



Department of Paramedical Sciences

Faculty of Allied Health Sciences

SGT UNIVERSITY

Shree Guru Gobind Singh Tricentenary University

Gurgaon-122505

Syllabus

B.Sc. Operation Theatre Technology (OTT)

Duration: 3 years (6 Semester)

W.e.f. Academic Session 2021-22

HUMAN ANATOMY-I

PAPER CODE-

B. Sc. Semester I (Operation Theatre Technology)

L T P Credits
3 - 3

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks
Duration of Examination: 3 Hours

UNIT-I

Introduction: human body as a whole

Definition of anatomy and its subdivisions

Anatomical nomenclature and terminology (planes & positions)

Surface Anatomy of main structures and vessels

Applied anatomy & Joints

Musculoskeletal system

Connective tissue & its modification, tendons, membranes, special connective tissue.

Bone structure, blood supply, growth, ossification, and classification.

Muscle classification, structure and functional aspect.

Joints classification, structures of joints, movements, range, limiting factors, stability, blood supply

Nerve supply, dislocations and applied anatomy

UNIT-II

Extremity (Lower & Upper extremities)

Bony architecture

Joints – structure, range of movement

Muscles – origin, insertion, actions, nerve supply

Major nerves – course, branches and implications of nerve injuries Development of limb bones, muscles and anomalies

Radiographic identification of bone and joints Applied anatomy

Lower extremity

Bony architecture

Joints – structure, range of movement

Muscles – origin, insertion, actions, nerve supply

Major nerves – course, branches and implications of nerve injuries Development of limb bones, muscles and anomalies

Radiographic identification of bone and joints Applied anatomy

UNIT-III

Spine and thorax

Back muscles -Superficial layer

Deep muscles of back, their origin, insertion, action and nerve supply.

Vertebral column – Structure & Development, Structure & Joints of vertebra. Thoracic cage

Head and neck: Cranium

Facial Muscles – origin, insertion, actions, nerve supply Temporal mandibular Joints – structure, types of movement

UNIT-IV

Cardiovascular system (with relevant applied anatomy)

Heart-Size,location, chambers.

Circulation -Systemic &pulmonary

Great vessels of the heart, branches of aorta.

Overview of blood vessels of upper extremity and lower extremity

Lymphatic system- (with relevant applied anatomy)

Salient features of lymphatic organs (spleen, tonsil, thymus, lymph node)

UNIT-V

Gastro-intestinal system (with relevant applied anatomy)

Partsofthe gastrointestinal tract

Gross anatomy of Tongue, stomach, small and large intestine, liver, gall bladder Pancreas and other digestive organ& related applied anatomy

Respiratory system (with relevant applied anatomy)

Partsof respiratory system with salient gross features of lung

Brief description of intercostal muscles andPara-nasal air sinuses

HUMAN ANATOMY I-PRACTICAL

PAPER CODE-

B. Sc. Semester I (Operation Theatre Technology)

L	T	P	Credits	Examination:	30 Marks
-	-	1/2		Int. Assessment:	20 Marks
				Total:	50 Marks

- 1) Identification and description of all anatomical structures.
- 2) Demonstration of dissected parts (upper extremity, lower extremity, thoracic & abdominal viscera, face and brain).
- 3) Demonstration of skeleton-articulated and disarticulated.
- 4) Surface anatomy: Surface land mark-bony, muscular and ligamentous. Surface anatomy of major nerves, arteries of the limbs.

HUMAN PHYSIOLOGY-I

PAPER CODE-

B. Sc. Semester I (Operation Theatre Technology)

L T P Credits
3 1 - 4

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks

Duration of Examination: 3 Hours

UNIT-I

General Physiology

Cell: morphology, Structure and function of cell organelles Structure of cell membrane

Transport across cell membrane Intercellular communication Homeostasis

Blood

Introduction-composition & function of blood

W.B.C., R.B.C., Platelets formation & functions, Immunity

Plasma: composition, formation & functions, Plasma Proteins: -types & functions, Blood Groups-
types, significance, determination.

Hemoglobin, Haemostasis

Lymph-composition, formation, circulation & functions

UNIT-II

Cardiovascular system

Conducting system-components, impulse conduction Heart valves Cardiac cycle-definition, phases of
cardiac cycle.

Cardiac output-definition, normal value, determinants.

Stroke volume and its regulation.

Heart rate and its regulation:

Arterial pulse, Blood pressure-definition, normal values, factors affecting blood pressure.

Shock-definition, classification, causes and features, Basic idea of ECG, Cardiovascular changes
during exercise

UNIT-III

Respiratory System

Mechanics of respiration Lung volumes and capacities

Pulmonary circulation, transport of respiratory gases

Factors affecting respiration, Regulation of respiration-neural regulation, voluntary control and
chemical regulation

Hypoxia, Hypercapnoea, Hypocapnoea,

Artificial respiration Disorders of respiration- dyspnoea, orthopnoea, hyperpnoea, hyperventilation,
apnoea, Tachypnoea, Respiratory changes during exercise.

Digestive System Digestion & absorption of nutrients, Gastrointestinal secretions & their regulation
Functions of Liver & Stomach

UNIT-IV

Nervous system

Introduction, central and peripheral nervous system, functions of nervous system

Reflexes-monosynaptic, polysynaptic, superficial, deep & withdrawal reflex Sense organ, receptors, electrical & chemical events in receptors.

Sensory pathways for touch, temperature, pain, proprioception & others.

Control of tone & posture: Integration at spinal, brain stem, cerebellar, basal ganglion levels, along with their functions.

Motor mechanism: motor cortex, motor pathway: the descending tracts -pyramidal & extrapyramidal tracts-origin, course, termination & functions. Upper motor neuron and lower motor neuron paralysis.

Special senses-eye, ear, nose, mouth

Water excretion, concentration of urine-regulation of Na⁺, Cl⁻, K⁺ excretion

Nerve Muscle Physiology

Muscles-classification, structure, properties, Excitation, contraction, coupling, Motor unit, EMG, factors affecting muscle tension, Muscle tone, fatigue, exercise .

Nerve – structure and function of neurons, classification, properties Resting membrane potential & Action potential their ionic basis, All or None phenomenon Neuromuscular transmission Ionic basis of nerve conduction.

Concept of nerve injury & Wallerian degeneration Synapses.

Electrical events in postsynaptic neurons Inhibition & facilitation at synapses .

Chemical transmission of synaptic activity Principal neurotransmitters. Chemical transmission of synaptic activity Principal neurotransmitters.

HUMAN PHYSIOLOGY I-PRACTICAL

PAPER CODE-

B. Sc. Semester I (Operation Theatre Technology)

L T P Credits
- - 2

Examination: 30 Marks
Int. Assessment: 20 Marks
Total: 50 Marks

1. Haemoglobinometry
2. WhiteBloodCellcount
3. RedBloodCellcount
4. DeterminationofBloodGroups
5. Leishman'sstainingandDifferentialWBCcount
6. DeterminationofpackedcellVolume
7. Erythrocytesedimentationrate[ESR]
8. CalculationofBloodindices
9. DeterminationofClottingTime,BleedingTime

BASIC BIOCHEMISTRY

PAPER CODE-

B. Sc. Semester I (Operation Theatre Technology)

L T P Credits
3 1 - 4

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks

Duration of Examination: 3 Hours

Basic concept of metabolism and their applied aspects

Unit-I

Carbohydrates: Definition, function and classification of carbohydrate. Monosaccharide, glycoside formation, oligosaccharides and polysaccharides. Glycolysis, catabolic fates of pyruvate, metabolic fate of Acetyl-CoA and Citric acid cycle, gluconeogenesis, glycogen metabolism, pentose phosphate pathway.

Unit-II

Amino acids and proteins: Definition, structure, classification, essential & non essential amino acids. Proteins definition and classification. Primary, secondary, tertiary and quaternary of proteins of proteins

Unit-III

Vitamins: Definition and classification of vitamins, difference between fat soluble and water soluble vitamins. Water soluble vitamins and fat soluble vitamins

Unit-IV

Lipids: Definition, classification and function of lipids. Fatty Acids, Triacylglycerols or Triacylgcerides or neutral fat. Fatty acid metabolism. Ketone body metabolism.

BASIC BIOCHEMISTRY-PRACTICAL

PAPER CODE-

B. Sc. Semester I (Operation Theatre Technology)

L T P Credits
- - 2

Examination: 30 Marks
Int. Assessment: 20 Marks
Total: 50 Marks

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1. Identification of carbohydrates by Molisch's test.
 2. Identification of reducing sugar by Benedict's test.
 3. Identification of ketose sugars by Seliwanoff's test.

4. Identification of reducing sugar by Osazone test.
5. Identification of cholesterol by Salkowski's test.
6. Identification of protein by Biuret's test.
7. Identification of protein by Ninhydrin test.

GENERAL MICROBIOLOGY

PAPER CODE-

B. Sc. Semester I (Operation Theatre Technology)

L T P Credits
3 1 - 4

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks

Duration of Examination: 3 Hours

UNIT-I

Safety measures in laboratory

Microscopy: Principle, working and applications of Light microscope, Dark field, Phase contrast microscopy, Fluorescent & Electron microscopy

Sterilization and Disinfection: Physical Methods of Sterilization, Chemical Methods of Sterilization, Methods of Disinfection

UNIT-II

Introduction and classification of Bacteria, Morphology of bacteria, Growth, Nutrition & Metabolism of Bacteria

Normal microbial flora of human body, role of normal flora, probiotics.

Bacterial genetics- Bacterial DNA & RNA, Replication of bacteria.

Microbial pathogenicity

UNIT-III

Bacterial Culture and Identification: Culture Media & Transport Media, Aerobic Bacterial Culture Techniques, Anaerobic Bacterial Culture Techniques, Sample collection and transport methods

Bacterial identification techniques: Conventional methods, Automated culture techniques.

UNIT-IV

Smear preparation & Staining methods: Gram stain, Acid fast stain, Negative stain, Spore stain

Antimicrobial susceptibility testing: Principle and techniques of Diffusion Methods Dilution Methods

Preservation techniques of bacteria

GENERAL MICROBIOLOGY-PRACTICAL

PAPER CODE-

B. Sc. Semester I (Operation Theatre Technology)

L	T	P	Credits	Examination:	30 Marks
-	-	2		Int. Assessment:	20 Marks
				Total:	50 Marks

1. Microscope
Light Microscope
2. Staining
Grams staining
ZN staining
Negative stain
3. Preparation of commonly used culture media
Nutrient Agar
Blood Agar
Chocolate agar
Mac Conkey agar
Muller Hinton agar
4. Culture methods
Streak method
Lawn method
Stroke method
Stab method
Pour Plate method
Liquid method
5. Antibiotic susceptibility test
Diffusion methods
Dilution Methods

BASIC PATHOLOGY AND HAEMATOLOGY

PAPER CODE-

B. Sc. Semester I (Operation Theatre Technology)

L T P Credits
3 1 - 4

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks

Duration of Examination: 3 Hours

UNIT-I

Pathology & its branches
Normal cell and its functions
Various types of microscope & light microscope in details.

UNIT-II

Introduction to hematology and laboratory Organization.
Formation of Blood
Composition and functions of blood
Various anticoagulants, their uses, mode of action and their merits & demerits.
Collection & preservation of blood for various hematological investigations.

UNIT-III

Normal hematological indices (MCV, MCH, MCHC, PCV)
Normal and absolute values in hematology.
Quality assurance in hematology.
Various methods of estimation of Hb involved and standardization of instrument.

UNIT-IV

Haemocytometry:- Procedure of cell count, visual as well as electronic red cell, Leucytes and platelet count.
Romanowsky dyes, preparation and staining procedure of blood smears.
Morphology of normal blood cells and their identification.
ESR & Factors influencing ESR and various procedures for its estimation.

BASIC PATHOLOGY AND HAEMATOLOGY-PRACTICAL

PAPER CODE-

B. Sc. Semester I (Operation Theatre Technology)

L T P Credits
- - 2

Examination: 30 Marks
Int. Assessment: 20 Marks
Total: 50 Marks

Hemoglobin estimation – Sahli’s method

Peripheral blood film (PFB), Preparation, staining by leishman stain & examination.

Cell counts by Neubauer chamber – RBCs, WBC, Platelets.

ESR & PCV estimation

COMMUNICATION SKILLS AND PERSONALITY DEVELOPMENT

PAPER CODE-

B. Sc. Semester I (Operation Theatre Technology)

L T P Credits
3 1 - 4

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks

Duration of Examination: 3 Hours

Unit I

Listening Comprehension

- Speeches
- Interviews
- audio-video clippings followed by exercises
- Introduction to Communication
- Importance of Communication
- Barriers to Communication and ways to overcome them

Unit II

Conversation Skills

- Greetings and introducing oneself
- Framing questions and answer
- Role play
- Buying: asking details etc
- Word formation strategies
- Vocabulary building: Antonyms, Synonyms, Affixation, Suffixation, One word substitution

Unit III

Reading Comprehension

- Simple narration and Stories
- Simple Passages
- Newspaper and articles clippings
- Note Making
- Paragraph Writing
- Comprehension
- Report Writing: types, characteristics
- Introduction to Letter Writing

**Unit IV:
Pronunciation**

- Pronunciation
- Syllable and Stress
- Intonation and Modulation

UNIT V

Writing Comprehension

- Letters: types, format, style
- Précis Writing
- Paragraph: Order, Topic sentence, consistency, coherence
- Report and Proposal

Project Writing: Features, Structure

HUMAN ANATOMY-II

PAPER CODE-

B. Sc. Semester II (Operation Theatre Technology)

L T P Credits
3 1 - 4

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks
Duration of Examination: 3 Hours

UNIT-I

Urinary system (with relevant applied anatomy)

Parts of urinary system

Salient gross features of kidney, urinary bladder, ureter and urethra.

UNIT-II

Reproductive system

Parts of male and female reproductive system with salient gross features of testis & uterus, ovary and fallopian tube

UNIT-III

Endocrine glands

List of the endocrine glands, their position and salient gross features

Hormones produced by each endocrine glands

Embryology

Spermatogenesis & oogenesis

Ovulation, fertilization, Placenta, Fetal circulation

UNIT-IV

Nervous system

Classification of the nervous system, Definitions of central, peripheral and autonomic nervous system

Neuron- structure and classification, neuroglia

Names of lobes of Cerebrum and cerebellum, Parts of brainstem (salient features only)

.Cerebrospinal fluid and its circulation, names of cranial nerves, spinal nerve, meninges, ventricles (salient features only)

UNIT-V

Sensory organs

Skin: Its appendages and functions

Eye: Parts of eye and its structure

Ear: Parts of ear- external, middle and inner ear and contents.

HUMAN ANATOMY I-PRACTICAL

PAPER CODE-

B. Sc. Semester II (Operation Theatre Technology)

L T P Credits
- - 2

Examination: 30 Marks
Int. Assessment: 20 Marks
Total: 50 Marks

Identification and description of all anatomical structures.

Demonstration of dissected parts

Demonstration of skeleton-articulated and disarticulated.

Surface anatomy: Surface land mark-bony, muscular and ligamentous. Surface anatomy of major nerves, arteries of the limbs.

HUMAN PHYSIOLOGY-II

PAPER CODE-

B. Sc. Semester II (Operation Theatre Technology)

L T P Credits
3 1 - 4

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks
Duration of Examination: 3 Hours

UNIT-I

Excretory system:

Functions of kidneys,
Composition of urine
Mechanism of urine formation
Regulations of body temperature
Fluid and electrolyte balance
Alterations in disease

UNIT-II

Sensory Organs:

Functions of skin, eye, ear, nose, tongue
Alterations in disease

UNIT-III

Endocrines

Functions of pituitary, Pineal gland, Thymus, Thyroid, Parathyroid,
Pancreas,
Suprarenal & placenta
Alterations in disease

UNIT-IV

Reproduction

Reproduction of cells-DNA, Mitosis, Meiosis, Spermatogenesis, Oogenesis
Functions of female reproductive organs:
Functions of breast, female sexual cycle
Introduction to embryology
Functions of male reproductive organs:
Fertility system
Alterations in disease

UNIT-V

Lymphatic and Immunological system:

Circulation of lymph
Immunity
Formations of T- Cells and B- Cells
Types of Immune response
Antigens
Cytokines

HUMAN PHYSIOLOGY II-PRACTICAL

PAPER CODE-

B. Sc. Semester II (Operation Theatre Technology)

L T P Credits
- - 2

Examination: 30 Marks
Int. Assessment: 20 Marks
Total: 50 Marks

1. Haemoglobinometry
2. White Blood Cell count
3. Red Blood Cell count
4. Determination of Blood Groups
5. Leishman's staining and Differential WBC count
6. Determination of packed cell Volume
7. Erythrocyte sedimentation rate[ESR]
8. Calculation of Blood indices
9. Determination of Clotting Time, Bleeding Time
10. Blood pressure recording
11. Auscultation for Heart Sounds
12. Artificial Respiration

LABORATORY APPARATUS, REAGENTS AND CONCEPTS OF SI UNITS

PAPER CODE-

B. Sc. Semester II (Operation Theatre Technology)

L T P Credits
3 1 - 4

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks
Duration of Examination: 3 Hours

INTRODUCTION TO LABORATORY APPARATUS:

Unit- I

Overview of the functioning of Biochemistry clinical laboratory.

Introduction to glass wares:

Test tubes and serum tubes.

Test tube draining rack, bottle racks, Pipette stands, tripod stand, wire gauze and Bunsen burner.

Cuvettes and their application in colorimetry and spectrophotometry.

Bottle Dispensers and their Maintenance.

Maintenance, Care and cleaning of laboratory glassware.

Unit-II

Introduction to the laboratory instruments and their maintenance:

Use care and maintenance.

Water Distillation Plant and Deionizers

Refrigerators

Centrifuges

Laboratory Balance and Direct Readout Electrical Balances

Colorimeter

Spectrophotometer

pH Meter and its Calibration

Unit-III

CONVENTIONAL AND SI UNITS USED IN THE LABORATORY

Molecular and equivalent weight
Normality, molality, molarity
Concentrations of solutions by w/w, w/v, v/v etc.
Preparation of standard solutions
Molar solutions and Percent solutions
Acid, base, salts and buffers
Indicators and their Functions
Buffers of the body

Unit-IV

DILUTIONS of solutions or samples:

Preparation of a stock standard and working standard.
Proper method of dilution of a solution or a laboratory sample.
Serial dilutions of samples
Saturated and supersaturated solutions
Significance of volumetric flask in preparing standard solutions,

LABORATORY APPARATUS, REAGENTS AND CONCEPTS OF SI UNITS

-PRACTICAL

PAPER CODE-

B. Sc. Semester II(Operation Theatre Technology)

L	T	P	Credits	Examination:	30 Marks
-	-	2		Int. Assessment:	20 Marks
				Total:	50 Marks

Introduction to glassware and instruments

Preparation of %, molar and normal solutions

Understanding the principle of pH meter and Demonstration of pH meter

Colorimetry

Principle of colorimetry (Lambert and Beer's laws and their verification), colorimeter and its uses

Standard curve, features and uses

BASIC CONCEPTS OF IMMUNOLOGY AND SYSTEMIC BACTERIOLOGY

PAPER CODE-

B. Sc. Semester II (Operation Theatre Technology)

L T P Credits
3 1 - 4

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks
Duration of Examination: 3 Hours

UNIT-I

Concept of Immunity and its types. Antigen & Antibody

Antigen antibody reactions I: Principle and types of Precipitation reaction and Agglutination reactions

Antigen antibody reactions II: Complement fixation, Neutralization, ELISA, RIA, IF

UNIT-II

Systemic Bacteriology I: Morphology, culture characteristic, identification, diseases caused and laboratory diagnosis of- Staphylococcus, Streptococcus, Bacillus, Neisseria, Corynebacterium, Clostridium, Mycobacteria

UNIT-III

Systemic Bacteriology I: Morphology, culture characteristic, identification, diseases caused and laboratory diagnosis of- Shigella, Salmonella, E.coli, Klebsiella, Proteus, Vibrio, Pseudomonas, Spirochetes

UNIT IV

Morphology, culture characteristic, identification, diseases caused and laboratory diagnosis of Mycoplasma, Nocardia, Actinomycetes, Legionella, Rickettsia

Immunoprophylaxis: Vaccines and its types.

National immunization schedule (NIS) for infants, children, pregnant women and healthcare workers.

BASIC CONCEPTS OF IMMUNOLOGY AND SYSTEMIC BACTERIOLOGY

-PRACTICAL

PAPER CODE-

B. Sc. Semester II (Operation Theatre Technology)

L T P Credits
- - 2

Examination: 30 Marks
Int. Assessment: 20 Marks
Total: 50 Marks

Identification of bacterial culture
Colony characteristics
Morphological characteristics

Bio medical waste
Use of colour coded bags
Black
Blue
Red
Yellow

Demonstration of Sterilization & Disinfection method
Autoclave
Hot Air oven
Water bath
Inspissator
Chemical Sterilization
Collection of specimen
From outpatient units
Inpatient units
Minor operation theatre
Major operation theatre for sterility testing
Disinfection of wards, OT and Laboratory
Visit to CSSD
Demonstration of personal protective equipment

SYSTEMIC AND CLINICAL PATHOLOGY

PAPER CODE-

B. Sc. Semester II (Operation Theatre Technology)

L T P Credits
3 1 - 4

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks
Duration of Examination: 3 Hours

UNIT-I

Clinical Pathology

Routine urine examination—specimen, physical examination, chemical examination, microscopic examination, **routine** examination of CSF, semen analysis, routine examination of sputum, routine examination of body fluids- pleural, peritoneal, synovial.

UNIT-II

Haemodynamic Disorders-

Oedema, thrombosis, Embolism, Infarction, Shock, Hyperemia & congestion, Hemorrhage.
Neoplasm- Definition, Classification, nomenclature and characteristics, Aetiology & agents causing neoplasm, Biology of neoplastic growth & neoplasm immunology.

UNIT-III

Cardiovascular System- Myocardial Infarction, Atherosclerosis, Pericardial Heart Disease, Ischemic Heart Disease, response of Vascular Walls to injury, Venous Diseases. **Respiratory system-** Restrictive lung disease, pulmonary infection, pleural disorders-pneumothorax, pleural effusion, carcinomas,

Digestive System- Disease of Oesophagus – Congenital, Muscular, Inflammatory and Tumors, Salivary tumors, Stomach - Peptic Ulcer, Gastritis, Neoplasm of Stomach, Intestine – Inflammatory - Ulcerative Colitis, Crohn's Disease, Infective – Enterocolitis, Colorectal cancer, Acute and Chronic Hepatitis, Cirrhosis of Liver, Hydronephrosis, Renal cell carcinoma– Carcinoma of the Breast, Vaginitis, Endometrial Hyperplasia, Ovarian Tumors. Testicular Tumors,

Unit VI:

Nervous system- Meningitis, Encephalitis, Cerebrovascular disease, Demyelinating Disease, Alzheimer's disease, Muscular Dystrophy, Disorder of Neuromuscular Junction, **Skeletal System-** Pyogenic Osteomyelitis, Tubercular Osteomyelitis, Tumors, Osteoporosis, Rickets, Osteoarthritis, Musculoskeletal system

SYSTEMIC AND CLINICAL PATHOLOGY

-PRACTICAL

PAPER CODE-

B. Sc. Semester II (Operation Theatre Technology)

L T P Credits
- - 2

Examination: 30 Marks
Int. Assessment: 20 Marks
Total: 50 Marks

1. BT & CT determination
2. ABO/Rh blood grouping by slide methods- Forward & reverse grouping
3. Urine examination – complete (Physical & chemical examination for glucose, proteins, bile salts & ketone bodies).
4. Semen analysis – Physical, Chemical & Neubauer's chamber counting.

FUNDAMENTALS OF COMPUTER SCIENCE

PAPER CODE-05270211

PAPER CODE-

B. Sc. Semester II (Operation Theatre Technology)

L T P Credits
3 1 - 4

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks
Duration of Examination: 3 Hours

UNIT-I

Introduction:

What are computers, Application areas, Characteristics & limitations, Evolution of computers, Classification & generations of computers, Data representation in computer memory (numbering system)

Computers Architecture /Organization:

Basic architecture, Functional Block diagram, Types of computers on the basis of purpose, Signal and Portability.

UNIT-II

Hardware:

CPU their generations and performance parameters, Input, output and storage devices. Primary (Main) Memories (RAM, ROM, Types of RAM and ROM, Cache Memory, Registers and types of registers, Storage Evaluation Criteria, Memory Capacity), Secondary Storage Devices: (Magnetic Disk, Floppy and Hard Disk, USBs, Optical Disks CD-ROMs)

Software:

Types: System Software (Machine Level Languages, Operating Systems, Device Specific Drivers), Higher Level Languages, and Applications

UNIT-III

Languages: Machine Language, Assembly Languages, Programming Languages. Use of Compilers, Assemblers, Linkers, Loaders and interpreters in programming languages

Operating System: Booting/Start Up Procedure of machines, Introduction to Operating System, Functions and Classification of Operating Systems, Basic introduction to DOS, UNIX/LINUX OS, Windows

HTML, Use of Multimedia, Computer aided teaching and testing
Application Software MS office (Word, Excel and Powerpoint)

UNIT-IV**Basic Introduction to Computer Networks:**

Data Communication, Network devices (Hub, Switches, Modems, and Routers etc), LAN, LAN topologies, WAN, MAN, Internet: Introduction, Basics of E-mail, Web browsers (IE, Google Chrome, and Mozilla Firefox),
Structure of Universal Resource Locator, Domains (.com, .in, .country specific, .org and rationale behind them), IP address, Backbone network, Network connecting devices, HTTP, DNS, Network Security and Search Engine.

INTRODUCTION TO OT TECHNOLOGY

PAPER CODE-

B. Sc. Semester III (Operation Theatre Technology)

L T P Credits
3 1 - 4

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks
Duration of Examination: 3 Hours

UNIT-I

OT Techniques

- Zoning of OT,
- OT disinfection & sterilization : Cleaning, carbolisation, fumigation, fogging
- Theatre clothes, PPE, Lead aprons, goggles
- Scrubbing, gowning, gloving
- Handling of sterilized articles in OT
- OT table, OT lights, image intensifier: Handling and maintenance

UNIT-II

Medical Gas

- Compressed gas cylinders: Types, sizes, parts
- Colour coding different gas cylinder and pipe line system
- Cylinder storage and handling :Things to remember
- Medical gas pipe line system and outlets.

- Diameter index safety system (DISS), and PISS
- Safety devices in pipe line and cylinders
- Air compressor
- Oxygen concentrator :working principal their uses and care

UNIT-III

Gas administration devices

- Anaesthesia masks and Oxygen masks
- Pressure Regulators , pressure gauges
- Flow meters, Flow restrictors

UNIT-IV

Oxygen Therapy

- Hypoxia and hypoxemia.
- Clinical signs of hypoxemia.
- Goals of oxygen therapy.
- Oxygen therapy devices, Types of oxygen masks
- Evaluation of patients receiving oxygen therapy
- Hazards of oxygen therapy

UNIT-V

Injection Techniques

- Routes of drug administration
- Intra muscular and Intra Venous techniques
- Handling of sterilized syringes and needles.
- Preparation , dilutions and labeling of drugs
- Disposal of sharps, used syringes, needles

UNIT-VI

Fluids and Electrolytes

- Type of fluid (Crystalloids & Colloids)
- Steps to prepare I.V. drip
- Indication of specific fluid and their complications

-Basics of periop fluid requirements

UNIT-VII

Blood Transfusion

- Various types of blood groups and blood products

-Pre transfusion Checks, cross matching

-Transfusion reactions

INTRODUCTION TO OT TECHNOLOGY

-PRACTICAL

PAPER CODE-

B. Sc. Semester II (Operation Theatre Technology)

L T P Credits
- - 2

Examination: 30 Marks
Int. Assessment: 20 Marks
Total: 50 Marks

- 1. Various Techniques of Injection –Advantages and Disadvantages**
2. Crystalloids and colloids
3. Medical Gas delivery Devices, DISS,PISS, Oxygen concentrator
4. Techniques of insertion of peripheral IV line
5. Blood products, Pretransfusion checks, transfusion reactions

BASIC ANAESTHESIA TECHNOLOGY

PAPER CODE-

B. Sc. Semester III (Operation Theatre Technology)

L T P Credits
3 1 - 4

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks
Duration of Examination: 3 Hours

UNIT-I

Anaesthesia Machine

- Basic Boyles Machine and its functions.
 - Modern anesthesia machine: Parts and safety features
 - Hanger and Yoke system, Pin index
 - Pressure regulator , Pressure gauge
 - Flowmeters, Vaporisers, scavenging system
- Ether bottle, Flow meter assembly,
Vaporizers-Types, Hazards, maintenance, Filling and Draining

UNIT-II

Breathing System

- Classification of breathing system
- Open, Semi closed and Closed Circuits,
- Mapleson breathing systems
- Jackson and Rees system-Bain's circuit
- Closed circuit: Components, advantages, disadvantages

UNIT-III

Anesthesia Equipment Maintenance

- Method of cleaning and disinfection of anesthetic equipments.
- Handling and maintenance of various equipments used in OT
- Setting of alarm limits in monitors and ventilators
- Electrical faults, earthing,

UNIT-IV

Monitors and Gas Analyzers

- Pulse oxymeter / Plethysmograph
 - EtCO₂ Monitor / Capnograph
- NIBP, IBP, Temperature, ECG
- FiO₂
 - Transcutaneous oxygen monitor
- inhalational agents analyser, BIS, Nerve stimulator

UNIT-V

Resuscitation Techniques in OT

- Basic Life Support (Circulation, Airway, Breathing)
- Drugs used in CPR, Defibrillator, AED
- Components of emergency tray / trolley
- Anaphylactic reaction

UNIT-VI

Artificial Airways

- Parts of airway (nasal/oral) : Types, Sizes, insertion techniques, indications for use
- Face mask- Types, sizes and its uses.
- Supraglottic Airway devices : LMAs – Types, sizes, method of insertion
- Endotracheal tubes: Types, sizes, parts
- Double lumen tubes, Bronchial blockers, Laryngeal tubes,

UNIT-VII

Minimum Standards of Anaesthesia

- Pre-anaesthesia check list
- Drugs and equipments to be kept ready before anaesthesia
- Pre operative preparation of patient, Drugs and doses for Premedication
- Management of pre operative room and PACU
- Transportation Techniques of patient in conscious, semi conscious and unconscious patient to and from operation theatre

BASIC ANAESTHESIA TECHNOLOGY

-PRACTICAL

PAPER CODE-

B. Sc. Semester III (Operation Theatre Technology)

L T P Credits
- - 2

Examination: 30 Marks
Int. Assessment: 20 Marks
Total: 50 Marks

- 1. Functioning of Anaesthesia Machine, Safety Mechanism**
- 2. Pressor gauge and Pressor Regulator , vapourisers**

3. Semi – Closed , closed circuits
4. Cleaning and Maintenance of Anaesthesia Equipments
5. Capnography, Plathysmography , Gas Analysers
6. Maintenance of Airway, CPR Technique, Defibrillation, AMBU Bag
7. Oropharyngeal and nasopharyngeal airways, face masks-types and sizes
8. Pre anaesthesia checklist

MEDICINE RELEVANT TO OPERATION THEATRE- Part A

PAPER CODE-

B. Sc. Semester III (Operation Theatre Technology)

L T P Credits
3 - 3

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks
Duration of Examination: 3 Hours

UNIT-I

Diabetes Mellitus (DM)

- Signs and symptoms *Diabetes Mellitus*
- Diabetic complications,
- Drugs used in diabetes mellitus
- Anaesthetic implications of DM
 - Causes of DM- Type- 1, Type -2
- Gestational diabetes,
- Prevention
- Management -Lifestyle, Medications

UNIT-II

Hypertension

- Signs and symptoms
- Management

- Causes
- Pathophysiology
- Diagnosis
- Prevention

UNIT-III

Ischemic heart disease

- - *Signs and symptoms* IHD
- -Diagnosis,Management
- -Anaesthetic implications
- -Risk factors
- -Pathophysiology
- -Prevention

UNIT-IV

Obesity

- -Diseases associated with obesity
- -Anaesthetic problems in obese patients
- -Ideal body weight, adjusted body weight in obese
- of obesity
- -Effects on health
- -Causes
- -Management

UNIT-V

Elderly patient

-Differences between adult and geriatric medicine

-Aging-associated diseases

-Dose adjustments in elderly patients

-Pharmacology

-Practical concerns

UNIT-VI

Pregnancy shock

-Managements of various types of shocks during pregnancy

- Types and Causes of pregnancy shocks
- Clinical Picture of various Shocks

UNIT-VII

COPD

- -Signs and symptoms of COPD
- -Cause of COPD
- -Management
- -Pathophysiology
- -Diagnosis, Lungs function tests in COPD
- Prevention

MEDICAL ETHICS

PAPER CODE-

B. Sc. Semester III (Operation Theatre Technology)

L T P Credits
3 1 - 4

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks
Duration of Examination: 3 Hours

UNIT-I

Medical Ethics

- Definition, goal, scope
- Ethical behavior and conduct

UNIT-II

Code of Conduct

- Introduction to Code of Conduct
- Goal

UNIT-III

Basic Principles

- Basic Principles

-Confidentiality

UNIT-IV

Malpractice and Negligence

-Malpractice and negligence of patient / treatment

-Rational and irrational drug therapy

UNIT-V

Autonomy and Informed Consent

-Introduction to consent

-Types of Consents

-Autonomy and Informed Consent

-Rights of Patients

UNIT-VI

Care of Terminally ill

--Care of terminally ill patients

-Euthanasia and its norms in India

-Organ transplantation- Will and Norms

UNIT-VII

Medicolegal aspects of Medical Records

-Medicolegal case and types

-Release of medical information

-Unauthorised disclosures

-Retention of medical records

-Records and documents related to MLC

-Ownership of medical records

-Medicolegal aspects and relation to Consumer Protection Act

ENVIRONMENTAL SCIENCE

PAPER CODE-

B. Sc. Semester III (Operation Theatre Technology)

L T P Credits
3 1 - 4

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks
Duration of Examination: 3 Hours

Unit 1:

The Multidisciplinary nature of environmental studies

- Definition, scope and importance.
- Need for public awareness.

Natural Resources

Renewable and non-renewable resources: Natural resources and associated problems.

- Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
- Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.
- Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies.
- Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

Unit 2:

Ecosystems

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.

Biodiversity and its conservation

- Hot-spots of biodiversity.
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts
- Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

Unit 3:

Environmental Pollution

Definition, causes, effects and control measures of:-

- a. Air pollution
 - b. Water pollution
 - c. Soil pollution
 - d. Marine pollution
 - e. Noise pollution
 - f. Thermal pollution
 - g. Nuclear hazards
- Solid waste Management : Causes, effects and control measures of urban and industrial wastes.
 - Fireworks, their impacts and hazards

- Pollution case studies.
- Disaster management : floods, earthquake, cyclone and landslides.

Unit 4 :

Social Issues and the Environment

- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- Environmental ethics: Issues and possible solutions.
- Consumerism and waste products.
- Environmental Legislation (Acts and Laws)
- Issues involved in enforcement of environmental legislation

Human Population and the Environment

- Population growth, variation among nations with case studies
- Population explosion – Family Welfare Programmes and Family Planning Programmes
- Human Rights.
- Value Education.
- Women and Child Welfare.

SURGICAL EQUIPMENTS AND MACHINERY
PAPER CODE-

B. Sc. Semester IV (Operation Theatre Technology)

L T P Credits
3 1 - 4

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks
Duration of Examination: 3 Hours

UNIT-I

Introduction of surgery

- Basic principal of surgery.
- Asepsis

UNIT-II

Wound Management

- Different types of bandages and their applications
- Surgical Needle & Needle holders.
- Types of suture material.

-Techniques of stitching and removal of stitches

UNIT-III

Surgical Instruments

- Instruments used for cleaning and draping for a surgical procedure.

-Classification of General surgical instruments.

-Urological surgery Instruments

-Orthopedic surgery instruments

-Obstetrics and Gynecological surgery instruments

-Reconstructive surgery instruments

Laparoscopic instruments used for Cholecystectomy and Laparoscopic gynecology procedures

UNIT-IV

Applied Surgery

- Intra-operative & postoperative problems and complications of general surgery.

-Management of emergency caesarean section.

-Care and maintenance of Para surgical equipment (Cautery, OT lights, OT Table)

-Esmarch bandage, simple tourniquet, pneumatic tourniquet uses, care and maintenance

-Major abdominal incision.

-Positioning of patient for different operation.

-Laparoscopic gynecology procedures.

-Surgical Consideration in TURP and PCNL

-Surgical management in major burns.

-Surgical management of Fracture, Joint replacement and arthroscopy.

-Surgical management of endoscopies, laryngectomy and cochlear implant.

-Management of PPV and perforating eye injury.

UNIT-V

Suction Apparatus

Foot operated, electrically operated suction apparatus, its General Principal, uses and care

-Central pipeline suction, colour coding

-Suction catheters – sizes, colour coding

-Yaunkauer suction

UNIT-VI

Surgical Diathermy Machine

- Types of electrocautery, leads
- Uses, precautions, handling

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SURGICAL EQUIPMENTS AND MACHINERY

-PRACTICAL

PAPER CODE-

B. Sc. Semester IV (Operation Theatre Technology)

L T P Credits
- - 2

Examination: 30 Marks
Int. Assessment: 20 Marks
Total: 50 Marks

-
- Identification and Demonstration of working of the instruments,
 - Cleaning and disinfection of articles,
 - Packing articles for sterilization,
 - Tourniquet Types , Esmarch bandage.
 - Care Sterilization & Lubrication of Orthopedic and other instruments.
 - Setting up trolley for various surgeries
 - Demonstration of Image Intensifier machine.
 - Cautery machine- Types setting & uses.
 - Positioning of orthopedic patient and other surgeries.
Advanced O.T. Table & Their attachment as well as their maintenance

Advanced Anaesthesia Technology

PAPER CODE-

B. Sc. Semester IV (Operation Theatre Technology)

L T P Credits
3 1 - 4

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks
Duration of Examination: 3 Hours

UNIT-I

Anaesthesia

- Types of Anaesthesia
- General anaesthesia/sedation techniques /MAC
- Regional anaesthesia techniques, Topical anaesthesia, Bier's block
- TIVA: Definition, Drugs used
- Balanced anaesthesia, Anaesthesia triad
- History of anaesthesia, Evolution of modern anaesthesia.
- Dye allergies,
- Monitoring, Equipment options in the MRI

UNIT-II

Anaesthesia : Airway Gadgets

- Different type of laryngoscope and blades
- Description of plain and cuffed endotracheal tubes (ETT)
- Preparation & technique for ETT intubation
- Complications of endotracheal intubation
- Other type of Endotracheal tubes, armored tubes, Ring, Adair and Elwyn tubes (RAE), Microlaryngeal tubes,
- LMA, Other supraglottic airway devices (SAD), Ambu bag,
- Contents of Intubation tray / trolley
- Tracheotomy tubes: Indications, Procedure
- Protocol for tracheotomy decannulation:
- Double lumen ETT, Bronchial blockers

UNIT-III

Anaesthesia Monitoring

- Clinical Monitoring, Peripheral pulse locations
- Multi parameter monitor: Normal values
- Arterial blood pressure - NIBP, IBP, Manual BP monitoring,
- Electrocardiogram monitoring : significance
- SpO2, EtCO2, Temperature, FiO2
- Monitoring of Anaesthesia ventilator: Paw, MV, RR, Alarms
- Neuromuscular monitoring , BIS

UNIT-IV

Anaesthetic Drugs

- Different route of drug administration.
- Drugs used during General anaesthesia and Regional anaesthesia,
- Intravenous anaesthetic agents: Uses and complications.
- Inhalational anaesthetics: Uses and complications
- Neuromuscular blockers and Reversal agents
- Analgesics : Types and complications
- Pre- medication: indication, Types of drugs used for premedication, Doses and side effects.
- Infusion pumps
- Vasopressors, Antiarrhythmic, Hypotensive drugs
- Anticoagulant drugs.

UNIT-V

Artificial Ventilation and Related Equipments

- Operation room Ventilators : Types, Settings , modes
- Complication in patients on Ventilators
- General care of patient on Ventilator, Ventilator alarms
- Disinfection and sterilization of ventilators
- NIV, HFJV

UNIT-VI

Cardiology and

Mental Sickness

- Various ECG leads, their placement

- Normal ECG.
- Circulatory shock and its management.
- Drug interactions with antidepressant drugs
- Electroconvulsive therapy (ECT), drug effects on seizure duration
- Hemodynamic responses and appropriate treatment
- Cardiac stents, Angiography, PCI

Advanced Anaesthesia Technology

**-PRACTICAL
PAPER CODE-**

B. Sc. Semester II (Operation Theatre Technology)

L	T	P	Credits	Examination:	30 Marks
-	-	2		Int. Assessment:	20 Marks
				Total:	50 Marks

1. Types of Laryngoscopes, ETT, LMAs
2. Multiparameter monitor, Clinical Monitoring, Nerve stimulator
3. Drugs used in GA, LA, premedication
4. Emergency drugs, Infusion pumps
5. OT and ICU ventilators , Care of Patients on ventilator
6. ECG leads placement, significance of ECG

CSSD PROCEDURES, CLEANING AND STERILIZATION

PAPER CODE-

B. Sc. Semester IV (Operation Theatre Technology)

L	T	P	Credits	Examination:	60 Marks
3	1	-	4	Int. Assessment:	40 Marks
				Total:	100 Marks
				Duration of Examination:	3 Hours

UNIT-I

CSSD Techniques

- Layout, aim, functioning of CSSD
- Cleaning, Carbolization and Maintenance in CSSD.
- Handling sterilized articles in CSSD.
- Quality assurance , Indicators of sterilization control

UNIT-II

Cleaning and care of instruments

- Methods of instruments cleaning, cleaning agents, detergents, mechanical washing, ultrasonic cleaner.
- Lubrication and inspection of instruments.
- Care of micro surgical and titanium instruments

UNIT-III

Sterilization and disinfection of Instruments

Principal of sterilization and disinfection

- Different methods of sterilization and disinfection
- Critical, semicritical, noncritical medical devices
- Recent advances in the methods of sterilization
- Sterilization of various type ET Tube, Laryngoscope and other anaesthesia equipments.

UNIT-IV

Autoclave Machine

- Types of Autoclave Machine
- Autoclave able instruments/Equipments
- Steps of sterilization by autoclave machine
- Required temperature and pressure for different materials
- Methods of check for efficiency of sterilization
- Precaution to be taken during sterilization
- Flash sterilisation

UNIT-V

Ethylene Oxide (ETO) Sterilisation & Plasma sterilisation

- Availability of ETO Machine according volume
 - Autoclave able instruments/Equipments
 - Preparation of equipments/instruments sealed packets, stamping etc.
 - Loading and working of ETO Machine
 - Methods of check for efficiency of sterilization
- Aseptic storage
 - Plasma sterilisation
 - Preparation of instruments for plasma sterilization
 - Loading and working of Plasma Machine

-Methods of check for efficiency of sterilization

UNIT-VI

Disinfection & Sterilisation of OT

-Cleaning and disinfection of OT, -Phenol (Carbolic acid 2%)

-Formaldehyde Fumigation of OT

-UV radiation

-Bacillocid, Virkon, Fogging method

-Microbiological monitoring: swab for culture, Air quality- Agar plate, Colony count, Documentation, Periodicity

UNIT-VII

Waste Disposable

-Recent amendment in EPA(Environmental Protection Agency) with reference to waste disposable.

CSSD PROCEDURES, CLEANING AND STERILIZATION

**-PRACTICAL
PAPER CODE-**

B. Sc. Semester IV (Operation Theatre Technology)

L T P Credits
- - 2

Examination: 30 Marks
Int. Assessment: 20 Marks
Total: 50 Marks

Organisation of CSSD

Cleaning, disinfection, decontamination, sterilization techniques

Antiseptics and Disinfectants

Functioning of Autoclave, stages of autoclaving

Critical, semicritical, noncritical devices & methods of Disinfection / sterilisation

Cleaning & sterilization of OT

MEDICINE RELEVANT TO OPERATION THEATR Part B

PAPER CODE-

B. Sc. Semester IV (Operation Theatre Technology)

L T P Credits
3 - 3

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks
Duration of Examination: 3 Hours

UNIT-I

Anaemia

- Signs and symptoms
- Anaesthetic implications
- Causes
- Diagnosis
- Treatments
- Epidemiology

UNIT-II

Chronic renal failure

- Signs and symptoms
- Causes
- Diagnosis
- Treatment
- Adjustment of drugs and doses

UNIT-III

Chronic liver disease/failure

- Causes of chronic liver disease
- Physical signs, Recognition, Treatment
- Risk factors for various liver diseases
- Adjustment of drugs and doses

UNIT-IV

Paediatric patient infant/neonate

- Physical characteristics of newborn
- Internal physiological changes at birth
- Neonatal Nursing :
- Care and feeding of newborn

-Potential diseases of neonatal period

UNIT-V

Epilepsy

-Signs and symptoms

-Management

-Causes

-Pathophysiology

-Diagnosis

-Prevention

UNIT-VI

CVA

-Types of stroke

-Causes

-Pathophysiology

-Evaluation

-Treatment

CARE AND MANAGEMNT OF SURGICAL INATRUMENTS AND EQUIPMENTS IN OPERATION THEATRE

B.Sc. OPERATION THEATRE TECHNOLOGY (4TH SEM)

L T P Credits

Examination: 60 Marks

3 1 4

Int. Assessment: 40

Total Marks: 100

UNIT – I

Surgical Instruments:-

- Introduction
- Uses of surgical instruments
- Types of general surgical instruments
- Instrument Requirement for Common Surgical Procedures

Maintenance of Instruments.

- Handling of instruments
- Cleaning of instruments

- -Maintenance of instruments

Cleaning of instruments

- Different types of cleaning machine such as
 - Hot air oven
 - Autoclave
- Different method of sterilization
 - Physical method
 - Chemical method

Storage of equipment

- Packaging and storage of different instruments

UNIT -II

OT equipments

- **Different types of OT equipment such as**
 - Defibrilators
 - Oxygen concentrators
 - Sterilizer machine
 - Anaesthesia Machine
 - Operation table and lights
 - Uses of OT equipments

Maintenance of equipment's.

- Cleaning of equipment
- Checking proper functioning of equipment's
- Alarming system in equipment and anaesthesia machine

CARE AND MANAGEMNT OF SURGICAL INATRUMENTS AND EQUIPMENTS IN OPERATION THEATRE (PRACTICAL)

- 1. General surgical instruments and used**
- 2. Diathermy machine**
- 3. Defibrillator**
- 4. Sterilization methods**
- 5. Autoclave machine**
- 6. Maintenance of equipment's.**
- 7. Methods of cleaning instrument**

Operation Theatre Technology - Clinical

PAPER CODE-

B. Sc. Semester V (Operation Theatre Technology)

L T P Credits
3 1 - 4

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks
Duration of Examination: 3 Hours

UNIT-I

OPERATION THEATRE

Lay out, Physical Facility, Peripheral support area,

- Introduction to Operating Room,
- Physical facilities available in OT,
- Layout of operation theatre, Zoning
- Maintenance of Temperature, humidity. Laminar air flow, Air circulation
- Peripheral support areas
- OT hazards : Potential source of injury to the care giver and patients
- Special procedure rooms,

UNIT-II

Surgical equipments

- Classification of different surgical equipments,
- Surgical instrumentation fabrication,
- Uses and maintenance of Powered surgical instruments,
- Things to remember while handling instruments.
- Preparation of surgical trolley

UNIT-III

Specialized surgical equipment

- Uses, care and maintenance of specialized surgical equipments like electric cautery, laparoscopes, Laser microsurgery equipments
- Endoscopes

-Handling of delicate instruments

UNIT-IV

Suture Material and Needles

-Types

-Uses

- Disinfection

- Storage

UNIT-V

Preparation and Assisting for Various Surgical Procedures; as Circulating and Scrub Technician

- Role of OT technician during surgery

-Setting up of operation room and table

- Setting up of trays and trolleys for various surgical procedures

- Part preparation for surgical procedures

- Positioning and draping according the surgical procedures

- Incisions for various surgical procedures

- Requirement of suturing materials for different surgeries.

Operation Theatre Technology - Clinical

**-PRACTICAL
PAPER CODE-**

B. Sc. Semester V (Operation Theatre Technology)

L T P Credits
- - 2

Examination: 30 Marks
Int. Assessment: 20 Marks
Total: 50 Marks

-
- 1. Layout of OT , OT lights, laminar airflow**
 - 2. Maintenance of Temperature, humidity and sterility**
 - 3. Classification of surgical instruments**
 - 4. Preparation of surgical trolley**
 - 5. Handling and maintenance of Endoscope, laparoscope, microsurgical instruments**
 - 6. Positioning , Part preparation, draping**
 - 7. Various types of suture material, needles and uses.**

Regional Anaesthesia Techniques

PAPER CODE-

B. Sc. Semester V (Operation Theatre Technology)

L T P Credits
3 1 - 4

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks
Duration of Examination: 3 Hours

UNIT-I

Role of Regional anaesthesia (RA) in Modern Anaesthesia and Pain management

- Anatomic considerations: CNS , PNS
- Techniques for nerve location-Nerve mapper cum locator
- Types of Regional anaesthesia techniques: CNB, Peripheral, Topical, IVRA
- Chronic pain management
- Ultrasound guided nerve blocks
- Paravertebral block, intercostals block, TAP block

UNIT-II

Spinal & epidural Anaesthesia

- Central Neurxial Blocks (CNB)
 - Positioning, preparation, monitoring, Needle types
- Spinal Anaesthesia (SA): Technique, setting of trolley
- Epidural Anaesthesia (EA): Technique, epidural catheters
- Local anaesthetics used : Concentrations /volume
- Differences between SA and EA
- Complications of SA / EA and management

UNIT-III

Upper limb blocks

- Supraclavicular block: indications, preparation, complications
- Wrist Block: Indications, preparation, complications
- Interscalene block
- Axillary block
- Catheter technique for prolonged analgesia

UNIT-IV

Lower limb blocks

- Femoral Nerve Block : Indications, preparation, complications
- Lateral Femoral cutaneous nerve block: Indications
- Ankle block: indications, preparation, complications
- Sciatic nerve block
- Popliteal block

UNIT-V

Drugs used in regional blocks

- Local anaesthetics (LA) - Types
- Xylocaine, bupivacaine, ropivacaine
- Concentrations and volume used for different techniques
- Preparation of different concentrations of LA
- Adjuvants used in regional anaesthesia-clonidine, dexmedetomidine, dexamethasone, soda bicarbonate, Fentanyl, Adrenaline

Complications of Local anaesthetics

Regional Anaesthesia Techniques

**-PRACTICAL
PAPER CODE-**

B. Sc. Semester V (Operation Theatre Technology)

L	T	P	Credits	Examination:	30 Marks
-	-	2		Int. Assessment:	20 Marks
				Total:	50 Marks

UNIT-I

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- Types of Regional anaesthesia techniques: CNB, Peripheral, Topical, IVRA
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- Ultrasound guided nerve blocks
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UNIT-II

Spinal & epidural Anaesthesia

- Central Neurxial Blocks (CNB)

- Positioning, preparation, monitoring, Needle types
- Spinal Anaesthesia (SA): Technique, setting of trolley
- Epidural Anaesthesia (EA): Technique, epidural catheters
- Local anaesthetics used : Concentrations /volume
- Differences between SA and EA
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UNIT-III

Upper limb blocks

- Supraclavicular block: indications, preparation, complications
- Wrist Block: Indications, preparation, complications
- Interscalene block
- Axillary block
- Catheter technique for prolonged analgesia

UNIT-IV

Lower limb blocks

- Femoral Nerve Block : Indications, preparation, complications
- Lateral Femoral cutaneous nerve block: Indications
- Ankle block: indications, preparation, complications
- Sciatic nerve block
- Popliteal block

UNIT-V

Drugs used in regional blocks

- Local anaesthetics (LA) - Types
- Xylocaine, bupivacaine, ropivacaine
- Concentrations and volume used for different techniques
- Preparation of different concentrations of LA
- Adjuvants used in regional anaesthesia-clonidine, dexmedetomidine, dexamethasone, soda bicarbonate, Fentanyl, Adrenaline
- Complications of Local anaesthetics

Regional Anaesthesia Techniques

**-PRACTICAL
PAPER CODE-**

B. Sc. Semester V (Operation Theatre Technology)

L	T	P	Credits	Examination:	30 Marks
-	-	2		Int. Assessment:	20 Marks
				Total:	50 Marks

- 1. Types of RA techniques**
- 2. CNB, difference between SA and EA**
- 3. Drugs used in LA- uses and complications**
- 4. Adjuvants used during LA techniques**
- 5. Nerve mapper cum locator**

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OPERATION THEATRE TECHNOLOGY-APPLIED

PAPER CODE

B. Sc. Semester V (Operation Theatre Technology)

L	T	P	Credits	Examination:	60 Marks
3	1	-	4	Int. Assessment:	40 Marks
				Total:	100 Marks
				Duration of Examination:	3 Hours

UNIT-I

Pre Operative preparation

- Pre operative preparation of the patient, check list
- Premedication : Drugs / doses, NPO protocol,
- Consent / Informed Consent, -ASA grading

UNIT-II

Monitoring : Applied aspects

- Patient record keeping : Pre operatively, during anesthesia and post anesthesia.
- Principal and techniques of temperature monitoring.
- Patient warming devices
- CVS monitoring :NIBP, IBP ,Plethysmography
- Three leads, 5 leads ECG : Electrode placement, colour coding
- Respiratory monitors, Anaesthesia ventilator and monitoring
 - Multiparameter monitor: Setting of alarm limits
- Proper care and preventive maintenance of equipments

UNIT-III

General Anaesthesia: Applied aspects

- Rapid sequence intubation, Cricoid pressure
- BURP maneuver, adjuvants used during difficult intubation
- Premedication, induction, intubation, maintenance, reversal, emergence, recovery
 - Setting of anaesthesia trolley / tray, cockpit drill
- Preparations and techniques for emergency anaesthesia
- Low flow anaesthesia/ circle system/ closed circuit
- Stages of anaesthesia
- Indication of general anaesthesia
- Nasogastric tube insertion technique in awake and unconscious patient

UNIT-IV

Complication of GA

- Complication of General Anesthesia
- Anaphylactic reaction, Hypothermia prevention
- Adverse drug reactions, malignant hyperthermia
- Aspiration pneumonitis : Prevention
- Resuscitation tray
- Drugs used during resuscitation

UNIT-V

Special Diagnostic Procedures

- Sedation and monitoring during diagnostic procedures
- Radio opaque dyes and uses, contrast studies
- Endoscopy
- Angiography
- Introduction to MRI : MRI compatible machine, monitor
- Biopsy specimens
- Nuclear medicine studies,
- Ultrasonography,

OPERATION THEATRE TECHNOLOGY-APPLIED

**-PRACTICAL
PAPER CODE-**

B. Sc. Semester V (Operation Theatre Technology)

L	T	P	Credits	Examination:	30 Marks
-	-	2		Int. Assessment:	20 Marks
				Total:	50 Marks

PAC , drugs used in premedication , NPO protocol, ASA grading
 Role of technician in Pre operative room
 IV and inhalation anaesthetic agents
 Balanced anaesthesia, Triad of Anaesthesia
 Preoperative checklist of Anaesthesia and drugs
 Anaesthesia ventilator: Settings, alarm system

RESEARCH METHODOLOGY& BIO STATISTICS

PAPER CODE

B. Sc. Semester V (Operation Theatre Technology)

L	T	P	Credits	Examination:	60 Marks
3	1	-	4	Int. Assessment:	40 Marks
				Total:	100 Marks
				Duration of Examination:	3 Hours

UNIT-I

Introduction of statistics

- Definition and characteristics of statistics,
- Importance of the study of statistics,
- Branches of Statistics,

- Parameters and estimates,
- Descriptive and inferential statistics,
- Variables and their types
- Measurement scales

UNIT-II

Tabulation of Data

Raw Data, the array, frequency distribution,

- Basic principles of graphical representation,
- Types of diagrams – histograms, frequency polygons, smooth frequency polygon, cumulative frequency curve, normal probability curve

UNIT-III

Measures of Central Tendency

- Introduction: Uses, applications and practical approach
- Definition and calculation of mean for ungrouped and grouped data
- Meaning and calculation of mode
- Comparison of mean and mode
- Guidelines for the use of various measures of central tendency

UNIT-IV

Measures of Variability

- Uses, applications and practical approach
- The range, average deviation or mean deviation
- The variance and standard variation
- Calculation of Variance and standard variation for ungrouped and grouped data
- Properties and uses of variance and standard deviation

UNIT-V

Probability and standard Distribution

- Meaning of probability of standard distribution,
- The binominal distribution,
- The normal distribution,
- Divergence from normality – skewness, Kurtosis

UNIT-VI

Sampling Techniques

- Uses, applications and practical approach
- Criteria for good samples
- Application of Sampling in Community
- Sampling Methods,
- Sampling and Non- Sampling errors
- Sampling variation and tests of significance.

UNIT-VII

Health Indicator

- Importance of health indicator
- Indicators of population, morbidity, health services
- Calculation of rates and ration of health

Operation Theatre Technology - Advanced PAPER CODE

B. Sc. Semester VI (Operation Theatre Technology)

L T P Credits
3 1 - 4

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks
Duration of Examination: 3 Hours

UNIT-I

Management of a patient in crisis

- Management of poisoning, COPD, snakebite.
- Gastric lavage, insertion of nasogastric tube
- Ventilation of patient in crisis
 - Mouth to mouth, Mouth to mask, Ambu bag
 - Short term ventilation/Transport ventilator
- Monitoring during transport
- Management of Hypotension, hypoxia, cyanosis, burns

UNIT-II

Neuro surgery

- Introduction to different neurology surgery and position required for them
- Preparation of patient and trolley
- Introduction to neurology special instruments
- Emergency neurology surgery, required instruments

UNIT-III

Gynecological/Obstetric Surgeries

- Introduction to different Gynecological diagnosis and surgeries
- Instrument required for different Gynecological surgeries
- Preparation and Positions for different Gynecological surgeries
- Introduction to different Obstetric diagnosis and surgeries
- Instrument required for different Obstetric surgeries
- Preparation and Positions for different Obstetric surgeries
- Preparation of trolley for emergency LSCS
- Laparoscopic Gynaecological surgery

UNIT-IV

Urology Surgery, Orthopedic Surgery,

Ophthalmic Surgery

- Urology related diagnosis and surgeries
 - Preparation and Positions for different Urology surgeries
 - Introduction to different Orthopedic, diagnosis and surgeries
 - Instrument required for different Orthopedic surgeries
 - Preparation and Positions for different Orthopedic surgeries
 - Management of different fractures
 - Esmarch bandage, tourniquet system, Arthroscopy
 - Instrument required for different Urology surgeries
- Introduction to image
- Introduction to different ophthalmic surgeries, Perforating eye injuries
 - Introduction to different ophthalmic instruments, their handling, cleaning and sterilization.
 - ESWL, PCNL, TURP

UNIT-V

Plastic and reconstructive surgery

- Introduction to Plastic and reconstructive surgeries
- Preparation and Positions for different Plastic and reconstructive surgeries
- Instrument required for different Plastic and reconstructive surgeries

UNIT-VI

Otorhinolaryngologic surgery

- Introduction to Otorhinolaryngologic surgeries
- Preparation and Positions for different ENT surgeries
- Instrument required for different Otorhinolaryngologic surgeries
- Cochlear implant, endoscopy

UNIT-VII

Thoracic, Cardiac and Vascular Surgery

- Introduction to Thoracic, Cardiac and Vascular surgeries
- Instrument required for different Thoracic, Cardiac and Vascular Surgery surgeries
- Preparation and Positions for different Thoracic, Cardiac and Vascular Surgery surgeries
- Types of perfusion machine
- Cell saver techniques
- Introduction of Cardiopulmonary Bypass Surgery
- CABG

Operation Theatre Technology - Advanced

**-PRACTICAL
PAPER CODE-**

B. Sc. Semester VI(Operation Theatre Technology)

L	T	P	Credits	Examination:	30 Marks
-	-	2		Int. Assessment:	20 Marks
				Total:	50 Marks

-
1. Shock, hypoxia , cardiac arrest – S/S, and Management
 2. Anaphylactic shock, snake bite, poisoning
 3. Preparation , positioning for Gyne /obst surgeries
 4. Different neurological surgeries – positioning and preparation

5. Different orthopaedic, urology, ENT, Ophthalmic surgeries
 6. Plastic and reconstructive, thoracic, cardiac surgeries
- Functioning of image intensifier machine, OT table, OT lights, cautery

Post Anaesthesia Care Unit

PAPER CODE

B. Sc. Semester VI (Operation Theatre Technology)

L	T	P	Credits
3	1	-	4

Examination: 60 Marks

Int. Assessment: 40 Marks

Total: 100 Marks

Duration of Examination: 3 Hours

UNIT-I

Setting up of PACU

- Definition of PACU
- Set up
- Staff/patient ratio
- Monitoring in PACU

UNIT-II

Discharge criteria

- Criteria for Shifting patient out of PACU
- Aldrete score / Modified Aldrete score
- Discharge criteria

UNIT-III

Common complications & its management in PACU

Post Operative Complications And Its Management

- Nausea & Vomiting
- Sore throat -hoarseness of voice, loss of voice
- Airway obstruction, desaturation, bronchospasm, laryngospasm,

- Unresponsiveness
- Neurological complications. - coma, seizures, CVA(stroke), cerebral hypoxia,
- Pulmonary edema
- Haemorrhage from the surgical site
- Vascular complications-. DVT, embolism,(thrombus, air, fat, amniotic)
- Trauma to teeth
- Headache
- Backache
- Ocular complications -loss of vision
- Hypotension, hypertension,
- Bradycardia, tachycardia, arrhythmia, myocardial infarction
- Hypoglycemia, hyperglycemia
- Electrolyte imbalance-hyponatremia, hypokalemia, hyperkalemia

UNIT-IV

Post operative pain relief

Management of postoperative pain- narcotics, NSAID (im/iv), local anaesthetics through catheters, transdermal patches

UNIT-V

Causes of mortality in PACU

Mortality -myocardial infarction, arrhythmias, hypoxia, electrolyte imbalance, respiratory depression,

massive haemorrhage, embolism.

-Components of Emergency tray / Trolley in PACU

Post Anaesthesia Care Unit

**-PRACTICAL
PAPER CODE-**

B. Sc. Semester VI (Operation Theatre Technology)

L T P Credits
- - 2

Examination: 30 Marks
Int. Assessment: 20 Marks
Total: 50 Marks

ABG Analysis : Normal values
Insertion of IV cannulas,

Functioning of syringe pumps and infusion pump,
Technique of using laryngoscopes,
Insertion of oropharyngeal and Nasopharyngeal airways,
Injecting drugs through epidural catheters,
Oxygenation, suctioning

Anaesthesia for Specialty Surgeries

PAPER CODE

B. Sc. Semester VI (Operation Theatre Technology)

L T P Credits
3 1 - 4

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks
Duration of Examination: 3 Hours

UNIT-I

Neuro Anaesthesia

- Premedication
- Checklist
- Induction of a patient
- Reinforced Endotracheal tubes
- Positioning in neuro surgery
- Air embolism
- Reversal of the patient
- Transferring to I.C.U. / Ward
- Special investigation - CT, Angiography and MRI

UNIT-II

Orthopedic Surgery

- Complications During Orthopedic procedures-fat embolism
- Haemorrhage,

- Tourniquet application and complications
- Radiation hazard, Preventive measures

UNIT-III

Plastic And Reconstructive Surgery And Vascular Surgery

- Burns -types and initial management-anaesthetic challenges
- RAE tubes
- Complications during revascularization and its management
- Recognition of compartment syndrome

UNIT-IV

Obstetric Anaesthesia

- Differences between a pregnant and a non pregnant lady
- Risks for anaesthesia.-difficult airway, supine hypotension syndrome
- Check list
- Regional vs General anaesthesia
- Induction / maintenance and recovery.
- Resuscitation of the new born, APGAR score
- Emergencies - manual removal of placenta
- Ruptured uterus
- Ectopic Pregnancy
- Amniotic fluid embolism

UNIT-V

Paediatric Anaesthesia

- Check list
- Premedication - modes
- Induction, laryngoscope
- Intubation - Securing the ETT
- Reversal & extubation - Problems and its management
- Transferring / ICU management
- Pain management

UNIT-VI

Cardiac Anaesthesia

- NYHA classification
- Arrhythmias -types of arrhythmias and antiarrhythmic drugs
- Angina- types
- Dyspnoea-causes
- Premedication
- Setting up of monitoring system
- Monitoring - invasive and non - invasive
- Induction of cardiac patient, precautions to be taken
- Cardiopulmonary bypass -indication and its function
- Chest tube management

UNIT-VII

Anaesthesia Outside the O.T.

Problems of anaesthetising patients in

- Endoscopy
- Cath Lab
- Radiology -CT,MRI
- ECT

UNIT-VIII

Day care Anaesthesia

Special features

- Indications
- Advantages
- Disadvantages

Anaesthesia for Specialty Surgeries

**-PRACTICAL
PAPER CODE-**

B. Sc. Semester VI (Operation Theatre Technology)

L T P Credits
- - 2

Examination:
Int. Assessment:

30 Marks
20 Marks

Total:

50 Marks

Setting up for cvp/ibp monitoring
Checking of double lumen tubes
Defibrillator-charging , method of defibrillation
Method of insertion of ICD, Care of ICD tube
Bed side lung function tests
Lithotomy position
Insertion of ryles tube /NG tube
Preparation for anaesthesia in MRI
Tourniquet application
Position for tonsillectomy

Basic Intensive Care

PAPER CODE

B. Sc. Semester VI (Operation Theatre Technology)

L T P Credits
3 1 - 4

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks
Duration of Examination: 3 Hours

UNIT-I

General ICU Care and Monitoring

- Layout of ICU
- General care and transport of ICU patient
 - Eye, skin, bladder care, position,airways, drains, catheters.
- Transport of critically ill patient to and out of ICU,
transport of patient with drains, airway, inotropes, mechanical ventilator.
- Care of uncouncious patient
- Monitoring in critical care: vital signs, drains, ECG,
 - Central Venous Pressure (CVP) monitoring
- Intake / Output chart
- Insertion of Nasogastric tube, Foley's catheter
- Physiotherapy in ICU

UNIT-II

Infection Control ,Nutrition in ICU, Acid Base Balance

- Infection control in ICU: prevention of cross infection, VAP
- Universal precautions, personal protective equipments (PPE)
- IV Fluids: Types, Maintenance requirement,
- ABG analysis: Arterial blood sampling, Normal values
- Antibiotics Policy.
- Nutrition and Fluid balance - Total Parenteral Nutrition (TPN)
- Nasogastric tube, gastric drainage
- Jejunostomy tube care and feeding,
- Acid base and electrolytes balance,

UNIT-III

Intensive Care in ICU and Mechanical Ventilation

- Cardiac care in ICU: IHD, hypertension, hypotension, arrhythmias, cardiac arrest,
- Respiratory care in ICU: airway care, tracheostomy care, endotracheal intubation
- ICU Ventilator: Modes, settings, NIV, Care of ventilated patient, complications and weaning,
- ABG & ventilator settings
- Emergency drugs used in ICU
- Renal failure: types, etiology, complications, corrective measures
- Hepatic failure: types, etiology, complications, corrective measures

UNIT-IV

Head Injury and Trauma care in ICU

- Head injury and Trauma Care: Glasgow Coma Scale (GCS), care of head injury patient,
- Poly trauma patient
- Blood and blood products ,Transfusion reactions & complications,
- Massive transfusion

Basic Intensive Care

**-PRACTICAL
PAPER CODE-**

B. Sc. Semester VI (Operation Theatre Technology)

L T P Credits
- - 2

Examination: 30 Marks
Int. Assessment: 20 Marks
Total: 50 Marks

1. Placement of 12 lead ECG electrodes
2. Care of a comatose patient
3. Drugs used in Intensive Care
4. Trouble shooting and maintenance of monitors, equipments and ventilators
5. Lung Function Tests
6. Veinous cut down procedure, Arterial cannulation