

CURRICULUM FOR

B.Sc. ANAESTHESIA TECHNOLOGY

(Applicable w.e.f. academic session 2017-18)

COURSE NAME: B.Sc. (ANAESTHESIA TECHNOLOGY)

DURATION OF COURSE: THREE YEARS

FULL-TIME/ PART – TIME: FULL-TIME

**SRI GURU RAMDAS UNIVERSITY OF HEALTH SCIENCES, SRI AMRITSAR,
PUNJAB**

1. B. Sc. in Anaesthesia Technology

Anaesthesia technology course trains students in aspects such as anaesthesia equipment, anaesthesia techniques, anaesthetic agents and dosage, patient monitoring, anaesthesia supplies and anaesthesia technology. They can be seen assisting Doctors/Surgeons in Intensive Care Units (ICU), Emergency wards and departments and Operation Theatres. Largely, their task is pre operative. That means they are required before the operation starts, to administer anaesthetic agent to the patient. In some cases, there are also needed to perform the said task during or after surgery. This is a regular theory & practical oriented program. The mode of teaching will be in the form of regular classrooms, lectures / demonstrations supplemented by handouts, manuals, brochures, checklists, performance with supervised clinical practices.

2. Duration of Course

The Bachelor of Science in Anaesthesia Technology Course is proposed to be a 3 years integrated degree course.

3. Eligibility Criteria for Admission

The students shall be admitted as per the admission criteria and qualification prescribed in the Notification issued by the Board of Management of Sri Guru Ram Das University of Health Sciences from time to time.

4. Medium of Instructions

The Medium of instruction during the course and for the university examination shall be in English.

5. Examination Scheme

- 5.1 The examination for the first, second and third year shall ordinarily be held twice year in the months of May/June and November/ December by the Institute as per University rules.
- 5.2 Annual Examination shall be held in May/June and supplementary within 6 months of annual examination.
- 5.3 The examination in theory/practical shall be held at the end of the 1st academic year (1st Year) and the end of 2nd academic year (2nd Year) and third exam at the end of the 3rd academic year (3rd Year) with one internal and one external examiners.
- 5.4 Date of examination and appointment of examiner will be made by the Board of Management on recommendation of Faculty of Medical Sciences.
- 5.5 The examination for the first, second and third year of B.Sc. Anaesthesia Technology Course would be held according to the prescribed syllabus.

6. Rules of Examination for Bachelor of Science in Anaesthesia Technology Course:

- 6.1 The students shall submit his/her application for admission to the examination to Controller of Examinations SGRDUHS, Sri Amritsar through the Director Principal of the SGRDIMSAR, Sri Amritsar on the prescribed form with the required fee (the last date of which will be updated on university website after notification issued from Board of Management time to time).

- 6.2 The candidates will be given 25 marks for theory and 15 marks for practical as internal assessment in each subject on the basis of their performance during the year. That a candidate be eligible to appear in the examination provided he/she secured a minimum of 35% marks in internal assessment in theory and practical.
- 6.3 There will be fresh internal assessment and compulsory attendance for the students for the examination in which he/she has failed at the time of subsequent examination in that subject.
- 6.4 The students will not be allowed to appear in the examination unless he/she attends 75% of the total theory and practical in each subject separately.
- 6.5 Director Principal of the college is empowered to condone the shortage of attendance of lectures to the extent of 5% lectures delivered in each course of theory and practical.
- 6.6 A student will be deemed to have passed in the examination if he/she passes in each subject separately.
- 6.7 In case of students joining late owing to the late admission with the approval of the Vice-chancellor, their lecturers are to be counted from the date of joining. Deficiency in studies should be made up by attending special classes for them at the level of Head of the Department.

7. First Year B.Sc. Anaesthesia Technology Examination:

The First Year B.Sc. Anaesthesia Technology examination shall be in the following subjects and candidate shall be required to pass all the subjects:-

Paper	Subject	Theory			Practical			Grand Total
		Marks	Internal Assessment	Total	Marks	Internal Assessment	Total	
Paper-I	Human Anatomy , Physiology & Pathology	75	25	100	35	15	50	150
Paper-II	Operation Theatre Equipment and Techniques.	75	25	100	35	15	50	150
Paper-III	Basic Anaesthesia drug and Techniques.	75	25	100	35	15	50	150
Paper-IV	General Surgical procedures & Surgical/ Para Surgical equipments	75	25	100	35	15	50	150
Supportive Subject	Basics of Computer	---	---	---	---	---	---	---

Note. The Examination in the subject of Basics of Computer will be conducted at college level and Grade will be sent to University for final inclusion in the result.

Grading System

Marks Range	81 - 100	76 - 80	71 - 75	61 - 70	51 - 60	41 - 50	31 - 40	0 - 30
Grade	A+	A	B+	B	C+	C	D	E

8. Second Year B.Sc. Anaesthesia Technology Examination:

The Second Year B.Sc. Anaesthesia Technology Examination shall be open to a person who has previously passed the First Year B.Sc. Anaesthesia Technology Examination of this University or an examination of any other recognized University/Institution in India considered equivalent for the purpose by the University.

Paper	Subject	Theory			Practical			Grand Total
		Marks	Internal Assessment	Total	Marks	Internal Assessment	Total	
Paper-I	Microbiology and Pharmacology related to Anaesthesia	75	25	100	35	15	50	150
Paper-II	Operation theatre equipment and techniques including resuscitation and sterilisation.	75	25	100	35	15	50	150
Paper-III	Advanced Anaesthesia drug and Techniques.	75	25	100	35	15	50	150
Paper-IV	Advanced surgical procedures and surgical/parasurgical equipment.	75	25	100	35	15	50	150

9. Third Year

The Third Year B.Sc. Anaesthesia Technology Examination shall be open to a person who has previously passed the Second Year B.Sc. Anaesthesia Technology Examination of this University.

Paper	Subject	Theory			Practical			Grand Total
		Marks	Internal Assessment	Total	Marks	Internal Assessment	Total	
Paper-I	Operation Theatre Technology - Applied	75	25	100	35	15	50	150
Paper-II	Operation Theatre Technology - Clinical	75	25	100	35	15	50	150
Paper-III	Critical Care Equipment and Procedures in ICU	75	25	100	35	15	50	150
Paper-IV	Specialized Anaesthesia	75	25	100	35	15	50	150

10. Promotion and Number of Attempts allowed

- 10.1 A candidate who fails in all the subjects in the First Year **B.Sc. Anaesthesia Technology** examination shall not be promoted to Second Year class.
- 10.2 A Candidate who fails in one more or more subjects will be given four attempts including first attempt as a regular candidate, plus one mercy chance at the discretion of the Vice-Chancellor, at six monthly intervals. However, he/she will have to clear all these attempts within 6 years of admission to the said course.
- 10.3 The candidate who will absent himself/herself from the examination will be deemed to have been failed in that subject.
- 10.4 A candidate who passes in at least one subject of University level First Year B.Sc. Anaesthesia Technology examination will be permitted to attend classes of Second Year. However, the candidate will be required to pass in all subjects of 1st Year examination at least 6 months before the final examination of 2nd Year examination.
- 10.5 A candidate who fails in all subjects in the second year B.Sc. Anaesthesia Technology examination shall not be promoted to **Third Year** class.
- 10.6 A candidate who passes in at least one subject of University level Second Year B.Sc. Anaesthesia Technology examination will be permitted to attend classes of Third Year. However, the candidate will be required to pass in all subjects of 2nd Year examination at least 6 months before the final examination of **3rd Year** examination.
- 10.7 Candidate who passes in one or more subjects of Second Year B.Sc. Anaesthesia Technology examination shall be exempted from appearing in these subject at a subsequent examination, but the candidate must pass the examination in a maximum of four attempts including first attempt, as a regular candidate plus one mercy chance at the discretion of the Vice-Chancellor failing, at six monthly intervals. However, he/she will have to clear all these attempts within 6 years of admission to the said course.
- 10.8 Candidate who passes in one or more subjects of **third Year** B.Sc. Anaesthesia Technology examination shall be exempted from appearing in these subject at a subsequent examination, but the candidate must pass the examination in a maximum of four attempts (including first attempt, as a regular candidate), plus one mercy chance at the discretion of the Vice-Chancellor failing, at six monthly intervals. However, he/she will have to clear all these attempts within 6 years of admission to the said course.

11. Appointments of Examiners:

- 11.1 There shall be two examiners – One internal and one external.
- 11.2 Professor & head of the Department shall be Convener. The Examiner at least 3 years post PG teaching experience in that specification field will be appointed as Internal Examiner.
- 11.3 The external examiner shall be appointed from other Universities at least 3 years post PG teaching experience in that specification field.

12. Paper Setting and moderation of Question Papers

The questions papers for 1st Year, 2nd Year and 3rd Year will be set under the direction of Controller of Examinations.

Each Question Paper covering entire course consists of seven questions out of which six questions carry 10 Marks and one question carry 15 marks.

13. Evaluation of Answer Books

The answer books shall be got evaluated by putting fictitious roll numbers thereon or spot evaluation (Table marking) or any other method under the direction of the Controller of Examinations.

14. Minimum Pass Marks

During all the three annual examinations in each subject paper the candidate shall have to obtain 50% in theory, practical & internal assessment taken together.

14.1 The successful candidates shall be classified into divisions as under:-

- a) Those who obtain 60% or more marks First Division.
- b) Those who obtain 50% or more marks but below 60% marks Second Division.
- c) A candidate who will obtain 75% or more marks of the total marks in any subject shall be declared to have obtained distinction in that subject provided he/she passed in all the subjects of the courses in all the parts in the first attempt.

A candidate is eligible to appear in the examination provided he/she secures a minimum of 35% marks in internal assessment in theory and practical separately.

15. Grace Marks

There shall be no provision for grace marks.

16. Declaration of Result

The results will be tabulated and declared by the Controller of Examination's office.

17. Award of Degree

On successfully passing the Third Year B.Sc. Anaesthesia Technology examination the students shall be awarded the degree of Bachelor of Sciences in Anaesthesia Technology.

First Year Syllabus

Paper-I: Human Anatomy, Physiology & Pathology

Anatomy

Theory Syllabus (50 Hrs)

- **Introduction:**
 - Definition of anatomy and its divisions, Terms of location, positions and planes.
 - Cell and its organelles, Tissues & its classification, Glands.
- **Musculoskeletal system:**
 - Structure of Bone & its types.
 - Joints- Classification of joints with examples; details of synovial joint.
 - Bones & joints of upper limb, lower limb and their movements.
 - Axial skeleton & appendicular skeleton.
 - Skull, spine & its movements, intervertebral disc.
 - Muscles & its types.
 - Muscles of the upper limb, lower limb, trunk and neck.
- **Cardiovascular System:**
 - Arteries & veins, Capillaries & arterioles.
 - Heart- size, location, chambers, blood supply of heart, pericardium.
 - Systemic & pulmonary circulation.
 - Major blood vessels of Heart- Aorta, pulmonary artery, common carotid artery, subclavian artery, axillary artery, brachial artery, common iliac artery, femoral artery.
 - Inferior vena cava, portal circulation, great saphenous vein.
- **Lymphatic System:**
 - Lymph & Lymph vessels.
 - Structure of lymph node, names of regional lymphatics, axillary and inguinal lymph nodes.
- **Gastro-intestinal System:**
 - Parts of GIT, structure of tongue, pharynx, salivary glands.
 - Location & Gross structure of Oesophagus, stomach, intestine (small and large), liver, gall bladder, pancreas, spleen.
- **Respiratory system:**
 - Parts of Respiratory system; Structure of nose, nasal cavity, larynx, trachea, lungs, pleura, bronchopulmonary segments.
- **Urinary System:**
 - Parts of Urinary system, location and gross structure of kidney, ureter, urinary bladder, urethra.
- **Reproductive system:**
 - Parts of male reproductive system, gross structure of testis, vas deferens, epididymis, prostate.
 - Parts of female reproductive system, gross structure of uterus, ovary, fallopian tube, mammary gland.

- **Endocrine glands:**
 - Name of all endocrine glands, gross structure & functions of pituitary gland, adrenal gland, thyroid gland and parathyroid gland.
- **Nervous system:**
 - Neuron, classification of NS.
 - Meninges, ventricles, CSF.
 - Gross features of cerebrum, midbrain, pons, medulla oblongata, cerebellum, name of basal nuclei.
 - Blood supply of brain, cranial nerves.
 - Spinal cord and spinal nerves.
 - Autonomic nervous system.
 - Visual & auditory pathways

Practical Syllabus(20 Hours):

1. **Demonstration** of all bones of the human body.
2. **Demonstration** of all organs of the human body.
3. **General Histology:**
 Epithelium: Simple (squamous, cuboidal, columnar, ciliated), Stratified, Transitional.
 Bone, muscles (skeletal, smooth, cardiac) • Cartilage (hyaline, elastic, fibro cartilage).
 Connective Tissue (loose and dense).
 Arteries (large & medium sized), Veins.

Books Recommended

1. Ross and Wilson, Anatomy and Physiology, Churchill Livingstone.
2. Companion Pocketbook for quick review B.D. Chaurasia's Human Anatomy: -Vol. (1,2,3)
3. B.D. Chaurasia's Human Anatomy -Vol. (1,2,3)
4. B.D. Chaurasia's Handbook of General Anatomy
5. Textbook of Anatomy & Physiology for Nurses- Nachiket Shankar/ Mario Vaz
6. Anatomy for B.Sc. Nursing – Dr Renu Chauhan

PHYSIOLOGY

THEORY SYLLABUS (50 Hrs)

- **The Cell:**
 - Cell Structure and functions of the various organelles.
 - Endocytosis and exocytosis
 - Acid base balance and disturbances of acid base balances (Alkalosis, Acidosis)
- **The Blood:**
 - Composition of Blood, functions of the blood and plasma proteins, classification and protein.

- Pathological and Physiological variation of the RBC.
- Function of Hemoglobin
- Erythrocyte Sedimentation Rate.
- Detailed description about WBC-Total count (TC), Differential count (DC) and functions.
- Platelets – formation and normal level and functions
- Blood groups and Rh factor
- **Cardio-Vascular System:**
 - Physiology of the heart
 - Heart sounds
 - Cardiac cycle, Cardiac output.
 - Auscultatory areas.
 - Arterial pressures, blood pressure
 - Hypertension
 - Electro cardiogram (ECG)
- **Respiratory system:**
 - Respiratory movements.
 - Definitions and Normal values of Lung volumes and Lung capacities.
- **Excretory system:**
 - Normal Urinary output
 - Micturation
 - Renal function tests, renal disorders.
- **Reproductive system:**
 - Formation of semen and spermatogenesis.
 - Brief account of menstrual cycle.
- **Central Nervous system:**
 - Functions of CSF.
- **Endocrine sytem:**
 - Functions of the pituitary, thyroid, parathyroid, adrenal and pancreatic Hormones.
- **Digestive system (for the students of Diploma in Scope Support Technology)**
 - Physiological Anatomy of the GIT.
 - Food Digestion in the mouth, stomach, intestine
 - Absorption of foods
 - Role of bile in the digestion.

PRACTICAL SYLLABUS

1. The compound Microscope
2. Determination of ESR-By westergren's method
3. Determination of Blood Groups.
4. Measurement of human blood pressure.
5. Examination of Respiratory system to count respiratory rate and measure inspiration and respiration

Books Recommended

1. Ross and Wilson, Anatomy and Physiology, Chruchill Livingstone.

2. Basics of medical physiology- D Venkatesh, HH Sudhakar
3. Textbook of anatomy and physiology for nurses-Nachiket Shankar, Mario Vaz
4. Manual of practical physiology for BDS-DR. A.K.Jain

PATHOLOGY (30 hrs)

- 1) Cellular adaptation, Cell injury & cell death. Introduction to pathology.
Overview: Cellular response to stress and noxious stimuli.
Cellular adaptations of growth and differentiation.
Overview of cell injury and cell death.
Causes of cell injury.
Mechanisms of cell injury.
Reversible and irreversible cell injury.
Examples of cell injury and necrosis
- 2) Inflammation.
General features of inflammation
Historical highlights
Acute inflammation
Chemical mediators of inflammation
Outcomes of acute inflammation
Morphologic patterns of acute inflammation
Summary of acute inflammation
Chronic inflammation
- 3) Immunity disorders.
General features of the immune system
Disorders of the immune system
- 4) Infectious diseases.
General principles of microbial pathogenesis
Viral infections
Bacterial infections-Rheumatic heart disease.
Fungal infections
Parasitic infections
- 5) Neoplasia.
Definitions
Nomenclature
Biology of tumor growth benign and malignant neoplasms
Epidemiology
Carcinogenic agents and their cellular interactions
Clinical features of tumors
- 6) Environmental and nutritional disorders.
Environmental and disease
Common environmental and occupational exposures
Nutrition and disease.
Coronary artery disease.

Paper II: Operation Theatre Equipment and Techniques

- Medical Gas Supply
 - Compressed gas cylinders
 - Colour coding
 - Cylinder valves; pin index.
 - Gas piping system
 - Recommendations for piping system
 - Alarms & safety devices.
- Anaesthesia Machine/Work station
 - Hanger and yoke system
 - Cylinder pressure gauge
 - Pressure regulator
 - Flow meter assembly
 - Vapourizers - types, hazards, maintenance, filling and draining, etc.
- Introduction to OT equipments
 - OT- Lights
 - OT Table
 - Sucker
 - Diathermy
- Face Masks & Airway Laryngoscopes
 - Types, sizes
 - Endotracheal tubes - Types, sizes.
 - Cuff system
 - Fixing, removing and inflating cuff, checking tube position complications.
 - Problems during intubation
 - Difficult airway algorithm
 - Difficult airway cart
- Oxygen therapy and related equipments

Paper III: Basic Anaesthesia drug and Techniques

- Breathing System
 - General considerations: humidity & heat
 - Common components - connectors, adaptors, reservoir bags.
 - Capnography ; etcO₂, ECG, NIBP
 - Pulse oximetry
 - Methods of humidification.
 - Classification of breathing system
 - Mapleson system - a b c d e f

- Jackson Rees system, Bain circuit
- Non rebreathing valves - ambu valves
- The circle system
- Components
- Soda lime, indicators
- Operation Theatre Techniques:
 - General anaesthesia
 - Regional anaesthesia
 - Local anaesthesia
- History Of Anaesthesia
 - First successful clinical demonstration:
 - Pre - historic (ether) era
 - Inhalational anaesthetic era
 - Regional anaesthetic era
 - Intravenous anaesthetic era
 - Modern anaesthetic era
 - Minimum standard of anaesthesia
- CPR
- Basic anaesthesia monitoring

B.Sc. Anaesthesia 1st Year

Paper IV: General Surgical procedures & Surgical/ Para Surgical equipments

- Physics related to anaesthesia equipments
- Care & maintenance of OT equipments
 - Handling, cleaning and carbolisation of operation tables, operation theatres lights, suction machines, diathermy and other OT Equipments.
 - Maintenance of special surgical equipment their care and preservation.
 - Techniques of handling of laser based equipments, their care preservation and maintenance.
 - Ventilation of operation theater air conditioning and control of pollution.
- Recovery Room and Nursing Care
 - Pre-operative preparation of patient.
 - Transportation techniques of patient in conscious, semiconscious and unconscious state, to and from Operation Theatre.
 - Management of Pre-operative and post-operative rooms.
 - Resuscitation Techniques along with the management of equipments and drugs.
- Patient Handling and shifting techniques
- Operating Room Ethics, Discipline, Layout, Equipments
 - Moral aspects and duties of Medical Technologies.
 - Indenting, Book Keeping and Storage procedures of different articles.
 - Co-ordination with all working personal in operation theatre.
 - Psychological aspects of patient staff and relatives of the patient.
 - Management of operations theatre in routine and emergency.
 - Theatre etiquettes.
- Basics of Sterilization.
- Surgical techniques
 - Handling of Sterilization articles in the Operation Theatre.
 - Techniques of Sterilization of surgical instruments and special equipment used in the operation theatre.
 - Management of surgical equipment and techniques.
 - Scrubbing techniques.
 - Injection techniques: Intra muscular and intra venous and insertion of I.V. Cannulas, Handling or Syringes and needles.
 - Types of suturing material, techniques of stitching and removed of stitches.
 - Positioning of patient for different operations.

BASICS OF COMPUTER

Theory : 30 hours

Practical's : 30 hours

THEORY

Introduction to computer – I/O devices – memories – RAM and ROM – Different kinds of ROM – kilobytes, MB, GB their conversions – large computer – Medium, Micro, Mini computers - Different operating system – Networking – LAN, WAN, MAN (only basic ideas)

Typing text in MS word – Manipulating text – Formatting the text – using different font sizes, bold, italics – Bullets and numbering – Pictures, file insertion – Aligning the text and justify – choosing paper size – adjusting margins – Header and footer, inserting page No's in a document – Printing a file with options – Using spell check and grammar – Find and replace – Mail merge – inserting tables in a document.

Creating table in MS-Excel – Cell editing – Using formulas and functions – Manipulating data with excel – Using sort function to sort numbers and alphabets – Drawing graphs and charts using data in excel – Auto formatting – Inserting data from other worksheets.

Preparing new slides using MS-POWERPOINT – Inserting slides – slide transition and animation – Using templates – Different text and font sizes – slides with sounds – Inserting clip arts, pictures, tables and graphs – Presentation using wizards.

Introduction to Internet – Using search engine – Google search – Exploring the next using Internet Explorer and Navigator – Uploading and Download of files and images – E- mail ID creation – Sending messages – Attaching files in E- mail.

Role of Computers in the Health care: - HIS, Medical Equipment, Pharmacy in inventory management, Patient record maintenance.

PRACTICAL

- Typing a text and aligning the text with different formats using MS-Word
- Inserting a table with proper alignment and using MS-Word - Create mail merge document using MS-word to prepare greetings for 10 friends
- Preparing a slide show with transition, animation and sound effect using MSPowerpoint
- Customizing the slide show and inserting pictures and tables in the slides using MSpowerpoint
- Creating a worksheet using MS-Excel with data and sue of functions Using MSEXcel prepare a worksheet with text, date time and data Preparing a chart and pie diagrams using MS-Excel
- Using Internet for searching, uploading files, downloading files creating e-mail ID

BSc Anaesthesia 2nd year

Paper I: Microbiology & Pharmacology related to Anaesthesia

MICROBIOLOGY

- Introduction to Microbiology & Aseptic techniques
- Medically important Gram Positive & Gram Negative Cocci
- Medically important Gram Negative Bacilli(GNB)
- Classification of fungus, Yeast & Yeast like
- Keratomycosis (Invasive fungal infections of cornea)
- Chlamydial & Gonococcal infections of Eye
- Acanthamoeba
- Viral conjunctivitis
- Biomedical waste management
- Dry heat sterilization
- Hospital acquired infections
- Moist heat sterilization
- Blood stream infection & Subacute bacterial endocarditis(SABE)
- Safety Measures in Microbiology lab
- Study of Compound Microscope
- Study of Sterilization By Dry Heat (Hot air oven)
- Study of Sterilization By Moist Heat (Autoclave)
- Aseptic techniques
- Culture media (Liquid)
- Culture media (Solid)
- Biomedical test (Catalase, Coagulase, Oxidase)
- Biomedical test (IMViC, Sugar fermentation, TSI, Urease, PPA)
- Antimicrobial sensitivity testing (AST)
- Motility testing
- Smear preparation
- Gram staining
- Revision of Gram staining
- ZN staining

- Revision of ZN staining
- Montoux test

PHARMACOLOGY:

- Routes of administration and dosage forms
- Pharmacokinetics
- Pharmacodynamics
- ANS
- Autacoids (histamine, serotonin, PGs)
- NSAIDs
- Drugs for cough and bronchial asthma
- GA
- Skeletal muscle relaxants
- LA
- Thyroid and anti thyroid drugs
- CHF
- Hematinics and drugs affecting coagulation, bleeding, thrombosis
- Anti arrhythmics
- Hypolipidaemics
- Anti hypertensives
- Drugs acting on skin and mucous membrane
- Diuretics and antidiuretics
- Anti anginals
- General chemotherapy:
- Beta lactams
- Sulfonamides
- Quinolones
- Aminoglycosides
- Macrolides
- Miscellaneous antimicrobials
- Vitamins
- GIT
- Drugs acting on uterus

Paper II: Operation theatre equipment and techniques including resuscitation and sterilisation

- Monitoring Equipment
- Multiparameter Vital Sign Monitors
- Types of Multiparameter Vital Sign Monitor and ECG Machines and their applications.
- Repair and maintenance of the Multiparameter Vital Sign Monitor

- Types of patient electrodes and their application.
 - Recording of ECG and safety in use of equipment.
- Defibrillators:
 - Principle and mechanism of the defibrillator and its types.
 - Uses and safety precaution during use.
 - Maintenance and its operational capabilities.
- Sterilization in details
- Principles Of Sterilization & Disinfections
 - Types of Sterilization (Dry & Wet), methods, hazards and tasting
 - Sterilization of dry hot air.
 - Sterilization by gases e.g. ethylene oxide etc.
 - Sterilization by radiation.
 - Sterilization by chemical lotions, different chemicals and their applied chemistry.
 - Sterilization by gamma-rays, ethylene oxide, ultra violet rays and etc
 - Sterilization for soft rubber articles.
 - Sterilization for carbonized articles.
 - Sterilization for Ventilators
 - Hazards of sterilization and their prevention
 - Hazards of radiation, gases and chemical lotions and their prevention
 - Methods to Checking sterility
- Types of disinfections;
 - Disinfection by boiling method.
 - Disinfection by chemical method.
- Method of vaporizing volatile anaesthetic agents :
 - Volatile anesthetic agents
 - Chemical and physical properties of Volatile chemical agents
 - Selection of material to be used for containers of the volatile anesthetic agents
 - Structure of different types of vaporizers
 - Principles of various vaporizers their maintenance and safety precautions.

Paper III: Advanced Anaesthesia drug and Techniques

- ANTISIALAGOGUES : Atropine, Glycopyrrolate

- SEDATIVES/ANXIOLYTICS: Diazepam, Midazolam, Phenergan, Lorazepam, Chlorpromazine, Trichlopho
 - NARCOTICS: Morphine, Pethidine, Fentanyl, Pentazozine
 - ANTIEMETICS : Metaoclopramide, Ondanseteron, Dexamethasone
 - ANTACIDS: Na citrate, Gelusil, Mucaine gel.
 - H2 BLOCKERS : Cimetidine, Ranitidine, Famotidine
 - INDUCTION AGENT: Thiopentone , Diazepam, Midazolam, Ketamine, Propofol, Etomidate.
 - MUSCLE RELAXANTS: Depolarising - Suxamethonium, Non depolarising - Pancuronium, Vecuronium, Atracurium, rocuranium
 - INHALATIONAL GASES: Gases - O₂, N₂O, Air
 - Agents - Ether-, Halothane, Isoflurane, Saevoflurane, Desflurane
 - REVERSAL AGENTS: Neostigmine, Glycopyrrolate, Atropine, Nalorphine, Naloxone, Flumazenil (Diazepam)
 - LOCAL ANAESTHETICS : Xylocaine, Preparation, Local – Bupivacaine - Topical, Prilocaine-jelly, Emla - Ointment, Etidocaine. Ropivacaine
 - Emergency Drugs
 - Adrenaline : Mode or administration, dilution, dosage,
 - Effects, Isoprenaline
 - Atropine, bicarbonate, calcium, ephedrine, xylocard,
 - Ionotropes : dopamine, dobutamine, amidaron
 - Aminophylline, hydrocortisone, antihistamines, potassium.
 - Cardiovascular drugs
 - Antihypertensives
 - Antiarrhythmics
 - Beta - Blockers
 - Ca - Channel blockers.
 - Vasodilators - nitroglycerin & sodium nitroprusside
 - Respiratory system - Bronchodilators, respiratory stimulants
 - Bronchiolytic agents
 - Renal system - Diuretics, furosemide, mannitol
 - Obstetrics - oxytocin, methergin

- Miscellaneous - Antibiotics, paracetamol, diclofenac- IV fluids, various preparations NaCl, Ringer lactate, haemaceal, hetastarch, heparin, protamine, insulin , analgesics, nsaid, ibuprofen, ketorolac,
- Laryngeal Sprays: Principal , uses mechanism and its maintenance.
- Sterilization & decontamination- I
 - Dry Heat
 - Moist Heat
- Sterilization - II
 - Chemical methods
 - Gaseous methods
 - Filtration
- Wound Infection & Urinary Tract Infections
- Blood stream Infections
- Respiratory tract Infection
- S.Typhi, Salmonella Paratyphi 'A', Salmonella Typhimurium
- Catheter, IV associated Infections
- Hospital acquired infections & prevention of hospital acquired infections
- Hepatitis C

B.Sc. Anaesthesia 2nd year

Paper IV: Advanced surgical procedures and surgical/parasurgical equipment

- Operation tables
 - Features, material used in fabrication and advantages of the material.
 - Care, maintenance and uses.
 - Controls-Hydraulic system, Electrical System.
- Diathermy/Cautery Machines :
 - Different types of diathermy and cautery machines, monopolar,
 - Bipolar and underwater working.
 - Structural features of diathermy and cautery machines.
 - Types of active and passive electrodes.
 - Care, maintenance and uses.
 - Prevention of hazards.
- Operation Lights:-
 - Types of Operation Lights and other Light sources.
 - Structural features, care cleaning carbolisation, maintenance and uses.
- Endoscopy Equipment
 - Types of endoscopes, Rigid & fiber - optic scopes i.e. Bronchoscope, Oesophago – gastro - I scope, laproscopes, Cystoscopes and ephroscope etc.
 - Their structural features, uses care maintenance.
- Operating Microscope:
 - Types and features.
 - Principle structural features operating microscope
 - Microscopic photography and cameras used
 - Care, maintenance and uses
 - Glasses used and property
- **Basics of surgery**
 - History of Surgery, role of the surgeon, importance of team work and anticipating the needs of surgeons; stresses that may arise during operative procedure
 - surgical terminology, types of incision and indications for the use of particular incision;
 - Haemorrhage-signs and symptoms of internal and external; classification and management;
 - identification of types of tourniquets reasons for use and duration of application, dangers of use;
 - Wounds, types, process of healing, treatment and complications; inflammation; wound infections-causes and treatment; incision and drainage of abscesses; importance of personal cleanliness and aseptic techniques;
 - Pre-operative and post-operative care of the surgical patient; Emergency procedures;
 - Knowledge of surgical asepsis, skin preparation for invasive procedures

Marks distribution for practical exam:

Drugs: 10 marks

Anaesthesia Machine: 10 Marks

Equipments: 15 Marks

Total marks : 35

B.Sc. Anaesthesia 3rd year

Paper I: Operation Theatre Technology - Applied

- Advance anaesthesia machine & apparatus
- Anaesthesia Drugs
 - Induction agents
 - Muscle relaxants
 - Inhalational agents- gases/agents
 - Reversal agents
 - Analgesics- opioids/nonopioids
 - Sedatives/anxiolytics
 - Antiemetics/ antacids/H₂
- Regional anaesthesia /Local Anaesthetics

PRE-OP PREPARATION:

- Pre anaesthetic assessment~ History – , past history - disease / Surgery / and personal history - Smoking / alcohol General physical assessment, systemic examination – CVS, RS, CNS

INVESTIGATIONS

- Routine
- Haematological - their significance
- Urine
- E.C.G.
- Chest X – ray
- Special Endocrine, hormonal assays
- Echocardiography
- Angiography
- Liver function test
- Renal function test
- Others
- Case acceptance: ASA grading - I, II, III, IV, V

PRE - ANAESTHETIC ORDERS:

Patient

- Informed consent
- Npo
- Premedication - advantages, drugs used
- Special instructions - if any

Machine

- Checking the machine
- O₂, N₂O, suction apparatus
- Laryngoscopes, et tubes, airways
- Things for IV accessibility
- Other monitoring systems

Drugs

- Emergency drugs
- Anaesthetic drugs

INTRAOPERATIVE MANAGEMENT

- Confirm the identification of the patient
- Monitoring – minimum
- Noninvasive & Invasive monitoring
- Induction - drugs used
- Endotracheal intubation
- Maintenance of anaesthesia
- Positioning of the patient
- Blood / fluid & electrolyte balance
- Reversal from anaesthesia - drugs used
- Transferring the patient
- Recovery room – set up and things needed

POST OPERATIVE COMPLICATIONS & MANAGEMENT

Paper II: Operation Theatre Technology - Clinical

- Respiratory System
- Cardiovascular system
- Nervous system
- Renal system
- Hepatobiliary system
- Pre anaesthetic checkup
- Bio medical waste management
- CSSD Procedures
- Waste disposal collection of used items from user area, reception protective clothing and disinfections sage gaurds,
- use of disinfectionts sorting and classification of equipment for cleaning purposes, sharps, blunt lighted etc. contaminated high risk baby care - delicate instruments or hot care instruments,
- cleaning process - use of detergents. Mechanical cleaning apparatus, cleaning instruments, cleaning jars, receivers bowls etc. trays, basins and similar hand ware utensils. Cleaning of catheters and tubings, cleaning glass ware, cleaning syringes and needles.
- Materials used for wrapping and packing assembling pack contents. Types of packs

prepared. Inclusion of trays and gilliparts in packs. Method of wrapping and making use of indications to show that a pack of container has been through a sterilization process date stamping.

- General observations principles of sterilization. Moist heat sterilization. Dry heat sterilization. EO gas sterilization. H₂O₂ gas plasma vapo sterilization.

Paper III: Critical Care Equipment and Procedures in ICU

MONITORING AND DIAGNOSTIC PROCEDURES IN I.C.U.

- Central Venous access.
- ECG monitoring.
- Invasive hemodynamic monitoring

GENERAL CARE OF PATIENT IN I.C.U.

- Eye
- Bladder Skin
- Care of mechanically ventilated patient
- Tracheostomy, humidification
- Vascular lines - arterial, venous line
- Radiography
- Physiotherapy - chest physiotherapy

FLUID BALANCE AND PARENTERAL NUTRITION

INFECTIOUS DISEASES IN I.C.U.

- Antibiotics in I.C.D.
- Oxygen therapy
- Mechanical ventilation

ACID - BASE DISORDERS

CARDIOVASCULAR FAILURE

- Inotropic suppo
- Vaso dilator drugs.

RENAL FAILURE & LIVER FAILURE

HEAD INJURY

PRINCIPLES OF TRANSFUSION THERAPY

- Whole blood, erythrocyte products
- Plasma components

Platelets concentrate) Massive transfusion, acute transfusion reactions.

VENTILATORS

- Principles of working of different ventilators
- Volume cycles ventilators.
- Time cycle's ventilators
- Pressure cycles ventilators
- High Frequency ventilators etc.

ABG MACHINES

- Working
- Principles & Uses

REGIONAL ANAESTHETIC TECHNIQUES.

- Local anaesthetic technique
- Nerve blocks
- Spinal Anaesthesia
- Epidural anaesthesia

Ultra sound guided nerve blocks

Paper IV: Specialized Anaesthesia

NEURO ANAESTHESIA

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

OBSTETRIC ANAESTHESIA

- Differences between a pregnant and a normal lady
- Risks for anaesthesia.
- Precautions to be taken
- Check list
- Regional vs general anaesthesia
- Induction / maintenance and recovery.
- Resuscitation of the new born, apgar score
- Reversal and extubation
- Emergencies

- manual removal of placenta
 - A.P .H.
 - P.P.H.
 - Ruptures uterus
 - Ectopic Pregnancy

PAEDIATRIC ANAESTHESIA

- Theatre setting
- Check list
- Premedication – modes
- Induction
- Intubation - Securing the EIT
- Reversal & extubation – Problems
- Transferring / ICU management
- Pain management

ENT Anaesthesia

- Anaesthesia for adenotonsillectomy
- Anaesthesia for mastoidectomy
- Bronchoscopy and oesophagoscopy

CARDIAC ANAESTHESIA :

- NYHA classification
- Arrhythmias
- Angina
- Dyspnoea
- Special investigations
- echo cardiography
- angiography
- Premedication
- Setting up of monitoring system
- Monitoring - invasive and non – invasive
- Getting ready for the case
- Induction of cardiac patient, precautions to be taken
- Cardiopulmonary bypass
- Weaning of CPB
- Transferring the patient to ICU.
- Care to be taken
- I.C.U management.
- Chest tube management

ANAESTHESIA OUTSIDE THE O.R.

- Situations
- Cath Lab
- Radiology
- E.C.T.

- Shortcomings.

DAY CARE ANAESTHESIA

- Special features
- Set up
- Advantages
- Disadvantages
- Complications
- Future

GERIATRIC ANAESTHESIA

- Physiological changes
- Diseases of aging
- Nervous system
- Geriatric pharmacodynamics / pharmacokinetics
- Postoperative nervous system dysfunction.

ANAESTHESIA FOR TRAUMA & SHOCK

- Resuscitation
- Preop investigation I assessment
- Circulatory management
- Management of anaesthesia
- Rapid sequence induction
- Other problems

THORACIC ANAESTHESIA

- Pulmonary function tests
- bed side
- Vitallograph
- Preoperative preparation
- Premedication
- Check list
- Induction. Intubation
- Double lumen tubes
- Monitoring
- Pain management
- Extubation
- ICU management

Postoperative problems

- Nausea & Vomiting
- Sore throat
- Laryngeal granuloma
- Neurological complications.
- Awareness
- Vascular complications.
- Trauma to teeth
- Headache

- Backache
- Ocular complications
- Auditory complications

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Anaesthesia Machine: 10 Marks

Equipments: 15 Marks

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