

PMF-NATIONAL COUNCIL OF PARAMEDICAL, DELHI

Syllabus & Curriculum Of Operation Theater Technology Course (One Year)

INDEX

- Objectives of the course.
- Outline of curriculum of 'Operation Theater Technology' course.
- Eligibility criteria & duration of the course.
- Scheme of examination.
- Schedule of the course.

OBJECTIVES OF THE COURSE:

Upon successful completion of the course, the student will be able to:

- 1- **Understand the structure and workflow of an operation theater**, including protocols for pre-, intra-, and post- operative procedures.
- 2- **Assist surgical teams during procedures**, ensuring all necessary equipment and sterile instruments are readily available and functioning.

- Prepare and maintain the operating room, including the 3arrangement of surgical instruments, drapes, anesthetic and monitoring equipment. 4-Apply strict aseptic techniques and infection control **protocols** to prevent contamination and surgical site infections. 5-Identify and handle surgical instruments and equipment, including basic, advanced, and procedure-specific instruments (laparoscopy, orthopedic, neuro, etc.). 6-Support anesthetists during induction and recovery, by preparing anesthesia carts, managing airway equipment, and monitoring vital signs. 7-Maintain and operate essential OT equipment, including autoclaves, suction machines, cautery units, anesthesia machines, and surgical lights. 8-**Respond to emergency situations in the OT**, including cardiac arrest, equipment failure, and rapid resuscitation needs. 9-Demonstrate teamwork, communication, and while professional behavior working with surgeons, anesthetists, nurses, and other healthcare staff. 10-Keep accurate documentation and records, including instrument count, patient data, sterilization logs, and OT utilization reports.
 - 11- Maintain high standards of safety, ethics, and confidentiality as per healthcare laws and regulations.

Out line of Curriculum Of

Operation Theater Technology Course (One year)

Theory Classes: (9AM to 12 Noon)

First Paper: ANATOMY & PHYSIOLOGY

Detailed Topic-Wise Syllabus

1. Introduction to Human Body – 10 Hours

- * Definition of anatomy and physiology
- * Levels of structural organization
- * Anatomical terms and body planes
- * Body cavities and membranes

2. Cell Structure and Function – 10 Hours

- * Components of a typical human cell
- * Cell membrane, cytoplasm, nucleus
- * Cell cycle, mitosis and meiosis
- * Types of tissues (epithelial, connective, muscular, nervous)

3. Skeletal System – 15 Hours

- * Classification and function of bones
- * Structure of a long bone
- * Axial and appendicular skeleton
- * Joints: classification and types
- * Common disorders (fractures, arthritis)

4. Muscular System – 15 Hours

* Types of muscle tissue (skeletal, cardiac, smooth)

- * Structure of skeletal muscle
- * Mechanism of muscle contraction
- * Muscle tone, fatigue

5. Circulatory System - 15 Hours

- * Structure and function of heart
- * Blood vessels: arteries, veins, capillaries
- * Cardiac cycle and conduction system
- * Blood pressure and pulse
- * Lymphatic system and immunity

6. Blood and Lymphatic System – 15 Hours

- * Composition and functions of blood
- * Blood groups and coagulation
- * White blood cells and immunity
- * Lymphoid organs and lymph circulation

7. Respiratory System – 15 Hours

- * Anatomy of respiratory tract
- * Physiology of respiration
- * Exchange of gases
- * Regulation of respiration
- * Common respiratory diseases (asthma, TB)

8. Digestive System – 15 Hours

- * Organs of the GI tract
- * Functions of liver, pancreas, gallbladder

* Digestion and absorption

* Enzymes and hormones in digestion

9. Excretory System (Urinary System) - 15 Hours

- * Structure of kidney and nephron
- * Formation of urine
- * Fluid and electrolyte balance
- * Hormonal control (ADH, aldosterone)
- * Common disorders (UTI, kidney stones)

10. Nervous System - 15 Hours

- * Organization: CNS, PNS, ANS
- * Structure and function of brain and spinal cord
- * Reflex arc
- * Nerve impulse conduction
- * Cranial and spinal nerves

11. Special Sense Organs - 10 Hours

- * Eye: structure and visual pathway
- * Ear: structure and auditory pathway
- * Nose, tongue, and skin: sensory receptors

12. Endocrine System – 15 Hours

- * Major endocrine glands and hormones (pituitary, thyroid, adrenal, pancreas)
- * Mechanism of hormone action
- * Feedback regulation
- * Common disorders (diabetes, goitre)

13. Reproductive System – 10 Hours

- * Male and female reproductive organs
- * Menstrual cycle
- * Fertilization, pregnancy, and parturition
- * Secondary sexual characteristics

14. Metabolism – 25 Hours

- * Basic concepts of metabolism
- * Carbohydrate, fat, and protein metabolism
- * Basal metabolic rate (BMR)
- * Role of vitamins and minerals
- * Water and electrolyte balance

Suggested Breakdown of Study Hours

Unit	Hours
Introduction	10
Cells & Tissues	10
Skeletal System	15
Muscular System	15
Circulatory & Lymphatic System	. 30
Respiratory System	15
Digestive System	15
Excretory System	15
Nervous System	15
Special Senses	10
Endocrine System	15
Reproductive System	10
Metabolism	25
Total	195 Hours

Recommended Books

* Ross & Wilson – Anatomy and Physiology in Health and Illness

* Tortora & Derrickson – Principles of Anatomy and Physiology

* Guyton & Hall – Textbook of Medical Physiology

Second Paper: Anesthetic Drugs & Equipment's & Special Operation Theater Tray Set-up.

Detailed Unit wise cum Topic wise Syllabus:

Unit 1: Introduction to Anesthesia

(10 Theory hrs / 5 Practical hrs)

- * History and evolution of anesthesia
- * Types of anesthesia (General, Regional, Local)
- * Phases: Induction, Maintenance, Recovery
- * Role of anesthesia technician

Unit 2: Classification of Anesthetic Drugs

(15 Theory hrs / 10 Practical hrs)

- * Pre-anesthetic medications: anticholinergics, sedatives
- * Induction agents: thiopentone, propofol, ketamine
- * Inhalational agents: ether, halothane, isoflurane, sevoflurane
- * Muscle relaxants: depolarizing (suxamethonium), nondepolarizing (vecuronium)
- * Analgesics and adjunct drugs (opioids, NSAIDs)
- * Emergency drugs used in anesthesia

Unit 3: Inhalational and IV Anesthesia Techniques

(10 Theory hrs / 10 Practical hrs)

- * Principles of inhalational anesthesia
- * Vaporizers and circuits
- * Total intravenous anesthesia (TIVA)

* Advantages, complications, and patient monitoring

Unit 4: Anesthesia Equipment – Basic & Advanced

(20 Theory hrs / 25 Practical hrs)

- * Anesthesia machine: parts and functions
- * Boyle's apparatus
- * Gas cylinders and flowmeters
- * Breathing circuits: Bain, Mapleson, Circle system
- * Airway devices: face mask, oropharyngeal airway, endotracheal tubes, LMA
- * Suction apparatus

Unit 5: Monitoring Devices and Parameters

(15 Theory hrs / 15 Practical hrs)

- * ECG, Pulse oximetry, NIBP, IBP
- * Capnography and EtCO₂
- * Temperature probe
- * Central venous pressure (CVP) monitoring
- * Defibrillators and crash carts

Unit 6: Emergency Management in Anesthesia

(10 Theory hrs / 10 Practical hrs)

- * CPR and BLS protocols
- * Anaphylaxis, cardiac arrest, malignant hyperthermia
- * Airway obstruction and management
- * Handling anesthesia-related emergencies

Unit 7: Maintenance & Safety of Anesthesia Equipment

(10 Theory hrs / 10 Practical hrs)

- * Routine maintenance of anesthesia machine
- * Leak test and calibration
- * Disinfection and sterilization of equipment
- * Safety standards and checklists

Unit 8: Special Operation Theater (OT) Tray Set-up

(10 Theory hrs / 10 Practical hrs)

- * Principles of OT tray setup
- * Sterile technique and instrument handling
- * Common trays: General surgery, Gynaecology, ENT, Ortho, Neurosurgery
- * Laparoscopy and robotic surgery OT setup

Unit 9: Procedure-Specific Tray Set-Ups (Instruments & Accessories)

(10 Theory hrs / 10 Practical hrs)

- * Cesarean section tray
- * Laparotomy tray
- * Craniotomy and spine surgery tray
- * ENT surgery tray (tonsillectomy, mastoidectomy)
- * Urological and orthopedic tray setup
- * Emergency tray / resuscitation trolley

Practical Training Activities

- * Demonstration and handling of Boyle's apparatus
- * Loading gas cylinders and flowmeters
- * Laryngoscope and endotracheal tube usage
- * OT tray arrangement for various specialties

* Setup of suction, oxygen and anesthesia delivery circuits

* Performing CPR, airway insertion, and emergency drills

* Maintenance and disinfection of equipment

Hour Allocation Summary

Unit	Theory	Hours Practical Hours
Unit 1: Introduction to Anesthesia	10	5
Unit 2: Anesthetic Drugs	15	10
Unit 3: Anesthesia Techniques	10	10
Unit 4: Anesthesia Equipment	20	25
Unit 5: Monitoring Devices	15	15
Unit 6: Emergency Management	10	10
Unit 7: Maintenance	10	10
Unit 8: OT Tray Setup Basics	10	10
Unit 9: Procedure-specific Trays	10	10
Total	100	95

Recommended Textbooks

- * Essentials of Anaesthetic Equipment B. Nimmo & M. Vaughan
- * Foundations of Anesthesia Hemmings & Egan
- * Textbook of Operation Theatre Technology Ajay Yadav
- * Clinical Anesthesia Paul G. Barash

Third Paper: Surgical Procedures (Disinfection on Sterilization) - Care of Patient in Emergencies.

Detailed Unit-wise cum Topic-wise Syllabus:

Unit 1: Principles of Asepsis and Infection Control

(10 Theory hrs / 10 Practical hrs)

* Definitions: asepsis, antisepsis, disinfection, sterilization

* Sources and types of infection (nosocomial, surgical site)

* Chain of infection and modes of transmission

* Personal protective equipment (PPE) and hand hygiene

* Universal precautions

Unit 2: Disinfection Methods

(15 Theory hrs / 15 Practical hrs)

- * Physical methods: boiling, pasteurization, UV radiation
- * Chemical disinfectants: alcohols, aldehydes, chlorine compounds
- * Use and preparation of antiseptic solutions
- * Environmental disinfection (floors, OT tables, beds)
- * Biomedical waste disposal

Unit 3: Sterilization Techniques

(20 Theory hrs / 20 Practical hrs)

- * Methods:
 - * Autoclaving (moist heat)
 - * Hot air oven (dry heat)
 - * Ethylene oxide (ETO) and formaldehyde fumigation
 - * Filtration and radiation
- * Packing, loading, and unloading of sterile instruments
- * Sterility indicators (chemical, biological)
- * Maintenance of sterile stores

Unit 4: Surgical Instruments and Tray Setup

(15 Theory hrs / 15 Practical hrs)

- * Classification and types of surgical instruments
- * Procedure-specific tray setup (major, minor, specialty)

* Draping and preparation of sterile fields

* Sponge, sharps, and instrument counts

* Cleaning and care of instruments

Unit 5: Preoperative and Postoperative Patient Care

(10 Theory hrs / 10 Practical hrs)

- * Preparation of the surgical site and patient
- * Patient positioning and pressure area care
- * Intra-operative monitoring and assistance
- * Postoperative observation and transfer
- * Prevention of hypothermia, infection, aspiration

Unit 6: Emergency Situations in the OT

(10 Theory hrs / 10 Practical hrs)

- * Common OT emergencies: bleeding, airway obstruction, anaphylaxis, cardiac arrest
- * Emergency tray and crash cart components
- * OT technician's role in emergencies
- * Emergency response documentation

Unit 7: Basic Life Support (BLS) and CPR

(10 Theory hrs / 10 Practical hrs)

- * Principles of resuscitation
- * CAB (Circulation, Airway, Breathing)
- * Adult, child, and infant CPR techniques
- * Recovery position and rescue breathing
- * AED (Automated External Defibrillator) basics

Unit 8: Care of Patients in Emergency Ward and Casualty

(10 Theory hrs / 5 Practical hrs)

- * Triage and prioritization of emergency cases
- * First aid for burns, fractures, bleeding, seizures, poisoning
- * Emergency drug trolley
- * Communication and coordination with emergency teams

Practical Skills Summary

- * Hand hygiene and PPE demonstration
- * Surface and instrument disinfection
- * OT fumigation procedure
- * Sterile instrument handling
- * Tray setup for major and minor surgeries
- * CPR manikin practice (adult/child/infant)
- * Setting up and managing an emergency tray

Hour Allocation Summary

Unit	Theory	Hours Practical Hours
Unit 1: Asepsis & Infection Control	10	10
Unit 2: Disinfection Methods	15	15
Unit 3: Sterilization Techniques	20	20
Unit 4: Surgical Instruments	15	15
Unit 5: Pre/Post-operative Care	10	10
Unit 6: OT Emergencies	10	10
Unit 7: BLS & CPR	10	10
Unit 8: Emergency Ward Care	10	5
Total	100	95

Recommended Books & References

* Textbook of Operation Theatre Technology – Ajay Yadav

* Manual of Infection Control Procedures – J. Walker

* First Aid and Emergency Nursing – Jaypee Publishers

* Basic Life Support Provider Manual – American Heart Association (AHA)

* WHO and CDC Guidelines on Infection Prevention and Control

Fourth Paper Operation Theater Techniques

Detailed Unit-wise cum Topic-wise Syllabus

Unit 1: Introduction to Operation Theater (OT)

(10 Theory hrs / 5 Practical hrs)

- * Types of operation theaters (general, specialty)
- * Layout and zoning of OT (protective, clean, sterile)
- * OT team structure and roles
- * OT protocols and daily routines

Unit 2: Asepsis, Disinfection & Sterilization

(15 Theory hrs / 15 Practical hrs)

- * Principles of asepsis and infection control
- * Hand washing, gowning, gloving techniques
- * Disinfectants and their applications
- * Sterilization methods: autoclave, ETO, hot air oven, etc.

Unit 3: Surgical Instruments and OT Setup

(15 Theory hrs / 15 Practical hrs)

- * Classification of instruments: cutting, clamping, retracting, etc.
- * Instrument tray arrangement
- * Draping techniques and maintaining sterile fields
- * Sponge, needle, and instrument counts

Unit 4: Preoperative Preparation of Patient and OT

(10 Theory hrs / 10 Practical hrs)

- * Preoperative assessment and checklists
- * Skin preparation and site marking
- * Positioning of patient for various surgeries
- * Transporting the patient to and from OT

Unit 5: Intra-operative Support Techniques

(15 Theory hrs / 15 Practical hrs)

- * Assisting surgeon with instruments and suction
- * Passing instruments and sutures
- * Handling cautery and suction devices
- * Maintenance of sterility and monitoring

Unit 6: Postoperative Care in OT

(10 Theory hrs / 10 Practical hrs)

- * Immediate postoperative care and observations
- * Care of drains, catheters, and IV lines
- * OT cleaning and waste management
- * Recording and reporting post-op status

Unit 7: Handling Surgical Complications and Emergencies

(10 Theory hrs / 10 Practical hrs)

- * Anaphylaxis and shock
- * Excessive bleeding, hypothermia, cardiac arrest
- * Crash cart setup
- * Technician's role in OT emergencies

Unit 8: Biomedical Waste and OT Safety

(10 Theory hrs / 5 Practical hrs)

* Types of biomedical waste

* Segregation and disposal protocols (color coding)

* Needle stick injury prevention

* OT fire safety and electrical safety

Unit 9: Records, Inventory & OT Management

(5 Theory hrs / 10 Practical hrs)

* Surgical logbook and instrument checklists

* Inventory management of consumables and drugs

* Communication with hospital departments

* Scheduling and coordination of surgical cases

Practical Skills Summary

* OT cleaning and disinfection

* Preparing and draping patient

* Setting up surgical tray and equipment

* Performing instrument count

* Managing suction, cautery, and lighting

* Handling sharps and biomedical waste safely

* Assisting with minor surgical procedures

Hour Allocation Summary

Unit	Theory Hour	s Practical Hours
Unit 1: OT Introduction	10	5
Unit 2: Asepsis & Sterilization	15	15
Unit 3: Instruments & Setup	15	15
Unit 4: Pre-op Preparation	10	10
Unit 5: Intra-op Techniques	15	15
Unit 6: Post-op Care	10	10
Unit 7: Surgical Emergencies	10	10
Unit 8: OT Safety & Waste	10	5
Unit 9: Records & Inventory	5	10
Total	100	95

Recommended Books

* Textbook of Operation Theatre Technology – Dr. Ajay Yadav

* Manual of Infection Control – J. Walker

* Essentials of OT Technology – Anitha K.

* Surgical Instruments: A Pocket Guide – Maryann P. Harding

List of Tools & Equipment Used in Operation Theatre:

A. Surgical Instruments (Procedure-Specific)

Used during surgical operations; selected based on the type of surgery.

* Scalpels & Blades (e.g., No. 10, 11, 15)

- * Scissors (Mayo, Metzenbaum, Dressing, Suture)
- * Forceps

* Thumb forceps (Toothed / Non-toothed)

* Artery forceps (Mosquito, Kocher, Crile)

* Needle Holders

* **Retractors** (Langenbeck, Deaver, Richardson, Self-retaining) * **Speculums** (Vaginal, Nasal) * Suction Tips (Yankauer, Frazier) * Probes & Dilators * **Clamps** (Bowel clamps, Bulldog clamps) * Towel Clips **B.** Anesthesia-Related Equipment Used in anesthesia administration and airway management. * Boyle's Apparatus / Anesthesia Machine * Face Masks (adult, pediatric) * Endotracheal Tubes (ET Tubes) * Laryngoscope (with blades – curved and straight) * Laryngeal Mask Airway (LMA) * Ambu Bag (BVM – Bag Valve Mask) * Suction Apparatus * Oxygen Cylinder with Flow Meter & Humidifier * Airway Adjuncts (Guedel, Nasopharyngeal airway) C. Monitoring Equipment For monitoring vital signs during surgery. * Multiparameter Monitor * ECG * NIBP * SPO₂ * Temperature

* EtCO₂

- * Pulse Oximeter
- * Capnograph
- * Defibrillator
- * Thermometer (digital or probe-based)
- * Infusion Pump / Syringe Pump

D. Sterilization & Disinfection Equipment

Ensures asepsis and infection control.

- * Autoclave (Vertical / Horizontal)
- * Hot Air Oven
- * ETO (Ethylene Oxide) Sterilizer
- * UV Disinfection Lamp
- * Fumigator / Fogger Machine
- * Instrument Washing Machine / Ultrasonic Cleaner
- * Sterile Container / Drum
- * Indicator Tape & Biological Indicators

E. OT Consumables and General Use Tools

Disposable and reusable items used daily.

- * Surgical Drapes & Gowns
- * Gloves (Sterile and Non-sterile)
- * Gauze Pads and Swabs
- * Sutures and Needles
- * Catheters (Foley, Nelaton, etc.)
- * Suction Catheters & Tubings
- * IV Cannulas and Sets

& Trolley (Instrument / Dressing / Anesthesia / Emergency) F. Special OT Furniture and Fixtures Fixed and mobile items required in any operation theater. * OT Table (Hydraulic / Electric) * OT Lights (Ceiling-mounted / Mobile) * Mayo Stand * Kick Bucket * IV Stand * Stools and Surgeon's Chair * Crash Cart (Emergency Trolley) * Linen Hamper Trolley G. Documentation and Management Tools For records, planning, and inventory. * OT Register / Logbook * Sterilization Record Book * Instrument Inventory Charts * Surgery Scheduling Boards * Waste Segregation Bins (Color-coded) **Optional / Advanced Tools (Specialized OT)** Used in specific surgeries or advanced setups. * Cautery / Electrosurgical Units

- * Laparoscopic Equipment (Camera, Insufflator, Trocars)
- * Suction Irrigation System
- * Microscope (ENT/Neuro surgeries)
- * Orthopedic Power Drill

* Laser Units

* Smoke Evacuator

Eligibility criteria & duration of the course.

ELIGIBILITY:-

Candidate must have Xth Or XIIth Passed from any recognised Board.

DURATION OF THE COURSE:

* It is 1 year, **full time**Course.

Scheme of Examination.

One Year Course :

Paper	Subject	Total	Min	Duration
_		Marks	Pass Marks	
First	Anatomy & Physiology	100	35	3 Hours
Second	Anesthetic Drugs & Equipment's and	100	35	3 Hours
	Special Operation Theater Tray Set-			
	up			
Third	Surgical Procedures (Disinfection on	100	35	3 Hours
	Sterilization)-Care of Patient in			
	Emergencies.			
Fourth	Operation Theater Techniques	100	35	3 Hours
	·		*	

Practical & Viva-Voce : Total Marks : 50, Pass Marks: 17

Internal Assessment : Total Marks : 50, Pass Marks: 20

Schedule of the course

(List of Holidays, Total Hours, Subject-wise allotment of Hours)			
<u>List of Holidays:-</u>			
Sundays Summer vacation Winter vacation Gazetted holidays Preparatory holidays		 52 days 10 days 10 days 23 days 10 days 	
	Total Holidays	- 105 days	
<u>Total Hours :-</u>			
	Theory classes per day	- 3 Hours	
	Practical classes per day	- 3 Hours	
	Total hours per day	- 6 Hours	
Total days & hours in 260 days (after holidays) - 1560 Hours Theory : 780 Hours. Practical: 780 Hours.	One year- Or		