

1ST YEAR - Syllabus

B.Sc Critical Care Technology, Operation Theatre Technology & Perfusion Technology course

PAPER 1: BASIC SCIENCES 1

Total class hours = 100

ANATOMY, PHYSIOLOGY, PHYSICS AND BIOPHYSICS, BIOCHEMISTRY

ANATOMY - 50 hrs

Gross anatomy of human skeleton

Brain, spinal cord, cranial nerves, peripheral nerves, autonomic nervous system

Heart and great vessels

Chest wall, muscles of respiration, the diaphragm, lungs, mediastinum

Abdominal wall, inguinal canal, abdominal viscera

Superior and inferior extremity

PHYSIOLOGY - 30 hrs

Ventilation and breathing, transport of gases, lung volumes and capacity

Haemodynamic parameters - pulse, BP, cardiac output, cardiac cycle

Digestion, absorption of food, bile

Urine formation, micturition

Endocrine system- pituitary, Thyroid, Parathyroid, Adrenal, Pancreatic hormones

Nervous system-

Blood- composition of blood & their function

PHYSICS AND BIOPHYSICS - 10 hrs

Force and motion, heat, light, sound, electricity, surface tension, viscosity, density, mole, diffusion, osmolarity, elasticity

BIOCHEMISTRY- 10 hrs

Chemistry of carbohydrate, protein, lipid

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Metabolism of carbohydrate, protein, lipid

Vitamins

Minerals

PAPER II: BASIC NURSING

Total class hours = 100

Patient care – 50 hrs

Nursing care of a patient – bed care, mouth care, back care

Care of a critically ill patient

Care of a patient on ventilator

Care of a post-operative patient

Hand washing

Dressing

Barrier nursing

Cardio Pulmonary Resuscitation (CPR)

Basic Life Support (BLS)

Airway management

Oxygen therapy

Self-protection during assisted breathing

Consent for various procedures

Communication with patient relatives

Infection control

Patient monitoring & relevant gadgets- 50 hrs

Monitoring of a critically ill patient

Monitoring of patient on ventilator

Monitors – multipara monitor

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Ryles tube, Foleys catheter, laryngoscope, central venous catheter, airways, ET tube, chest drains, arterial cannula

ECG

Pacemaker

IV cannula, drip sets

IV fluids

Glucometer

Sphygmomanometer

PAPER III : BASIC ANAESTHESIA, BASIC SURGERY
100

Total class hours =

Basic Anaesthesia- 50 hrs

GA - Premedication, induction of GA, Intubation, maintenance of GA

Drugs related to GA - induction agents, muscle relaxants, analgesics, sedatives, reversal agents

Regional anaesthesia - spinal/ epidural/ local block

Local anaesthetics

Monitoring of GA and RA

Anaesthesia equipment- breathing system, airway equipment (ETT, oral & nasal airway)

Anaesthesia Machine

Fasting guidelines before elective surgery

Regurgitation, aspiration & Aspiration prophylaxis

Consent for surgery and anaesthesia

Basic Surgery- 50 hrs

Surgical instruments -uses

Sutures

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Cleaning and sterilization of instruments

Diathermy

Bleeding and hemostasis

Layout of instruments

Dressing and draping

Various positions

Counting of instruments

Different abdominal incisions

PAPER IV: Community Health, Environmental Science

Total class hours = 100

Community Health – 50 hrs

Concept of health and disease

Epi Occupational health hazards demiology – infectious diseases – cause, transmission

Occupational health hazards

Disease prevention and control

Health programmes in India

Nutrition

Public awareness & motivation

Health education, information

Communication skill

Environmental science- 50 hrs

Water – safe water, reservoir

Water pollution,

Water related diseases

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Purification of water

Composition of air

Air pollution

Environment protection act

Noise pollution

Radiation & its hazards

Housing and health

Disposal of solid waste – solid, liquid & biochemical waste

Disposal of liquid waste

Disposal of biochemical waste

Sanitation & general hygiene

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2nd YEAR - Syllabus

**B.Sc Critical Care Technology, Operation Theatre Technology & Perfusion
Technology course**

PAPER I: BASIC SCIENCES 2

PATHOLOGY, MICROBIOLOGY, PHARMACOLOGY

Total class hours = 100

Pathology- 40 hrs

Inflammation – acute and chronic

Wound healing

Necrosis and gangrene

Neoplasm

Shock

Oedema

Thrombosis and embolism

Rheumatic fever and rheumatic heart disease

Jaundice – types

Diseases of RBC, WBC and platelets

Microbiology- 30 hrs

Morphology and physiology of bacteria

Culture media and culture methods

Immune system – antigen, antibody, complements, immune response

Hypersensitivity and autoimmunity

Specific bacterial diseases – staphylococcus, streptococcus, pneumococcus, Neisseria,
clostridium, coliforms, salmonella, shigella, pseudomonas, klebsiella etc

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Virology

Clinically important viruses

Hepatitis, HIV

Medical mycology

Clinically important fungal diseases

Parasitology

Protozoal diseases – Entamoeba, Plasmodium

Helminthic diseases – tapeworm, roundworm, hydatid disease etc

PHARMACOLOGY- 30 hrs

Drugs – routes of administration, pharmacokinetics, pharmacodynamics

Drugs acting on autonomic nervous system – inotropes

NSAIDs

Hormones – thyroid, insulin, calcium metabolism

Sedatives

Drugs used in psychiatric diseases

Antihypertensive drugs

Antianginal drugs

Antiarrhythmic drugs

Diuretics

Drugs affecting bleeding and coagulation

Drugs for peptic ulcer, constipation and diarrhea

Antimicrobial drugs – antibiotics, antivirals, antifungals, anti TB drugs

Vaccines

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PAPER II: OPERATION THEATRE SCIENCE 1 Total class hours = 100

For OTT

Common surgical procedures including related instruments - 60 hrs

Excision of cyst, soft tissue tumours

Drainage of abscess

Surgery for various types of hernia

Appendicectomy

Cholecystectomy

CBD exploration

Intestinal resection and anastomosis

Gastrectomy

Gastrojejunostomy

Hemicolectomy

Anterior resection and APR

Enterocutaneous fistula

Hemorrhoid surgery

Mastectomy

Thyroid surgeries

Feeding jejunostomy

Normal labour

Caesarean section

Hysterectomy – various types

Minimal access surgery

Preoperative preparation – thyroid surgery, bowel preparation, gastric lavage

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Orthopaedic surgery including related instruments-10 hrs

Fixation of fractures – K wire, nails, plates

Prosthesis – hip, knee

Hip replacement surgery

Knee replacement surgery

Surgery for bone tumours

Amputation

Anaesthesia –30 hrs

Patient positioning- supine, prone, lithotomy

Patient positioning & associated risk

Supraglottic device (LMA, airway)

Specific anaesthetic drugs

Specific monitors for specific surgery

Protocol to receive a patient for surgery & hand over post-operative patient to Ward, ICU, HDU

PAPER II: CRITICAL CARE SCIENCE 1

Total class hours = 100

For CCT

Instruments and drugs used in ICU: 50 hrs

Concept of critical care

CPR- BLS & ALS

Defibrillator

Pacemaker

Mechanical ventilation – indication, modes, settings, complications, monitoring

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Drug used in ICU- Inotropes, Vasodilator, Vasopressor, sedative, analgesic etc

Central venous catheter – complications, insertion, care

Arterial cannulation- complications, insertion, care

Intra Aortic Balloon pump (IABP) therapy

Basic management in ICU - 30 hrs

Monitoring of a critically ill patients

Nutrition in critically ill patients

Care of critically ill patients

Hypoxia- types, definition, cause

Oxygen therapy

Oxygen toxicity

Shock – types, pathophysiology & management in brief

Blood transfusion – blood grouping & cross matching

Protocol to receive a post operative patient to ICU

Fluid and electrolyte balance

Acid base balance – details

Advanced management of critically ill patient - 20 hrs

Unconscious patient – cause, management

Difficult airway cart

Nosocomial infection

Infection control in ITU

Organ dysfunction

Systemic inflammatory Response syndrome (SIRS)

Multi Organ Dysfunction Syndrome (MODS)

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Immunocompromised patient

ITU psychosis

PAPER II: PERFUSION SCIENCE 1

Total class hours = 100

Physiology of CPB & drugs used during CPB- 50 hrs

History of cardiopulmonary bypass

Coronary circulation

Conduction system- arrhythmias

Details of heart structure & their function

CPB- definition, indication, component of CPB

Cardioplegia – details

Hemodilution and priming

Hypothermia- degree, pathophysiology

Myocardial protection

Drugs affecting coagulation system

Heparin, protamine

Instruments of CPB – 50 hrs

Onset of CPB

Monitoring during CPB

Weaning from CPB

Drugs used during CPB

Pumps – various types

Oxygenators – various types

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Circuit and cannulae

Different types of filters & methods of filtration

Venting – methods

PAPER III: LABORATORY SCIENCES

Total class hours = 100

Basics of Haematology – 40 hrs

Haematology

Hemoglobin, blood cell counts, differential count

Anaemia, polycythemia

Thrombocytopenia

Coagulation parameters- BT, CT, PT, INR, APTT

Coagulation disorders

Blood transfusion – hazards and complications

Basic clinical investigations- 40 hrs

Collection and examination of various body fluids – urine, CSF, ascetic fluid, pleural fluid

Examination of stool

Cytopathology – staining methods, PAP stain

Histopathology – examination of pathological specimens

Microbiology – various staining methods

Identification of microorganism from a clinical specimen

Culture and antibiotic sensitivity testing

Serological tests – viral markers, diagnosis of malaria, dengue

Biochemical tests

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Arterial blood gas analysis – concept of acidosis, alkalosis

Blood sugar

Renal profile

Liver function test

Hormone assay

Thyroid tests

Electrolytes

Basics of imaging studies -20 hrs

Imaging -

X-ray

C-arm

USG

Echocardiography

Doppler test

CT scan

MRI scan

Angiography

Contrast imaging

PAPER IV: CENTRAL STERILIZATION AND SUPPLY DEPARTMENT (CSSD)

Total class hours = 100

Basic steps and materials used in CSSD -50 hrs

Definition and function of CSSD department

Sterilization and disinfection

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Physical agents-

Autoclave

Hot air oven

Radiation

Ultrasonic cleaning

Chemical agents -

Alcohols

Aldehydes

Halogens

Gases – Ethylene Oxide (ETO)

Hydrogen peroxide

Plasma sterilization

Surface active agents

Antiseptic solutions

Advanced CSSD – 50 hrs

Monitoring of sterilization

Indicators

CSSD cycle - organisation

Sterilization of OT, ITU

Sterilization and infection control protocol, barrier nursing

Hand washing

Nosocomial infection

Multidrug resistance

Universal precaution

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Management of biomedical waste

Plasma pyrolysis technology [PPT]

Incinerator

Disposal of seropositive patient's waste -HBV, HIV

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3rd YEAR - Syllabus

B.Sc Critical Care Technology, Operation Theatre Technology & Perfusion
Technology course

PAPER I: SPECIFIC SUBJECT

OPERATION THEATRE SCIENCE 2

Total class hours = 100

For OTT

CTVS including related instruments – 30 hrs

Open heart surgery

Concept of cardiopulmonary bypass

Surgery for ASD, VSD

Valve replacement surgery

CABG – on pump, off pump

Thoracotomy – types

Lung surgeries – lobectomy, pneumonectomy, thymectomy

Intercostal drain

Vascular surgery – AV Fistula, embolectomy, vascular anastomosis

Monitoring during surgery- hemodynamics, CNS, Temperature, Renal function, respiratory system

Urology including related instruments – 20 hrs

Nephrectomy

PCNL

ESWL

Energies used in urology

TURP

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TURBT

Cystectomy

Surgeries on urethra

Neurosurgery including related instruments – 10 hrs

Burr hole

Craniotomy

Approach to posterior cranial fossa surgery

Plastic surgery including related instruments – 10 hrs

Skin grafting

Flaps

Various rotation flaps

Microvascular anastomosis – basic concept

Paediatric surgery including related instruments -10 hrs

Surgery for tracheoesophageal fistula

Surgery for Congenital diaphragmatic hernia

Anesthetic consideration for pediatric surgery including paediatric breathing circuit

Eye surgeries including related instruments – 10 hrs

Cataract surgery, glaucoma surgery, injury

Operating microscope details

ENT surgery including related instruments – 10 hrs

Tonsillectomy, Adenoidectomy, Septoplasty, Tympanoplasty, Polypectomy

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PAPER I: CRITICAL CARE SCIENCE 2

Total class hours = 100

For CCT

Cardiovascular problems – 25 hrs

Acute Coronary Syndrome

Heart failure

Hypertensive crisis

Cardiogenic shock

Common Arrhythmias

Critical care after open heart surgery

Respiratory problems- 25 hrs

Respiratory failure

Acute Lung Injury

Acute Respiratory Distress Syndrome

Airway management including difficult airway

Acute severe asthma

Acute COPD

Hemoptysis

Critical Care management -50 hrs

Renal replacement therapy - Hemodialysis, CRRT

Surgical ITU

Post operative fluid and electrolyte management

Management of drains and surgical wounds

Critical care in pregnancy

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Pre-eclampsia / Eclampsia
Antepartum Haemorrhage, Postpartum Haemorrhage
Critically ill child
CPR in paediatric cardiac arrest
Heart failure
Respiratory failure
Basic neurological assessment & monitoring in ICU patient
Critical care of a burn patient
Care of Head injury patient
Advanced trauma life support
Assessment & Care of polytrauma patient

PAPER I: PERFUSION SCIENCE 2

Total class hours = 100

For PT

Pathophysiology of CPB & their relation to cardiac surgery – 50 hrs
Organ system dysfunction after Cardio Pulmonary Bypass (CPB)
Immune and inflammatory response after CPB
Neuroprotective strategies
Embolic events
Endocrine, metabolic, neurologic events
CABG – on pump, off pump, stabilizers, shunt
Blood conservation technique including cell saver
Termination of Cardio Pulmonary Bypass (CPB)

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Difficulty in weaning from CPB

Problems on Cardio Pulmonary Bypass

ASD, VSD surgery – outline

Valve surgery – mechanical and biological valves

Recent advances in CPB - 50 hrs

Neonatal cardiac surgery

Surgery for complex congenital heart diseases

Surgery for cyanotic heart diseases

Perfusion for aortic surgeries

Assist devices

Intra-Aortic Balloon Pump (IABP)

Extracorporeal membrane oxygenator (ECMO)

Ventricular Assist Device

Perfusion in minimal access cardiac surgery and robotic cardiac surgery

Perfusion in thoracic surgery

PAPER II: CLINICAL MEDICINE AND PAEDIATRICS (For all courses)

Total class hours = 100

Respiratory & cardiovascular system- 40 hrs

Examination and Investigations relevant to cardiovascular system

Ischemic heart disease

Valvular heart diseases

Common arrhythmias encountered in clinical practice

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Hypertension

Heart failure

Cardiomyopathies

Examination and Investigations relevant to respiratory system –

Asthma and COPD

Pneumonia

Pulmonary tuberculosis

Bronchiectasis

Lung abscess

Pneumothorax

Pleural effusion

Respiratory failure – types, causes and management

Carcinoma lung

Specific organ dysfunction - 50 hrs

Examination and Investigations relevant to gastrointestinal system-

Oesophageal diseases – dysphagia, hiatus hernia etc

Peptic ulcer disease

Hepatitis

Hepatic failure

Portal hypertension

Cirrhosis of liver

Inflammatory bowel disease

Abdominal tuberculosis

Anaemia

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Haemorrhagic disorders

Lymphomas

Leukemias

Thyroid disorders – hypo and hyperthyroidism

Diabetes mellitus

Examination and Investigations relevant to renal system-

Acute renal failure

Chronic renal failure

Examination and Investigations relevant to nervous system-

Convulsion

CVA

Spinal cord diseases

Myopathies – myasthenia gravis

Common poisonings including snake bite

PAEDIATRICS – 10 hrs

Growth and development of a child

Neonatal jaundice

Congenital heart diseases

PAPER III: CLINICAL SURGERY INCLUDING ORTHOPAEDICS (For all courses)

Clinical surgery - 60 hrs

Total class hours = 100

Shock

Wound, tissue repair, scar

Surgical infection

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Preoperative preparation
Principles of minimal access surgery
Trauma – assessment and management
Trauma to neck and spine, chest, abdomen, limbs
Burns
Clinical examination of a surgical patient
Skin and subcutaneous tissue
Thyroid
Vascular disorders
Hernias
Esophageal diseases
Stomach and duodenum
Liver and biliary system – gall bladder disease
Pancreas – pancreatitis, carcinoma
Spleen
Intestine – various surgical diseases – obstruction
Appendix
Rectum and anal canal diseases
Kidney, ureter, bladder, urethra
Stone diseases
Neoplastic diseases of urinary tract

Orthopaedic surgery – 40 hrs
Fractures and dislocations

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Upper limb – fractures
Spine diseases
Hip disorders
Lower limb - fractures
Plaster
Peripheral nerve injuries

PAPER IV: GYNAECOLOGY, OBSTETRICS, OPHTHALMOLOGY, ENT

Total class hours = 100

Gynaecology & Obstetrics - 70 hrs

Menstrual cycle, Puberty, Menopause
Abnormalities of menstruation
Gynaecological examination and specific investigations
Benign lesions of genital system- Fibroid, Polyps, Ovarian cysts etc
Malignant lesions of genital system – Cervix, Endometrial, Ovarian etc
Diagnosis of pregnancy
Antenatal period
Abortion
MTP
Ectopic pregnancy
Eclampsia
High risk pregnancy
Intra uterine growth retardation (IUGR)
Intra uterine fetal death

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Normal labour

Caesarean section

Abnormalities in various stages of labour including

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OPHTHALMOLOGY – 10 hrs

Anatomy of eye

Cataract

Glaucoma

Retinal diseases

Blindness – causes, prevention

Various eye surgeries – outline

OTORHINOLARYNGOLOGY – 20 hrs

Anatomy of ear, nose and throat

Deafness – types and causes

Diseases of middle ear – otitis media

Diseases of nasal septum

Nasal polyps

Epistaxis

Tonsils

Pharyngitis, retro and parapharyngeal abscesses

Laryngitis

Foreign bodies in throat

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