



SEMESTER – II

PAPER CODE	SUBJECT NAME	THEORY HOURS	PRACTICAL HOURS	THEORY MARKS	PRACTICAL MARKS
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DOTT201	MICROBIOLOGY & INFECTION CONTROL	45 Min	1 Hrs.	50	50
DOTT202	OPERATION THEATRE TECHNIQUES	45 Min	1 Hrs.	50	50
DOTT203	EMERGENCY CARE & CPR	45 Min	1 Hrs.	50	50
DOTT204	PREPARATION OF SURGERY & ITS PRINCIPLES	45 Min	1 Hrs.	50	50

MICROBIOLOGY & INFECTION CONTROL

Theory

1. Introduction to Microbiology

- History and scope of microbiology
- Classification of microorganisms
- Differences between bacteria, viruses, fungi, and protozoa
- Microscopy – types and use in microbiology
- Morphology of bacteria (shape, size, arrangement)

2. Sterilization & Disinfection

- Definitions: sterilization, disinfection, antisepsis
- Physical methods of sterilization:
 - Heat (Autoclave, Hot air oven)
 - Radiation (UV, Gamma)
 - Filtration
- Chemical disinfectants: types and uses (glutaraldehyde, phenol, alcohol)
- Biological indicators and sterility monitoring
- Sterilization control and validation

3. Bacteriology

- Classification and structure of bacteria
- Pathogenic bacteria:
 - Staphylococcus aureus
 - Escherichia coli



- Pseudomonas aeruginosa
- Clostridium tetani
- Mycobacterium tuberculosis
- Gram staining and acid-fast staining
- Normal flora vs. pathogenic organisms

4. Virology

- General structure and classification of viruses
- Common viral infections in OT settings:
 - Hepatitis B and C
 - HIV/AIDS
 - Influenza
 - Herpes virus
- Modes of viral transmission
- Prevention and control in clinical environments

5. Mycology

- Classification and types of fungi
- Common fungal infections:
 - Candidiasis
 - Aspergillosis
 - Dermatophytosis
- Prevention of fungal contamination in OT

6. Parasitology (Basic Overview)

- Common parasites:
 - *Entamoeba histolytica*
 - *Plasmodium* spp. (malaria)
 - *Ascaris*, Hookworm
- Mode of transmission and prevention

7. Hospital-Acquired Infections (HAIs)

- Definition and causes of nosocomial infections
- Sources of infection in hospital and OT
- Common HAIs:
 - Catheter-associated infections
 - Surgical site infections (SSI)
 - Ventilator-associated pneumonia (VAP)
 - Bloodstream infections (BSI)

8. Infection Control Practices

- Standard precautions (hand hygiene, PPE, safe injection practices)
- Surgical asepsis vs. medical asepsis
- Use of personal protective equipment (PPE)
- Isolation techniques and barrier nursing

Needle stick injury: prevention and post-exposure prophylaxis (PEP)



9. Biomedical Waste Management

- Categories and segregation of biomedical waste
- Color coding and container types
- Collection, storage, and transportation of waste
- Legal and environmental aspects (BWM Rules 2016 – overview)

10. Role of OT Technician in Infection Control

- Disinfection of OT surfaces, floors, and air
- Personal hygiene and aseptic behavior
- Role in infection surveillance
- Cleaning and disinfection of instruments and equipment
- Fumigation and fogging procedures

Practical

MICROBIOLOGY

➤ Laboratory Orientation

- Introduction to microbiology lab equipment
 - Microscope, autoclave, hot air oven, incubator
- Rules of aseptic laboratory techniques
- Hand hygiene and use of PPE in lab settings

➤ Microscopy

- Demonstration of microscope use (light microscope)
- Observation of prepared slides:
 - Bacteria (cocci, bacilli)
 - Fungi (yeast, molds)
 - Parasites (e.g., *Entamoeba*, *Plasmodium*)

➤ Staining Techniques

- Preparation of bacterial smear
- **Gram staining procedure** (demo and practice)
- **Acid-Fast Staining** (Ziehl-Neelsen technique – observation)
- Simple staining for shape and arrangement of bacteria

➤ Culture Techniques (Demonstration or Practice)

- Preparation of media (Nutrient agar, MacConkey agar – demo)
- Inoculation of culture media using aseptic technique
- Observation of colony characteristics
- Aerobic vs. anaerobic culture setup (demo only)

➤ Identification of Common Pathogens (*observation-based*)

- *Staphylococcus aureus*
- *E. coli*
- *Pseudomonas*
- *Clostridium tetani*
- *Mycobacterium tuberculosis*

➤ Antimicrobial Sensitivity Testing (Demo)



- Disc diffusion method (Kirby-Bauer method)
- Antibiotic zones of inhibition – interpretation basics

INFECTION CONTROL PRACTICALS

➤ **Hand Hygiene Practices**

- **Demonstration of medical and surgical hand washing techniques**
- Use of alcohol-based hand rub
- Monitoring hand hygiene compliance (observation checklist)

➤ **Personal Protective Equipment (PPE)**

- Donning and doffing PPE
- Mask types and proper use
- Use of gloves, apron, face shield, goggles

➤ **Sterilization and Disinfection**

- **Autoclave operation and demonstration**
- Monitoring sterilization with indicators (chemical and biological)
- Hot air oven and chemical disinfection (glutaraldehyde, hypochlorite)
- Preparation of disinfectant solutions (0.5% chlorine, alcohol)

➤ **Biomedical Waste Management**

- **Segregation of biomedical waste by color coding**
- Identification of types of waste (sharps, soiled, general)
- Use of needle burner and puncture-proof container
- Chart of BMW categories (as per BMW Rules 2016)

➤ **Surface & Equipment Disinfection in OT**

- Cleaning protocols for OT tables, lights, suction, cautery units
- Floor and wall disinfection methods
- OT fumigation and fogging demonstration
- High-touch surface disinfection checklist

➤ **Infection Control Audits / Checklists (Practice or Observation)**

- Hand hygiene audit
- OT infection control checklist
- Linen handling and sterilization logs
- Pre- and post-operative aseptic preparation list

OPERATION THEATRE TECHNIQUES

Theory

1. Introduction to Operation Theatre Techniques

- Definition and importance
- Duties and responsibilities of OT Technician
- Surgical team members and their roles



- Zones of OT and movement control
- Ethical behavior and communication in OT

2. Operation Theatre Setup & Environment

- OT design and zoning (protective, clean, sterile, disposal)
- Lighting, ventilation, and temperature control
- OT table and lighting – types and uses
- Suction apparatus and emergency power backup
- Noise and pollution control in OT

3. Surgical Instruments

- Classification: cutting, grasping, clamping, retracting, suturing instruments
- Identification and usage of common surgical instruments
- Instrument handling, cleaning, drying, and storing
- Checking instruments before and after surgery
- Care of delicate and electrical instruments (laparoscopic, cautery tools)

4. Patient Preparation and Positioning

- Pre-operative preparation: shaving, skin prep, ID check, fasting confirmation
- Different surgical positions: supine, prone, lithotomy, lateral, Trendelenburg, Fowler's
- Pressure point protection and safety straps
- Draping techniques for different surgeries
- Transfer and shifting of patient to/from OT

5. Asepsis and Sterile Techniques

- Principles of asepsis
- Surgical handwashing
- Gowning and gloving (open and closed methods)
- Creating and maintaining a sterile field
- Handling sterile and non-sterile items

6. Operation Theatre Procedures

- Setting up surgical trolley
- Instrument and sponge count (pre-op and post-op)
- Assisting the surgeon and scrub nurse during procedure
- Use of electrocautery and suction machine
- OT discipline and protocol during surgery

7. Anesthesia Equipment Support

- Types of anesthesia: general, local, regional (brief overview)
- Identification of anesthesia machine components
- Checking oxygen cylinder, flow meter, masks, and airways
- Monitoring vitals during anesthesia (support role)
- Assisting anesthetist during intubation/extubation

8. Sterilization and Disinfection

- Methods: autoclave, hot air oven, chemical disinfection
- OT fumigation and fogging procedure



- Instrument sterilization: packaging, labeling, and tracking
- Maintenance of sterility in OT environment

9. Infection Control in OT

- Standard precautions and PPE use
- Biomedical waste management in OT
- Handling spills and contamination
- OT cleaning schedules (daily, weekly, terminal cleaning)
- OT records and documentation related to infection control

10. Post-operative OT Procedures

- Clearing and disinfection of OT after surgery
- Disposal of surgical waste and soiled linen
- Post-operative instrument care and packaging
- Preparation for next surgery (turnover management)
- Documentation: sponge/instrument count sheet, case log

11. Emergency OT Procedures

- Crash cart layout and essential drugs/equipment
- OT technician role during code blue/emergency
- Handling unplanned/emergency surgeries
- Rapid OT turnaround and cleaning under pressure

Practical

➤ Orientation to OT Setup

- Visit and observation of different OT zones (sterile, clean, protective, disposal)
- Identification and use of OT furniture: OT table, OT lights, suction, cautery, etc.
- Understanding OT schedule board, communication system, and surgical safety checklist

➤ Hand Hygiene and Personal Preparation

- Demonstration and return demo of:
 - Medical and surgical handwashing techniques
 - Donning and doffing of gloves and gown
 - Mask and cap wearing techniques
- Scrubbing area protocols

➤ Aseptic Techniques & Sterile Field Maintenance

- Creating and maintaining a sterile field
- Draping techniques for different surgical areas
- Handling and passing of sterile instruments and supplies
- Sterile trolley setup: major and minor procedures
- Checking and maintaining sterility indicators

➤ Identification and Handling of Surgical Instruments

- Identification and naming of:
 - Cutting instruments
 - Grasping and holding instruments



- Clamping and occluding instruments
- Retractors and suction instruments
- Care, cleaning, drying, and storage of instruments
- Sharpening and checking sharpness (where applicable)

➤ **Surgical Positioning of Patients**

- Practice positioning mannequins or dummies in:
 - Supine, prone, lithotomy, lateral, Trendelenburg, Fowler's
- Proper use of safety straps and padding of pressure points
- Transfer of patient to and from OT table (with team)

➤ **Preparation of Surgical Trolley**

- Setting up major and minor surgical trays
- Pre-op verification of instrument count and sterilization
- Laying out instruments based on specialty (ENT, Ortho, Gynae, etc.)

➤ **Sponge, Instrument, and Needle Counts**

- Practice maintaining pre-operative and post-operative counts
- Documenting on count sheet/logbook
- Handling missing item protocol

➤ **Assisting in Surgery (Role Play / Observation)**

- Practicing role of circulating nurse and scrub nurse (as technician)
- Passing instruments using correct techniques
- Handling of suction and electrocautery machine
- Monitoring surgical environment for sterility breaches

➤ **Disinfection and Cleaning of OT**

- Cleaning protocols for: OT lights, tables, walls, floor, and equipment
- Fumigation and fogging procedure demonstration
- Handling biohazard spills and safe cleanup
- Segregation and disposal of biomedical waste

➤ **Sterilization Techniques**

- Autoclave operation (loading/unloading and parameters)
- Packing and labeling instruments for sterilization
- Use of chemical disinfectants (glutaraldehyde, hypochlorite)
- Use of indicators: biological and chemical

➤ **Emergency Response in OT**

- Setting up and checking crash cart
- Practice emergency drills (Code blue scenario – dummy based)
- Assisting in CPR and BLS (Basic Life Support)



EMERGENCY CARE & CPR

Theory

1. Introduction to Emergency Care

- Definition and scope of emergency care
- Role of OT technician in emergencies
- Principles of triage and emergency response
- Medico-legal aspects in emergency care

2. Basic Human Physiology in Emergencies

- Vital signs: normal values and interpretation
- Respiratory and cardiovascular system overview
- Hypoxia, shock, and respiratory failure
- Glasgow Coma Scale (GCS) and its application

3. Primary and Secondary Assessment

- Scene safety and situation analysis
- Airway, Breathing, Circulation (ABC) protocol
- Rapid head-to-toe secondary assessment
- SAMPLE history and AVPU scale

4. Basic Life Support (BLS)

- Principles of BLS – Adult, Child, and Infant
- Chain of survival and early response
- Chest compressions and rescue breaths
- CPR techniques – one-rescuer and two-rescuer
- BLS algorithms and updates (based on AHA/IRC)

5. Cardiopulmonary Resuscitation (CPR)

- Definition and types of CPR
- CPR indications and contraindications
- CPR procedure step-by-step
- High-quality CPR parameters (rate, depth, recoil, ventilation)
- Complications and post-CPR care

6. Use of Automated External Defibrillator (AED)

- Working principle of AED
- Indications and contraindications
- Steps to operate AED in adult and pediatric cases
- Safety measures while using AED

7. Airway Management

- Anatomy of the airway
- Airway obstruction causes and relief (Heimlich maneuver)
- Airway opening techniques: head tilt–chin lift, jaw thrust
- Use of oropharyngeal (OPA) and nasopharyngeal airway (NPA)



- Suctioning techniques and precautions
- Bag-valve-mask (BVM) ventilation technique

8. Medical Emergencies

- Recognition and basic management of:
 - Myocardial infarction (heart attack)
 - Seizures and epilepsy
 - Stroke and TIA
 - Diabetic emergencies (hypo/hyperglycemia)
 - Asthma and anaphylaxis
 - Poisoning and drug overdose

9. Trauma and Injury Emergencies

- Types of injuries: blunt, penetrating, burns, fractures
- Basic wound care and bleeding control
- Head and spinal trauma – precautions and stabilization
- Fracture immobilization methods
- Soft tissue injury management

10. Shock and Its Management

- Types of shock: hypovolemic, cardiogenic, septic, anaphylactic
- Signs and symptoms of shock
- Immediate emergency interventions
- Fluid resuscitation principles

11. Crash Cart and Emergency Equipment

- Components of crash cart
- Emergency drugs: names, indications, doses (basic knowledge)
- Oxygen therapy equipment: cylinder, mask, nasal cannula
- Defibrillator, suction machine, ambu bag – working principles

12. Infection Control in Emergencies

- Universal precautions during resuscitation
- Use of PPE (gloves, mask, gown, eye shield)
- Biomedical waste disposal during emergencies
- Decontamination of CPR equipment

13. Disaster Management (Basic Concepts)

- Types of disasters (natural, man-made, hospital-based)
- Triage tagging and mass casualty management
- Fire safety and evacuation procedures
- Role of OT technician in disaster settings

Practical

➤ Basic Life Support (BLS) – Adult, Child, and Infant

- Chain of survival – practical understanding



PARAMEDICAL EDUCATION & TRAINING COUNCIL

Ch. No.157/1, Near Laxmi Nagar, Metro Station Gate No 1, Vikas Marg, Delhi-92

- Scene safety and patient assessment (conscious vs. unconscious)
- Checking response, airway, breathing, and pulse
- Demonstration and practice on mannequins for:
 - Chest compressions (rate, depth, hand placement)
 - Rescue breaths using pocket mask
 - Mouth-to-mouth resuscitation
 - One-rescuer and two-rescuer CPR techniques
- Practice using CPR feedback manikins (if available)

➤ **Use of Automated External Defibrillator (AED)**

- Identification and demonstration of AED device
- Proper placement of AED pads
- Safe operation and following AED voice prompts
- Simulation of shockable and non-shockable rhythms
- Practicing AED use during CPR cycles

➤ **Airway Management Techniques**

- Head tilt–chin lift and jaw thrust maneuvers
- Use of oral airway (Oropharyngeal airway - OPA)
- Use of nasal airway (Nasopharyngeal airway - NPA)
- Bag-valve-mask (BVM) ventilation
- Oxygen cylinder setup and face mask administration

➤ **Initial Emergency Assessment**

- Primary survey: Airway, Breathing, Circulation (ABC)
- Secondary survey: Head-to-toe assessment
- Checking vitals: pulse, respiratory rate, temperature, BP
- Glasgow Coma Scale (GCS) scoring practice
- Management of shock and unconscious patients

➤ **Management of Common Medical Emergencies**

- Simulation/role play for:
 - Chest pain (suspected MI)
 - Asthma attack
 - Seizures
 - Hypoglycemia
 - Stroke (FAST assessment)

➤ **Trauma & Bleeding Control**

- Application of direct pressure and pressure bandage
- Elevation and tourniquet techniques (simulation)
- Control of nosebleed (epistaxis) and minor cuts
- Simulation of fracture splinting (upper/lower limb)

➤ **Emergency Response and Crash Cart**

- Layout and labeling of crash cart trays
- Checking crash cart inventory



- Practice of emergency drug identification and preparation
- Arranging emergency equipment: ambu bag, laryngoscope, suction machine
- **Triage & Patient Transport**

- Triage tagging (Red, Yellow, Green, Black)
- Use of stretchers, spine boards, and wheelchairs
- Logroll technique and cervical collar application
- Safe lifting and transfer of patients
- **Wound Dressing and Bandaging**

- Cleaning and dressing of minor wounds
- Practice of sterile and pressure dressing
- Application of roller bandage, triangular bandage, and sling
- Care of surgical wound (under supervision)

➤ **Fire & Disaster Drill Participation**

- Fire extinguisher use demonstration (PASS technique)
- Evacuation drill participation
- Basic fire safety and disaster preparedness (role-play based)

PREPARATION OF SURGERY & ITS PRINCIPLES

Theory

1. Introduction to Surgery

- Definition and scope of surgery
- History and evolution of surgical practices
- Classification of surgeries:
 - Elective, emergency, minor, major, diagnostic, therapeutic
- Role and responsibilities of OT technicians in surgical preparation

2. Preoperative Patient Preparation

- Psychological preparation and counseling
- Informed consent and documentation
- Fasting and pre-anesthetic check-up (PAC)
- Skin preparation (shaving, antiseptic application)
- Bowel preparation and bladder care
- Allergy checks and identification bands
- Positioning of patient – general principles

3. Principles of Asepsis and Antisepsis

- Definition and importance of asepsis
- Types of asepsis: medical and surgical
- Antiseptic agents used in OT (betadine, spirit, etc.)
- Methods of sterilization (moist heat, dry heat, chemical, gas)
- Disinfection procedures for surfaces and instruments

4. Sterilization Techniques and Equipment



- Sterilizers: autoclave, hot air oven, ethylene oxide (ETO), plasma sterilizer
- Packaging, labeling, and handling of sterile supplies
- Quality control in sterilization (Bowie-Dick test, chemical indicators, biological indicators)
- Storage and transport of sterile items

5. Surgical Hand Scrubbing

- Indications and steps of hand scrubbing
- Types of hand hygiene: routine, surgical, and antiseptic hand rub
- Gowning and gloving techniques (open and closed method)
- Principles of donning and doffing PPE

6. Operating Room Environment & Discipline

- Zoning in the OT: protective, clean, sterile, disposal
- Temperature, humidity, and air exchange standards
- Cleanroom behavior and traffic control
- Surgical team roles: surgeon, anesthetist, scrub nurse, circulating nurse, technician

7. Surgical Instruments and Their Preparation

- Types of instruments: cutting, grasping, clamping, retracting, suturing
- Cleaning and inspection of instruments
- Wrapping, sterilizing, and arranging on instrument trays
- Safe handling, passing, and care of instruments

8. Surgical Draping and Trolley Setup

- Types of drapes and draping techniques
- Principles of sterile field maintenance
- Preparing instrument trolley, linen trolley, and medicine trolley
- Sponge, swab, and sharps counting procedures

9. Positioning of Patient for Surgery

- Common surgical positions: supine, prone, lithotomy, Trendelenburg, lateral
- Positioning aids and padding
- Risks and complications related to positioning
- Pressure points and their protection

10. Incision and Suturing Techniques (Basic Concepts)

- Types of surgical incisions
- Basic principles of incision and hemostasis
- Types of sutures: absorbable/non-absorbable
- Suture materials and needles
- Techniques of suturing and wound closure (overview)

11. Intraoperative Care and Support

- Maintaining sterile field
- Monitoring patient during surgery
- Handling of surgical specimens
- Assisting in counts and documentation



- Handling of emergency situations

12. Postoperative Room Preparation

- Transfer of patient to recovery room
- Cleaning and disinfection of OT post-surgery
- Handling biomedical waste and linen disposal
- Decontamination of instruments and surfaces

13. Legal & Ethical Principles in Surgery

- Consent and confidentiality
- Patient rights and documentation ethics
- Role boundaries and professional behavior

Practical

➤ Preoperative Patient Preparation

- Demonstration of patient identity verification
- Preparation of consent forms and verification
- Practice of patient shifting techniques to OT
- Shaving and skin preparation of operative site
- Administration of enema or bladder care (simulated)
- Preoperative fasting protocols and checklist review

➤ Surgical Hand Washing Techniques

- Steps of **surgical hand scrub** (demonstration and repetition)
- Use of antiseptic solutions and brushes
- Practice of **gowning and gloving** (open and closed methods)
- Hand rub procedure with alcohol-based sanitizers

➤ Sterilization and Disinfection Procedures

- Cleaning, packing, and autoclaving of surgical instruments
- Operation of autoclave (loading, timing, temperature)
- Use of **chemical disinfectants** (glutaraldehyde, cidex, betadine)
- Bowie-Dick test and indicator checks for sterilization efficacy
- Handling and storage of sterile packs and trays

➤ Instrument Handling and Trolley Setup

- Identification and correct use of basic surgical instruments
- Practice of preparing **instrument trolley** and **drape packs**
- Arranging major/minor surgical sets (e.g., dressing, suture, laparotomy)
- Checking instrument function (scissors sharpness, forceps alignment, etc.)

➤ Surgical Draping Techniques

- Demonstration of different types of surgical drapes
- Proper folding and unfolding of drapes
- Draping patient in sterile manner for various procedures
- Draping of equipment/trolley for sterile procedures



➤ **Patient Positioning for Surgery**

- Positioning mannequins/dummies in:
 - Supine, Prone, Lithotomy, Trendelenburg, Lateral, Fowler's
- Padding pressure points and securing patient
- Use of positioning accessories (leg holders, arm boards, straps)

➤ **Operating Room Protocols**

- Cleaning and disinfection of OT before and after surgery
- Checking room humidity, temperature, and lighting
- Demonstrating traffic control and movement zones
- Conducting sponge, instrument, and needle counts

➤ **Assisting in Intraoperative Procedures (Simulated)**

- Handling instruments and passing techniques
- Practice of maintaining sterile field
- Mock procedure: gowning, gloving, assisting with incision and suturing (on dummies)
- Collecting and labeling surgical specimens correctly

➤ **Postoperative Room Turnover**

- Demonstration of OT cleaning protocols after surgery
- Biomedical waste segregation and disposal
- Decontamination of used instruments
- Preparation of OT for next surgery

➤ **Emergency & Crash Cart Familiarization**

- Checklist of crash cart items
- Locating emergency drugs and equipment
- Demonstration of emergency protocols in OT settings