بِسۡمِ ٱللَّهِ ٱلرَّحۡمَٰنِ ٱلرَّحِيمِ

Bismillahirrahmannirrahiim

In the name of God, the Most Gracious, the Most Merciful

CURRICULUM / STATUTES/ REGULATIONS

FOR 2 YEARS DIPLOMA PROGRAMME IN

ANESTHESIOLOGY

Faisalabad Medical University

Faisalabad

Contents

Section A

VISION STATEMENT:

Faisalabad Medical University has been established since 05-05-2017 for purpose of imparting better medical education and encouraging and arranging extensive research and publication in the field of medical science. The vision of university is:

"Striving to achieve national and international stature in undergraduate and postgraduate medical education with strong emphasis on professionalism, leadership, community health services, research and bioethics"

MISSION STATEMENT

The mission of the University is:

"Educate Healthcare professionals to prevent, diagnose and treat human illnesses to practice evidence-based medicine with focus on lifelong healthcare in order to meet the challenges of community needs and competitive medical profession at the same time"

STATUTES

Nomenclature

The name of the degree shall be **diploma in anesthesiology (DA)**

Course Title:

DA; diploma in anesthesiology

Training Centers

Department of anesthesia and intensive care at hospitals affiliated with Faisalabad Medical University, Faisalabad, under an approved supervisor.

Duration of Course

The duration of course shall be 2 years with structured training in a recognized department, as per university rules and curriculum.

Course structure:

The course is structured in two parts:

Part I: The candidate shall undertake the training in the basic sciences as per curriculum. 75% content will be uniform for all the specialties, approved by the Dean basic sciences and academic council, while 25% will be subject specific, provided and approved by the relevant department and academic council. At the end of 6-months, Part I Examination will be held by the examination department of Faisalabad medical University as per the table of specification in the basic medical Sciences subjects with same percentage of content from uniform and subject specific content as indicated above i.e. 75% and 25% respectively. All the candidates will attend classes in basic

science departments as per the time table for 5 days (Monday - Friday) and on Saturday they will attend the class in their respective specialty as per the time table provided by the university during first 6 months.

Part II: The candidate shall undertake clinical training in the specialized department as per the curriculum. At the end of 2 years, Part II Examination will be held by the examination department of Faisalabad medical University as per the table of specification in the subject concerned.

Section B

Admission and Eligibility Criteria:

Applications for admission to DIPLOMA will be invited through advertisement in print and electronic media and according to guidelines and rules approved by the Faisalabad Medical University

Candidate shall have:

1. MBBS or equivalent classification
2. Valid PMDC registration
3. One year House job (Three months house job in relevant specialty will be preferred)
4. Secure pass percentage in entry test conducted by The Faisalabad medical university
5. Qualify the interview successfully

Required Documents:

1. Completed application Form
2. Copy of MBBS degree with mark sheets of Professional Examinations and certificate of number of attempts in Professional Examination
3. Copy of PMDC Registration certificate.
4. Certificate of completion of required experience.
5. Reference letters from two consultants, with whom the applicant has worked
6. Three latest passport size photographs

Accreditation Related Issues of The Institution

A. Faculty

Properly qualified teaching staff in accordance with the requirements of Pakistan Medical and Dental Council (PMDC).

B. Adequate resources

The university will provide adequate resources Including class-rooms (with audiovisual aids), demonstration rooms, computer lab, clinical pathology lab, theaters, instruments and other equipment etc. for proper Training of the residents as per their course outcomes and objectives.

C. Library

Departmental library should have latest editions of recommended books, reference books and latest journals (National and International).

Section C

AIMS AND OBJECTIVES OF THE COURSE

AIM

The aim of two years Diploma program in **Anesthesiology** is to equip medical graduates with relevant professional Knowledge, skill and ethical values to enable them to apply their acquired expertise at health care institutions. Anesthesiologists play a pivotal role not only in the operation rooms but also as physicians in intensive care units as well the pain management clinics.

CORE COMPETENCIES:

Patient Care:

- Residents are expected to provide patient care that is compassionate, appropriate and effective for the promotion of health, prevention of illness, treatment of disease and at the end of life.
- Gather accurate, essential information from all sources, including medical/surgical interviews, physical examinations, medical records and diagnostic/therapeutic procedures.
- Make informed recommendations about preventive, diagnostic and therapeutic options and interventions based on clinical judgment, scientific evidence, and patient preference.
- Develop, negotiate and implement effective patient management plans.
- Perform competently various procedures considered essential to their respective specialty.

Interpersonal And Communication Skills:

- Residents are expected to demonstrate interpersonal communication skills that enable them to establish and maintain professional relationships with patients, families, and other members of health care teams.
- Use effective listening, nonverbal, questioning, and narrative skills to communicate with patients and families.
- Maintain comprehensive, timely, and legible medical records.

Professionalism:

- Residents are expected to demonstrate behaviors that reflect a commitment to continuous professional developmental, altruism, ethical practice and a responsible attitude toward their patients, their profession, and society.
- Demonstrate sensitivity and responsiveness to the gender, age, culture, religion, socioeconomic status, beliefs, behavior and disabilities of patients and professional colleagues.
- Adhere to principles of confidentiality, scientific/academic integrity, and informed consent.

Practice-Based Learning:

- Residents are expected to be able to use scientific evidence and methods to investigate, evaluate, and improve patient care practices.
- Identify areas for improvement and implement strategies to enhance knowledge, skills, attitudes and processes of care.
- Develop and maintain a willingness to learn from errors and use errors to improve the system or processes of care.
- Use information technology or other available methodologies to access and manage information, support patient care decisions and enhance both patient and physician education.

Systems-Based Practice

- Residents are expected to demonstrate both an understanding of the contexts and systems in which health care is provided, and the ability to apply this knowledge to improve and optimize health care.
- Apply evidence-based, cost-conscious strategies to prevention, diagnosis, and disease management.
- Collaborate with other members of the health care team to assist patients in dealing effectively with complex systems and to improve systematic processes of care.

LEARNING OBJECTIVES:

GENERAL OBJECTIVES:

Two-year training should enable a student to practice and master Knowledge, Skill and Attitude in various domains of clinical practice in Anesthesiology.

The trainee shall be able to:

1. Demonstrate comprehensive knowledge of General Medicine, General Surgery, Physiology, Pharmacology, physical properties of gases, working of vast array of anesthesia equipment, medical conditions, drug interactions, general and intensive care of the patients.

2. Apply national and international guidelines to assess a patient
3. Satisfactorily addresses fears, concerns and expectations of the patients

4. Evaluate patients in the setting of outpatient department, hospital wards, labor room, emergency and operation theatre
5. Order a set of relevant investigations considering availability, diagnostic yield, cost-effectiveness, side effects, and implications for management
6. Take proper informed consent for physical examination and ensure confidentiality and appropriate environment for intimate physical examination

7. Counsel patients and relatives in patient's preferred language in elective and emergency situations in keeping principles of good communication skills, empathy and empowerment of patients

8. Exhibit emotional maturity and stability, integrity, ethical values and professional approach, sense of responsibility in day-to-day professional activities
9. Act as an independent specialist at community level/Tehsil and District Headquarter Hospital

10. Show initiative and become life-long self-directed learners tapping on resources including clinical material, faculty, internet and on-line learning program and library

11. Develop and master various procedural skills
12. Able to provide anesthesia services under indirect supervision and later independently

13. Be an effective team player, leading the team if necessary
14. Demonstrate honesty, integrity and timeliness (punctuality and completion of tasks in assigned time frame)

15. Maintain confidentiality, take appropriate consent
16. Consults with colleagues and refers the patient as appropriate
17. Demonstrate conflict resolution and management skills.

SPECIFIC LEARNING OUTCOMES:

Following competencies will be expected from a student completing 02 year training program of Diploma in Anesthesiology :

At the end of the training program students will be able to understand and perform:

Anesthetic equipment and safety:

- Physical principles underlying the function ofthe anesthetic machine, pressure regulators,flow meters, vaporizers, and breathing systems.
- Absorption of carbon dioxide
- Principles of lung ventilators, disconnectionmonitors
- Manufacture and storage of oxygen, nitrousoxide, carbon dioxide, and compressed air.
- Pipeline and suction systems, gas cylinders
- Humidification devices
- Minimum monitoring requirements
- Environmental control of the operating theatre including scavenging systems for waste anesthetic gases and vapors
- Pre-use checks of the anesthetic machine, breathing systems, and monitoring apparatus
- Anesthetic records and critical incidents
- Function and use of related anesthetic and resuscitation equipment including that used for regional anesthesia; Airways, tracheal tubes, tracheostomy tubes, laryngeal masks, oxygen therapy equipment, self-inflating bags,spinal and epidural needles, intravenous cannulas and transfusion devices
- Sterilization and cleaning of the equipment

Preoperative assessment

- Implications for anesthesia of more common medical conditions. In particular, respiratory diseases (e.g., asthma, chronic obstructive airway disease), cardiac disease (e.g., angina pectoris, valvular disease, myocardial infarction, pacemakers, arrhythmias), vascular disease (e.g., hypertension), sickle cell disease

and anemias, rheumatoid arthritis, renal dysfunction and insufficiency, plasma electrolyte disturbance (e.g., hyper- and hypokalemia), diabetes mellitus, liver disease

- Implications for anesthesia of more commonsurgical conditions, trauma, intestinal obstruction, and acute abdominal emergencies
- ASA classification and other pre-anesthetic scoring systems such as the Glasgow ComaScale
- Interpretation of relevant preoperative investigations, plasma electrolytes, hematology, disturbances of acid/base status,ECG, X-rays, pulmonary function tests, and clotting abnormalities
- Preoperative assessment of a patient of anyage (excluding neonates) for elective or emergency surgery
- Restriction of food and fluid by mouth,cessation of smoking, correction of dehydration
- Assessment of difficulty of tracheal intubation
- Precautions in the management of the infective patient (e.g., hepatitis seropositive orHIV positive)
- Anesthetic implications of current drug therapysuch as beta-blockers, antihypertensive drugs, tricyclic antidepressant agents and monoamine oxidase inhibitors, insulin, anti- diabetic drugs, anticoagulants, contraceptives
- Assessment of postoperative analgesic needs

Premedication

- Rationale for premedical drugs.
- Choice of drugs, advantages, anddisadvantages
- Induction
- Intravenous and inhalational anesthetic agents; advantages and disadvantages; techniques
- Recognition and management of anaphylacticand anaphylactoid reactions, including follow-up and patient information
- Indications for tracheal intubation
- Management of difficult intubation and failedintubation
- Recognition of correct placement of trachealtube, esophageal and endobronchial intubation, complications
- Causes of regurgitation and vomiting duringinduction, prevention, and management

- Technique of cricoid pressure; pulmonaryaspiration
- Induction of anesthesia in special circumstances, head injury, full stomach,upper airway obstruction.

Intraoperative assessment

- Ability to deal with emergencies before, duringand after anesthesia and the ability to stabilize a patient's condition until senior assistance can be obtained.
- Techniques of maintenance of anesthesia.
- To provide adequate analgesia using opioidsand other analgesic drugs.
- Management of appropriate intermittentpositive pressure ventilation.
- Intraoperative fluid therapy.
- Diagnosis and management of important critical incidents during anesthesia including cyanosis, hypertension, hypotension, cardiac arrhythmias, bronchospasm, respiratory obstruction, increased peak inspiratory pressure, hyper- and hypocarbia, failed intubation, failed reversal
- Management of massive hemorrhage, volume expansion, blood transfusion (hazards including incompatibility reaction), gas embolism, malignant hyperthermia
- Correct intraoperative positioning on theatretable - complications, prone position
- Diagnosis and treatment of pneumothorax

Postoperative assessment

- Causes and treatment of failure to breathe atend of operation, suxamethonium apnea management
- Care of the unconscious patient
- Recovery room diagnosis and treatment of inadequate pulmonary ventilation, cyanosis, hypo- and hypertension, shivering, and stridor.
- Oxygen therapy, indications, and techniques
- Methods of pain management. Assessment ofpain and analgesic techniques

- Prevention, diagnosis and treatment of postoperative pulmonary atelectasis, deepvein thrombosis and pulmonary embolus
- Postoperative fluid therapy
- Causes and treatment of postoperativenausea and vomiting
- Minor and major adverse sequelae to anesthesia and their management

Anesthesia in special circumstances

- Principles of Obstetric Anesthesia
- Principles of the care of children (excluding neonates and infants) undergoing anesthesia for straightforward surgical procedures, including ENT, eye, and dental operations
- Principles of general anesthesia for simple ophthalmic procedures and a penetrating eye injury
- Patients with a pacemaker
- Advantages and problems associated withday surgery, appropriate anesthetic techniques
- Principles of neurosurgical anesthesia asapplied to the management of the head-injured patient
- Problems of anesthesia in the obese patient
- Repeat anesthesia - hepatic injury
- Implications for the anesthetist of viralhepatitis and HIV infections
- Laparoscopic and minimally invasiveprocedures
- Management of patients requiring transfer

Regional anesthesia

- Indications, technique, and, management ofthe complications of spinal and epidural (including caudal approach) analgesia.
- Techniques including intravenous regional anesthesia, brachial plexus block, femoral nerve block, inguinal field block, ankle blockand the dorsal nerve of the penis block.

- Local anesthesia for awake tracheal intubation.

Resuscitation

- Immediate care and resuscitation in patientsof all ages. Patient assessment
- The principles and practice of life support
- The principles and practice of recognition andmanagement of life-threatening arrhythmias including defibrillation and drug therapy
- The techniques of venous access and theintraosseous route
- Management of the airway and ventilation in an emergency situation, including care of the cervical spine
- Specific problems in pediatric resuscitation
- Ethical aspects of resuscitation

Trauma

- Pathophysiology of trauma and hypovolemia
- Assessment, immediate care, and management of trauma patients of all ages
- Performance and interpretation of the primaryand secondary survey
- Immediate specific treatment of life- threatening illness or injury, with special reference to thoracic and abdominal trauma
- Care of cervical spine injury
- Emergency airway management and oxygentherapy
- Cannulation of major vessels for resuscitationand monitoring
- Management of hypovolemic shock
- Chest tube insertion and management
- Pain management in trauma victims

Critical Care

- General care
- Ventilation modes

- Nutritional support
- Organ support

Content list:

Part I:

Theoretical Component relevant to Anesthesiology:

1. Applied anatomy
2. Applied physiology
3. Clinical Pharmacology and therapeutics
4. General pathology/ applied hematology/ general microbiology
5. Physics and anesthetic equipment
6. Monitoring equipment
7. Resuscitation and crisis management
8. Basics of anesthesia
    - Preoperative assessment
    - Clinical examination and recognition of medical disease
    - Premedication
    - Airway maintenance
    - PACU / Recovery from anesthesia
    - Post op problems and care
    - Occupational hazards

A : BASIC SCIENCES CONTENT:

ANATOMY:

Gross Anatomy of Head & Neck

- Scalp & Face

- Bony Orbit
- Mandible & Cervical Vertebra
- Temporal Fossa, Infra Temporal Fossa & Mandible
- Eye Ball & Extra-ocular Muscle
- Fascia & Triangles of Neck
- Tongue, Oral Cavity & Salivary Gland
- Larynx & Thyroid Gland
- Pharynx
- Ear
- Nose & Paranasal Air Sinuses
- Vessels of Head & Neck
- Lymphatic Drainage of Head & Neck
- Radiography of Head & Neck
- Cranial Cavity

Gross Anatomy of Abdomen & Pelvis

- Anterior Abdominal Wall
- Anterior Abdominal Wall & Rectus Sheath
- Inguinal Canal & Hernia,Scrotum & External Genitalia
- Peritoneum
- Stomach & Small Intestine
- Liver,Pancreas,Spleen & Extrahepatic Billiary Apparatus
- Bllod Supply & Nerve Supply Of Abdomen
- Large Intestine + Appendix
- Posterior Abdominal Wall
- Bony Pelvis + Joints Of Pelvis
- Female Reproductive System
- Anal Region
- Nerves & Vessels of Pelvis
- Radio Graphs of Abdomen & Pelvis

Neuroanatomy

- Dural Venous Sinuses &Meningies
- Brainstem 1
- Brainstem 2
- Brainstem 3
- ANS
- Cerebrum 1
- Cerebrum 2
- Diencephalon 1
- Diencephalon 2
- Ventricular System
- Cranial 1
- Cranial 2

GROSS ANATOMY OF SPINAL CORD

General & Special Embryology

General & Special Histology

APPLIED PHYSIOLOGY:

Conceptual and considered approach to

1. Cell physiology
2. Basic and Clinical Neurophysiology
3. Blood physiology
4. Heart and overview of Circulation
5. Renal Physiology
6. Advance Endocrinology
7. Respiratory Physiology
8. Molecular and physiological aspects of Nerve and Muscle

Cell Physiology

1. Functions of cells, cell membranes and its organelles

2. Homeostasis
3. Necrosis
4. Apoptosis

Basic & Clinical Neurophysiology

1. Nerve physiology
2. Action potential in nerve fiber, mechanism of generation action potential in a nerve fiber
3. Parts of central, peripheral nervous system and their physiology
4. Autonomic nervous system
5. Special sense vision (eye)
6. Pathophysiology of the diseases involved

Blood Physiology

1. Components of blood, functions of blood plasma and plasma proteins
2. Blood grouping and principles of transfusion
3. The body defense systems (lmmunology)
4. Disorders of the blood

Heart And Overview of Circulation

1. The basic structure and function of heart, ECG recording and interpretation
2. Conductive pathway of heart
3. Physiological principles to manage a person in shock due to various reasons
4. Disorders of the CVS

Renal Physiology

1. Basic structure and function of the kidney
2. Glomerular filtration, tubular function and urine formation.
3. Role pf kidney in acid base, Na,K,Ca blance
4. Endocrine and regulatory functions of the kidney

Advance Endocrinology

1. Endocrine glands, classification their functions
2. Feedback control mechanisms
3. Disorders of endocrine glands

BIOCHEMISTRY:

1. Buffers

- Ionization of water
- Henderson – Hasselbach equation
- Body buffers and regulation of Acid base balance human body
- Acids produced in the body, mechanisms of regulation of pH, role of lungs and kidney in buffering mechanism
- Disorders of acid base metabolism

2. Enzymes:

- Classification/nomenclature, Properties of enzymes and catalysts, regulation of enzyme activity
- Functions of enzymes and catalysts,
- Therapeutic use and application of enzymes in clinical diagnosis
- Enzyme kinetics, Factors affecting enzyme activity (Michaelis – Menten and Lineweaver Burk equations)
- Classification of enzyme inhibitors and their biochemical importance

3. Carbohydrates:

- Definition, biochemical function and classification of carbohydrates, Structure and functions of monosaccharides and their derivatives
- Disaccharides, Oligosaccharides, Polysaccharides and their Biochemical importance.

4. Proteins:

- Definitions, biochemical importance and classification of proteins based on physiochemical properties, Structure of proteins and their significance in pH maintenance
- Amino acids and their structure, properties, functions, Classification and nutritional significance of amino acids
- Immunoglobulins and their biomedical significance
- Plasma proteins and their clinical significance

5. Porphyrins and Hemoglobin:

- Chemistry and biosynthesis of porphyrins and related disorders
- Structures, functions and types of hemoglobin, Oxygen binding capacity of hemoglobin, factors affecting and regulating the oxygen binding capacity
- of hemoglobin, Haemoglobinopathies (Sickle cell disease, Thalassemia etc.) and their biochemical causes
- Degradation of hemoglobin, formation of bile pigments, its types, transport and excretion

- Hyperbilirubinemias, biochemical causes and differentiation

6. Lipids and Fatty Acids:

- Classification of lipids and their biochemical functions, Structure and biochemical function of neutral lipids phospholipids, glycolipids and sphingolipids
- Classification of fatty acids and their biochemical functions,
- Eicosanoids and their function in health and disease
- Steroids and their biochemical role, Cholesterol, its structure, chemistry and functions
- Bile acids and bile salts
- Lipid peroxidation and its clinical significance

7. Vitamins and Minerals:

- Vitamins and their different types, Classification of vitamins, their chemical structure and biochemical function, Absorption of vitamins and minerals
- Daily requirements, sources of water- and fat-soluble vitamins
- Clinical effects of vitamin deficiency, Role of vitamins as co-enzymes, Hypo- and hyper-vitaminosis
- Minerals in human nutrition, sources, biochemical actions and recommended daily allowance (RDA), Sodium, potassium, chloride, calcium, phosphorus, magnesium, sulfur, iodine, fluoride, Trace elements: Iron, Zinc, Selenium, Iodine, Copper, Chromium, Cadmium, Manganese (Fe, Zn, Se, I, Cu, Cr, Cd and Mn)

7. Endocrinology:

- Introduction of hormones, mechanism of hormone action, classification of hormones
- Endocrine hormones of human body (Synthesis, Secretion, Mechanism of Action, effects on target tissues, regulation, related disorders)

a. Anterior Pituitary Hormones
b. Posterior Pituitary Hormones
c. Hormones of Adrenal Cortex, Adrenal Medulla
d. Sex Hormones of male & female reproductive system
e. Hormones of thyroid gland
f. Parathyroid Hormone
g. Endocrine portion of Pancreas

9. Nucleotides and Nucleic acids:

- Chemistry of purines and pyrimidines, their derivatives, structure and function, Derivatives of purines and

pyrimidines, their role in health and disease

- Chemistry and structure of nucleoside and nucleotide and their biochemical role, Nucleic acids (DNA & RNA) their types, structure and functions

10. <u>Bioenergetics and Biological oxidation</u>:

- Endergonic and exergonic reactions, coupling through ATP
- Oxidation and reduction, methods of electron transfer, redox potential, enzymes and coenzymes of biologic oxidation and reduction
- Respiratory chain and oxidative phosphorylation, components of respiratory chain, electron carriers
- ATP synthesis coupled with electron flow
- ADP coupled to electron transfer
- Uncouplers and inhibitors of oxidative Phosphorylation

11. <u>Metabolism of carbohydrates</u>:

- Glycolysis, Phases and reactions of glycolysis
- Energetics of aerobic and anaerobic glycolysis and their importance, Regulation of glycolysis
- Cori's cycle, The fate of pyruvate
- Citric Acid Cycle, Reactions, energetics and regulation and importance of citric acid cycle
- Amphibolic nature of citric acid cycle (tricarboxylic acid cycle –TCA or the Krebs's cycle)
- Anpoleratic reactions and regulations of TCA cycle
- Gluconeogenesis
- Important three by-pass reactions of gluconeogenesis
- Entrance of amino acids and intermediates of TCA cycle and other nutrients as gluconeogenic substrates
- Significance of gluconeogenesis
- Glycogen metabolism
- Reactions of glycogenesis and glycogenolysis
- Importance of UDP-Glucose
- Regulation of glycogen synthase and glycogen phosphorylase
- Glycogen phosphorylase A and the blood glucose sensor
- Disorders of glycogen metabolism (glycogen storage diseases)
- Secondary pathways of carbohydrate metabolism
- Hexose Mono Phosphate (HMP) shunt, its reactions and importance
- Glucuronic acid pathway, its reactions and importance

- Metabolism of fructose, galactose and lactose
- Regulation of Blood Glucose level
- Hyperglycemia, hypoglycemia and their regulating factors
- Biochemistry of Diabetes Mellitus, its laboratory findings and diagnosis

12. <u>Metabolism of Lipids</u>:

- Mobilization and transport of fatty acids, triacylglycerol and sterols
- Oxidation of fatty acids
- Activation and transport of fatty acid in the mitochondria
- β-oxidation, fate of acetyl CoA, regulation of β-oxidation
- Other types of oxidations, i.e., αoxidation, ω-oxidation, peroxisome oxidation, oxidation of odd number carbon-containing fatty acids and unsaturated fatty acids etc.
- Ketogenesis
- Mechanism and utilization of ketone bodies and significance
- Ketosis and its mechanism
- Biosynthesis of fatty acids
- Eicosanoids, synthesis from arachidonic acid, their mechanism and biochemical functions
- Triacylglycerol synthesis and regulation
- Synthesis and degradation of phospholipids and their metabolic disorders
- Cholesterol synthesis, regulation, functions, fate of intermediates of
- Cholesterol synthesis, hypercholesterolemia, atherosclerosis
- Plasma lipoproteins, VLDL, LDL, HDL, and chylomicrons, their transport, functions and importance in health and disease
- Glycolipid metabolism and abnormalities

13. <u>Metabolism of Proteins</u>:

- Amino acid oxidation, metabolic fates of amino acid, transamination, deamination decarboxylation, deamidation and transamination
- Transport of amino group, role of pyridoxal phosphate, glutamate, glutamine, alanine
- Ammonia intoxication, nitrogen excretion and urea formation,
- Urea cycle and its regulation, genetic defects of urea cycle
- Functions, pathways of amino acid degradation and genetic disorders of individual amino acids

14. <u>Metabolism of Nucleotides:</u>

- De novo purine synthesis
- Synthesis of pyrimidine
- Recycling of purine and pyrimidine bases (Salvage pathway)
- Degradation of purine, formation of uric acid
- Disorders of purine nucleotide metabolism

15. <u>Bio signaling</u>:

- G-Protein Coupled Receptor
- Second Messengers
- Tyrosine Kinase Receptor
- Role of cGMP
- Multivalent Adaptor Proteins and Membrane Rafts
- Gated Ion Channels
- Bidirectional Cell-Adhesion Receptors
- Regulation of Transcription by Nuclear Hormone Receptor
- Regulation of Cell Cycle by Protein Kinases
- Oncogenes, Tumor Suppressor Genes, Programmed Cell Death

16. <u>Genes and Chromosomes</u>:

- Chromosomal elements
- DNA supercoiling
- Structure of chromosomes
- Genetic Mutations

17. <u>DNA Metabolism</u>:

- DNA structure
- DNA replication
- DNA damage and repair mechanism
- DNA Recombination

18. <u>RNA Metabolism</u>:

- DNA dependent synthesis of RNA
- RNA processing
- RNA dependent synthesis of RNA & DNA
- HIV Reverse Transcriptase

- Methods for generating RNA polymers

19. Regulation and Gene Expression:

- Principles of gene regulation
- Process of Transcription, Post-Transcriptional Modification
- Regulation of gene expression in bacteria/eukaryotes
- Genetic code
- Process of Translation, Post-Translational Modification

20. Metabolic Disorders and Their Clinical Importance:

1. Metabolic disorders related to Carbohydrate Metabolism:

- Diabetes Mellitus& its complications
- All types of Glycosuria
- Classical Galactossemia
- Hereditary fructose intolerance
- Essential Fructosuria
- Essential Pentosuria
- G-6 PD deficiency
- Hyperosmolar Nonketotic Diabetic Coma
- Glycogen Storage Diseases
- Hypoglycemia
- Lactose intolerance

2. Metabolic disorders related to Lipid Metabolism:

- Lipid Storage Diseases
- Ketosis and Ketonuria including Diabetic Ketoacidosis
- Respiratory Distress Syndrome
- Hypercholesterolemia
- All types of Hyperlipidemias including hyperlipoproteinemia
- Hypo lipoproteinemia
- Atherosclerosis, CVA, CHD
- Steatorrhea
- Chyluria
- Cholelithiasis/Obstructive Jaundice

- Congenital Adrenal Hyperplasia
- Carnitine Deficiency
- Fatty liver
- Obesity/Metabolic Syndrome
- Disorders related to oxidation of Fatty Acids (Refsum's Disease, Zellweger syndrome, Methyl Malonic Acidemia, SIDS)

3. Metabolic disorders related to Protein Metabolism:

- All types of Uremia
- Hepatic Encephalopathy
- Hyperammonemia
- Arginine-succinic aciduria
- Citrullinemia
- Isovaleric academia
- Glycinuria /Hyperoxaluria
- Cystinuria / Cystinosis
- Phenylketonuria/Albinism
- Tyrosinemia
- Alkaptonuria
- Homocystinuria
- Hartnups disease
- Maple Syrup Urine Disease
- Histidinemia
- Creatinuria
- Carcinoid syndrome

4. Metabolic disorders related to Nucleotides and Nucleic Acids Metabolism:

- Hyperuricemia &Hypouricemia
- Gout
- Lesch-Nyhan Syndrome
- Severe Combined Immunodeficiency Disease (SCID)
- Oroticaciduria
- Purine Nucleoside Phosphorylase Deficiency

5. Metabolic disorders related to heme metabolism:

- Porphyria's
- Hyperbilirubinemia
- Jaundice

6. Disorders related to Vitamins and Minerals:

- Vitamin Deficiency Diseases
- Minerals & Trace elements Deficiency Diseases

7. Clinical Enzymology:

- Principles of Diagnostic Enzymology
- Isoenzymes and their role in clinical diagnosis
- Types of various enzymes in human body
- Functional & Non-Functional Enzymes
- Enzymes used as reagents and drugs

8. Clinical Nutrition:

- Factors altering nutrition requirements in different conditions
- Nutritional assessment and support in health & convalescence
- Diseases that produce nutrition problems
- Protein Energy Malnutrition (PEM)

9. Single-Gene Disorders:

Major Modes of Inheritance (Autosomal Dominant, Autosomal Recessive, X-Linked Recessive)

10. Cytogenetics:

- Numerical chromosome abnormalities:
- Euploidy, Aneuploidy
- Structural chromosome abnormalities:
- Translocations, deletions
- Other chromosomal abnormalities:
- Inversions, Ring Chromosome, Isochromosome, Uniparental Disomy
- Advances in molecular cytogenetics:
- Fluorescence in situ hybridization (FISH), Spectral Karyotyping

11. Genetics of Common Diseases:

Multifactorial inheritance

12. Gene Mapping

Different types of DNA Polymorphism

- Restriction Fragment Length Polymorphisms (RFLPs)
- Variable Number of Tandem Repeats (VNTRs)
- Short Tandem Repeat Polymorphisms (STRPs)
- Single Nucleotide Polymorphisms (SNPs)

13. Gene Mapping: Linkage Analysis

14. Genetic Diagnosis Recombinant DNA Technology

- Isolation of DNA from Blood
- Isolation of DNA from tissues
- RNA isolation from blood and tissues
- Restriction enzymes

Practical work:

(A) Basic biochemical practical

1. pH metery

- Principle of pH metery
- Components and working of pH meter
- Applications of pH metery in Biochemistry laboratory

2. Centrifugation

- Principle of Centrifugation
- Types of centrifuge machines
- Ultracentrifugation
- Uses in Biochemistry lab

3. Spectrophotometer and Photometry

- Spectrophotometry
- LFT's
- RFT's
- Lipid Profile
- Sugar
- Uric Acid
- Serum Bilirubin Direct / Indirect

- Serum Albumin A/G ratio

4. Elisa Based Test

- Principal of Elisa
- Thyroid Profile
- Hepatitis B & C (ICT & Elisa based)
- Cortisol
- HIV (ICT & Elisa based)

5. Urine Complete Examination

- pH, Specific gravity
- Albumin, Sugar, proteins
- Microscopy
- UPT

6. Specimen Collection & Processing; Sources of Biological variation:

- Sources & composition of blood specimen
- Types of blood specimen & equipment
- Venipuncture, skin puncture, arterial puncture, anticoagulants & preservatives of blood, hemolyzed sample
- Preanalytical considerations
- Capillary specimen collection
- Specimen handling & processing for testing
- Collection of urine, faces, spinal fluid, other fluids for analysis

7. Establishment and use of reference values

- Introduction to statistical terms & techniques
- Use of reference values

8. Quality assurance

Elements of quality assurance

PHARMACOLOGY:

1. **Cardiovascular system**
    a. Antihypertensive drugs
    b. Drugs for heart failure
    c. Antianginal drugs
    d. Anticoagulants
2. **Respiratory system**
    a. Anti-asthmatic drugs
    b. Antihistamines
3. **Central nervous system**

a. General anesthetics
b. Local anesthetics
c. Antipsychotics
d. Antidepressants

4. **Drugs acting on uterus**
    a. Tocolytic drugs
    b. Drugs for labor and delivery
5. **Endocrinology**
    a. Antidiabetic drugs
    b. Estrogens and androgens
6. **Chemotherapeutic drugs**
    a. Antibiotics of general use

GENERAL PATHOLOGY:

Cell as a unit of Disease

- The genome.
- Cellular metabolism & cellular activation.
- Signal transduction pathways, growth factors and receptors.
- Cell cycle and stem cell.

Cell injury and adaptation

- Reversible and Irreversible Injury
- Fatty change, Pigmentation, Pathological classification
- Necrosis and Gangrene

Cellular adaptation

- Atrophy, Hypertrophy,
- Hyperplasia, Metaplasia, Aplasia

Inflammation

- Acute inflammation, Vascular changes, Chemotaxis, Opsonization and Phagocytosis
- Enlist the cellular components and chemical mediators of acute inflammation
- Differentiate between exudates and transudate
- Chronic inflammation
- Etiological factors, Granuloma

Cell repair and wound healing

- Regeneration and Repair
- Healing---steps of wound healing by first and second intention
- Factors affecting healing
- Complications of wound healing

Hemodynamic disorders

- Define and classify the terms Edema, Hemorrhage, Thrombosis, Embolism, Infarction & Hyperemia
- Define and classify Shock with causes of each.
- Describe the compensatory mechanisms involved in shock
- Describe the pathogenesis and possible consequences of thrombosis
- Describe the difference between arterial and venous emboli

Neoplasia

- Dysplasia and Neoplasia
- Differences between benign and malignant neoplasm
- Enlist the common etiological factors of Neoplasia
- Define and discuss the different modes of metastasis
- TNM staging system and tumor grade

Immunity and Hypersensitivity

- Humoral and cell mediated immunity and types of Hypersensitivity with examples.

General Microbiology

- General Microbiology
- Introduction to microbiology
- Role of microbes in various human diseases
- Sources of infection
- Classification of microorganisms.
- Morphology and identification of bacteria.
- Bacterial metabolism and growth.
- Sterilization and disinfection, definition, use of physical and chemical disinfectants and their practicalutility in clinical practice.
- Infection and immunity pathogenicity, pathology of infection, Resistance and natural immunity, antigens and antibodies.

B. SPECIALTY SPECIFIC:-

PHYSICS AND EQUIPMENT:

1. Basic Definitions: Vapor Pressure, Critical Pressure, Critical Temperature, Boiling Point, Thermal
    a. Conductivity
2. Basic laws of physics applicable to Anesthesia
3. Operation theatre environment and recovery area: humidity, temperature, light, electrical safety,
    a. pollution, infection, post-anesthesia care unit (PACU)
4. Medical gas supply system VIE (Visual Information Engineering), manifolds, cylinders, regulation
5. Anesthesia machines, machine check, safety feature, flow meters, vaporizers, pressure relief valves
6. Delivery system / Breathing systems, Mapleson circuits, carbon dioxide absorber
7. Scavenging System
8. Largyngoscope, guedel airways, face masks, laryngeal mask airways, endotracheal tubes, bougies, stylet, connectors
9. **Monitoring**

a. Standards / Principles of monitoring
b. Record Keeping
c. Critical Incident Monitoring
d. Principles of Oximetry
e. Principles of Capnography
f. Electrocardiography
g. Temperature Monitoring
h. Neuromuscular Monitoring
i. Blood Pressure Monitoring, Non-Invasive and Invasive
j. Blood Loss
k. Airways Pressures / Spirometry
l. Cerebral Function Analysis Monitor

PREOPERATIVE ASSESSMENT

PRE MEDICATION

PACU

COMPLICATIONS DURING ANESTHESIA

OCCUPATIONAL HAZARDS

Part II:

Theoretical component

1. General surgical conditions and anesthesia
2. Medical diseases and anesthesia
3. Obstetrical and gynecological anesthesia
4. Neuro anesthesia
5. Pediatric anesthesia
6. Urology anesthesia
7. Daycare anesthesia
8. EYE and ENT anesthesia

9. Trauma and orthopedic anesthesia
10. Post anesthetic recovery and anesthesia
11. Crises management
12. Cardiac arrest and resuscitation
13. Regional anesthesia/Neuraxial Anesthesia
14. Intensive Care Unit

Practical Component:

1. Preoperative assessment, Counselling
2. Optimization of common medical diseases
3. Pre-medication
4. Plan & Conduct of anesthesia
5. Airway maintenance
6. Monitoring during anesthesia
7. Recovery from anesthesia/PACU
8. Post op problems and care
9. Complications during anesthesia & Management
10. ICU: patient management, ventilation strategies, organ system support, nutrition.
11. Patient shifting

SYLLABUS:

SYSTEM	ANATOMY	PHYSIOLOGY	PHARMACOLOGY	PATHOLOGY	Clinical Anesthesia
	Upper Airway	Respiratory mechanics &lung volumes	Drugs affecting airway caliber	Obstructive lung diseases	Physiological effects of

Respiratory System	Lower Airway Diaphragm Thoracic Cage Nerve supply Blood Supply	Control of Breathing V/Q matching Gas exchange PFTs and ABGs Transport of blood gases Pulmonary Circulation Physiology	Oxygen therapy Antihistamines Drugs affecting respiratory drive Antibiotics	Restrictive lung diseases ARDS Smoking hazards Pulmonary edema Aspiration of gastric contents	anesthesia on respiration. Anesthesia with respiratory disease: per-op evaluation, optimization, Anesthetic technique, postop care; obstructive lung diseases, pulmonary hypertension, OSA/OHA Anesthetic management of: Bronchoscopy, lobectomy, one lung ventilation
	Heart Coronary circulation Great blood vessels	Cardiac Cycle Origin of cardiac impulse and its conduction,	Antihypertensive Antiarrhythmics Vasoactive drugs Inotropes	Hypertension Ischemic Heart disease Congestive cardiac failure	Physiological effects of anesthesia on CVS. ECG interpretation,

Cardio-vascular System	Peripheral vascular system	Myocardial contraction Blood pressure & its regulation Autoregulation Organ blood flow Factors affecting Coronary circulation Microcirculation	Cardiac glycosides Vasodilators Antiplatelet drugs	Cardiomyopathies Valvular diseases	Arrhythmia management Anesthetic management of patient with Cardiovascular disease: preop evaluation, risk stratification, optimization, Anesthetic technique, postop care Cardiac arrest and resuscitation according to recent guidelines, ACLS, BLS

Central Nervous System	Brain: gross anatomy, blood supply, CSF formation & Circulation. Spinal Cord: gross anatomy, meninges & spaces Vertebral column Pain Pathways Dermatomes.	Intracranial pressure Cerebral Circulation Determinants of cerebral blood flow CSF Neurotransmitters Synaptic membrane Synaptic transmission Gate control theory of Pain	Drugs effecting CNS antidepressants	Trauma: brain, spinal cord, nerves Increase in ICP: effects, diagnosis, Venous air embolism, Parkinson's disease	Preop evaluation, optimization, anesthetic technique. Methods of cerebral protection,. ICP: monitoring, reduction techniques Space occupying lesions Head Injury Principles of controlled hypotension Spinal cord injury Surgery on spinal cord Laminectomy

					Basics of neuroendocrine surgery Postop care of neurosurgical patient Effect of Anesthetic agents on CNS
Autonomic & Peripheral Nervous System	Sympathetic chain, ganglia, receptors. Parasympathetic centers, ganglia, receptors, Peripheral nervous system	Neurotransmitters, effects of autonomic Nervous System activation	Sympathetic: agonists, antagonists Parasympathetic: agonists, antagonists		Effects of anesthesia on Autonomic Nervous system: General Neuraxial Local anesthetic techniques

Gastro-intestinal and Hepato-billary Systems	Gross anatomy , Circulation	Synthetic and metabolic functions of liver, Coagulation Cascade, clotting factors	Drugs for: aspiration prophylaxis, Antiemetics Cytocrome P450 Hepatotoxic drugs	Jaundice Acute hepatitis Chronic hepatitis Portal hypertension Coagulopathies/ Bleeding disorders	Effects of anesthesia on hepatic function preop evaluation, preparation, premedication, anesthetic plan. Associated comorbidities Postop care Laparoscopic cholecystectomy Bowel: obstruction, resection Bleeding from GI tract Anesthesia for splenectomy Pulmonary effects of abdominal surgery

					Postop Nausea and vomiting (PONV), prophylaxis & treatment. Anesthesia for patient with coagulopathy
Endocrine system	Thyroid Gland, Pancreas, adrenal gland Gross anatomy, blood supply	Physiological effects Pituitary hormones Thyroid hormones Adrenal hormones Parathyroid homone Insulin	Drugs altering thyroid hormone/gland function Insulin Oral hypoglycemic corticosteroids Drugs affecting parathyroid hormone function DDAVP	Diabetes Mellitus Pituitary: hypo and hyper secretion Thyroid: hypo and hyper secretion Adrenal: hypo and hyper secretion Parathroid: hypo and hyper secretion	Preop evaluation, preparation, premedication, anesthetic concerns in patient with endocrine disease. Post op care. Antithyroid drugs Effects of insulin, oral hypoglycemic drugs.

				Diabetes insipidus SIADH	
Kidney and Genito-urinary systems	Nephron Basic anatomy, blood supply of kidney Body compartments &fluid distribution	Renal blood flow regulation Functions of kidney Basics of Dialysis and CRRT Renal function tests Fluid &electrolyte balance (Na,K,Ca,Mg) Blood pH control	Diuretics Vasoactive drugs acting on Kidney Magnesium Sulphate	Renal Failure: acute and chronic Glomerulonephritis	Peri-operative fluid therapy Effects of anesthesia on renal function Preop assessment, preparation, premedication Associated co-morbidities Anesthesia for: Nephrectomy, TURP, lithotripsy, PCNL, bladder pathologies Dialysis, CRRT, Plasmapheresis
	Motor end plate	Tests of neuromuscular function	Muscle relaxants: depolarizing, non-depolarizing	Myasthenia Gravis	Preop assessment, preparation, premedication, anesthetic

Neuro-muscular, Collagen, Skeletal systems	Neuro-muscular junction	Peripheral nerve stimulation interpretation		Malignant Hyperthermia Rheumatoid arthritis Ankylosing spondylitis Guillain Barre syndrome	technique. Management of complications Postop care Neuromuscular monitoring, nerve conduction,
Airway	Basic airway anatomy, nerve supply	Physiological responses to airway instrumentation			Airway assessment Topical airway anesthesia Management of difficult airway: ASA/DAS guidelines Endotracheal Intubation: Indications, position, complications, extubation

					Surgical Airway: indications, complications
Hematolog-ical, ***Blood transfusion***		Hemoglobin Hemoglobin-Oxygen Dissociation Curve Normal Coagulation pathways	Anticoagulants Clotting factors	Anemias Hemo-globinopathies Coagulopathies Porphyria DIC Venous thromboembolism	Blood transfusion Blood component therapy Hazards of blood transfusion Massive blood transfusion Blood substitutes Basics Of: Autologous Transfusion Blood conservation Estimation of blood loss
	Anatomical changes in pregnancy	Physiological Changes of pregnancy	Uterotonic drugs Tocolytic drugs	Medical diseases in pregnancy	Preop Evaluation Analgesia for labor and delivery

Maternal &neonatal / Obstetrics	Placenta	Uteroplacental Unit: functions, effects of anesthesia Fetal circulation &changes at birth	Magnesium Sulphate Pharmaco-dynamic &Kinetics of drugs during pregnancy Drugs for labor &delivery Placental transfer of drugs	Hypertensive disorders of Pregnancy Amniotic fluid embolism	Anesthesia for Elective & Emergency :Caesarean section Operative vaginal delivery Management of Ante &Postpartum hemorrhage Non Obstetric surgery during pregnancy Management of difficult airway CPR during pregnancy Neonatal Resuscitation

Pediatric Anesthesia	Anatomical considerations in child, difference from adult	Physiological considerations in child, difference from adult	Pharmacological considerations, effects of anesthetics	Upper respiratory tract infection Epiglottis Trauma Congenital anomalies	Preop evaluation, preparation, premedication. Postop care. Anesthetic equipment Monitoring Perioperative fluid management Fasting Temperature control Management of difficult airway Foreign body in airway Basic principles of neonatal anesthesia CPR: neonate, pediatric

Neuraxial & Local Anesthetic Techniques	Intrathecal space Epidural space Brachial plexus Nerves: Main nerves in upper extremity Main nerves in lower extremity Nerve supply of foot	Physiological effects of Neuraxial Anesthesia	Local anesthetics Adjuvants used	Patient on anticoagulants Local anesthetic toxicity and management	Spinal anesthesia Epidural anesthesia Combined spinal and epidural anesthesia Caudal anesthesia Brachial plexus block Nerve Blocks: Femoral block Sciatic block Popliteal block Ankle block BIER'S Block (IVRA)

Anesthetic Management

General Anesthesia	Airway management. Anesthetics: volatiles, IV induction agents, Medical gases (Oxygen, Nitrous oxide, Air, Carbon dioxide, Entonox) Intubation. Monitoring and maintenance of Anesthesia Recovery after GA Analgesia Fluid management Positioning Thermoregulation Stress response to anesthesia and surgery Total Intravenous Anesthesia Emergency surgery under general anesthesia

Orthopedic Surgery	General problems in orthopedic patient. Preop evaluation, preparation, premedication, anesthetic plan, postop care Tourniquet and its considerations Cement use and complications Positioning DVT prophylaxis Complications: Fat embolism syndrome Pulmonary embolism
Trauma	Management of: Head injury, Spinal injury, thoracic trauma, abdominal trauma, major orthopedic trauma. Airway trauma management Blunt &Penetrating trauma Management in ICU Shifting of trauma patient Burns

ENT ***Dental*** ***Laser***	Preoperative assessment, preparation, anesthesia plan, postoperative care Anesthesia for surgery of: nose, ear, tonsillectomy/adenectomy, tumors, infections. Tracheostomy Bleeding after surgery and management Dental chair anesthesia Facial trauma Lasers: types, uses, precautions, hazards Management of airway fire
Ophthalmology	Preoperative assessment, preparation, anesthesia plan, postoperative care. Intra Ocular pressure: factors affecting Blocks: Retrobulbar & Peribulbar Effects of ophthalmic medications Anesthetic management of: Open eye injury, Squint correction, cataract surgery

Laparoscopy/ Endoscopy	Preoperative assessment, preparation, premedication, postoperative care. Benefits Hazards Anesthetic management
Plastic Surgery	Preoperative assessment, preparation, premedication, postoperative care. Anesthesia for: Burn patient Paralyzed patient Cleft lip and Palate
Geriatric Anesthesia	Preoperative assessment, preparation, premedication, postoperative care. Anatomical, Physiological, Pharmacological changes due to age.
Anesthesia outside OR	Patient selection, preoperative assessment, premedication, postoperative care. Personnel and location Anesthetic Plan. Monitoring, Recovery Transport of patient Anesthesia for:

	CT, MRI, Cardio version, Electroconvulsive therapy, Emergency OR procedures.
Day Case Anesthesia	Preoperative assessment, preparation, premedication, postoperative care Patient selection Anesthetic management Discharge criteria and instruction s to patient Shifting to indoor after day case surgery
Pain Management	Pain pathways Acute pain management Chronic pain management Pharmacological agents Regional techniques, nerve blocks
Post Anesthesia Care (PACU)	Monitoring in PACU Shifting to PACU Staffing, location, facilities Complications and management Discharge from PACU

Complications, Resuscitation and CPR, Critical Care

Complications of Anesthesia	Airway /Breathing/ Respiration: Trauma to airway and teeth, laryngeal spasm, laryngeal edema, bronchospasm, aspiration, negative pressure edema, hypoxia, hypo/hypercarbia, pneumothorax Cardiovascular: Bradycardia, Tachycardia, Hypertension, Hypotension, dysrhythmias, cardiac failure, cardiac arrest, Myocardial ischemia/ infarction Central Nervous System; Hypoxic encephalopathy, CVA, postop delirium, Awareness, nerve injuries Temperature: hypothermia, hyperthermia Miscellaneous: Delayed Recovery from anesthesia Anaphylaxis Positioning Burns: thermal, electrical

CPR	Physiology of CPR Pharmacology of drugs used during CPR Recent guidelines Algorithms
Critical Care	Shifting of patient to ICU Monitoring in ICU; noninvasive, invasive Mechanical ventilation: modes, methods, weaning Analgesia and sedation Nutrition CVS, Renal, Hematological and other systems' support Management and Pathophysiology Of: Respiratory failure/ARDS Shock Polytrauma Sepsis Severe asthma/ status asthmaticus Renal failure

	Acid/ base disturbance Diabetic Ketoacidosis Seizures Eclampsia Organophosphate Poisoning Antibiotics

Physics, Equipment and Operation Theatre Environment

Physics	Physics 'law applicable to Anesthesia Definitions: MAC, Critical temperature, Critical pressure, Vapor pressure, Venturi effect, Boiling point, Blood/Gas solubility, Oil/Gas solubility Flow The Gas laws Humidity Electricity: basic principles, safety, cattery Infusion pumps
Monitoring	Standard monitoring/ASA guidelines Pulse oximetry Capnography ECG Blood pressure: Noninvasive, Invasive Gas Analysis under GA Airway pressure monitor

	CVP monitoring Temperature Neuromuscular blockade
Anesthesia Work station	Breathing systems Circle system Vaporizers Flowmeters Ventilators Scavenging Gas supply: cylinders, Manifolds, Pin Index &DISS systems. Anesthesia Accessories Anesthesia machine check Cleaning and sterilization
Operation Theatre	Operation theatre environment Fire safety Sterilization /cleaning

Miscellaneous	General Pharmacology: pharmacokinetics and Pharmacodynamics Communication, Informed consent, Counselling Documentation Record Keeping Substance abuse Professional hazards of Anesthesia

Study Guide DA Anesthesiology

Year I

Exit Outcome	Enabling Outcome	Teaching Method	Assessment Method
ClinicalSkills: to perform Pre-Anesthesia assessment and optimization of ASA I-II patients presenting for elective and emergency procedures. (for minor to major surgeries).	• History taking, • physical examination, interpretation of investigation, including radiology, CXR, X-ray cervical spine, CT scan • Management of concurrent illness& medications for pre-op. assessment with relevance to anesthesia, advice on pre-op medications, & preparation • Decision making on referral/consult • Risk assessment, Plan & Anesthesia administration,	• Lecture • Anesthesia Clinic • Small Group discussion • Journal Club	• MCQ • Case based discussion • Problem based discussion • Short case • Short essay question • Mini CEX.

	Recovery and Post-op care • Crisis Management & Resuscitation • Documentation of Records		
Communication & Counseling Skills. To be able to communicate effecting and perform counseling of patients & relatives.	• Counsel all patients and their relatives about the anesthetic interventions in minor & moderate surgeries • Communicate with colleagues of related disciplines about the techniques, risks and intervention in major and complicated surgeries • Obtain Informed consent • Counsel on crisis, management of complications • Presentation Skills	• Lecture • Counseling Session • Small Group discussion • Demonstration	• MCQ • Case based • Short case • Mini CEX • TOACS
Pain Management	• Post-operative	• Lecture • Journal club	• MCQ • SEQ

Acute Pain Management	• Systemic Epidural / Caudal • Patient Controlled Analgesic • Epidural for Labour Analgesia	• Case base discussion • Small group discussion • Demonstration on patients	• Short case discussion • DOPS
Procedural Skills Intra - Vascular Access and Interpretation of Graphs • Airway Management Regional Techniques Use of Anesthesia Equipment & Sundries	• Mask, Guedel Airway, Nasal airways • Supra glottic Devices • Endotracheal Intubation • (Mallampati I, II, III & IV) • Cricothyroidotomy • Sub-arachnoid Block • Epidural / Caudal • Combined Spinal Epidural Use of Monitors & interpretation of information Oximetry,	• Lecture • Journal club • Case base discussion • Small group discussion • Demonstration on patients • Demonstration on manikins	• MCQ • SEQ • Short case discussion • DOPS • Mini CEX

	Capnography, NIBP, ECG, Temperature, Peripheral Nerve Stimulator		

Year II

Exit Outcome	**Enabling Outcome**	**Teaching Method**	**Assessment Method**
Clinical skills Pre-Anesthesia assessment and optimization of ASA I-V patients presenting for elective and emergency procedures. (for minor to major surgeries).	• History taking, Physical Examination, Interpretation of Investigations, including Radiology for CXR and X-ray Cervical Spine, CT Scan , MRI scan • Management of Concurrent illness and medications for Pre-op. assessment with relevance to anesthesia advice on Pre-op medications, & preparation • Decisions making on referral / consultation • Risk assessment, Anesthesia Plan & Administration of Anesthesia • Recovery and Post-op Care • Crisis Management & Resuscitation Documentation of Records	• Lecture • Anesthesia Clinic • Small Group discussion • Journal Club	• MCQ • Case based discussion • Problem based discussion • Short case • Short essay question • Mini CEX.

Communication & Counseling Skills.	• Techniques, risks and intervention in major and complicated surgeries • Obtain Informed consent • Counsel on crisis and management of complications • Presentation Skills		
Pain Management • Postoperative pain management • Acute Pain Management	• Post-operative • Systemic • Epidural / Caudal • Nerve Blocks / Use of Nerve Stimulator	• Lecture • Journal club • Case base discussion • Small group discussion • Demonstration on patients	• MCQ • SEQ • Short case discussion • DOPS
Procedural Skills Intra-Vascular Access & Interpretation of graphs Airway Management of ASA I-V,Elective / Emergency in all major /complicated surgeries. Regional Techniques Peripheral Nerve Blocks	• Central I/V Cannulation • Endotracehal Intubation (Mallampati I & IV) • Cricothyroidotomy • Sub-arachnoid Block Epidural / Caudal Combined Spinal Epidural • Brachial Plexus, Wrist Block,	• Lecture • Journal club • Case base discussion • Small group discussion • Demonstration on patients • Demonstration on manikins	• MCQ • SEQ • Short case discussion • DOPS • Mini CEX

	Intercostal Block, TAP Block, Sciatic Block Three in One Block • Biers Block • Ankle Block		
Use of Anesthesia Equipment and Sundries Use of Monitors and interpretation of information	• CNS monitoring, BIS • PNS monitoring, Nerve Stimulator /Locator • Oximetry, Capnography, Flow-Volume loops, Compliance graphs, Airway Pressure, Arterial Blood Gases. Pulmonary Function Tests • Cardio- Vascular Monitoring Blood Pressure - Non-Invasive / Invasive ECG Echocardiography, • Haematologic, Hepatic, Renal Systems and Acid Base Balance Ability to order correct battery of investigations and correct interpretation of the obtained information • Ability to order correct battery of investigations, and Interpretation of the Obtained	• Lectures • Demonstrations • Bedsides teaching • Workshops	• MCQ's • Mini CEX • TOACS • Short case • Table viva

	information,		
ICU Skills Ventilatory support Cardio-Vascular Support Renal Support Hematologic support Nutritional support Infection treatment/ control General Patient Care, Physiotherapy Implementation of Bundle Therapy	• Assembly of ventilator • Choice of correct respiratorysupport by choosing correct variables and modes • Choice of Sedation & Analgesia • Ability to provide cardio vascular support with correct choice of drugs and infusion devices • Fluids, Blood, Blood Products • Delivery Devices • Choice of Enteral / Parenteral Nutrition • Calculation of Nutritional requirements • Choice of antibiotics • Making protocols • Physiotherapy • General care & hygiene	• Lectures • Bed side teaching • Journal club • Case present • Small group discussion • Problem based discussion	• MCQ • SEQ • TOACS • Mini CEX • DOPS • Table viva

Instructional Strategies:

As a policy, active participation of students at all levels will be encouraged.

Following teaching modalities will be employed:

1. Lectures
2. Journal Club Presentations
3. Group Discussions
4. Grand Rounds
5. Conferences and seminars
6. Assignments
7. Self-study, and use of internet
8. Demonstrations
9. Workshops
10. Writing a review article

Assessment Strategies:

1. Multiple choice questions
2. Short essay questions
3. TOACS
4. Directly observed procedural skills
5. Mini clinical exercises
6. Short case
7. Table viva
8. Continuous formative / internal assessment

Program Format

Program duration	Two years
Application by candidate	
Entry examinations	
Admissions	
Stage 1 At the end of six months	Revision of core basic and clinical components. Basic knowledge and Acquiring skills related to the specialty according to the objectives made. Part -I Examination.
Stage 2 At the end of 02 year programme	Advanced training of clinical knowledge and skill in specialty according to the objectives made. Clinical Training with compulsory/ optional rotation in different specialties as required by the programme. Log Book Final Examination; Part-II
Award of Diploma	

Rotations:

Clinical Rotations	Duration (02 year)
Basic Sciences & Clinical Specialty	6 months
General Surgery, Orthopedics & Trauma	3 months
Gynae & Obstetrics	3 months
Urology	2 months
ENT	2 months
EYE	1 month
ICU	2 months
Neurosurgery	2 months
Pediatrics	2 months
Anesthesia outside OR	1 month

Section D

Assessment Plan

Program duration	Course contents		Assessment method
At the end of 6 months of program	**Basic medical sciences** : • Anatomy including histology • Physiology • Biochemistry • Pathology • Pharmacology	75%	**Part I** to be taken by university. It will include: Written (MCQ)=100(1 each) **Total Marks =100**
	• Physics/ anesthesia equipment / monitoring equipment • Resuscitation • Occupational hazards	25 %	

At the end of 2nd year	**Specialized training in the relevant department**	**Part II Examination** to be conducted by university. It will include: **<u>A) Paper A</u>** MCQ=50 (1 mark each) =50 SEQ=10 (5 marks each) =50 **Total Marks=100** **<u>B) Paper B</u>** MCQ=50 (1 mark each)=50 SEQ=10 (5 marks each)=50 **Total Marks=100** **<u>C) Log Book=20 Marks</u>** **<u>D) Clinical Paper=180</u>** OSCE/OSPE =90 marks Clinical=90 marks

		(long case= 30 marks Short Cases= 4 (15 marks each total 90) **Total Marks=400**

Part I Examinations:

Part I would be conducted for the candidate at the end of 6 months of the program.

Components of Part I Examination

MCQs = 100 (each 1 mark)

Total Marks = 100

Eligibility Criteria:

To appear in the Part I Examination the candidate shall be required:

1. At least 75% Attendance in all the basic medical sciences subjects as well as the specialized department as per the curriculum provided.
2. Evidence of payment of examination fee as prescribed by the university from time to time.
3. The examination fee once deposited cannot be refunded / carried over to the next examination under any circumstances.
4. Candidate remained on institution roll during the period required for appearing in examination.

Declaration of Results

- The candidates scoring 60% marks in the written examination will be considered pass and will then be eligible to appear in the Part II examination.
- A maximum of total SIX (6) consecutive attempts, availed or un availed, will be allowed in Diploma Part I examination. If the candidate fails to pass this examination within the above-mentioned limit of SIX (6) attempts, he/she shall be removed from the program and the seat will fall vacant.

Part II Examination

(At the end of 2nd Calendar year of the program)

Components of Part II Examination

A) Paper A

MCQs = 50 ; Marks = 50

SEQs = 10 ; Marks =50

Total Marks=100

B) Paper B

MCQs = 50 ; Marks =50

SEQs = 10 ; Marks =50

Total Marks=100

C) Log Book

Total Marks = 20

D) Clinical Exam

Total Marks = 180 (90+90)

OSCE/OSPE: Marks = 90 ; 9 stations, 10 marks each . 05 interactive and 05 static stations.

Clinical: Marks = 90

Long case = 30 marks ; 01 long case

Short Cases = 60 marks; 04 cases , 15 marks each

Total Marks=400

Eligibility Criteria:

To appear in the Part II Written Examination the candidate shall provide:

1. Result card showing that the candidate has passed Part I Examination.
2. Certificate of completion of 2 Years training as per the curriculum approved by the university.
3. Evidence of payment of examination fee as prescribed by the university from time to time.
4. The examination fee once deposited cannot be refunded / carried over to the next examination under any circumstances.

Declaration of Results

a. The candidates scoring 60% marks in aggregate of Paper A and Paper B of the written examination will be declared pass and will become eligible to appear in the Clinical Examination.

Clinical Examination:

a) The Clinical Examination will consist of 04 short cases, 01 long case and TOACs/OSCE with 01 station for a pair of Internal and External Examiner

b) The Total Marks of Clinical and TOACs/OSCE & Oral will be 180 and to be divided as follows:

- 04 Short Cases (15 marks each) Total Marks = 60
- 1 Long Case Total Marks = 30
- TOACS/OSCE Total Marks = 90

Total= 180

Log Book=20 marks

Declaration of Final Result

- A student scoring 60% in long case, 60% in short cases and 60% in TOACS/OSCE will be considered pass in the examination.

Section E

Award of Diploma in Anesthesiology (DA)

A candidate having declared successful in all the components of examination that is ***Theory and Clinical*** shall be declared pass and shall be conferred Diploma In ANESTHESIOLOGY.

Section F

Log Book

- **Log Book**

  As per format approved by the university (available on university website)

Section G

Paper Scheme / TOS

Part I Examination (Written)

TABLE OF SPECIFICATIONS (100 MCQs)

TOTAL MARKS= 100

SUBJECT: BASIC SCIENCES

Sr. no	Topic	MCQs
1.	General Pathology	08
2.	General Anatomy & Histology	20
3.	Basic Biochemistry	20
4.	General Pharmacology	07
5.	General Physiology	20
6.	Specialty Specific	25
	Total	100

PART II EXAMINATION

THEORY PAPER

Sr No.	Paper	Number Of MCQ	Number Of SEQ	Total Marks
1	Paper A	50 MCQ (1 each)	10 (5 marks each)	100
2	Paper II	50 MCQ (1 each)	10 (5 marks each)	100

TABLE OF SPECIFICATION FINAL EXAMINATION: PAPER A

SUBJECT: CLINICAL ANESTHESIA

TOPICS:

- Pre operative assessment
- Day care surgery
- Intercurrent medical diseases and anesthesia
- Emergency/ trauma/ orthopedic surgery
- Resuscitation
- Acute Pain management
- Post anesthesia care and recovery
- Regional anesthesia

Sr. no	**Topic** **CLINICAL ANESTHESIA**	**Level of Cognition**			**MCQs**	**SEQ**
		C1	**C2**	**C3**		
1.	Pre-operative assessment	1	1	1	03	1
2.	Regional anesthesia	1	2	2	05	1
3.	Day care surgery		1	1	02	
4.	Intercurrent medical diseases and anesthesia	4	10	6	20	4
5.	Emergency/trauma/ orthopedic	2	5	3	10	2
6.	Resuscitation	1	1	3	05	1
07.	Poat operative care/ recovery/ post op pain management	1	2	2	05	1
	Total				50	10

TABLE OF SPECIFICATION FINAL EXAMINATION: PAPER B

SUBJECT: CLINICAL ANESTHESIA

TOPICS:

- General surgery
- Obstetric and gynecological surgery
- Pediatric surgery
- Basic principles of thoracic anesthesia
- Neurosurgery
- Ophthalmic surgery
- ENT surgery
- Urological surgery

Sr. no	Topic	Level of Cognition			MCQs	SEQs
		C1	C2	C3		
1.	General surgery	1	3	2	05	2
2.	Obstetrics and gynecological surgery	2	3	2	07	2
3.	Pediatric surgery	2	3	2	07	1
4	Neurosurgery	2	3	2	07	1
5	Ophthalmic surgery	2	1	2	05	1

6	ENT surgery	1	2	2	05	1
7	Urological surgery	1	2	2	05	1
8	Basic principles of thoracic anesthesia	1	2		3	
9	Critical care	2	2	2	06	1
	Total				50	10

TOACS Station distribution:

Total stations= 09 (05 Interactive, 04 Static)

Total marks=90, each station shall carry 10 marks

Time duration = 10 min/ station

Clinical Examination:

Short Cases= 04

Long Case= 01 (30 minutes for interaction with patients and 30 minutes for viva)

Section H

Resources and references (books and other resource material)

- **Miller's Anesthesia**, 9th edition, 2019, Editor-in-Chief Michael Gropper. *Miller's* has been *the* comprehensive textbook in our specialty since the first edition in 1981, and it touches on every facet of anesthesiology. All anesthesia providers should have access to the current two-volume 3112-page edition.
- **Stoelting's Anesthesia and Co-existing Disease,** 8th edition, 2021, Editors Roberta Hines and Stephanie Jones. First published in 1983, *Stoelting's Anesthesia and Co-existing Disease* is the leading textbook regarding co-existing and uncommon diseases, with a stated goal to "provide a concise description of the pathophysiology of disease states and their medical management that is relevant to the care of the patient in the perioperative period.
- **Anesthesia Equipment: Principles and Applications**, 3rd edition, 2020, Editor Jan Ehrenwerth. Every anesthesia professional should understand the machines they utilize. This textbook, was first published in 1993, answers the questions pertaining to anesthesia machines, airway equipment, monitors and other perioperative devices.
- **Smith and Aitkenheads Textbook of Anaesthesia** 7th Edition
- **Morgan & Mikhail's Clinical Anesthesiology** 7th Edition
- **Marino The ICU book** by Paul L. Marino MD PhD FCCM (Author)

- **British Journal of Anesthesia**
  - https://www.Bjanaesthesia.org
- **Anesthesiology: Journal of the American society of Anesthesiologist**
  - http://www.Anesthesiology.org
- **BMC Anesthesiology**
  - https://bmcanesthesiology.biomedcentral.com

Section I

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