

SUMANDEEP VIDYAPEETH

(Declared as Deemed to be University under Section 3 of the UGC Act 1956)

Accredited by NAAC with a CGPA of 3.53 out of four-point scale at 'A' Grade

Category – I deemed to be university under UGC Act - 2018

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CURRICULUM Bachelor of Science (B.Sc) PERFUSION CARE TECHNOLOGY

Attested CTC

Charaney
15/2/2021

Vice-Chancellor

Sumandeep Vidyapeeth

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AMENDED UP TO DECEMBER -2020

INTRODUCTION

Scope

The quality of paramedical care has improved tremendously in the last few decades due to the advances in technology, thus creating fresh challenges in the field of healthcare. It is now widely recognized that health service delivery is a team effort involving both clinicians and non-clinicians, and is not the sole duty of physicians and nurses. Professionals that can competently handle sophisticated machinery and advanced protocols are now in high demand. In fact, diagnosis is now so dependent on technology, that paramedical and healthcare professionals are vital to successful treatment delivery.

Effective delivery of healthcare services depends largely on the nature of education, training and appropriate orientation towards community health of all categories of health personnel, and their capacity to function as an integrated team, with a range of skills and expertise, play key roles within the National Health Service, working autonomously, in multi-professional teams in various settings. All of them are first-contact practitioners and work across a wide range of locations and sectors within acute, primary and community care.

Learning goals and objectives for paramedical healthcare professionals

The learning goals and objectives of the undergraduate and graduate education program will be based on the performance expectations. They will be articulated as learning goals (why we teach this) and learning objectives (what the students will learn). Using the framework, students will learn to integrate their knowledge, skills and abilities in a hands-on manner in a professional healthcare setting. These learning goals are divided into nine key areas, though the degree of required involvement may differ across various levels of qualification and professional cadres.

Program outcomes


After completion of B.sc perfusion care technology should be able to assist physicians by diagnosing and treating diseases of the heart and blood vessels and take the images of the heart and peripheral blood vessels through both invasive and non-invasive procedures, such as catheterization, balloon angioplasty, or the use of ultrasound equipment.

Ethics and accountability

Students will understand core concepts of clinical ethics and law so that they may apply these to their practice as healthcare service providers. Program objectives should enable the students to:

- Describe and apply the basic concepts of clinical ethics to actual cases and situations
- Recognize the need to make health care resources available to patients fairly, equitably and without bias, discrimination or undue influence
- Demonstrate an understanding and application of basic legal concepts to the practice
- Employ professional accountability for the initiation, maintenance and termination of patient-provider relationships

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- Demonstrate respect for each patient's individual rights of autonomy, privacy, and confidentiality

Commitment to professional excellence

The student will execute professionalism to reflect in his/her thought and action a range of attributes and characteristics that include technical competence, appearance, image, confidence level, empathy, compassion, understanding, patience, manners, verbal and non-verbal communication, an anti-discriminatory and non-judgmental attitude, and appropriate physical contact to ensure safe, effective and expected delivery of healthcare.

Eligibility for admission:

He/she has passed the Higher Secondary (10+2) Science or a duly constituted Board with pass marks in Physics, Chemistry, Biology

Duration of the course:

Duration of the course is 4 years including 1 year internship.

Attendance:

A candidate has to secure minimum 80% attendance in overall with at least-

1. 75% attendance in theoretical
2. 80% in Skills training (practical) for qualifying to appear for the final examination.

No relaxation, whatsoever, will be permissible to this rule under any ground including indisposition etc.

Assessment:

Assessments should be completed by the academic staff, based on the compilation of the student's theoretical & clinical performance throughout the training programme. To achieve this, all assessment forms and feedback should be included and evaluated. Student must attain at least 50% marks in each Theory, Internal assessment and Practical independent/ separately for each individual subject.

Course of Instruction

Course Name	Course code	Theory (In hrs.) (Class and lab)	Practical (In hrs.) (Clinical)
First Year - Total Hours 380			
Anatomy	BPCT101	60	40
Physiology	BPCT102	60	40
Pathology & Microbiology	BPCT103	60	40
Biochemistry	BPCT104	40	40
Total		220	160
Second Year - Total Hours 340			
Applied Pharmacology	BPCT201	60	40
Applied Pathology	BPCT202	60	40
Applied Microbiology	BPCT203	40	60
Medicine Relevant to Perfusion Technology	BPCT204	40	--

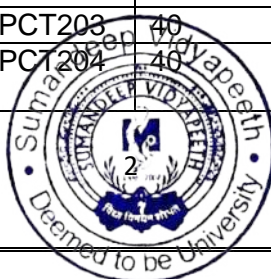
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Total		200	140
Third Year - Total Hours 720			
Introduction to Perfusion Technology- Applied	BPCT301	80	160
Perfusion Technology Clinical	BPCT302	80	160
Perfusion Technology – Advanced	BPCT303	80	160
Total		240	480
Fourth Year			
Internship (Integrated Practice) -			
Total Hours			
Internship	2184		

Scheme of Examination

Course	Course Code	Assessment			
		Hours	Internal	External	Total
First Year					
Anatomy	BPCT101	3	20	80	100
Physiology	BPCT102	3	20	80	100
Pathology & Microbiology	BPCT103	3	20	80	100
Biochemistry	BPCT104	3	20	80	100
Total			80	320	400
Second Year -					
Applied Pathology	BPCT201	3	20	80	100
Applied Microbiology	BPCT202	3	20	80	100
General Medicine	BPCT203	3	20	80	100
Applied pharmacology	BPCT204	3	20	80	100
Total			80	320	100
Third Year -					
Introduction related to Perfusion care technology	BPCT301	3	20	80	100
Clinical aspect of Perfusion care	BPCT302	3	20	80	100
Advance Perfusion care	BPCT303	3	20	80	100
Total			60	240	300

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1ST YEAR B.SC. PERFUSION CARE TECHNOLOGY

BPCT101 - ANATOMY

(60 HOURS)

Unit 1- Organization

- Terms, terminology, planes
- Tissues of the body (General) Epithelial tissue
- Glands, mucous membrane.

Unit 2- Skeletal system

- Cartilage
- Bones
- Ossification, blood supply
- Joints
- Synovial joint

Unit 3- Muscular tissue

- Muscle classification – I
- Muscle – II

Unit 4- Nervous system

- Neuron, Neuroglia
- Spinal cord & Spinal nerves
- Parts of brain & major functions
- Cranial nerves
- Autonomic nervous system

Unit 5- Sensory organs

- Nose & Olfaction
- Tongue

Unit 6- Circulation & Lymphatic

- Systemic, Pulmonary, Portal
- Heart, chambers, valves
- Coronary circulation, Venous drainage, applied
- Major branches of aorta, major veins, pulse
- Femoral and Axillary artery
- Diaphragm
- Lymphoid tissue classification, structure I
- Lymphoid tissue classification, structure II
- Lymphatic drainage, lymphatic trunks

Unit 7- Respiratory system

- Larynx, Trachea
- Pleura & lung & structure
- Bronchopulmonary segments, Para nasal sinuses

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Unit 8 - Digestive system

- Pharynx, Oesophagus
- Stomach, Duodenum
- Liver, Gall bladder, Pancreas
- Jejunum, Ileum, Appendix
- Colon, Rectum, Anal canal

Unit 9 - Urinary system)

- Kidney
- Ureter, Urinary bladder
- Prostate, Urethra

Unit 10- Endocrine system

- Thyroid, Parathyroid
- Suprarenal
- Pituitary Pancreas,

Unit 11- Reproductive system

- Female reproductive system
- Male reproductive

PRACTICALS:

(40 HOURS)

- Human skeleton
- Organ systems
- Organs – 1
- Organs – 2
- Organs – 3
- Organs – 4
- Organs – 5
- Types of Cartilages
- Bones -1
- Bones -2
- Bones -3
- Histology of compact bones
- Muscles of body as functional groups
- Histology of types of muscles

BPCT102 - PHYSIOLOGY

(60 HOURS)

Unit 1- General Physiology

- Introduction to cell physiology,
- transport across cell membrane
- Homeostasis, Body Fluid compartment & measurement

Unit 2 - Blood

- Introduction - composition and function of blood

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- Plasma proteins
- Red blood cells.
- Haemoglobin
- WBC
- Platelets
- Homeostasis
- Blood Group

Unit 3 - Nerve - Muscle Physiology

- Resting membrane potential & Action potential
- Types of muscle & Mechanism of Muscle Contraction
- Neuromuscular Junction
- Neuron and neuroglia
- Properties of nerve fibre
- Secretion & Composition & function of CSF

Unit 4 - GIT

- Movement of GIT
- Deglutition & Mechanism of Vomiting
- Digestive Juices in upper digestive tract
- Digestive juices in lower digestive tract

Unit 5 - Excretory system

- Kidneys-structure, function
- Glomerular filtration rate
- Counter current mechanism of concentration of urine,
- micturition, Diuretics
- Artificial kidney, renal function tests
- Skin
- Regulation of body Temperature

Unit 6 - Respiratory system

- Mechanism of Breathing
- Hypoxia
- O₂ and CO₂ transport
- Pulmonary volume & Capacities

Unit 7 - Cardio Vascular System

- Introduction to CVS & general principles of circulation
- Properties of Cardiac muscle
- Cardiac cycle, heart sounds, Pulse
- Cardiac output, Heart rate, BP, ECG
- Coronary circulation, Cutaneous Circulation-Triple response, Shock
- Effects of exercise on CVS and Respiratory System

Unit 8 - Lymphatic System

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Unit 9 - Endocrine System

- Hormones of pituitary, Thyroid
- Parathyroid Gland
- Hormones of Adrenal Gland & Pancreas

Unit 10 - Reproductive System

- Introduction to reproductive system, Puberty
- Male reproductive system,
- Female reproductive system,
- Physiological changes during pregnancy, pregnancy tests, parturition & lactation
- Male & Female contraceptive methods
- Special senses
- Vision
- Audition
- Olfaction
- Gustation

PRACTICALS: (40 HOURS)

- Introduction and Laboratory guidelines
- Demonstration of estimation of Hemoglobin
- Practical of estimation of Hemoglobin
- Practical of BT & CT
- Practical of Blood Grouping
- ESR & PCV
- Blood Pressure
- Pulse
- Revision
- Heart rate & heart sound
- Breathing rate & breathing sound
- Identification of blood cells by peripheral smear. RBC, WBC, Platelets.
- Revisions

BPCT103 PATHOLOGY & MICROBIOLOGY (60 HOURS)

PATHOLOGY (30 HOURS)

Unit 1 - Histo Pathology

- Introduction to Histo Pathology
- Receiving of Specimen in the laboratory
- Grossing Techniques
- Mounting Techniques – various Mountants
- Maintenance of records and filing of the slides.
- Use & care of Microscope
- Various Fixatives, Mode of action, Preparation and Indication. Section Cutting
- Tissue processing for routine paraffin sections
- Decalcification of Tissues.
- Staining of tissues - H& E Staining
- Bio-Medical waste management

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Unit 2 - Clinical Pathology

- Introduction to Clinical Pathology
- Collection, Transport, Preservation, and Processing of various clinical Specimens
- Urine Examination – Collection and Preservation of urine. Physical, chemical, Microscopic Examination
- Examination of CSF and other body fluids.
- Sputum Examination.
- Examination of feces

Unit 3 - Hematology

- Introduction to Hematology
- Normal constituents of Blood, their structure and function.
- Collection of Blood samples
- Various Anticoagulants used in Hematology
- Various instruments and glassware used in Hematology, Preparation and use of glassware
- Laboratory safety guidelines
- SI units and conventional units in Hospital Laboratory
- Hb, PCV
- ESR
- Normal Hemostasis
- Bleeding Time, Clotting Time, Prothrombin Time, Activated Partial Thromboplastin Time.

Unit 4 - Blood Bank

- Introduction
- Blood grouping and Rh Types
- Cross matching

PRACTICALS:

(20 HOURS)

- Urine Examination.
- Physical
- Chemical
- Microscopic
- Blood Grouping Rh typing.
- Hb Estimation, Packed Cell Volume[PCV], Erythrocyte Sedimentation rate{ESR}
- Bleeding Time, Clotting Time.
- Histopathology – Section cutting and H &E Staining.

MICROBIOLOGY (30 HOURS)

Unit 1: General Microbiology

- History: Louis Pasteur, Robert Koch
- Microscope: Parts, function and its types
- Morphology of bacteria: classification of microorganisms, bacteria cell, staining of bacteria-Gram and ZN stain
- Physiology of bacteria: Growth and nutrition of bacteria, Growth curve
- Sterilization and disinfection: Dry heat, moist heat sterilization, filtration, Radiation, disinfectants use in hospital
- Culture media: simple and complex media, preparation and its use

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- Culture methods: aerobic and anaerobic
- Identification of bacteria: catalase test, coagulase test, oxidase test, Urease test, IMViC TESTS

Unit-2: Immunology

- Infection
- Immunity
- Antigen
- Antibody

Unit 3: Collection, transport and processing of clinical specimens:

- Throat swab
- Sputum
- Urine
- Pus
- Blood
- CSF

Unit 4: Health care associated Infections: Sources, Method of transmission and Prevention

Unit 5: Principle and Practices of Biomedical waste management:

PRACTICALS: (20 HOURS)

- Microscope: parts function, focus, care and handling
- Hanging drop preparation
- Performance of Gram's stain
- Performance of ZN stain
- Culture media preparation: Nutrient agar, Blood agar, Chocolate agar, NA slant, MacConkey agar
- Functioning of Autoclave and Hot air oven
- Visit to hospital for the demonstration of Biomedical Waste Management
- Aseptic practices in laboratory and safety precautions

BPCT104 BIOCHEMISTRY (40 HOURS)

- Introduction and scope of Clinical Biochemistry
- Functioning Clinical Laboratory: - Role of Medical Laboratory technologist, Code of Ethics.
- Laboratory Safety including Biomedical waste disposal
- Reagents: - Preparation, Formulation, storage, safety and uses.
- Collection and Preservation of Sample/specimen & anti-coagulants
- Chemistry of Body fluids: - Blood, CSF, Urine, Milk, Bile, Gastric Juice and Saliva.
- Buffers of Body system and pH regulation.
- Glassware's & plastic ware's used in laboratory and its calibration, cleaning, care and maintenance.
- Biophysics: -Osmosis, Dialysis, Viscosity, Surface tension, Colloids and Sedimentation, Osmotic Pressure and Osmolality.
- Blood buffers and pH regulation.

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- Cell biology:- Prokaryotic and Eukaryotic, cell organelles, subcellular fraction and its function
- Chemistry and Biomedical Importance of :
- Carbohydrate
- Proteins
- Lipids
- Nucleic acid.
- Enzymes:
- Vitamins
- Minerals
- Chemistry of Body fluids: - Blood, CSF, Urine, Milk, Bile, Gastric Juice and Saliva.

PRACTICALS: (40 HOURS)

- To demonstrate glassware's, apparatus and plastic wares used in laboratory.
- Preparation of different percentage solutions
- Preparation of normal and molar solutions. (0.1 N NaOH, 0.2N HCl, 0.1 M H₂SO₄).
- Reactions of Carbohydrate
- Reactions of Protein: - Precipitation and Color reaction.
- Analysis of Normal Urine:- Physical, Chemical and Microscopic
- Analysis of abnormal Urine:- Physical, Chemical and Microscopic
- Qualitative analysis of Saliva.
- Qualitative analysis of Milk
- Qualitative analysis of Bile.
- Qualitative analysis of CSF.

2nd YEAR B.SC. PERFUSION CARE TECHNOLOGY

Each student shall undergo training in Skill Simulation Laboratory for learning certain basic clinical skills like IV/IM injection, setting IV line, Cardio-pulmonary resuscitation (CPR), and Life support skills in the beginning of second year, for duration of continuous four days. (Board of Studies letter No.:FPMS/SV/BOS-MIN/0006/2016-17, dated 19/04/2017, and vide notification of Board of Management resolution Ref.:No. SVDU/R/2017-18/5056, dated 09/01/2018).

BPCT201 - APPLIED PHRMCOLGY (60 HOURS)

- Introduction & Sources of Drug
- Routes of drug Administration
- Pharmacokinetics:
- Membrane Transport
- Absorption and Distribution of drug
- Pharmacokinetics:
- Metabolism and Excretion
- Kinetics of Elimination
- Pharmacodynamic:
- Mechanism of drug action
- Pharmacodynamic:
- Receptor Pharmacology
- Factor affecting drug action
- Autonomic Nervous System:
- Anatomy & functional organisms of ANS

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- Cholinergic drugs Part-I:
- Classification, Therapeutic uses & Side effects
- Cholinergic drugs Part-II:
- Classification, Therapeutic uses & Side effects
- Anticholinergic drugs:
- Classification, Therapeutic uses & Side effects
- Adrenergic drugs:
- Classification, Therapeutic uses & Side effects
- Antiadrenergic drugs Part-I:
- Classification Therapeutic uses
- Side effects
- Antiadrenergic drugs Part-II:
- Classification Therapeutic uses
- Side effects
- Diuretics Part-I
- Diuretics Part-II
- Drug affecting Renin-Angiotensin System:
- ACE inhibitors
- Drug affecting Renin-Angiotensin System:
- ARBs (Angiotensin Receptor Blockers)
- Antianginal drugs:
- Nitrates]
- Antianginal drugs:
- Others
- Drugs for heart failure:
- Cardiac Glycosides
- Drugs for heart failure:
- Others
- Antihypertensive drugs Part-I
- Antihypertensive drugs Part-II
- Drugs for Myocardial infarction
- Antiarrhythmic drugs
- Blood:
- Coagulants & Anticoagulants
- Thrombolytics & Antiplatelet drugs
- Lipid lowering drug
- Anti-peptic ulcer drugs like proton pump inhibitors & others
- Chemotherapy:
- Penicillin
- Chemotherapy:
- Others
- Pharmacovigilance
- Autonomic Nervous System:
- Interpretation of relevant charts.
- Cardiovascular Drugs:
- Interpretation of relevant charts

BPCT201 - APPLIED PATHOLOGY

(60 HOURS)

Unit 1 -Atherosclerosis

- Definition, risk factors, briefly Pathogenesis & morphology, clinical significance and prevention.

Unit 2 - Hypertension

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- Definition, types and briefly Pathogenesis and effects of Hypertension. Aneurysms – Definition, classification, Pathology and complications.

Unit 3 - Pathophysiology of Heart failure.

Unit 4 - Cardiac hypertrophy

- Causes, Pathophysiology & Progression to Heart Failure.

Unit 5 - Ischaemic heart diseases-

- Definition, Types. Briefly Pathophysiology, Pathology & Complications of various types of IHD.

Unit 6 - Valvular Heart diseases-

- Causes, Pathology & complication. Complications of artificial valves. Cardiomyopathy Definition, Types, causes and significance.

Unit 7 - Pericardial effusion-

- Causes, effects and diagnosis.

Unit 8 - Congenital heart diseases

- Basic defect and effects of important types of congenital heart diseases.

Unit 9 - Anemia

- Definition, morphological types and diagnosis of anemia. Brief concept about Haemolytic anaemia and polycythaemia.

Unit 10 - Leukocyte disorders-

- Briefly leukemia, leukocytosis, agranulocytosis etc

Unit 11 - Bleeding disorders-

- Definition, classification, causes & effects of important types of bleeding disorders. Briefly various laboratory tests used to diagnose bleeding disorders.

Unit 12 - Chronic obstructive airway diseases

- Definition and types. Briefly causes, Pathology and complications of each type of COPD.

Unit 13 - Briefly concept about obstructive versus restrictive pulmonary disease.

- Pneumoconiosis- Definition, types, Pathology and effects in brief.

Unit 14 - Pulmonary congestion and edema.

Unit 15 - Pleural effusion

- Causes, effects and diagnosis.

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Unit 16 - Clinical manifestations of renal diseases

- Briefly causes, mechanism, effects and laboratory diagnosis of ARF & CRS. Briefly Glomerulonephritis and Pyelonephritis.

Unit 17 - End stage renal disease

- Definition, causes, effects and role of dialysis and renal transplantation in its management.

Unit 18 - Brief concept about obstructive uropathy

BPCT203 - APPLIED MICROBIOLOGY

(40 HOURS)

Unit 1-Health care associated infections and Antimicrobial resistance

- Infections that patients acquire during the course of receiving treatment for other conditions within a healthcare setting like Methicillin Resistant Staphylococcus aureus infections, Infections caused by Clostridium difficile, Vancomycin resistant enterococci etc.
- Catheter related blood stream infections, Ventilator associated pneumonia, Catheter Related urinary tract infections, Surveillance of emerging resistance and changing flora.
- The impact and cost attributed to Hospital Associated infection.

Unit 2 - Disease communicable to Healthcare workers in hospital set up and its preventive measure

- Occupationally acquired infections in healthcare professionals by respiratory route (tuberculosis, varicella-zoster, respiratory syncytial virus etc), blood borne transmission (HIV, Hepatitis B, Hepatitis C, Cytomegalovirus, Ebola virus etc), orofecal route (Salmonella, Hepatitis A etc), direct contact (Herpes Simplex Virus etc).
- Preventive measures to combat the spread of these infections by monitoring and control.

Unit 3 - Microbiological surveillance and sampling

- Required to determine the frequency of potential bacterial pathogens including Streptococcus pneumoniae, Haemophilus influenzae, and Moraxella catarrhalis and also to assess the antimicrobial resistance. Sampling: rinse technique, direct surface agar plating technique. 6 Hours

Unit 4 - Importance of sterilization:

- Disinfection of instruments used in patient care: Classification, different methods, advantages and disadvantages of the various methods.
- Disinfection of the patient care unit
- Infection control measures for ICU's 10 Hours

Unit 5 - Sterilization

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- Rooms: Gaseous sterilization, one atmosphere uniform glow discharge plasma (OAugDP).
- Equipment's: classification of the instruments and appropriate methods of sterilization.
- Central supply department: the four areas and the floor plan for instrument cleaning, high-level disinfecting and sterilizing areas.

Unit 6 - Preparation of materials for autoclaving

- Packing of different types of materials, loading, holding time and unloading. 4 Hours

PRACTICALS

(60 HOURS)

- Principles of autoclaving & quality control of Sterilization.
- Collection of specimen from outpatient units, inpatient units, minor operation theater and major operation theater for sterility testing.
- The various methods employed for sterility testing.
- Interpretation of results of sterility testing.
- Disinfection of wards, OT and Laboratory.

BPCT204 - MEDICINE RELEVANT TO PERFUSION TECHNOLOGY

(40 HOURS)

- General Medicine
- Introduction
- Cardiovascular System:
- Ischemic Heart Disease
- Cardiovascular System:
- Rheumatic Heart Disease
- Cardiovascular System:
- Hypertension
- Cardiovascular System:
- Ischemic Heart Disease and LV Failure
- Cardiovascular System:
- Congenital Heart Disease
- Cardiovascular System:
- Pulmonary hypertension
- Cardiovascular System:
- Pulmonary Oedema
- Peripheral Vascular Disease
- Hematology:
- Iron Deficiency Anemia
- Hematology:
- Other Anemias
- Hematology:
- Bleeding disorders and diagnostic laboratory tests
- Respiratory System:
- Chronic Obstructive Pulmonary Disease(COPD)
- Respiratory System:
- Obstructive vs Restrictive Lung Disease and PFT
- Renal System:
- ARF, CRF and End stage Renal Disease
- Renal System:

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- Role of Dialysis, Renal transplantation and its management
- Autonomic Nervous System
- Central Nervous System Disorders and their Etiology
- Diabetes Mellitus
- Obesity
- Pregnancy
- Elderly Patients
- Paediatric Patient

3rd YEAR B.SC. PERFUSION CARE TECHNOLOGY

BPCT301 - INTRODUCTION TO PERFUSION TECHNOLOGY-APPLIED (80 HOURS)

Unit 1 -Basics of diagnostic techniques

- Chest of X-ray .ECG. Echo. Angiography. Nuclear Cardiology. Laboratory investigations in relation to perfusion technology. Cardiopulmonary bypass and perfusion technology

Unit 2 History of Cardiac surgery and perfusion

- Specific reference of Gibbon Lillehei, carrel. Pre CPB surgery
- Azygous Flow principle.
- Hypothermic/ non hypothermic non-CPB surgery including gross's.Well technique and controlled cross circulation.

Unit 3 - Monitoring and instrumentation

- Concepts of monitoring – instrumentation technology of ECG machine, pressure transducer, syringe and peristaltic pumps, monitors, ventilators, pulse oximeters, temperature probes and thermo regulatory monitoring, defibrillators and fibrillators. Piped and non-piped gas delivery systems and connections. Basic physics related to medically used gases.

Unit 4 Hemodynamic monitoring hemostatic monitoring

- Haematologic monitoring

Unit 5 - Maintenance of oxygen, carbon dioxide and acid-base status and their monitoring Neurological monitoring (SSPE, EEG and cerebral function monitor)

Unit 6 - Cardiac surgery team, profession and terminology, scope of perfusion technology

- Physiology of Extracorporeal circulation
- Heart – Lung machine
- Principles of extracorporeal circulation Materials used in EC circuit
- Principles of extracorporeal gas exchange
- Various types of oxygenators
- Bubble oxygenators
- Rotating spiral/cylinder/disc oxygenators Membrane oxygenators
- Mechanism of action components deaerating, rated flow.

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- Theory of blood pumps
- Ideal blood pump, pulsatile versus non-pulsatile flow, occlusive and non-occlusive pumps, various types of pumps roller, bellow, sigma motor, diaphragm, ventricular and centrifugal pumps.
- Element of extracorporeal circulation/hazards of:
 - blood failure
 - Bubble trap
 - Flow meters
 - Temperatures
 - Heat exchanger
 - Regulating devices
- Connection of the vascular system with extracorporeal circulation:
 - Arterial and venous cannulae.
 - Connecting tubes and connectors Vents
 - Suckers
 - Cardioplegia delivery system Venous drainage.
- Hemodynamic of arterial return, venous drainage, cardioplegia Delivery and venting. Blood banking, handling of blood products and their management. Blood components and their use.

BPCT302 - PERFUSION TECHNOLOGY CLINICAL

(80 HOURS)

- Pharmacokinetics and Pharmacodynamics of Cardiopulmonary bypass
- Drugs (including anesthetic drugs) used in cardiopulmonary bypass
- Conduct and monitoring of Cardiopulmonary bypass
- Adequacy of perfusion – General considerations, specific aspects of perfusion, monitoring, other concomitants which may affect its adequacy
- Pulsatile perfusion – Introduction, theory & physiology of pulsatile flow, hemodynamic, metabolic effects, Clinical use, hematological effects
- Cannulation techniques during cardiopulmonary bypass
- Termination of cardiopulmonary bypass – principles and methodology
- Myocardial protection and cardioplegia- pretreatment of the Myocardium, cardioplegia, hypothermia, controlled reperfusion, myocardial protection for specific clinical problems, Complications of cardioplegia. Non cardioplegic methods during cardiac surgery on cardiopulmonary bypass
- Oxygenation – general consideration, bubble & membrane (including assessment and comparison of oxygenator function)
- Heat exchangers-principles function of heat exchangers & their assessment. Complications related to heat exchange and their management
- Priming fluids and hemodilution

PERFUSION TECHNOLOGY – APPLIED

Unit 1 - Blood cell trauma

- Analysis of forces of fluid motion, effects of physical forces of blood cell, clinical effect. Complications of blood transfusion.

Attested CTC

Unit 2 - Anticoagulation on bypass, its monitoring, its reversal and complications.

- Heparin less bypass. Platelet aggregation and platelet dysfunction. Coagulopathies due to cardiopulmonary bypass and its management.

Signature
15/2/2021

Vice-Chancellor

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Unit 3 - Inflammatory response to cardiopulmonary bypass & its clinical effects.

- Methods to minimize the same. Immune response, neuroendocrine, renal, metabolic splanchnic response, pulmonary response and electrolyte response to cardiopulmonary bypass

Unit 4 - Blood conservation hemofiltration & dialysis during cardiopulmonary bypass including modified ultra-filtration reverse autologous priming and other methods

Unit 5 - Micro emboli

- Gaseous and particulate, filters used in cardiopulmonary bypass circuit.

Unit 6 - Counter pulsation techniques and assist devices

BPCT303 0 PERFUSION TECHNOLOGY – ADVANCED (80 HOURS)

Unit 1 - Perfusion techniques for Paediatric cardiac surgery

Unit 2 - ECMO

- Special perfusion techniques for special cardiac surgeries and medical conditions (including thoracic aortic surgeries deep hypothermia and circulatory arrest). Perfusion for non-cardiac surgery, invasive cardiology and outside the operation suite.

Unit 3 - Perfusion as a method of cardiopulmonary bypass

Unit 4 - Complications and safety during cardiopulmonary bypass

- Bypass safety, organizational aspects, accidents, coagulopathies, mechanical and electrical failures, perfusion management, perfusion systems, safety for the perfusionist and surgical team management of perfusion accidents.

Unit 5 - Minimally invasive surgery and the perfusionist

Unit 6 - Recent advances in perfusion techniques

Unit 7 - Experimental perfusion

4th YEAR B.SC. PERFUSION CARE TECHNOLOGY

Internship (Integrated Practice)

(Total Hours 2184)

The internship will span for 1 Year. This will include 6 hours of practice a day, totaling to 2184 hours during internship year. As a part of this, the students will maintain a work logbook which will be duly endorsed by the supervisor or trainer. At the end of internship, the candidate shall submit the work log book along with certificate from the training institute.

The internship time period provides the students the opportunity to continue to develop confidence and increased skill in clinical delivery of services. Students will demonstrate competence in beginning and intermediate procedures. Students will observe the advanced and specialized procedures. The student will complete the clinical training by practicing all the skills learned in classroom and clinical instruction. The students are

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expected to work for minimum 6 hours per day and this may be more depending on the need and the healthcare setting.

CODE OF PROFESSIONAL CONDUCT

INTRODUCTION

The Code of Professional Conduct is designed and set out as guidance for clinical practitioner within the relationship that exists with every patient receiving health care.

Essential to that relationship is the patient's trust in the practitioner. This trust hangs upon the patient's assurance of being the practitioner's first concern during their clinical encounter, and upon the patient's confidence that the care received will be competent, whether in diagnosis, therapy or counseling.

STANDARD OF PRACTICE AND CARE

Patients are entitled to the highest standard of practice and care. The essential elements of this are professional competence, good relationships with patients and colleagues and observance of professional ethical obligations.

In providing care you must therefore:

- recognise the limits of your professional competence.
- be willing to consult colleagues
- keep clear, accurate and contemporaneous patient records which report the relevant findings.
- keep colleagues informed.
- pay due regard to the efficacy and the prudent use of resources.
- be competent, truthful, and accurate, when reporting on investigations.
- be competent when giving or arranging treatment.

Patients rights

- listen to patients and respect their views.
- treat patients politely and considerately.
- respect patients' privacy and dignity.
- give information to patients in a way they can understand.
- respect the right of patients to be fully involved in decisions about their care.
- respect the right of patients to refuse treatment or to take part in teaching or research, reporting the refusal to the person requesting the procedure.
- respond to complaints promptly and constructively.
- ensure that your views about a patient's life style, culture, beliefs, race, colour, sex, sexuality, age, social status, or perceived economic worth, do not prejudice the service you give.

CONFIDENTIALITY

Patients have a right to expect that you will not pass on any personal information which you learn in the course of your professional duties, unless they agree



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