CURRICULUM DESIGN

MS ANAESTHESIOLOGY

DEPARTMENT OF ANAESTHESIOLOGY, SICU & PAIN CENTER PUMHSW - SBA

PROGRAM MISSION, OBJECTIVES AND OUTCOMES

Mission Statement of the Program

Our mission is provision of comprehensive training in perioperative patient care, pain management and critical care medicine. Our program aims to train expert clinicians as future leaders in the field of anesthesiology who will expand the knowledge of the specialty through research that ultimately improve ability to provide superior care for the patients in the Rural areas of SIND.

Objectives of the Program

The **Faculty/ Department is** committed to excellence in patient care, education and research thereby meeting the health care needs of patients by promoting critical ethical thinking, challenging the boundaries of knowledge, fostering compassion and developing creativity and independence of the mind through multidisciplinary approach.

- To raise and maintain the standards for the safe practice of anaesthesia, by qualified anaesthesiologists
- To improve the quality of care for the critically ill and trauma patients
- To provide Training Facilities for Undergraduates, Postgraduates of Degree and diploma programs, Nursing staff & Technicians to keep them up to date with recent advances. Teaching standards are heightened to meet the requirement of CPSP & other Nationwide Universities.
- To deliver Pain management services to the patients suffering from acute and chronic pain.

Expected outcomes of the Program

- Practice quality anesthesia of all types and forms including general and regional techniques as per recent guidelines and protocols and deal with complicated surgical cases and perioperative complications.
- Resuscitate peri-operatively and in trauma care.
- Manage pain clinics.
- Manage critical care cases and unit.
- Work as a planner, teacher, trainer and team leader.
- Plan and conduct Research & Audit.
- Develop Protocols/Guidelines.
- Follow principles of Medical Ethics and Quality Assurance in practice.
- Participate in Continuing Professional Development activities and keep himself updated with recent advances

CURRICULUM DESIGN AND ORGANIZATION

ADMISSION CRITERIA

- MBBS or equivalent qualification registered with PMDC
- One year house Job in an institution recognized by PMDC
- Passed MS-I examination of PUMHSW
- Valid PMDC Registration.
- After selection registration by Post graduate department of PUMHS SBA.

LENGTH OF COURSE

The course will be held for FOUR (04) academic years, starting from January & July every year.

NUMBER OF CANDIDATES

Four (04) students per supervisor.

ELIGIBILITY

- MBBS or equivalent qualification recognized by PMDC
- Passed MS-I

CRITERIA FOR SELECTION

- Passed MS-I.
- Interview to see Eligibility

REGISTRATION IN THE PROGRAM

The candidate should enroll as a postgraduate scholar within one month of admission by submitting the prescribed application form recommended and signed by the supervisor to the Director postgraduate studies.

MONITORING OF STUDENTS' ACADEMIC PROGRESS

Monitoring of students' academic progress is done by periodic assessment through Quarterly evaluation test by theory consisting of SBA, SAQs, LAQs and practical examinations in the form of TOACS.

Midterm examination is also planned at the end of TWO (02) years training to assess the level of competency and acquired knowledge.

ASSESSMENT AT THE END OF TRAINING

THEORY AND VIVA VOCE EXAMINATION:

PART-II EXAMINATION:

THEORY

A. Paper One 10 Short Answer Questions	100 Marks
B. Paper Two 100 Single Best answer questions (SBQ's)	100 Marks
C. Paper Three 05 Long Essay Questions (LEQs)	100 Marks
	Total 300

a) VIVA VOCE AND CLINICAL EXAMINATION:

It will be conducted after the candidate qualifies the theory of Part-II with at least 60% marks in each examination (in each paper).

The clinical examination will consist of the following:

a) One long case	100 marks
b) Viva voce in clinical Anaesthesiology	100 Marks
c) TOACS	100 Marks
Total	**300** Marks
Grand Total	**600 Marks**

There will be 04 examiners from amongst Professors & Associate Professors of Anaesthesiology. The supervisor can be the Coordinator but not examiner.

The candidate whose thesis has been accepted and has passed the theory of Part—II examination but fails viva voce may be readmitted to the viva voce, as per general rules.

a) SUBSEQUENT EXAMINATION:

He / She shall pay the prescribed examination fee on each attempt. If the candidate fails three consecutive attempt he / she shall have to repeat theory examination of part—II.

MS PART I PAPER I

(Single Best MCQs)

APPLIED ANATOMY RELATED TO ANAESTHESIA (20 MCQs)

- Cardiovascular system
- Respiratory system
- Nervous system
- Musculoskeletal system

PHYSIOLOGY (20 MCQs)

- Fluid and electrolyte balance
- Heart and Circulation
- Blood and immunology
- Respiration
- Musculoskeletal System
- Renal system
- Nervous system:
- Liver:
- Digestive system and Metabolism:
- Endocrine system

PHYSICS AND CLINICAL MEASUREMENTS: (10 MCQs)

- S.I. units, gas laws, behavior of gases and liquids(volatile) .
- Measurements of volumes, flow, pressure, temperature.
- Humidification, analysis of gases, electrical safety
- Theatre pollution hazards **and** prevention.

MS PART I PAPER II

(Single Best MCQs)

PHARMACOLOGY: (15 MCQs)

Intravenous induction agents, gases and volatile anaesthetics, local anaesthetics and muscle relaxants with antidotes. Analgesics, sedatives, tranquilizers, hypnotics and antidepressants. Cardiovascular drugs like vasodilators, inotropes, chronotropes. Diuretics, antiemetics, antihistamines, anticonvulsants, & bronchodilators.

EQUPMENT AND APPARATUS: (10 MCQs)

Equipment design, anaesthesia delivery system, pressure valves, regulators, Vaporizers and gas supply (central and cylinders).

Breathing system devices, airway, masks, endotracheal tube, laryngeal mask. Tracheostomy tubes and laryngoscopes.

MONITORING: (05 MCQs)

Minimum monitoring standards, Pulse, Blood pressure, Temperature, respiratory rate, ECG and urine output. Oximetry, capnography, arterial and central lines

CLINICAL MANAGEMENT: (20 MCQs)

- ACLS/ Trauma
- Preoperative assessment
    - General surgery, orthopaedic surgery, neurosurgery, paediatric/ neonatal surgery, Eye & ENT surgery, Gynae & obstetric surgery, maxillofacial surgery, Dental surgery, cardiothoracic surgery and day care surgery.
    - Spinal, epidural , local or regional blocks
    - Shock, ventilatory failure, cardiac failure and sepsis.

SYLLABUS OF MS ANAESTHESIOLOGY

OUTLINE

ANESTHETIC EQUIPMENT & MONITORS
The Operating Room Environment ▪ Medical gas systems ▪ Delivery of medical gases ▪ Environmental factors in the operating room ▪ Electrical safety ▪ Surgical diathermy ▪ Surgical fires & thermal injury ▪ Laser safety
Breathing Systems ▪ Insufflation open drop anesthesia, draw over anesthesia ▪ Mapleson circuits classification ▪ Performance characteristics of mapleson circuits ▪ The circle system ▪ Performance characteristics of the circle system ▪ Resuscitation Breathing Systems
The Anesthesia Machine ▪ Essential safety features on a modern anesthesia workstation. ▪ Gas supply ▪ Flow control circuits ▪ Vaporizers ▪ Oxygen analyzers ▪ Humidifiers ▪ The breathing circuit ▪ Ventilators-i ▪ Ventilators-ii ▪ Waste gas scavengers ▪ Anesthesia machine checkout list
Cardiovascular Monitoring ▪ Noninvasive arterial blood pressure monitoring ▪ Invasive arterial blood pressure monitoring ▪ Journal club ▪ Electrocardiography ▪ Central venous catheterization ▪ Pulmonary artery catheterization ▪ Cardiac output ▪ Echocardiography
Noncardiovascular Monitoring ▪ Respiratory gas exchange monitors ▪ Pulse oximetry ▪ Capnography

▪ Anesthetic gas analysis ▪ Peripheral nerve stimulation ▪ Eeg monitoring ▪ Evoked potentials
CLINICAL PHARMACOLOGY
Pharmacological Principles ▪ pharmacokinetics of anaesthetic drugs ▪ biotransformation and drug receptors ▪ pharmacodynamics of anaesthetic drugs
Inhalation Anesthetics
Intravenous Anesthetics
Analgesic Agents – opioids, NSAIDS, Paracetamol and adjuncts
Neuromuscular Blocking Agents
Cholinesterase Inhibitors & Other Pharmacologic Antagonists to Neuromuscular Blocking Agents
Anticholinergic Drugs
Adrenergic Agonists & Antagonists
Hypotensive Agents
Local Anesthetics
Adjuncts to Anesthesia
ANESTHETIC MANAGEMENT
Preoperative Assessment, Premedication, & Perioperative Documentation
Airway Management
Cardiovascular Physiology & Anesthesia
Anesthesia for Patients with Cardiovascular Disease ▪ Anaesthetic Management of Pt with Hypertension ▪ Anaesthetic Management of Pt with IHD ▪ Introduction of Bioethics (PGD Project) ▪ Arrhythmia pacemaker & internal cardioverter defibrillator management ▪ Heart Failure + Cardimyopathy ▪ Mitral stenosis + Mitral regurtitation ▪ Aortic Stenosis + Aortic regugitation ▪ Congenital cardiac lesions ▪ Pacemakers + ICD (Devices)
Anesthesia for Cardiovascular Surgery
Respiratory Physiology & Anesthesia
Anesthesia for Patients with Respiratory Disease ▪ Asthma - Anaesthetic Consideration ▪ COPD - Anaesthetic Consideration ▪ Morbidity Mortality Meeting ▪ Restrictive Lung disease Anaesthetic Consideration ▪ Pulmonary embolism
Anesthesia for Thoracic Surgery
Laproscopic Surgery
Neurophysiology & Anesthesia

Anesthesia for Neurosurgery ▪ Anaesthesia for craniotomy for pt: with mass lesion ▪ Anaesthes for posterior fossa surgery ▪ Anaesthesi for head trauma ▪ Anaesthesia for cerebral aneurysm ▪ Anaesthesia for Scoliosis Surgery ▪ Anaesthesia for pituitary gland surgery
Anesthesia for Patients with Neurologic & Psychiatric Diseases ▪ Anaesthesia for Parkinson disease ▪ Gullion Barre syndrome ▪ Autonomic dysfunction & autonomic hyper reflexia ▪ Anaesthesia for ECT
Renal Physiology & Anesthesia
Anesthesia for Patients with Kidney Disease
Anesthesia for Genitourinary Surgery - TURP Syndrome
Hepatic Physiology & Anesthesia
Anesthesia for Patients with Liver Disease
Anesthesia for Patients with Endocrine Disease ▪ Anaesthesia for pt: with DM ▪ Anaesthesia for pt: with Thyroid dysfunction ▪ Anaesthesia for Pheochromocytoma
Anesthesia for Patients with Neuromuscular Disease
Anesthesia for Ophthalmic Surgery
Anesthesia for Otorhinolaryngologic Surgery
Anesthesia for Orthopedic Surgery
Anesthesia for Trauma, burn & Emergency Surgery
Maternal & Fetal Physiology & Anesthesia
Obstetric Anesthesia ▪ Labour analgesia ▪ Anaesthesia for C-Section ▪ Anaesthesia for Complicated Pregnancy ▪ Hypertensive disease of Pregnancy ▪ Appendectomy of Pregnant Pt: ▪ Neonatal Resuscitation
Pediatric Anesthesia ▪ Anaesthesia for premature neonate ▪ Anaesthesia for TEF ▪ Anaesthesia for Pyrotic stenosis ▪ Anaesthesia for CDH ▪ Anaesthesia for Cleft lip + Palate Surgery
Geriatric Anesthesia
Ambulatory, Nonoperating Room (MRI) , & Office-Based Anesthesia
Anaesthetic consideration for obese patient
Malignant hyperthermia
Anaesthesia for intestinal obstruction
Anaesthesia for pt: with Sickle cell disease

Anaesthesia for pt: with hemophilia
Peripheral Nerve Blocks
Chronic Pain Management
Perioperative Pain Management
PERIOPERATIVE & CRITICAL CARE MEDICINE
Management of Patients with Fluid & Electrolyte Disturbances
Acid–Base Management
Fluid Management & Blood Component Therapy Massive transfusion protocol + problems
Thermoregulation, Hypothermia, & Malignant Hyperthermia
Nutrition in Perioperative & Critical Care
Anesthetic Complications
Cardiopulmonary Resuscitation
Postanesthesia Care
Critical Care ▪ Economic, Ethical, & Legal Issues in Critical Care ▪ Respiratory Care, oxygen therapy and its hazards ▪ Mechanical ventilation in critically ill patients, modes of ventilation: characteristics, merits and demerits. Invasive and non invasive ventilation, care of mechanically ventilated patient and weaning protocols ▪ Respiratory Failure ▪ Acute Myocardial Infarction ▪ Acute Kidney Injury & Failure ▪ Infections & Sepsis ▪ Gastrointestinal Hemorrhage ▪ Head Trauma ▪ End-of-Life Care

SYLLABUS FOR MIDTERM EXAM OF MS ANAESTHESIOLOGY

Applied Basic Sciences

1. Applied Clinical Pharmacology

A) General pharmacology with in depth knowledge of pharmacokinetics & pharmacodynamics of drugs used to provide General Anesthesia

- Medical gases

- Intravenous Anesthetics

- Inhalational Anesthetics

- Local Anesthetics

- Neuro muscular blockers-Depolarizers / Non Depolarizers

- Reversal agents of neuro muscular blockers

- Analgesics - Opioids /Opioid Antagonists/ Non Opioids

- Sedatives - eg. Benzodiazepines

- Anticholinergics

- Premedicants - Axiolytics, Antisialagouges, Prokinetics, Antiemetics, Regurgitation Prophylaxis

- Adrenergics / Antagonists / Hypotensive agents

B) Pharmacological management of

- Adverse drug reactions

- Anaphylaxis

- Cardio pulmonary resuscitation

- Systemic toxicity

- Substance abuse

- Pharmacology & Provision of Regional Anesthesia

- Pharmacology related to Acute and Chronic Pain

- Opioids and opioid antagonists

- Non-opioids
- Local Anaesthetics
- Adjuvants - Antidepressants - Anti-arrhythmics, Antihistamines

2. Anatomy, Physiology &Patho-physiology of Systems

A) Respiratory System - Anatomy & Physiology

B) Cardio Vascular System - Anatomy & Physiology

C) Central Nervous System

- Anatomy
- Gross anatomy of Brain
- Detailed Anatomy of Spinal cord, its coverings and Function
- Formation of Cerebral spinal fluid
- Cerebral circulation
- Vertebral column
- Dermatomal distribution
- Pain pathways

- Physiology
- Neurotransmitters
- CSF, Intracranial Pressure
- Cerebral Circulation and Determinants of Cerebral Blood Flow
- Synapse and synaptic transmission
- Effects of anesthetics on the CNS
- Gate way theory

D) Autonomic Nervous System

- Anatomy

- Physiology

‣ Sympathetic receptors and transmitters

‣ Parasympathetic receptors and transmitters

‣ Anesthetic effects on the Autonomic Nervous System

E) Neuromuscular Junction

- Neuromuscular Anatomy and Transmission

- Tests of Neuromuscular Function

- Interpretation of Peripheral Nerve Stimulator

F) Liver

- Hepatic Circulation

- Liver Functions and Tests

- Effects of Anesthesia and Surgery on Liver Function

G) Kidney

- Basic Anatomy of Kidneys, Nephron as a unit

- Body Compartments and Body Fluids

- Renal Functions and Renal Blood Flow

- Renal Function Tests

- Acid-Base control

- Fluid and Electrolyte Balance and Calcium & Magnesium Metabolism

- Peri-operative Fluid Therapy

- Effects of anesthesia & surgery on renal function

- Implication of Renal Transplantation

H) Maternal and Neonatal Anatomy & Physiology

- Anatomy of Placenta

- Physiology of the Uteroplacental Unit - Placental Drug Transfer

- Physiology of pregnancy

- Principles of Fetal Assessment and Monitoring (CTG)

- Neonatal and Paediatric Anatomical & Physiological Changes

3. Applied Physics, Anesthesia machine & Monitoring Equipment

A) Physical laws governing the function of all anesthesia equipment

B) Physical concepts governing delivery of anaesthetics e.g. vapor pressure, B/G solubility, O/G Solubility, boiling point, critical temperature and pressure, MAC

C) Operation theatre environment

D) Humidity & humidification

E) Electrical safety

F) Safety of operation theatre personnel

G) Cleaning & sterilization of equipment

H) Anesthesia machine, Breathing circuits & Ventilators,

I) Oxygen Therapy Devices & Ventilator

J) Scavenging system

K) Monitoring equipment - Principles & Functioning

- Oximeter

- Capnograph

- Electrocardiography

- NIBP monitor

4. Clinical measurement - interpretation and limitations

A) Monitoring of Respiratory function

- Airway pressure, volume, flow, compliance

- Oximetry

- Capnography

- Arterial blood gas analysis

B) Monitoring of Cardiovascular system

- B.P measurement, Non invasive

- Interpretation of Electrocardiogram

- Principles of Central Venous Pressure Monitoring.

C) Monitoring of Neuromuscular junction

- Peripheral Nerve Stimulator

D) Monitoring of Renal / Hepatic / Haematologic System. Interpretation of relevant investigations

E) Interpretation of imaging & ultrasound

- Plain X-Ray - Neck, Chest, Spine

- Ultrasound

F) Fetal monitoring - Basic Concept

Understanding of Co-existing Diseases

A) Central Nervous System

- Pathophysiology of Head Trauma

B) Cardio-Vascular System

- Coronary Artery Disease

- Hypertension

- Dysrhythmias and Heart Blocks

C) Respiratory System

- Upper Respiratory Tract Infections & Pathologies

- Chronic Obstructive Airway Diseases

- Asthma

- Restrictive Airway Disease

- Obstructive Sleep Apnoea

- Pneumo./Hemo./Hydrothorax

D) Endocrinopathies

- Thyroid Dysfunction

- Diabetes Mellitus

E) Renal Diseases

- Acute and Chronic Renal Failure

- Acid-Base Disturbances

- Water & Electrolyte Imbalance

F) Musculo-Skeletal & Neuromuscular Diseases

- Myasthenia Gravis & Myasthenic Syndrome

- Guillain Barre's Syndrome

- Tetanus

G) Haematologic Disorders

- Anaemias

- Coagulopathies

- Platelet disorders

H) Obesity

I) Geriatrics

J) Obstetrics

- Medical Diseases Complicating Pregnancy

- Surgical Conditions Concurrent with Pregnancy

- Pre-eclampsia and Eclampsia

- Obstetric Haemorrhage and Resuscitation

- Amniotic Fluid Embolism

- Labour Pain Pathways and Physiology

K) Liver Disorders

- Hepatitis and its implication

- Cirrhosis

Clinical Anesthesia for Different Surgical Disciplines

1. Pre-operative Assessment and Management with Risk Assessment

- Assessment - History taking, Physical examination

- Ordering & Interpretation of Investigations

- ASA grading, Risk Assessment, Airway Assessment, Prediction of Peri-operative Mortality &Morbidity

- Anaesthetic implications of Surgical conditions,

- Emergency & Elective - Optimization & Advice

- Anaesthetic implications of Concurrent medical therapy and advice

- Pre-medication and request for Blood and Blood Products

- Pre-operative fasting guidelines

- Informed Consent and Counseling

- Plan of Anesthesia - General / Regional, Day Care / Inpatient.

2. Post-Operative Care

- PACU orders

- PACU essential monitoring

- Analgesia

- Oxygen therapy

- Discharge criteria

3. Anesthesia for Surgical Disciplines

General & Regional Techniques for all Surgical procedures done in both Elective & Emergency Surgeries

Medical Implications due to the Surgical Condition

Decision Making on Elective / Emergency Surgery

Decision Making on General/ Regional Techniques

Decision Making on Day Care / In patient management

Surgical Disciplines

- General Surgery/Minimal Access Surgery
- Obstetrics / Gynaecology
- Orthopaedics
- Traumatology & Resuscitation
- ENT
- EYE
- Facio-maxillary
- Dental

Day Care Surgery

- Selection Criteria
- Choice of Anesthesia
- Special Anesthesia Techniques
- Minimum Monitoring Standards
- Post-op Care
- Discharge Criteria
- Critical Incidents, Crisis Management

Implications of intra-operative events

(i) Cardiovascular System

- Hypertension, Hypotension
- Dysrhythmias, Heart Blocks, Cardiac Arrest

- Myocardial Ischaemia

(ii) Respiratory System

- Hypoxia, Hypo and Hypercapnia
- Airway Obstruction
- Laryngospasm, Bronchospasm
- Pulmonary Odema
- Pulmonary Aspiration
- Pneumothorax
- CICV
- Pulmonary Embolism
- Air Embolism

(iii) Drug Induced Crisis

- Overdosage
- Delayed Recovery
- Sux. Apnea
- Dual Block
- Awareness
- Malignant Hyperthermia
- Anaphylaxis

(iv) Miscellaneous

- Hypothermia
- Injuries

Resuscitation and Trauma Medicine

- Adult Resuscitation - BLS & ACLS

- Neonatal Resuscitation - BLS

- PALS - Basic concepts

- Advanced Trauma Life Support

- Principles of Triage and Trauma Scoring

- Principles of Damage Control Surgery

- Principles of Fluids Resuscitation in Trauma

- All Resuscitative Fluids, Devices & Equipment

- Head & Spinal Trauma

- Trauma of other Body Parts

Critical Care Management - Clinical Management

A) Admission & Discharge Criteria

B) Basic Understanding of Common medical & surgical patients requiring High Dependency or Critical Care Management due to Elective Reasons or due to any Critical incident.

C) Critical Care Management of commonly admitted patients to ICU (eg) Tetanus, G.B, Sepsis, Shock, MODS, Head trauma, Poly trauma, Obstetric Cases.

D) Knowledge of systemic support of all systems required by a critically ill patient (eg) Cardiac, Renal, Hematologic, Nutritional

E) Respiratory failure and Respiratory support including all forms of Oxygen-therapy and devices and Ventilator parameters, Modes of ventilation.

F) Brain Death & Vegetative States

G) Knowledge of managing emergencies like Diabetic Ketoacidosis, Massive Haemorrhage, Status Asthmatics, Status Epilepticus, Acute Renal Failure, Acute Hepatic Failure, Disturbance of Temperature regulation.

H) Poisoning & Envenomation

I) General nursing care & Infection Control.

J) Analgesia & Sedation

K) Comprehensive Anatomical, Physiological & Pharmacological knowledge to carry out the invasive procedures safely under supervision. Be familiar with correct pharmacological assistance & safe use of devices and equipment used for invasive procedures.

Pain Management

- Pharmacological Management of Pain with Analgesics, Anaesthetics and Adjuvants

- Basic knowledge of alternative techniques.

SYLLABUS FOR MS PART 2

Applied Basic Sciences

1. Applied Clinical Pharmacology

A) Anesthetic interaction and pharmacological management of

- Cardio vascular diseases

- Respiratory diseases

- Hepatic & Renal diseases

- G.I. Problems

- Pitutary , Thyroid, Adrenals

- Diabetes Mellitus

- Epilepsy

- Psychiatric disorders

- Bacterial, Fungal and Viral infections

B) Pharmacological techniques

- Total intravenous anesthesia

- Achieving steady states by boluses & infusions

- Choice of agents, additives

- Sedation techniques

C) Pharmacology related to Acute and Chronic Pain

- Opioids, Non-Opioids and Adjuvants

- Non-Pharmacological methods, TENS, Acupuncture,

Cryotherapy, Radiofrequency

- Techniques

- Patient Controlled Systemic and Epidural Analgesia

- Regional & Peripheral Nerve Blocks

- Inhalational Analgesia

D) Special Pharmacological Application on

- CNS CVS
- Cerebral blood flow Systemic & Pulmonary Vascular
- Cerebral perfusion Resistance
- Intra cranial pressure Heart Rate and Blood Pressure
- Convulsions
- Anticoagulants and Thrombolytic therapy Cardio pulmonary bypass, Cardioplegia

E) Organ Transplant & Harvesting

2. Applied Clinical Anatomy, Physiology &Patho-physiology of Systems

A) Endocrine and Metabolism

- Diabetes Mellitus

- Hyper and hypo function of Pituitary gland and hypothalamus

- Hyper and hypo function of Adrenal gland

- Hyper and hypo function of Thyroid and Parathyroid glands

- Diabetes Insipidus, Syndrome of Inappropriate Secretion of Anti-Diuretic Hormone

- Malignant hyperthermia

- Porphyria

- Surgery, Anesthesia and Stress Response

- Thermoregulation

B) Hematology / Transfusion / Immunology

- Anemias, Hemoglobinopathies, Coagulopathies

- Coagulation Cascade & New Concept of Cell Based Model

- Anticoagulation & Management of abnormal coagulation

- Transfusion therapy - Indications / Risks /Complications of blood transfusion

- Blood components, Artificial colloids, Crystalloids

- Risks / Complications of Blood substitutes

- Autologous Transfusion and Blood Conservation Techniques - Basic principles only

- Anaphylaxis

3. Applied Physics, Anesthesia machine & Monitoring Equipment

A) Monitoring Equipment

- IBP monitoring devices

- Transducers

-. CFAM

- Evoked potentials

- BIS monitor

- Temperature monitor

- PA Catheters / Central Venous Catheters

- Storage of medical gases & principles of F1 O2 Analyzer

- Principles of gas and inhalation agent analysis

- Neuromuscular Monitoring Devices-Nerve Stimulator, Nerve Locator

- Cardiac Rhythm Devices-Pacemakers,ICD

- Defibrillator

4. Clinical measurement - interpretation and limitations

A) Monitoring of Respiratory function

- Airway pressure, volume, flow, compliance

- Oximetry

- Capnography

- Pulmonary function tests

- Arterial blood gas analysis

- V/Q scanning (Basic Principles of interpretation)

B) Monitoring of Cardiovascular system

- B.P measurement, Invasive and Non invasive

- Interpretation of Electrocardiogram

- Echocardiography - TEE

- Cardiac output and Derived Indices, Invasive and Non invasive - All forms, NICO, PICCO, LIDCO

- Principles of Central Venous Pressure & Pulmonary Artery Pressure Monitoring.

C) Monitoring of Central Nervous & Neuromuscular System

- Evoked potentials - Interpretation

- Interpretation of CFAM

- Interpretation of BIS

- Electromyography - Basic understanding

- Peripheral Nerve Stimulator

D) Monitoring of Renal / Hepatic / Hematologic System Interpretation of relevant investigations

E) Interpretation of imaging & ultrasound

- Plain X-Ray, Neck, Chest, Spine

- Ultrasound

- Doppler

- CT, MRI (Basic Concepts)

F) Fetal monitoring (Basic Concepts)

Understanding of Co-existing Diseases

Management and Anesthetic implications of common systemic medical diseases to be able to make decisions on conducting, postponing or referring for consultation Common Medical Diseases

A) Central Nervous System

- Seizure Disorders

- Psychiatric Disorders

- Head Trauma

B) Cardio-Vascular System

- Coronary Artery Disease

- Hypertension

- Dysrhythmias & Heart Blocks

- Valvular Heart Disease

- Congestive Cardiac Failure

- Cardiomyopathires

- Corpulmonale

- Pacemaker / ICD/Stents

C) Respiratory System

- Upper Respiratory Tract Infections & Pathologies

- Chronic Obstructive Airway Diseases

- Asthma

- Restrictive Airway Diseases

- Obstructive Sleep Apnea

- Pneumo./Hemo./Hydrothorax

- Evaluation for One Lung Anesthesia Endocrinopathies

- Pituitary Dysfunction - (Anterior and Posterior)

- Thyroid Dysfunction

- Parathyroid Dysfunction

- Diabetes Mellitus / Insulinoma

- Adrenal Cortical & Medullary Conditions Esp. Phaeochromocytoma.

D) Renal Diseases

- Acute and Chronic Renal Failure

- Nephrotic Syndrome

- Acid-Base Disturbances

- Water & Electrolyte Imbalance

E) Musculo-Skeletal & Neuromuscular Diseases

- Myasthenia Gravis &Myasthenic Syndrome

- GuillainBarre's Syndrome

- Tetanus

- Rheumatoid Arthritis

- Sarcoidosis

- Parkinsons Disease

- SLE

- AnkylosingSpondilitis

- Muscular Dystrophy

F) Cancer and its anesthetic Implications

G) Immunological Disorders & Immunosuppression

H) Haematologic Disorders

- Anemias

- Coagulopathies

- Platelet disorders

I) Obesity

J) Geriatrics

K) Obstetrics

- Physiological Changes of Pregnancy

- Physiology of Utero-Placental Flow, Transfer of Drugs & effects of anesthesia on Uterine Blood Flow & Activity

- CPR in a pregnant patients

- Medical Diseases Complicating Pregnancy

- Surgical Conditions Concurrent with Pregnancy

- Pre-eclampsia,Eclampsia & HELLP

- Obstetric Haemorrhage& Resuscitation

- Amniotic Fluid Embolism

- Labour Pain Pathways and Physiology

L) Liver Disorders

- Hepatitis and its implication

- Cirrhosis

- Hepatic Encephalopathy

M) Common Neonatal & Paediatric Conditions

- Anatomical, Physiological & Pharmacological differences from adults and their anaesthetic implications including premature baby in relevance to;

- Pre-operative Assessment

- Peri-op Fluid Management

- Common Congenital anomalies and their anaesthetic implications

- Paediatric Airway Emergencies

- Pain Management

- Trauma & Burns

N) Thermoregulation & Disorders

- Malignant Hyperthermia

- Hypothermia

O) Genetic disorders

- Turner's syndrome

- Trisomy

Clinical Anesthesia for Surgical Disciplines

1. Pre-operative Assessment & Management

- Assessment - History taking, Physical examination

- Ordering & Interpretation of Investigations

- ASA grading, Risk Assessment, Airway Assessment, Prediction of Peri- operative Morbidity &Mortality

- Anaesthetic implications of Co-existing diseases, Optimization and Referral

- Anaesthetic implications of Surgical conditions,

- Emergency & Elective - Optimization & advice

- Anaesthetic implications of Concurrent medical therapy and advice

- Pre-medication and request for Blood and Blood Products

- Pre-operative fasting guidelines

- Informed Consent and Counseling

- Plan of Anesthesia - General / Regional, Day Care / Inpatient

2. Post-Operative Care

- Decision making on Inter-hospital / Intra-hospital Transfer

- PACU setup & staffing

- PACU orders

- PACU essential monitoring

- Analgesia

- Oxygen therapy

- Discharge criteria

3. Surgical Disciplines

- General and Regional Techniques for all Surgical procedures of mandatory rotations in different Elective and Emergency Surgeries

- Medical Implications due to the Surgical Condition

- Decision Making on Elective / Emergency Surgery

- Decision Making on General / Regional Techniques

- Decision Making on Day Care / In patient management

- Decision Making on Employing Special Anesthesia Techniques

- Theroetical & Practical Knowledge about procedures like, Bronchoscopy, Thoracostomy, Percutaneous Dilatational Tracheostomy, Central Venous Line, Arterial Line.

Surgical Disciplines

- General Surgery

- Obstetrics / Gynaecology

- Paediatrics / Neonatal

- Orthopaedics

- Traumatology & Resuscitation

- Neurosurgery

- Cardiac Surgery

- Thoracic Surgery

- Vascular

- Bariatric

- Minimal Access Surgery

- Laser Surgery

- Robotic Surgery

- Transplant Surgery (Renal, Hepatic)

- Burns

- Plastic

- Anesthesia outside OR

Details of Surgical Disciplines

1. General Surgery

Cholecystectomy, Appendectomy, Bowel Obstruction, Perforation and Bowel Resection, Acute Gastrointestinal Bleeding, Splenectomy, Pancreatic Resection, Hepatic Resection, Portal Shunting Procedures, Adrenal Surgery, Laparoscopic Surgery, Effects of Abdominal Surgery on Pulmonary Function and Postoperative Pulmonary Complications, Postoperative Intestinal Dysfunction,

2. Obstetrics / Gynaecology

Preterm Labour, D/C & D/E, Operative Vaginal Delivery, C-Section for all obstetric conditions, Non-Obstetric Surgery in Obstetric patients, Total Abdominal Hysterectomy, Bilateral Salpingo Oopherectomy, Obstetric Haemorrhage

3. Paediatrics / Neonatal

Monitoring and Specialized Equipment for Paediatric Anesthesia, Common Paediatric Syndromes and Emergencies, TE fistula, Diaphragmatic Hernia, Exomphalos, Hirshprungs Disease, Intestinal Atresia, Pyloric Stenosis, Below Umbilicus Surgeries like Inguinal Hernia, Undescended Testis, Imperforate Anus, Paediatric Urology, FB in airway, epiglottitis, Ex-premie, Anesthesia outside OR.

4. Orthopaedics

DVT prophylaxis, Fat Embolism, Pulmonary Embolism, Compartment Syndrome, Cement implantation syndrome, Surgery under Tourniquet, Upper limb Surgeries, Lower limb Surgeries, Spine Surgery

5. Neurosurgery

Air embolism, Intracranial hypertension, Induced Hypotension, Subarachnoid hemorrhage Seizures, Methods of Brain Protection, Declaration of Brain Death, Head Trauma, Evacuation of Haematoma, Cerebral Aneurysms, Occlusive Cerebrovascular Disease, AVM, Cerebral

Aneurysm, Posterior Fossa Surgery, Spinal Cord Surgery, Pituitary Tumors, Interventional Neuro radiology, Epilepsy Surgery, Pediatric Neurosurgery

6. Cardiac Surgery

Valvular Disease, CABG & Management of CPB

7. Thoracic Surgery

Pathophysiology of lateral position and open thorax, One Lung Anesthesia, Tracheal Resection, Lung Resection, Airway Laser Surgery, Esophageal Surgery, Thoracoscopic Surgery, Bronchopleural Fistula, Pulmonary Hemorrhage, Bullae and Pneumothorax, Post-Thoracotomy Analgesia

8. Vascular Surgery

Thoracic Aneurysm Surgery, Abdominal Aneurysm Surgery, Peripheral Vascular Surgery, Carotid Endarterectomy, Emergency Vascular Surgery

9. Laser Surgery

Types of lasers and their use, Hazards of laser surgery and appropriate precautions, Management of airway fire,

10. Transplant Surgery (Renal, Hepatic)

Preoperative Assessment, Preparation and Management of Recipient for Kidney, Liver Management of Transplant Patient for Non-transplant surgery, Transplantation Immunology, Management of Live and Cadaver Organ Donor

11. Anesthesia outside OR

Personnel, Patient Selection, Monitoring, Transport, Recovery, Considerations in Anesthesia for, Radiologic Procedures like MRI, CT, Angiography Cardioversion, Emergency Room procedures, ECT

Day Care Surgery

- Selection Criteria

- Choice of Anesthesia

- SpecialAnaesthesia Techniques

- Post-op. Care

- Discharge Criteria

- Critical Incidents, Crisis Management

- Minimal monitoring standards, utilization of resources

Special Anesthesia Techniques

- Hypotensive Anesthesia

- Use of Hypothermia

Critical Incidents, Crisis Management, Minimum Monitoring Standards

- Cardiovascular System

- Hypertension, Hypotension

- Dysrhythmias, Heart Blocks, Cardiac Arrest

- Myocardial Ischaemia

- Respiratory System

- Hypoxia, Hypo and Hypercapnia

- Airway Obstruction

- Laryngospasm, Bronchospasm

- Pulmonary Odema

- Pulmonary Aspiration

- Pneumothorax

- CICV

- Pulmonary Embolism

- Air Embolism

- Drug Induced Crisis

- Overdosage

- Delayed Recovery

- Sux. Apnea

- Dual Block

- Awareness
- Malignant Hyperthermia
- Anaphylaxis
- Miscellaneous
- Hypothermia
- Injuries

Resuscitation & Trauma Medicine

- Adult Resuscitation - BLS & ACLS
- Neonatal Resuscitation BLS
- PALS - Basics only
- Advanced Trauma Life Support
- Principles of Triage & Trauma Scoring
- Principles of Damage Control Surgery
- Principles of Fluid Resuscitation in Trauma
- All Resuscitative Fluids, Devices & Equipment
- Blunt and Penetrating Trauma
- Airway Trauma
- Head and Spinal Trauma
- Thoracic Trauma
- Abdominal Trauma
- Trauma of other Body Parts

Critical Care Management

1. Clinical Management

- Admission & Discharge Criteria

- Basic Understanding of Common medical and surgical patients requiring High Dependency or Critical Care Management due to Elective Reasons or due to any Critical incident.

- Critical Care Management of commonly admitted patients to ICU (eg) Tetanus, G.B, Sepsis, Shock, MODS, Head trauma, Poly trauma, Obstetric cases.

- Knowledge of systemic support of all systems required by a critically ill patient (eg) Cardiac, Renal, Hematologic, Nutritional

- In depth knowledge of Respiratory failure and respiratory support including all forms of Oxygen-therapy and devices and ventilator parameters, modes of ventilations.

- Brain Death & Vegetative States Diagnosis, Decisions and Orders eg DNR Code Status.

- Knowledge of managing Emergencies like Diabetic Ketoacidosis, Massive Haemorrhage, Status Asthmatics, Status Epilepticus, Acute Renal Failure, Acute Hepatic Failure, Disturbance of Temperature regulation.

- Poisoning and Envenomation

- General nursing care & Infection Control Antibiotic policy

- Analgesia and Sedation

- Scoring system APACHE, SOFA etc

- Concept and Implementation of Bundle Therapy

- Comprehensive Anatomical, Physiological & Pharmacological knowledge to carry out the invasive procedures safely. Be familiar with procedures and the ability to deliver correct pharmacological assistance with the safe use of devices. Should have the know how of the equipment used for invasive procedures.

2. Administrative

- Organization and setting up an ICU

- Staffing, Equipment and Environment

- Admission and Discharge Policies

- Development of protocols and guidelines (eg) DNR, Organ Donation etc.

- Documentation and Record Keeping

- Communication and Counseling

- Ethical Approval of Research Protocols

- Funding, Data Collection and Statistical Analgesia

- Medico-legal Aspects

Pain Management

1. Clinical Management

- Pharmacological and Non Pharmacological Management of Pain with Analgesics, Anaesthetics and Adjuvants

- All techniques and procedures required to provide pain relief in acute and chronic conditions

- Basic Understanding of Palliative Care

2. Administrative

- Setting up of a Pain Management Clinic

- Developing Protocols / Guidelines for managing Acute and Chronic Pain

- Documentation and Record keeping

- Communication and Counseling

- Ethical Approval of Research Protocols Finding, Data Collection and Statistical Analysis

- Medico-legal Aspects

Professional Skills

1. Statistics and Research Methods

- Statistics

- Definitions: mean, mode, median, standard deviation

- Tests: one and two sample tests, multiple sample tests, contingency tables and Chi2 analysis, linear regression and correlation

- Concepts: sensitivity, specificity, incidence, prevalence, positive predictive value, negative predictive value, odds ratio, sample size analysis

- Experimental Designs: Prospective, Retrospective,

Randomization, Protocol development

- Writing a paper

- Critical Appraisal

- Reading the Literature

- Appropriate application of literature to clinical practice

- Use of Medline and other information sources

- Research Ethics

2. Ethics

- Basic principles of Ethics - Autonomy, Beneficence, Non-maleficence, Justice

- Ethical systems- Teleological, Deontological, Different value systems cultural, religious

- Discussing/framing an ethical argument, Common areas of ethical conflict in anesthesia duty to report colleagues Informed consent, surgical, anaesthetic patient refusal, limited consent (models of autonomy vs beneficence) age (children)mental competence, substitute decision making, coercion vs persuasion

- Duty of Care - Physician- Patient Contract, patient dangerous to the physician (AIDS, Hep B, Violence) confidentiality, Allocation of resources, End of Life desicion, Brain death, with-holding/withdrawing treatment,

- Advance Directives/Living Wills no blood, DNR, Informed consent

3. Legal Issues

- Consent, Informed consent, disclosure of risk substitute decision makers

- Malpractice: Duty of Care, definition of negligence, Confidentiality

5. Teaching and Communication Skills

- Presentation skills giving rounds (& larger lectures), preparing slides and overheads, oral exams. Teaching principles of professional education one-to-one, teaching with students

and juniors, housestaff, small group teaching, how to give feedback, principles of evaluation

- Learning skills: Concept of CME & CPD, Organizing study & reading in residency, What to read, Use of literature

searchers, the Net, an effective program for continuing medical education.

- Communication with patients and families, effective interviewing and information-giving skills, Determining how information is received, Breaking bad news, Managing disagreements.

- Making a contribution to your practice environment

- Defining personal professional interests in addition to clinical service. (Teaching, research, administrative, technical/ equipment/quality assurance,etc.)

- Time management to leave quality time for personal and family life

- Peer group leadership, Strategic planning, Advocacy role for the department within the hospital, Interface between external professional bodies, government and public organizations and the department.

CORE COMPETENCIES

CASES/PROCEDURES ANAESTHESIA	1ST YEAR cases	level	2ND YEAR cases	level	3RD YEAR cases	level	4TH YEAR cases	level
PREOP/POSTOP ASSESSMENT	100	2 - 3	100	4	-	-	-	-
Give Anaesthesia to following surgical disciplines GENERAL SURGERY	100	2 - 3	100	3	100	4	100	4
ENT / EYE	50	2 - 3	100	3	25	4	25	4
ORTHOPAEDIC	50	2 - 3	50	3	25	4	25	4
UROLOGY	25	2	25	3	25	4	25	4
NEUROSURGERY	25	2	25	3	25	3	25	4
MAXILLOFACIAL	10	2	10	3	10	3	10	4
GYNACOLOGICAL	10	2	10	3	10	4	10	4
OBSTETRIC	25	2	25	3	25	4	25	4
PAEDIATRIC/ NEONATAL	5	2	5	3	5	3	5	4
DAY CARE	5	2	5	3	10	4	10	4
THORACIC / VASCULAR	2	2	3	3	5	3	5	4

Level of Competency

Observer status	1
Assistance status	2
Performed under direct supervision	3
Performed independently	4

TEXT BOOKS

1. Smith and Aitkenhead's Textbook of Anesthesia
2. Morgan & Mikhail's Clinical Anesthesiology
3. Yao & Artusio's Anesthesiology,
4. Millers Anaesthesia
5. Barash - Clinical Anesthesia
6. Oxford Text Book of Anaesthesia

LIST OF APPROVED JOURNALS

1. British journal of Anaesthesia
2. Europium journals of anaesthesiology
3. Anaesthesia & Analgesia
4. Journal of College of physician in surgeons Pakistan
5. Anaesthesia, pain & Intensive care

MANDATORY WORKSHOPS

1. Thesis writing
2. Communication Skill
3. BLS (Basic Life Support)

8. Neuromuscular blocking agents
9. Cholinesterase inhibitors & other pharmacologic antagonists to neuromuscular blocking agents
10. Anticholinergic drugs
11. Adrenergic agonists & antagonists
12. Hypotensive agents
13. Adjuncts to anesthesia
14. Premedication
15. Analgesics opioids. Nsaids & other analgesics

EQUIPMENTS AND DEVICES SAQ 01 SBA 20

1. Medical gas systems
2. Surgical diathermy
3. Fire prevention & preparation
4. Laser safety
5. Breathing systems
6. Modern anesthesia machine
7. Gas supply
8. Flow control circuits
9. Vaporizers
10. The breathing circuit
11. Oxygen analyzers
12. Adjustable pressure-limiting valve
13. Humidifi ers
14. Ventilators
15. Waste gas scavengers

MONITORING SAQ 02 SBA 20

CARDIOVASCULAR MONITORING

1. Arterial blood pressure
2. Electrocardiography
3. Central venous catheterization
4. Pulmonary artery catheterization
5. Cardiac output

NONCARDIOVASCULAR MONITORING

1. Precordial & esophageal stethoscopes
2. Pulse oximetry
3. Capnography
4. Anesthetic gas analysis
5. Electroencephalography
6. Evoked potentials
7. Temperature
8. Urinary output
9. Peripheral nerve stimulation

TABLE OF SPECIFICATIONS FOR MID TERM EXAMINATION OF MS IN ANAESTHESIOLOGY

S.NO.	CONTENTS	SAQ	SBA
1.	ANATOMY	01	10
2.	PHYSIOLOGY	01	15
3.	PHARMACOLOGY	02	20
4.	EQUIPMENTS AND DEVICES	01	20
5.	MONITORING	02	20
6.	MISCELLANEOUS	03	15
TOTAL		**10**	**100**

ANATOMY SAQ 01 SBA 10

1. Airway
2. Cardiovascular system
3. Respiratory tract
4. Nervous system
5. Renal system
6. The liver

PHYSIOLOGY SAQ 01 SBA 15

1. Cardiovascular system
2. Respiratory tract
3. Nervous system
4. Neuromuscular junction
5. Hepatic & hematology
6. Renal system
7. Fluid electrolytes & acid base balance
8. Physiology of pain
9. Physiology of pregnancy
10. endocrinology

PHARMACOLOGY SAQ 02 SBA 20

1. Pharmacological principles
2. Drugs acting on the cardiovascular and autonomic nervous systems
3. Drugs acting on the respiratory system
4. Inhalation anaesthetic agents
5. Intravenous anaesthetic agents
6. Local anaesthetic agents
7. Anticonvulsant drugs

MISCELLANEOUS SAQ 03 SBA 15

1. Basic physics for the anaesthetist
2. Preoperative assessmenting diseases
3. Anaesthesia & co-exist
4. The practical conduct of anaesthesia
5. Complications during anaesthesia
6. Postoperative care & pain management
7. Local anaesthetic techniques
    a. Spinal, epidural, & caudal blocks
    b. Peripheral nerve blocks
8. Cardiopulmonary resuscitation
9. Critical care

TABLE OF SPECIFICATIONS FOR MS PART-II EXAMINATION IN ANAESTHESIOLOGY

EXAMINER 1:

NUMBER OF QUESTIONS	
SBA	50
SAQ	06
Long essay Questions	03

TOPICS

1. E.N.T. Surgery
2. Eye surgery
3. Epidural / spinal / peripheral nerve block / regional blockade
4. Minimally invasive procedures
5. Fluids, electrolytes, acid base balance
6. Liver diseases, renal diseases
7. Thoracic surgery
8. Vascular surgery
9. Neuro surgery
10. Urogenital surgery
11. Obesity & obstructive sleep aponea

EXAMINER 2:

NUMBER OF QUESTIONS

SBA	50
SAQ	03
Long essay Questions	02

TOPICS

1. Coexisting diseases
2. Blood transfusion
3. Trauma
4. Cardiac arrest
5. Hemophilia
6. Sickle cell disease
7. Thalassemia
8. Patient on anticoagulant therapy

EXAMINER 3:

NUMBER OF QUESTIONS

SBA	50
SAQ	03
Long essay Questions	01

TOPIC

1. Equipments of monitoring
2. Patients positioning
3. Airway management
4. Rare coexisting diseases
5. Myasthenia gravis
6. Malignant hyperthermia
7. Gullian bare syndrome
8. Tetanus

EXAMINER 4:

NUMBER OF QUESTIONS

SBA	50
SAQ	03
Long essay Questions	02

TOPIC

RESPIRATORY FAILURE

PULMONARY EDEMA (CARDIOGENIC , ARDS/ ALI)

SEPSIS

NUTRITION

ACUTE MI

ACUTE RENAL FAILURE

OXYGEN / RESPIRATORY THERAPY

MECHANICAL VENTILATION (NON INVASIVE & INVASIVE VENTILATION)

INFECTION IN ICU

BRAIN DEATH

DROWNING

G.I BLEEDING

SCORING SYSTEMS IN ICU