microbiology New Central Book Agency (P) Ltd By P Chakraborty	
	Computer Science-II (subsidiary subject) **(205)** **Unit I** Windows Graphical User Interface, Windows, Features of Windows, Control Button of windows, Various Icons on Desktop Microsoft Word(INTRODUCTION) **Unit II** Microsoft Excel (INTRODUCTION) Microsoft PowerPoint (INTRODUCTION) Internet – Features, Different type of network, Internet, **Unit-III** Patient ManagementMedical Establishments using Computer, One or More Computer,Network,Software,Training,Service Operators of System Computerization in Hospitals and Nursing Homes, Features of a Hospital Software Packages, Password Protection ,Various Application of Different Medical ,Software and Support **Unit-IV** Picture archiving communicating system,DICOM,RIS,HIS, Uses of computer in hospitals in different department Online reporting system,different types of software used in medical fields.	0(0-0-0)
	Semester 3rd **Clinical Microbiology** **(301)** **Unit I** **Morphology** Classification of microorganisms, size, shape and structure of bacteria. Use of microscope in the study of bacteria. **Growth and nutrition** Nutrition, growth and multiplications of bacteria, use of culture media in diagnostic bacteriology.	6(3-1-2)

Unit II

Culture media

Use of culture media in diagnostic bacteriology, antimicrobial sensitivity test.

Sterilization and Disinfection

Principles and use of equipment of sterilization namely hot air oven, autoclave and serum inspissator, pasteurization, antiseptic and disinfectants.

Unit III

Immunology

Immunity, vaccines, types of vaccine and immunization schedule, principles and interpretation of common serological tests namely Widal, VDRL, ASLO, CRP, RF & ELISA.

Rapid tests for HIV and HBsAg (excluding technical details).

Systematic Bacteriology

Morphology, cultivation, diseases caused, laboratory diagnosis including specimen collection of the following bacteria (excluding classification, antigenic structure and pathogenicity),

Staphylococci, Streptococci, Pneumococci, Gonococci, Meningococci, C. diphtheriae, Mycobacteria, Clostridia, Bacillus, Shigella, Salmonella, E. coli, Klebsiella, Proteus, Vibrio cholerae, Pseudomonas & Spirochetes.

Unit IV

Parasitology

Morphology, life cycle, laboratory diagnosis of following parasites: E. histolytica, Plasmodium, tape worms, Intestinal nematodes.

Mycology

Morphology, diseases caused and lab diagnosis of following fungi. Candida, Cryptococcus, Dermatophytes, opportunistic fungi

Virology

General properties of viruses, diseases caused lab diagnosis and prevention of following viruses, Herpes, Hepatitis, HIV, Rabies and Poliomyelitis.

PRACTICALS

- Widal,
- VDRL,
- ASLO,
- CRP,
- RF & ELISA.
- Rapid tests for HIV and HBsAg (excluding technical details).
- Use of culture media in diagnostic bacteriology, antimicrobial sensitivity test
- Use of microscope in the study of bacteria.
- Principles and use of equipment of sterilization.
- Other practical based on syllabus.

	Basic Intensive care **(302)** **Unit I** Care and maintenance of ventilators, suction machine, monitoring devices. Sterilization and disinfection of ventilators. Care, maintenance and operational capabilities of beds, lights and other apparatus. Air conditioning and control of pollution in ICU. Attachment and intraoperative utility of ventilators and monitoring devices. Care of unconscious adult and pediatric patients. **Unit II** Physiotherapy techniques, feeding, Ryle's tube insertion and hyper alimentation. Suctioning and posturing of semiconscious and unconscious patients. Oxygen therapy, maintenance of clear Airway. Ventilation of patient in crisis: Mouth to mouth. Mouth to ET Tube. **Unit III** Resuscitator/ bag valve mask assembly Different types of Airways. Short term ventilation/ Transport ventilators. ICU Laboratory; Detection of blood gases of the patient, Principles of ABG machines. Management of asepsis. Management of tetanus patient. **Unit IV** Psychological aspects of the patient, relative and staff. Hemofiltration and hemodialysis. **Ventilators:** Principles of working of different ventilators: Volume cycled/Time cycled/Pressure cycled ventilators. High frequency ventilators and other types. Methods of measuring the expired gases from the patient; Types of spirometers, Principles of working of spirometers. Clinical application of above apparatus. Apparatus and techniques of measuring of blood pressure and temperature; Principle and working of direct/indirect blood pressure monitoring apparatus; structure, principle and working of the oscillotonometer. Principles and working of aneroid manometer type B.P. instrument. Laryngeal sprays; Types, material, principle and mechanism. Monitoring techniques and equipment; Cardiac monitors, Respiratory monitors, Spirometers, Temperature monitors.	6(3-1-2)

	Practical • Care and maintenance of ventilators, suction machine, monitoring devices. • Sterilization and disinfection of ventilators. • Care, maintenance and operational capabilities of beds, lights and other apparatus. • Air conditioning and control of pollution in ICU. • Principles of ABG machines. • Detection of blood gases of the patient • Principle and working of direct/indirect blood pressure monitoring apparatus. • Principles of working of spirometers. **Basic Techniques of Anesthesia (303)** **Unit I** Resuscitation techniques: Basic life support (Airway, breathing, circulation) and the equipment used for it. Drugs used in CPR. AED and Defibrillators. Anesthesia drugs and techniques: Principles of anesthesia. Basics of general anesthesia depth, mechanism and intubation. **Unit II** Techniques of general anesthesia. Various intravenous and inhalational agents. Regional anesthesia, spinal and epidural, posture and drugs. Local Anaesthetic agents. Neuro muscular blocking agents. **Unit III** Principles of oxygen administration along with the apparatus. Care of patient in the recovery room. Post-operative pain: evaluation and management. Types of fluid and therapy. Blood and blood components transfusion. **Unit IV** Preparation of anesthesia machine, intubation kit, suction machine, anesthesia drugs. Patient identification, marking, shifting to OT before surgery and out of OT to recovery room after surgery, complete takeover and handover of the patient with vital signs recording before and after surgical procedure to the nursing staff.	6(3-1-2)

Practical

1. Anesthesia work station
2. Boyle's anesthesia apparatus and other Advanced Anesthesia machines.
3. Apparatus and technique of the intravenous injections:
    a. Selection of the material used for intravenous injection.
    b. Different types of intravenous needles and cannulas.
    c. Theoretical study for testing of the toxicity of the materials.
4. Resuscitation equipment and Resuscitation techniques:
    a. Endotracheal tubes :
        Selection of the material used for the endotracheal tube
        Study of the structure of various types of the endotracheal tubes. Cleaning and sterilization of ETT.
    b. Connectors: Various connectors, size and material used.
    c. Mask: Material, structure and importance of dead space of face mask.
    d. Supraglottic airways.
    e. Spinal and epidural blocks: equipment, types of spinal and epidural needles, their structure. Instruments used for spinal and epidural blocks.
    f. Laryngeal sprays: Types, structure and material used, mechanism, uses and their maintenance.

Clinical Pharmacology (304)

6(3-1-2)

Unit I

Antisialagogues: Atropine, Glycopyrrolate.

Sedatives I Anxiolytics: Diazepam, Midazolam, Phenergan, Lorazepam, Chlorpromazine, and Triclofos.

Narcotics: Morphine, Pethidine, Fentanyl, Pentazozine, tramadol.

Antiemetic's: Metoclopramide, Ondanseteron, Dexamethasone.

Unit II

Induction Agent: Thiopentone, Diazepam, Midazolam, Ketamine, Propofol, Etomidate.

Muscle Relaxants: Depolarizing - Suxamethonium, Non depolarizing - Vecuronium, Atracurium, rocuranium

Inhalational Gases: Gases-02, N20, Air, Agents-Ether, Halothane, Isofllurane, Saevoflurane, Desflurane

Reversal Agents: Neostigmine, Glycopyrrolate, Atropine, Naloxone, Flumazenil (Diazepam).

	Unit III Local Anesthetics: Xylocaine, Bupivacaine - Topical, Prilocaine-jelly, Emla - Ointment, Etidocaine. Ropivacaine. Emergency Drugs : Mode or administration, dilution, dosage and effects Adrenaline, Atropine Ephedrine, Mephentramine Bicarbonate, calcium, potassium. **Unit IV** Inotropes: dopamine, dobutamine, amidarone Aminophylline, hydrocortisone, antihistaminic, Antihypertensive –Beta-blockers, Ca-channel blockers. Antiarrhythmic- xylocard Vasodilators- nitroglycerin & sodium nitroprusside Respiratory system- Bronchodilators Renal system- Diuretics, frusemide, mannitol **Practical** • Demonstration of Emergency Drugs: Mode or administration, dilution, dosage and effects. • Demonstration of Local Anesthetics: Xylocaine, Bupivacaine - Topical, Prilocaine-jelly, Emla - Ointment, Etidocaine. Ropivacaine. • Demonstration of Muscle Relaxants: Depolarizing - Suxamethonium, Non depolarizing - Vecuronium, Atracurium, rocuranium. **Semester 4th** **Basics of Surgical Procedures** **(401)** **Unit I** Blood Transfusion History of discovery of blood groups and genetics of blood groups. Types of blood groups and Rh factor. Coombs test. Collection of blood, its preservation and standardization. Various types of blood and blood products(Packed cells, PRP, FFP) Pre-transfusion checks. **Unit II** Transfusion reactions. Fluids and electrolytes Body fluid compartments and the effect of fluid administration on them. Types of fluids (crystalloids and colloids) and their chemical composition. Indications of specific fluids and their complications. General surgical procedure and para-surgical equipment.	6(3-1-2)

	Operating tables: structure, material used, maintenance, control, Hydraulic system and Electrical system. **Unit III** Different types of diathermy machine. Monopole, Bipolar, Ligasure, Harmonic Scalpel, CUSA- Principle, hazards, prevention, functioning and maintenance. Types of operation lights and light sources: Features, Care, cleaning, sterilization and maintenance. Operation Theatre sterilization- Different recent advances. LAR/APR--Positioning of patient, care-Prevention of hazards. Total thyroidectomy—with emphasis on proper positioning. Transthoracic esophagectomy—Different approaches. **Unit IV** Venesection and Tracheostomy. Laproscopic Cholecystectomy – Pneumoperitonium - Creation and removing, principles. Nephrectomy. Breast surgery. Positioning of patient for different operations: Problems and hazards. Hypothermia and hyperthermia. **Practical** • Indications of specific fluids and their complications. • General surgical procedure and para-surgical equipment. • Operating tables: structure, material used, maintenance, control, Hydraulic system and Electrical system. • Positioning of patient for different operations. • CUSA- Principle, hazards, prevention, functioning and maintenance. • Types of operation lights and light sources. • Types of blood groups and Rh factor. • Coombs test. • Collection of blood • Other practical based on syllabus **CSSD Procedures (402)** **Unit I** Principles of sterilization and disinfection. Methods of sterilization Dry Sterilization. Wet sterilization.	6(3-1-2)

	Unit II Gaseous sterilization. Chemical sterilization. Sterilization by radiation (Gamma rays, ultraviolet rays) Techniques of sterilization of rubber articles. (LMA, FOB, ETT, Laryngoscopes, Anesthesia machines and circuits.) **Unit III** Technique of sterilization of carbonized articles. Methods of disinfection. Boiling. Chemical disinfection. **Unit IV** Hazards of sterilization. Prevention of hazards of sterilization. Precautions to be taken during sterilization. Recent advances in the methods of sterilization. **Practical** • Principles of sterilization and disinfection. • Methods of sterilization. • Dry Sterilization. • Wet sterilization • Technique of sterilization of carbonized articles. • Methods of disinfection. • Chemical disinfection.	
	Medical Law and Ethics (403) **INTRODUCTION:** Legal and ethical considerations are firmly believed to be an integral part of medical practice in planning patient care. Advances in medical sciences, growing sophistication of the modern society's legal framework, increasing awareness of human rights and changing moral principles of the community at large, now result in frequent occurrences of healthcare professionals being caught in dilemmas over aspects arising from daily practice.[28] Medical ethics has developed into a well based discipline which acts as a "bridge" between theoretical bioethics and the bedside. The goal is "to improve	6(3-1-2)

the quality of patient care by identifying, analyzing, and attempting to resolve the ethical problems that arise in practice".[28] Doctors are bound by, not just moral obligations, but also by laws and official regulations that form the legal framework to regulate medical practice. Hence, it is now a universal consensus that legal and ethical considerations are inherent and inseparable parts of good medical practice across the whole spectrum. Few of the important and relevant topics that need to focus on are as follows:

Unit I

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

Unit II

Malpractice and negligence - Rational and irrational drug therapy
Autonomy and informed consent - Right of patients
Care of the terminally ill- Euthanasia.

Unit III

Organ transplantation
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.

Unit IV

Professional Indemnity insurance policy
Development of standardized protocol to avoid near miss or sentinel events
Obtaining an informed consent.

Practical

- Basic principles of medical ethics – Confidentiality.
- Malpractice and negligence
- Autonomy and informed consent - Right of patients
- Medico legal aspects of medical records – Medico legal case and type- Records and document related to MLC

Semester 5th

	Introduction To Quality and Patient Safety (501) **Unit I** Quality assurance and management - The objective of the course is to help students understand the basic concepts of quality in health Care and develop skills to implement sustainable quality assurance program in the health system. Concepts of Quality of Care. Quality Improvement Approaches. Standards and Norms. Quality Improvement Tools. Introduction to NABH guidelines. **Unit II** Basics of emergency care and life support skills - Basic life support (BLS), sudden cardiac arrest (SCA) and activation of the emergency response system, cardiopulmonary resuscitation (CPR), Vital signs and primary assessment Basic emergency care – first aid and triage Ventilations including use of bag-valve-masks (BVMs) Choking, rescue breathing methods One- and Two-rescuer CPR Using an AED (Automated external defibrillator). Managing an emergency including moving a patient Bio medical waste management and environment safety. Definition of Biomedical Waste, Waste minimization BMW – Segregation, collection, transportation, treatment and disposal (including color coding) Liquid BMW, Radioactive waste, Metals / Chemicals / Drug waste BMW Management & methods of disinfection Modern technology for handling BMW Use of Personal protective equipment (PPE) Monitoring & controlling of cross infection (Protective devices) **Unit III** Infection prevention and control. Evidence-based infection control principles and practices [such as sterilization, disinfection, effective hand hygiene and use of Personal protective equipment (PPE)], Prevention & control of common healthcare associated infections, Components of an effective infection control program, and Guidelines (NABH and JCI) for Hospital Infection Control Antibiotic Resistance- History of Antibiotics How Resistance Happens and Spreads Types of resistance- Intrinsic, Acquired, Passive	6(3-1-2)

	Trends in Drug Resistance Actions to Fight Resistance Bacterial persistence Antibiotic sensitivity Consequences of antibiotic resistance Antimicrobial Stewardship- Barriers and opportunities, Tools and models in hospitals **Unit IV** Disaster preparedness and management. Fundamentals of emergency management, Psychological impact management, Resource management, Preparedness and risk reduction, Key response functions (including public health, logistics and governance, recovery, rehabilitation and reconstruction), information management, incident command and institutional mechanisms. **Practical** • Basics of emergency care and life support skills - Basic life support (BLS), • cardiopulmonary resuscitation (CPR), One- and Two-rescuer CPR • Vital signs and primary assessment • Basic emergency care – first aid and triage • BMW – Segregation, collection, transportation, treatment and disposal (including color coding) • Use of Personal protective equipment (PPE) • Monitoring & controlling of cross infection (Protective devices) **Advance Anesthesia Techniques (502)** **Unit I** Heart as a pump. Cardiac cycle. Cardiac contractility and stroke volume. Cardiac output and its measurement. Various ECG Leads, their placement and Normal ECG. Cardiac Arrhythmias (atrial fibrillation, ventricular tachycardia, extra systoles) **Unit II** Circulatory shock and its physiology.	6(3-1-2)

Cardiac failure.
Physics of blood flow and pressure.
Measurement of blood flow.
Electromagnetic flow meter, ultrasonic flow meter, plethysmography.
Regulation of arterial pressure and hypertension (Drugs used for treatment of hypertension)

Unit III
Arterial circulation including cardiopulmonary bypass.
Artificial ventilation and related equipment:
Physiology of IPPV (Intermittent positive pressure ventilation)
Principles of mechanical ventilation.
Various modes of IPPV.
Automatic pressure and time cycled ventilators.

Unit IV
Operating room ventilators.
Other types of ventilators (HFJV, NIV)
Complications in patients on ventilators.
General care of a patient on ventilator.
Disinfection and sterilization of ventilators.
Humidification
Principles of oxygen administration and methods used to deliver oxygen.
Acid base balance.
Electrolyte imbalance and its relevance to anesthesia.

Practical

- Various ECG Leads, their placement and Normal ECG.
- Measurement of blood flow.
- Arterial circulation including cardiopulmonary bypass.
- Artificial ventilation and related equipment
- Principles of oxygen administration and methods used to deliver oxygen.

Medicine
(503)

	Unit I Common symptoms of diseases – Pain: pathophysiology, clinical types, assessment and management Fever: clinical assessment and management Cough, chest pain, dyspnoea, hemoptysis Edema, anasarca, ascites Pallor, jaundice Bleeding Anorexia, nausea and vomiting **Unit II** Constipation and diarrhea Hematemesis, malena and hematochezia Common urinary symptoms- dysuria, pyuria, anuria, oliguria, polyuria, nocturia, enuresis Body pains and joint pains Headache, seizures, fainting, syncope, dizziness, vertigo Disturbances of consciousness and coma Weight loss and weight gain **Unit III** Immune Response and Infections Approach to infectious diseases – diagnostic and therapeutic principles Immune defense mechanisms Laboratory diagnosis of infections Principles of immunization and vaccine use Immunodeficiency disorders - acquired Immunodeficiency disorders – congenital **Unit IV** Systems Cardiovascular system- Clinical examination of the cardiovascular system, major manifestations of cardiovascular disease Respiratory system - Clinical examination of the respiratory system, major manifestations of respiratory disease Renal and genito-urinary system- Major manifestations of renal and urinary tract disease Liver and biliary tract disease - Viral hepatitis, alcoholism. Endocrinology and metabolism - Diabetes mellitus, Hyper - and hypothyroidism. Disorders of the Immune System, Connective Tissue and Joints	6(3-1-2)

	Disorder of haemopoesis - Anemia - iron deficiencies anemia. **Practical** • Fever: clinical assessment and management • Laboratory diagnosis of infections • Clinical examination of the cardiovascular system • Clinical examination of the respiratory system **Transplant Technology (504)** **Unit I** Introduction, Classification & Importance of Transplant Technology. Type of Transplants, Reactions of Transplants, Liver transplant, heart transplant, hair transplant, hip joint transplant, knee joint transplant. **Unit II** Graft versus Host Reactions, Tumor Antigens – Specific & Associated Antigens, Immune Response of Transplantations. Tissue Tying & Matching. ABO Compatibility, HLA Compatibility. **Unit III** HLA Complex, HLA Molecules Antigen & Its Classification. Indicators of HLA & Its Reactions. Immunogenetics of Transplantation, Factors of Transplantations. **Unit-IV** Theory Behinds the Transplantation of Bone Marrow, Kidney, Skin. Diagnosis of transplant Acceptance & Rejections. Microbiology Associated with transplantation. **PRACTICALS** 1. Demonstration of Transplant technology 1. Determination of Hormone & Enzyme As tumor Marker 2. Perform the ABO Compatibility 3. Perform the ABO Compatibility Test 4. Identification of micro-organism in transplant patients 5. Any other practical's based on theory paper **RECOMMENDED BOOKS**	6(3-1-2)

	1. Operative Techniques in Transplantation Surgery 1 Har/Psc Edition by Michael J. Englesbe M.D. (Editor), Michael W Mulholland MD PhD 2. Regenerative Medicine Applications in Organ Transplantation*by: Giuseppe Orlando* 3. Abdominal Organ Transplantation: State of the Art **Semester 6th** **Specialized Anesthesia and Surgery** **(601)** **Unit I** Cardiovascular and Respiratory System- Techniques, equipment, procedures and instruments Diseases of cardiovascular and respiratory systems. Types of perfusion machines. Techniques of Perfusion and operational capabilities. Intra-aortic Balloon pump. Cell saver techniques. Care, maintenance and working of Heart lung Machine. Patient's record keeping preoperatively, during anesthesia and post-operatively. Principles and techniques of temperature monitoring. Positioning during cardiothoracic surgical procedures. Positioning and techniques for: Radial artery cannulation. Central venous cannulation/pulmonary artery catheter. Femoral artery/venous cannulation. **Unit II** Monitoring Techniques and Equipment: Cardiac monitors, blood pressure and ECG monitoring. Respiratory monitors, respiratory rate, Spirometers, SpO2, and EtCO2. Temperature monitors. TEE and echocardiography machine Non- invasive cardiac output machine Positioning- During various neurosurgical procedures including sitting, prone, lateral and position for trans-sphenoidal hypo-physectomy. Fixation of head during various neurosurgical procedures. Prone and Knee chest position for spine surgery. Requirements during intubation in a case of cervical spine fracture including fiber- optic laryngoscopy, awake intubation, LMA family especially ILMA.	6(3-1-2)

Unit III

Anaesthetic and surgical requirements during aneurysm surgery.

Surgical and Anaesthetic requirements during micro neurosurgery including types of microscopes, principle, structural features, microscopic photography and cameras used.

Anaesthetic and surgical requirements during thyroid surgery, adrenal surgery.

Anaesthetic and surgical requirements during abdominal surgery including Laproscopic surgery, genitourinary surgery including percutaneous nephrolithotomy, Endoscopic surgery, TURP, TURBT, Lithotripsy, ESWL (Extracorporeal shock wave therapy)

Anaesthetic and surgical requirement during renal transplant donor and recipient surgery including care and precautions during operative procedures of hepatitis B & hepatitis C positive patients.

Anaesthetic and surgical requirement during pediatric and Neonatal surgical procedures including emergency procedures like tracheo-esophageal fistula. Sub diaphragmatic hernia, major abdominal and thoracic procedures. Foreign body bronchus and esophagus.

Unit IV

Apparatus and techniques for measuring blood pressure and temperature.

Principle and working of direct/Indirect blood pressure monitoring apparatus.

Intraoperative and postoperative problems and complications of general surgery.

Management of emergency caesarean section.

Management of massive obstetrical hemorrhage.

Surgical management in major burns and craniofacial surgery.

Surgical management of joint replacement and arthroscopy.

Surgical management of endoscopies, laryngectomy with RND and cochlear implant.

Management of PPV and perforating eye injury.

Care and maintenance of Para-surgical equipment (Cautery, OT Lights, OT Table etc.)

PRACTICALS

- Types of perfusion machines.
- Techniques of Perfusion and operational capabilities.
- Radial artery cannulation.
- Central venous cannulation/pulmonary artery catheter.

	• Femoral artery/venous cannulation • Cardiac monitors, blood pressure and ECG monitoring. • Respiratory monitors, respiratory rate, Spirometers, SpO2, and EtCO2. • Temperature monitors • Apparatus and techniques for measuring blood pressure and temperature **Electronics and Technology In Surgery and Anesthesia (602)** **Unit I** Electronics and electro mechanical techniques- Electrical safety precautions in operation theatre. OT tables, OT lights, suction machines, electrodes, pressure transducers, electrical safety, application, handling operation. Basic electronics, basic principle, care and maintenance and uses of surgical diathermy machine, defibrillator, Boyle's apparatus, anesthesia machine, monitors, pace-makers and stimulators etc. Engineering aspects of operation theatre equipment, power supplies, CVT, servo-stabilizers, and ups etc. **Unit I** Book keeping and Stock maintenance. Moral aspects and duties of OT technologist. Indenting, Book keeping and storage procedures of different articles. Co-ordination with all working personal in operation Theatre. **Unit I** Psychological aspects of patient, staff and relatives of the patient. Management of operation theatre in routine and emergency. **Unit IV** Computer data processing, software information and Data management Logging on and off, Security concepts, Sending and receiving Emails. Hospital information system. **PRACTICALS** • Hospital information system. • Book keeping and Stock maintenance. • Moral aspects and duties of OT technologist. • Management of operation theatre in routine and emergency. **Assignment (Project Work)**	6(3-1-2)

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