

**Mahatma Gandhi University**  
of  
**Medical Sciences & Technology, Jaipur**

# **Syllabus**

**M.Sc. Operation Theatre Technology**  
( 2 Years Degree Course )

## **Notice**

1. Amendments made by the University in Rules / Regulations of the Courses shall automatically apply.
2. The University reserves the right to make changes in the syllabus/books/ guidelines, fee structure or any other information at any time without prior notice. The decision of the University shall be binding on all.
3. The Jurisdiction of all court cases shall be Jaipur Bench of Hon'ble Rajasthan High Court only.

## **M.Sc. Operation Theatre Technology**

(2 Years Degree Course)

## **Rules & Regulations**

### **1. TITLE OF THE COURSE**

The title of the course shall be “**M.Sc. Operation Theatre Technology**”

### **2. DURATION OF COURSE/TRAINING**

The course shall be of two years duration

### **3. MEDIUM OF INSTRUCTION**

English shall be the medium of instruction

### **4. ELIGIBILITY FOR ADMISSION:**

Candidate should have passed the Bachelor's Degree in Science with Physics as one of the main subjects.

### **5. CRITERIA FOR ADMISSION**

Selection shall be done by an Admission Board of the University strictly on merit. It will consist of two-step process –Written Entrance Examination followed by Counseling/Personal Interview (PI).

### **6. RESERVATION POLICY**

Reservation shall be applicable as per policy of the State Government.

### **7. ENROLMENT**

Every candidate who is admitted to M.Sc. Course in Mahatma Gandhi Medical College & Hospital shall be required to get himself/herself enrolled with the Mahatma Gandhi University of Medical Sciences & Technology after paying the prescribed eligibility and enrolment fees.

A candidate shall deposit enrolment fees along with tuition fees at the time of his/her admission to the course. Such a candidate who fails to submit, through the college Principal, duly filled enrolment form along with original documents including migration certificate required for enrolment within two months of his/her admission or up to November 30 of the year of admission whichever is later, he/she will have to pay late fee prescribed by the University

### **8. MIGRATION RULES**

No student, once admitted to the course and enrolled by the University, will be permitted to migrate to any other Course/ University.

No student will be admitted to the Course on migration from any other Course/ University.

### **9. ATTENDANCE**

Minimum 75% attendance in each year, both for theory and practical classes separately. Student with deficient attendance will not be permitted to appear in University examination.

## 10. TRAINING:

1. The period of training for M.Sc. shall be of two years from the date of admission.
2. Part – I and Part – II of the course shall be of one-year duration each.
3. The candidate will undertake the post graduate training as a full-time post graduate in the department concerned.
4. The students will be required to complete the prescribed period of study and fulfill the requirement of attendance before they are allowed to appear in the University examination.

## 11. EXAMINATION AND ASSESSMENT

1. The examination of Part I shall consist of three theory papers and internal assessment and practical & viva-voce examination.
2. The examination of Part II shall consist of three theory papers & internal assessment and practical in the opted specialization.
3. A candidate shall be permitted a maximum of 4 years from the year of admission to complete the course and pass the examination failing which, the candidate will have to leave the course.
4. Only those candidates will be allowed to appear at Part II examination, who have passed Part –I examination completely.
5. Degree of M.Sc. Anesthesiology & Critical Care Technology will be awarded to a candidate only after his successful completion of one year compulsory internship.

## 12. CONDUCTION OF THE UNIVERSITY EXAMINATION:

University examination shall be conducted twice in a year; that is Main and Supplementary Examination. Supplementary examination shall be conducted after 2-4 months of the main examination.

## 13. SCHEME OF EXAMINATION

**The Examination in Part I shall consist of:**

<b>Paper</b>	<b>Marks</b>
<b>Theory</b>	
<b>Paper I - Applied Basic Sciences</b>	100 Marks
<b>Paper II –Basic Principle of Anesthesia &amp; Equipments</b>	100 Marks
<b>Paper III - Basic Knowledge of surgeries, Instruments &amp; CSSD</b>	100 Marks
<b>Internal Assessment</b>	100 Marks
<b>Practical &amp; Viva Voce Examination</b>	100 Marks
<b>Total Marks</b>	<b>500 Marks</b>

**Notes:**

1. Each theory paper shall be of 3 hours duration.
2. Each paper will be set by the External Examiner of the subject concerned and will be assessed by the internal examiner of the subject concerned.

Pattern of questions to be set and answered shall be as follows:

<b>Paper</b>	<b>No. of questions to be set</b>	<b>No. of questions to be answered</b>
Paper I	4	4
Paper II	4	4
Paper III	4	4

3. In order to pass the University Examination, the candidate must secure a minimum of 50% marks in each theory paper including internal assessment and 50% marks in practical and viva-voce examination separately.
4. A candidate who has failed in one or more theory paper of Part-I Examination must appear in that theory paper in supplementary examination which will be conducted by university within 2 – 4 months.

**The Examination in of Part II shall consist of:**

<b>Paper</b>	<b>Marks</b>
<b>Theory</b>	
<b>Paper I-Specialty Anesthesia Techniques &amp; O R Management</b>	<b>100 Marks</b>
<b>Paper II - Special surgeries, Equipments</b>	<b>100 Marks</b>
<b>Paper III -Trauma, Critical Care &amp;Research Methodology</b>	<b>100 Marks</b>
<b>Internal Assessment</b>	<b>100 Marks</b>
<b>Practical &amp; Viva Voce Examination</b>	<b>100 Marks</b>
<b>Total Marks</b>	<b>500 Marks</b>

**Notes:**

1. Each theory paper shall be of 3 hours duration.
2. All papers shall be set by the External Examiners.
3. Paper I will be assessed by the External Examiner and Paper II will be assessed by the Internal Examiner viz. Head of the Department of subject concerned. Paper III will be assessed by Professor / Associate professor / Assistant professor

Pattern of questions to be set and answered shall be as follows:

<b>Paper</b>	<b>No. of questions to be set</b>	<b>No. of questions to be answered</b>
Paper I	4	4
Paper II	4	4
Paper III	4	4

4. Practical examination shall be conducted by one Internal, one External Examiner which will be appointed by the university.
5. In order to pass the examination the candidate must secure a minimum of 50% marks in Theory papers including internal assessment and 50% marks in practical and viva-voce examination separately.
6. In case a student passes either in Theory or in Practical only, the student shall be considered to fail in the whole examination and he will have to appear in both the Theory and Practical in the subsequent examination.

#### **14. APPOINTMENT OF EXAMINER AND PAPER SETTERS**

- a. All the examiners, paper setters, theory examination answer books evaluators, Internal and External Examiners for Practical examinations shall be appointed by the President of the University.
- b. Qualification of the Paper setter / Examiner: Assistant Professor and above.
- c. Paper setter can be an examiner

#### **15. GRACE MARKS**

No grace marks will be provided in M.Sc. Examination

#### **16. REVALUATION / SCRUTINY**

No Revaluation of answer books shall be permitted in M.Sc. Examination. However, the candidate can apply for scrutiny of marks as per University Rules.

## Curriculum Outline

### Distribution of Teaching hours

#### 1<sup>ST</sup> Year M.Sc. Operation Theatre Technology

Course Title	Hours
Basics Sciences Applied to Anesthesiology & Surgery	80
Principles and equipments related to Anesthesia & operation Theatre	100
Principles of Sterilization techniques & Infection control	90
Concepts of diseases in relation to anesthesia, surgery & Critical Care	100
Pre-operative optimisation & preparation for surgery	80
Anesthesia Techniques, complication, anesthetic & emergency drugs,	100
Basic surgical techniques, instruments & equipments	100
Fundamentals of Critical Care and Monitoring in OR and ICU	50
Biostatistics, audits & Epidemiology	50
Teaching Methodology & Computer applications	50
<b>Total Theory Hours</b>	<b>800</b>
Practical	400
<b>Total Hours:</b>	<b>1200</b>

#### 2<sup>nd</sup> Year Master of Anaesthesia & Critical care Medicine

Course Title	Hours
Specialities Anaesthetic Technique, Advanced Monitoring Systems and Procedure	120
Specialised surgeries and sub specialities surgeries	150
Sepsis, infections and advanced organ system support	120
Trauma Management	100
Clinical guideline, evidence-based practices & quality improvement	80
Management of OT, Quality assurance Accreditation	80
Biomedical instrumentation in O, Anesthesia & Critical care	50
Medico legal issues, Medical Ethics	50
Research Methodology and recent advances	50
<b>Total Theory Hours</b>	<b>800</b>
Practical	400
<b>Total Hours:</b>	<b>1200</b>

# SYLLABUS

## M.Sc. OPERATION THEATRE TECHNOLOGY

(2 Years Degree Course)

### Learning Objectives:

- Hands on training on all anaesthesia and surgical equipments like anaesthesia machine, monitors, different surgical instruments, laparoscopy equipments, ventilator etc.
- Training in aseptic techniques.
- Exercise empathy and a caring attitude towards patients.
- Maintain professional integrity, honesty and high ethical standards
- Capability of handling adverse reactions and emergencies in OT and PACU.
- Demonstrate skills in maintenance of equipments and proper documentation.
- Be a motivated teacher- defined as one keen to share knowledge and skills with a colleague or a junior or any learner.

### Expectation from the future graduate in the providing patient care

1. Student should be able to demonstrate comprehensive knowledge, of assisting all types of surgical procedures and anaesthetic techniques to all types of Patient.
2. Student should be able to integrate knowledge with practice in handling and maintaining various of anaesthesia, monitoring and surgical instruments and equipments.
3. He/she must be well versed with infection control, sterilization and CSSD protocols.
4. Student must be capable of OR management, medical record keeping, consent and accreditation & management policies implementation
5. Student should be able to manage advanced patient care procedures during anaesthesia and critical care.
6. Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible management.
7. Always adopt ethical principles and maintain proper etiquette in dealings with patients, relatives and other health care personnel and to respect the rights of the patient including the right to information, privacy and second opinion.
8. Student should have ability to work independently and take responsibility for his own work, collaborating in activities of clinical research, training ethical and evidence-based practices.

### Assessment:

The examination to the first/second year shall be open to a student who has remained on the rolls of the course concerned for full on academic year preceding the examination and having attended not less than 75% of the full course of lectures and 75% practical separately held for the purpose in each year.

## **FIRST YEAR**

### **PAPER I:: Applied Basic Sciences**

#### **Anatomy :**

1. Human body & Anatomical terms, surface anatomy and land marks & cell structure.
2. Musculo – skeleton systems, skull, vertebral column, pelvic bones, extremities, rib cage.
3. Respiratory systems – Airway- Nose, larynx, trachea,pleura, lungs, pulmonary functions bronchopleural segments, thorax, gaseous exchange.
4. Cardio-vascular system – Heart, major arteries & veins, renal & portal system.
5. Alimentary system – mouth, pharynx, oesophagus, stomach, intestines, spleen, liver, gall bladder, pancreas.
6. Brain, spinal cord, Sympathetic,parasympathetic and peripheral nervous systems, Plexuses and dermatomes
7. Sensory organs – Skin, eyes, ears, tongue, nose.
8. Urinary system – kidney, ureter, urinary bladder-urethra, prostate
9. Reproductive system – male & female.

#### **PHYSIOLOGY – GROSS PHYSIOLOGY OF THE FOLLOWINGS**

1. Transport across cell membrane, Blood Propagation of nerve impulse, Muscle-properties-classification –excitation /contraction coupling.
2. G.I.T. system – Functions of alimentary organs, hepato biliary systems, pancreas, peritoneal cavity
3. Excretory system-kidney, formation of urine and role in electrolyte balance.
4. Cardio vascular system-structure & function of cardiac muscles, Structure& properties of cardiac muscle. -Cardiac cycle, Heart rate regulation-factors affecting Heart Rate, Blood pressure- definition, regulation, and factors affecting blood pressure
5. Nervous system – Brain, spinal cord, neuro muscular junction, impulse transmission,autonomic nervous system, skeletal muscle, involuntary muscles.
6. Respiratory system – General Mechanics of respiration, lung volumes & capacities, exchange of gases, airway resistance.
7. Central nervous system – conduction of nerve impulse, peripheral and automatic nervous system.
8. Endocrine glands – metabolic processes, fluid and electrolyte balance, Pituitary, thyroid, parathyroid and adrenal gland.
9. Maternal and neonatal physiology, skin, ear, eye, tongue & nose.
10. Blood and blood products, coagulation systems, haemoglobin, oxygen and carbon dioxide exchange.
11. Homeostasis- body fluids, acid base and electrolyte balance
12. Nutrients -Carbohydrate, -Protein, -Lipid, -Vitamin, -Minerals
13. Regulation of body temperature
14. Pressure loss due to abrupt change in bore of tube, Principle of flow meters and its types

## **B. MICROBIOLOGY and pathology --**

1. General principles of microbial
2. Different types of infections, pathological bacteria, viruses, actino- mycosis & fungi.
3. Hospital acquired infections and prevention, Methods of cleaning, Decontamination and Sterilization Hepatitis B, C, HIV/AIDS, Causes& prevention
4. Cover PPE (Personal Protective Equipments - list) Universal Precautions- indications Waste Management:Use of colour coded bags
5. Bloodgroups& blood transfusions, B.T., C.T.
6. Coagulation& bleeding disorders, blood transfusion reactions
7. Sample collection, labeling& sending it to lab.
8. W.B.C., TLC and DLC, ESR and PCV

Introduction to Computer:

Computer basics, I/O devices

- **Different operating system**
- MS DOS
- Basic commands
- MD, CD, DIR,TYPE and COPY CON commands
- Networking
- LAN, WAN,MAN(only basic ideas)
- Memories, RAM and ROM, Different kinds of ROM, kilobytes.
- MB, GB their conversions
- Typing text in MS word
- Manipulating text,Formatting the text using different font sizes, bold, italics
- Bullets and numbering
- Pictures, file insertion
- Aligning the text and justify
- choosing paper size, adjusting margins
- Header and footer, inserting page No 's in a document Printing files, preparing charts, tables, use of excel, making PPT and use of internet

### **Practicals:**

- Demonstration of ph meter. Urine analysis.
- General tests of carbohydrates & proteins.
- Making of blood smear. DIC, TLC, RBC, ESR.
- Pulse -rate, rhythm, volume
- Blood pressure – how to monitor, effect of posture &exercise on BP and other factors affecting. Demonstrate correct Hand Hygiene technique
- Demonstration of Personal Protective Technique
- Power point presentation

## **PAPER II – Basic Principles of Anesthesia & Equipments**

**Basic of medical diseases:** Disorder of haematopoiesis - anaemias - iron deficiency anaemia, Sepsis and septic shock, -Fever of unknown origin, -Infective endocarditis Diseases caused by bacteria, viruses, mycobacterium, fungi, protozoa and helminths, secondary infection in HIV

Diseases of CVS: -CHF, -Pulmonary edema, -CAD, -Peripheral vascular diseases

Disease of Respiratory system: Asthma, -pneumonia, -COPD, Restrictive Lung Disease.

Kidney & Urinary Tract Disease: Acute renal failure, Glomerulonephritis, Haemodialysis, Kidney transplant, Urinary Tract Infection

Liver and Biliary Tract Disease: Viral hepatitis, Liver failure, Jaundice, cholecystitis.

Endocrinology and Metabolism: Diabetes mellitus, Hyperthyroidism, hypothyroidism, adrenal gland disorders -pheochromocytoma **Documentation: Importance of record keeping in OT and ICU -Various registers and statistics PAC and Anaesthesia record**

- Induction, Intubation, Maintenance,
- Reversal,
- Recovery / Emergence.

**Techniques of Anaesthesia-** General anaesthesia, regional anaesthesia techniques, local blocks.

### **Anaesthetic agents & Drugs**

Premedications, Induction, Intubation, Maintenance, Reversal, Recovery / Emergence

Antisialagogues, anxiolytics, Anti emetics, prokinetics. Local anaesthetics

I.V. Induction agent their doses, indication, contra indication and management

Inhalational anaesthetic agents- halothane, isoflurane, N<sub>2</sub>O, sevoflurane, desflurane- their role in GA, Advantages and disadvantages of drugs used for Neuromuscular blocks their doses, indication and contra indications, complications Reversal agents properties, doses, indication and contra indication Steroids- doses, indication and contra indication Drugs used as Analgesics their doses, indication and contra indication Opioids / Non opioids NSAIDs Analgesics, Infusions, PCA

### **EMERGENCY DRUGS**

Emergency drug used in OT and ICU Their uses, doses, indication and contra indication Vasopressors, inotropic agents, Vasodilators, Anticholinergics, Anticoagulants, Antiarrhythmics, Mode of administration, dilution, dosage, indication contra indications and side effects of Adrenaline, Dopamine, Dobutamine, Isoprenaline, Mephenteramine Sodium Bicarbonate, Xylocard, Aminophylline, Derriphylline, Hydrocortisone, Antihistamines Antiarrhythmics, Vasodilators – nitroglycerin, SNP, mucolytic agents, Furosemide, Mannitol Oxycotin Methergin Diclofenac, various I.V. Fluids – Crystalloids & colloids - NaCl, Ringer lactate, Haemaccel, Hetastarch etc.

**Face Masks:** types of masks, Technique of holding Anaesthesia mask

## **AIRWAYS:**

Types, Sizes, insertion technique, Insertion of SGADs (LMA, I -Gel etc) Oropharyngeal / Nasopharyngeal airways, sizes, colour coding, insertion techniques, airway adjunct, stylettes, Supra glottic airway devices, bougies, light wand.

## **Laryngoscopes & Laryngoscopy. –**

Parts Procedure and maintenance, types, sizes, blades, Fibre optic laryngoscope, video laryngoscope

**Endo tracheal Tubes** : parts, types , sizes, specialized ETTs

## **Intubation :**

- Technique of endotracheal intubation-
- Checking tube position, complications, cuff inflation and pressure
- Sellick maneuver, BURP Technique
- Double lumen tubes (DLT), bronchial blockers.
- Difficult Intubation Trolley
- Tray Types of Oxygen masks, oxygen therapy
- Anesthesia circuits – uses, advantages, disadvantages, checking of various circuits, maintenance
- Anesthesia machines and work stations, ventilators: parts, functioning, checking, maintenance, servicing alarms and safety devices
- Tracheostomy- tubes, types, sizes, decannulation procedure
- Spinal and Epidural Needles, epidural catheters: Sizes, types, colour coding, Epidural catheters. Preparation for the procedure, content of the set, indications, complications.
- Suction Catheters- types, sizes, colour coding, uses Syringe pumps and infusion pumps, PCA Pumps- functioning, handling maintenance, alarms and safety features Monitoring Devices- SPO<sub>2</sub>, Pulse oxymetry, ETCO<sub>2</sub>, NIBP, IBP- Preparation of OT, checking of anesthesia machine, monitors and drugs, IV fluids- appropriate doses with labelling for general and regional anesthesia services for various surgical procedure.
- Post- operative Nausea & Vomiting, Sore throat, Laryngeal granuloma, Neurological complications. Awareness Vascular complications. Trauma to teeth, Headache, Backache, Ocular complications - Auditory complications Asepsis in OT: Importance of OT Asepsis
- Aseptic techniques, OT sterilization procedures
- How to handle HIV, HCV, HBsAg positive cases in OT, PPE

## **PRACTICAL:**

Preparations of drugs and trolley for Anaesthesia

Dilutions of different drugs, proper labelling

Differences between subarachnoid and epidural anaesthesia

Calculation of doses of various important drugs used during perioperative period

Calculation of dose from various % strengths

Gram, mg, mcg; relationship and conversions

Insertion and care of airways, SADs, laryngoscope blade

Assessment of sizes of ETT, airways, suction catheters, Laryngoscope blades, SADs

**PRACTICAL:**

Difficult airway trolley and checking for anesthesia machine and circuits Procedure for IV cannulation, Technique of endotracheal intubation.

Insertion of Foley's catheter, NG tube Calculation of ml of drug required from a given % of drug Method of holding resuscitation mask, triple airway maneuvers

**PAPER III – BASIC KNOWLEDGE OF SURGERIES, OR INSTRUMENTS & CSSD**

**Basic Procedures Techniques:** Must know Scrubbing Technique, Gowning Technique, Gloving techniques.

**Surgical terminology and Incision:** Must know Surgical terminology, -Types of incision - indications for the use of particular incision. Hemorrhage: Signs and symptoms of internal and external hemorrhage : classification of hemorrhage -Management of hemorrhage

**Wounds and Abscess:** What is Wounds, Types of wounds, Wound healing, Treatment and complications of wound, inflammation, wound infections, causes and treatment; Incision and drainage of abscesses; importance of personal cleanliness and aseptic techniques Skin preparation for invasive procedures -Surgical asepsis

**Suture Material:** Types and uses, different Suturing techniques, instruments used for suturing

**CSSD:** Layout and location of CSSD, Collection of used items from user area. Sorting and classification of equipment for cleaning purposes, sharps, blunt lighted etc, contaminated high risk items, delicate instruments or hot labile instruments. Documentation, staff, dress protocol -Various methods of cleaning Use of disinfectants, use of detergents. -Mechanical cleaning apparatus, Cleaning instruments, Cleaning jars, receivers bowl etc. trays, basins and similar hand ware utensils. Cleaning of catheters and tubing, cleaning glass ware, cleaning syringes and needles. Uses and maintenance of autoclaving machine Materials used for wrapping and packing –Assembling pack contents. Assembling pack contents. Principles of sterilization and disinfection

**Methods of decontaminations** Moist heat sterilization.

**Dry heat sterilization.** -EO gas sterilization. H<sub>2</sub>O<sub>2</sub> gas plasma sterilization

Irradiation. **Gamma sterilisation,**

**Sterilisation control:** Indicator agents Types of packs prepared. Method of wrapping Labelling: Date, contents, initials Use of indications to show that a pack of container has been through a sterilization process Types of packs prepared. Method of wrapping. Labelling: Date, contents, initials

**Sterilisation of OR:** - Fumigation method, Fogging machine and agents Carbolisation Decontamination of spillage of infected material. Monitoring protocols for sterilization of OR Critical, semi critical, noncritical equipments Methods of disinfection: High level and low-level disinfection. Various techniques of sterilization and disinfections of items.

**Decontamination procedure** -Complete steps in operation of autoclave, its maintenance protocol Documents to be maintained in CSSD Various physical, chemical methods of sterilization Cleaning and sterilization of OT. Methods to decrease infections in OT

**Ventilators** -Modes, working, alarms & settings

**Defibrillators** – use, selection of charge, position of pads, precautions during handling, Functions of AED

**Diathermy**- types, use, precautions

**Pulse Oximetry,**

**End –Tidal Carbon Dioxide Monitoring,**

**Arterial blood gas studies Multipara Monitors, ABG Machine** – use ,interpretations, handling and maintenance OT **Table, Lights, C Arm HVAC system**- types, positioning ,handling & care, specifications, maintenance Planning, Organizing, Staffing, Leading and Controlling Organization of OT protocols and schedules, Motivation and leadership.

**Biomedical waste management**

**PRACTICALS:** Scrubbing, gowning, gloving techniques.Instruments, suture materials.Application of tourniquets.Types of incisions,Bandaging of wounds, drainage of abscessComplete steps in operation of autoclave,its maintenance protocol. Documents to be maintained in CSSD.Variou physical, chemical methods of sterilization.Cleaning and sterilization of OTMethods to decrease infections in OT

## SECOND YEAR

### PAPER I: Specialty Anesthesia Techniques & O R Management

**Preanaesthetic patient assessment, investigations and preparation, monitoring and instruments & equipments preparedness of various highly specialised surgeries**

#### Types of Anesthesia

General Anesthesia Techniques, GA, Balanced anesthesia, TIVA, Regional Anesthesia Techniques, IVRA, CNB, Plexus Block, Topical, Sedation / MAC Complication of GA / RA

#### Pre-anesthetic assessment.

- History – past history - disease / Surgery / and personal history - Smoking / alcohol / drugs / medication
- General physical assessment, systemic examination – CVS, RS, CNS
- Investigations – Hematological, Urine, ECG, Chest X- ray, Endocrine, Hormonal assays, Echocardiography, angiography, Liver function test, renal function test
- Patient check List: Protocol, Part preparation, Consent, PAC, Investigations, NPO Status, OT Dress,
- Lipstick/ Nail polish, Premedication, Basal parameters, I.V. Line, Premedication
- Pre-Operative Checklist

#### Anesthesia Machine / Gas Supply

- Suction Machine
- Monitors anesthesia
- Airway Devices – Laryngoscope, Airways, ETT, Stylet, Bougies.
- I.V. Cannula, I.V. fluids
- Drugs – Anesthesia related and Emergence.
- Special preparation – As per specific patient need.
- Difficult intubation tray: Contents

#### Post-Operative Care

- PACU, Discharge Criteria
- Modified Aldrete Score
- Five Vital Signs
- PONV
- Bladder Distension
- Pain management

**Procedures in Cardiac and Thoracic OT-**Arrhythmias Angina, Dyspnoea Special investigations, ECHO cardio-graph/ TEE, Angiography, Setting up of monitoring system Chest tube management

- Bed side tests NYHA classification
- Cardiopulmonary bypass
- Weaning of CPB

**Monitoring** - invasive and non – invasive, Transferring the patient to ICU.

Intubation: **Technique of endotracheal intubation Insertion of SGADs (LMA, I -Geletc.)**  
**Cuff inflation and pressure Difficult intubation kit** Sellick maneuver, BURP Technique

**Neuro anaesthesia** – Anaesthetic techniques and drugs used for various procedures, intra cranial pressure- monitoring, measures to decrease it-Reinforced Endotracheal tubes  
Positioning in neuro surgery, Air embolism

**Urology O T– Spinal and epidural techniques, complications, TURP syndrome, Foley’s**  
catheterisation: Types, sizes Insertion Technique, sterile precautions Obstetrics &  
**Gynaecology OT and labour room-** Risks for anesthesia. Precautions to be taken Check list,  
Regional vs General anesthesia Resuscitation of the new born, Apgar score Preparation for  
emergency LSCS, MRP, painless delivery and other procedure.  
Contents of baby resuscitation trolley Uses, Check list

Procedures in Orthopaedics

## **GERIATRIC ANAESTHESIA**

Physiological changes Diseases of aging Nervous system. Geriatric pharmacodynamics /  
pharmacokinetics

Postoperative cognitive dysfunction

**ANAESTHESIA OUTSIDE THE O.T:** Cath lab, ECT, Radiology, risk preventive measures

**ENT ANAESTHESIA:** Anesthesia for adenotonsillectomy anesthesia for mastoidectomy  
Anesthesia Bronchoscopy and esophagoscopy Nasal Intubation – Preparation and Technique  
RAE endotracheal tubes: Indications

**Emergency and Trauma OT:** Resuscitation, Pre-op investigation / assessment, Circulatory  
management, anaesthetic management, Rapid sequence induction – Cricoid pressure

**Procedures in Transplant units OT** - assessment, consent of donor and recipient and  
specific anaesthetic needs,

**Paediatric surgery OT-** IV fluids, drug doses as per age and body weight of neonates and  
children Check list for pediatric Anesthesia, Premedication – modes, drugs, doses, Pediatric  
circuit, Pain management

**Day care Anaesthesia:** Special features Patient selection, Advantages, disadvantages,  
Anesthesia Techniques

Transfusion and IV therapy

## **O R Management**

Compressed gases- cylinders, colour coding, sizes, safe handling, storage, pressure  
regulators, pin index systems, pipeline system, manifold room, DISS, alarms & safety device,  
oxygen concentrators- mechanism, functioning and maintenance. Liquid oxygen. Modern  
anaesthesia Machine and work stations-functioning, check list, safety features, scavenging  
systems.

## **PRACTICALS: (Anaesthesia Delivery system and Devices)**

- Procedure for IV cannulation, CV cannulation, arterial cannulation
- Technique of endotracheal intubation, insertion of Foley's catheter, NG tube
- Calculation of ml of drug required from a given % of drug
- Method of holding resuscitation mask, triple airway manoeuvre
- Maintenance and upkeep of anaesthesia machine, monitors, accessories
- Recognising various breathing circuits, basic components, assembling
- Setting up of various alarms, functioning of ventilator, setting alarms, modes, etc.
- Checking for leaks, Cockpit drill, Safety features of modern anaesthesia machine
- Parts of modern Anaesthesia work station, handling of gas cylinders
- Safety features in Anaesthesia machine
- Hazards in OT and their prevention
- Handling of OT table, OT lights, C arm,
- Air conditioning system in OT, HEPA filters, Laminar air flow

## **PAPER II: SPECIALISED SURGERIES, EQUIPMENTS AND OR MANAGEMENT**

### **Preparation of OT:**

Preparation of OT before surgery, Positions of patient for different surgeries

Handling of instruments • Cleaning of instruments -Maintenance of instruments

**Instrument Requirement for Common Surgical Procedures:** Surgical procedures such as

- Herniorrhaphy
- Appendicectomy
- Laparotomy
- Mastectomy
- I & D
- Hydrocele, -Intestinal Obstruction

Instruments required for different obstetric surgeries -Instruments required for different Gynecological

**Preparation and Position for Urological Surgeries.:** Brief description of different Urological Surgeries. Preparation for different Urological Surgeries.Position for different Urological surgeries.

**Orthopedics surgeries:** Brief description of different orthopedics Surgeries. -Preparation for different orthopedics Surgeries. -Position for different orthopedics surgeries -Instruments required for different orthopedics surgeries.

**Neurological Surgeries:** Brief description of different Neurological Surgeries.Preparation for different Neurological Surgeries.Position for different neurological surgeries, instruments required for different neurological surgeries

**Ophthalmology Surgeries:** Description of different Ophthalmology Surgeries.Preparation and position different Ophthalmology surgeries.Instruments required and maintenance of different Ophthalmology surgeries.

**Otorhinolaryngologic Surgeries:** Various Otorhinolaryngologic Surgeries and instruments required for them, Preparation of trolleys for ENT surgeries. Preparation of different dilutions of adrenaline: 1: 50,000, 1: 100,000, 1: 200,000, etc.

**Reconstructive Surgeries:** Brief description of different Reconstructive Surgeries. Preparation for different Reconstructive Surgeries. Position for different Reconstructive surgeries. Instruments required for different Reconstructive surgeries

**Thoracic, Cardiac, Vascular surgeries:** Brief description of different Thoracic, Cardiac, Vascular Surgeries, Preparation and position for different Thoracic, Cardiac, Vascular Surgeries. Instruments required for different Thoracic, Cardiac, Vascular surgeries.

**Organ Transplant Surgeries:** Detailed protocols for consents, preparation of OR, preparation of necessary drugs instruments and equipments, assisting the surgeries. Transportation of patients, peri operative care

**Minimum Invasive surgeries & endoscopic procedure:** Brief description of different endoscopic surgeries. Preparation, maintenance, disinfection of various endoscopic instruments and equipments for endoscopic surgeries and procedures

**Acute Trauma care:** Emergency surgeries for trauma patients- neuro surgical procedure, abdominal surgeries, orthopaedics trauma and other surgical procedures- instruments, equipments, drugs, blood and fluids etc required and knowledge to assist these procedures.

### **Postoperative Care :**

#### **PRACTICALS:**

- Preparation of OT for various surgeries
- Familiarisation with special instruments used for various sub specialties
- carbolisation of OT
- Preparation of trolleys for various types of sub specialties of surgeries
- Cleaning, disinfection and storage of various instruments

### **PAPER III: -I-TRAUMA, CRITICAL CARE & RESEARCH METHODOLOGY**

#### **MONITORING AND DIAGNOSTIC PROCEDURES IN I.C.U.**

**Clinical Monitoring** - Central Venous access. - ECG monitoring. - NIBP – Cuff sizes and application - Multi-parameter monitor – Normal values -PCT, Surgical Tracheostomy -ICD -USG, Invasive hemodynamic monitoring, Cardiac Output.

**GENERAL CARE OF PATIENT IN I.C.U.:** Care of unconscious patient, Syringe pump / Infusion Pump uses, infusion rate. Vascular lines - arterial, venous line Radiography, USG, Physiotherapy chest physiotherapy Oxygen Therapy – Sources of oxygen, Oxygen Delivery devices, Oxygen Toxicity, Monitoring Hypoxia

**INFECTIONS IN ICU:** Ventilator Associated Pneumonia (VAP) -Prevention of infection in ICU

**ACID - BASE DISORDERS AND FLUID BALANCE:** ABG analysis, Normal ABG value Crystalloid and colloids: Differences, indications -Monitoring drip rate -Fluid balance - Intake/output chart. Shock and volume disorders dyselectrolytemia, acidosis-alkalosis-

interpretation causes, diagnosis management. Peritoneal dialysis, hemodialysis, renal replacement therapy,

**COMMON DRUGS USED IN ICU:** Inotropic support, Vaso dilator drugs, Vasopressor Antiarrhythmic drugs, Bronchodilators, Sedatives & Hypnotic, Anticoagulant drugs Anticonvulsants, Neuromuscular blockers

**BLOOD TRANSFUSION:** Blood Grouping and cross matching, Whole blood, packed RBC Blood components and indications, Technique of blood transfusion, Complication of Blood Transfusion -Anaphylactic reaction

**ICU VENTILATORS:** Basic respiratory parameters -Basic ventilators settings and modes - Monitoring and alarms, Weaning process -Complications of ventilator, Care of patient on ventilator -Suctioning of ETT / Tracheotomy tube, NIV, CPAP, BIPAP, Handling and disinfection of ventilators. Tracheotomy – Indications, Technique, care, Decannulation Procedure

**CARDIOPULMONARY RESUSCITATION:** Causes of cardiac arrest and types, Basic life support outside hospital, Triple Airway Maneuver, AMBU Bag, BLS Protocol for adult / children, BLS Protocol for infants, Chest compression technique, use of AED / Defibrillator Drugs used in Cardiac arrest. Vascular lines, venous line, Invasive hemodynamic monitoring, Cardiac Output Intra cranial pressure, monitoring Radiography / USG, Echo cardiography, Trans-esophageal-echo-cardiography .Arterial Cannulation - Significance, Locations, types, sizes, Technique, Complications Central venous catheterization- Role, Types, sizes Locations Positions, Technique, Precautions Complications

### **TRAUMA:**

Head Injury, Glasgow coma score assessment -Fluid Resuscitation in Polytrauma  
**INFECTIONS IN ICU** Ventilator Associated Pneumonia (VAP). prevention of infection in ICU

### **NUTRITION ICU PATIENT:**

- NG tube insertion
- Parenteral Nutrition
- Types, Techniques, complications.
- Enteral Nutrition

Assessment of patient for alteration in blood sugar levels monitoring blood sugar levels periodically & administering insulin periodically. Administration of drugs: IM, IV injection, IV cannulation & fixation of infusion pump, calculation of dosages, use of insulin syringes/ tuberculin, monitoring fluid therapy, blood administration. Setting up dialysis machine and starting, monitoring and closing dialysis Procedures for prevention of infections: Hand washing, disinfection & sterilization surveillance, and fumigation universal precautions. Setting, use & maintenance of basic equipment, ventilator, O<sub>2</sub> analyzer, monitoring equipment, transducers, defibrillator, infusion & syringe pumps, centrifuge machine

### **Research methodology**

**Introduction to statistics** Classification of data, source of data. Method of scaling- nominal, ordinal, ratio and interval scale Measuring reliability and validity of scales Data sampling

Measures of central tendency, Measures of dispersion, skewness and kurtosis

**Sampling:** sample size determination Concept of probability and probability distributions- binomial probability distribution, poisson probability distribution and normal probability distribution Data correlation Correlation-Karl person, spearman's rank correlation methods regression analysis. Testing hypothesis-chi square test, students test, NOVA.

**Introduction to research methods,** Variable in research, Reliability and validity in research, conducting a literature review Formulation of research problems and writing research questions, Hypothesis, Null and research Hypothesis, Type I and type II errors in hypothesis testing Experimental and non- experimental research design, Sampling methods, data collection, observation method.

Interview method, questionnaires and schedules construction

Research Frame work: Ethical issues in research, Principles and concepts in research ethics- confidentiality and privacy informed consent, writing research proposals, Development of conceptual framework in research

### **Research Project:**

Unit I- Research Project Proposal Development is comprehensive literature survey of the chosen research, literature in detail and the topic for research project will be finalized.

Unit II- Research Project: Submission to the university with the signed approval of the guide, a proposal defining the research project, the methods and design of the experiments needed for completion, the progress to date and plans for completion.

Unit III – Research Project preparation: The research project must include a cover page, abstract, table of contents, introduction of the thesis topic with a comprehensive review of literature, appropriately organized methods, results and discussion section for the experiment performed and final conclusions section summarizing the outcome of the project.

### **PRACTICALS:**

Familiarisation with handling and use of various items and equipments used in ICU Care of unconscious patient and patient on ventilator, ventilator alarms Preparation of trays for various emergency procedures Modes of ventilation, , ventilator settings, use of defibrillator and AED Handling of ABG analyser, ABG analysis, normal value Vital parameters, normal ranges, maintenance of monitors and other equipments

## MODEL PAPER

M.Sc.(Anes& CCT) – I

Short Name

M.Sc. Anesthesiology and Critical Care Technology Part-I (Main) Examination month year

### Paper I

#### Applied Basic Sciences

**Time: Three Hours**

**Maximum Marks: 100**

*Students shall be allowed to take only one supplementary copy long with one main answer book. All the parts of one question should be answered at one place. Different parts of one question should not be answer at different places in the answer book*

**Attempt all Questions.**

- Q.1 Describe anatomy of kidney. Draw diagram showing its gross structure and blood supply also. 25
- Q.2 What are liver functions, the normal values. Importance of liver functions in anaesthesia and surgery 25
- Q.3 Long answers Type
- a) Heart rate- how it is regulated and factors affecting heart rate. 12½
- b) What are universal precautions and why these are necessary. 12½
- Q.4 Short Notes 5x5=25
- a) Acidosis- definition, types, causes and maintenance of pH in body
- b) Brachial Plexus
- c) Hypo glycemia- definition, signs and symptoms
- d) Blood pressure
- e) Power point presentation

## MODEL PAPER

M.ScAnes & CCT – I

Short Name

### M.Sc. Operation Theatre Technology Examination Part - II

#### Paper-II

#### Basic Principle of Anaesthesia & Equipments

Time: Three Hour

Maximum Marks: 100

*Students shall be allowed to take only one supplementary copy long with one main answer book. All the parts of one question should be answered at one place. Different parts of one question should not be answer at different places in the answer book*

**Attempt all Questions.**

- Q.1 Discuss in detail checklist for receiving patient in pre-operative area. 25
- Q.2 Spinal anaesthesia – contents in spinal tray, steps of preparation, drugs used for sub arachnoid block, indications and complications of spinal anaesthesia 25
- Q.3 Long answers Type
- a) What is Post Anaesthesia care unit (PACU). Write in details the discharge criteria from PACU 12½
  - b) Enumerate safety features in anaesthesia machine, briefly describe Pin Index system 12½
- Q.4 Short Notes 5x5=25
- a) Emergency drug in the anaesthesia tray
  - b) IV fluids
  - c) Types of airways and their uses
  - d) Sellicksmaneuver
  - e) Oxygen therapy

## MODEL PAPER

M.Sc. Anes & CCT- I

Short Name

### M.Sc. Operation Theatre Technology Examination month year Paper-III

#### Basic Knowledge of surgeries, Instruments & CSSD

Time: Three Hours

Maximum Marks: 100

*Students shall be allowed to take only one supplementary copy long with one main answer book. All the parts of one question should be answered at one place. Different parts of one question should not be answer at different places in the answer book*

**Attempt all Questions.**

- Q.1 Classification of haemorrhage. Signs, symptoms and management of internal haemorrhage 25
- Q.2 What is the OR sterilisation protocol. What is sterilisation and decontamination procedure after operating HIV positive patient in OR. 25
- Q.3 Long answers Type
- a) Write commonly used suture materials with indication, contra indications, advantages and disadvantages. 12½
- b) Types of Tourniquets- indications, method of applying and duration of application permitted at different area 12½
- Q.4 Short Notes 5x5=25
- a) EO sterilisation
- b) Multipara monitors
- c) Diathermy – types, use & precautions
- d) Hand washing
- e) PPE

## MODEL PAPER

M.Sc. Anes&CCT.– II

Short Name

### **M.Sc.operation theatre technology examination (Main) Part - II** **Examination month year**

#### **Paper I**

#### **Specialty Anesthesia Techniques & O R Management**

**Time: Three Hours**

**Maximum Marks: 100**

*Students shall be allowed to take only one supplementary copy long with one main answer book. All the parts of one question should be answered at one place. Different parts of one question should not be answer at different places in the answer book*

**Attempt all Questions.**

- Q.1 What are the drugs and instruments required to anaesthetising a patient for bariatric surgery. Also write the equipments in a difficult airway cart. 25
- Q.2 What are the sizes, colour coding, pressures of various gas cylinders used in OR. What are other means of oxygen supply. 25
- Q.3 Long answers Type
- a) What is ideal induction agent, innumerate commonly used induction agent and describe any one 12½
- b) Preparation of monitoring for cardiac patient 12½
- Q.4 Short Notes 5x5=25
- a) Neo natal resuscitation trolley
- b) Aldrete scores
- c) Rapid sequence induction
- d) Fibre optic laryngoscopy
- e) Consent

## MODEL PAPER

M.Sc. Anes& CCT.– II

Short Name

**M.Sc. Operation Theatre Technology II (Main) Examination month year**

**Paper-II**

**SPECIALISED SURGERIES, EQUIPMENTS**

**Time: Three Hours**

**Maximum Marks: 100**

*Students shall be allowed to take only one supplementary copy long with one main answer book. All the parts of one question should be answered at one place. Different parts of one question should not be answer at different places in the answer book*

**Attempt all Questions.**

- Q.1 Describe instruments equipments and OT preparation for emergency craniotomy 25
- Q.2 What are the instrument and OR preparation needed for trachea esophageal fistula repair 25
- Q.3 Long answers Type
- a) Cleaning, maintenance, disinfection and handling of endoscopic instruments 12½
- b) Lay out of surgical trolley for intestinal obstruction 12½
- Q.4 Short Notes 5x5=25
- a) Positions of patients for different types of surgeries
- b) PCNL
- c) Instruments used in THR
- d) LSCS
- e) Urinary catheterisation

## MODEL PAPER

M.Sc. Anes& CCT.– II

Short Name

**M.Sc. Operation Theatre Technology II (Main)**

**Examination month year**

**Paper-III**

**Trauma, Critical Care & Research Methodology**

**Time: Three Hours**

**Maximum Marks: 100**

*Students shall be allowed to take only one supplementary copy long with one main answer book. All the parts of one question should be answered at one place. Different parts of one question should not be answer at different places in the answer book*

**Attempt all Questions.**

- |     |   |        |
|-----|---|--------|
| Q.1 | 24 patients are supposed to arrive in emergency after abus accident, how will you manage and triage these patients. | 25     |
| Q.2 | Explaining detail patient care in ICU, Cardio-pulmonary resuscitation   | 25     |
| Q.3 | Long answers Type   |        |
|     | a) Monitoring and care of unconscious patient   | 12½    |
|     | b) Hemodialysis – method and protocol   | 12½    |
| Q.4 | Short Notes   | 5x5=25 |
|     | a) Multipara monitors   |        |
|     | b) ACLS guide lines 2015  |        |
|     | c) Diabetic ketoacidosis  |        |
|     | d) Transfusion reaction- diagnosis and treatment  |        |
|     | e) Concepts in research ethics-confidentiality  |        |