



**REVISED SYLLABUS & CURRICULUM**

**w.e.f. 2022-2023 onwards**

**FOR**

**BS- ALLIED HEALTH SCIENCES (BS AHS)**

**(Four Year Degree Program)**

- A: BS AHS (Pathology Lab Sciences)**
- B: BS AHS (Surgery / OT Lab Sciences)**
- C: BS AHS (Radiology Lab Sciences)**
- D: BS AHS (Public Health Lab Sciences)**

**Department of Allied Health Sciences  
Sargodha Medical College Campus  
University of Sargodha  
Sargodha**

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Department of Allied Health Sciences  
Sargodha Medical College  
University of Sargodha

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## **B: BS AHS (Surgery / OT Lab Sciences)**

Surgery/Operation Theatre Technologists are the professionals who have the technical expertise in a wide variety of disciplines to help the surgeons in various surgical procedures. OT technology/sciences play a critical role in the healthcare for operating procedures and other surgical modalities.

### **GOALS OF THE PROGRAMME:**

The purpose of BS surgery/OT lab sciences program is to prepare operation theatre technologists who will:

1. Support the multidisciplinary team in providing a safe, high quality environment for the carrying out of surgical procedures by assisting in patient preparation for surgery, Supporting and observing the patient throughout the operation and assist in measuring & recording of fluid input and output.
2. Work as part of the multidisciplinary team for the benefit of the patient, appreciating each member of the team's needs and role.
3. Anticipate the needs of the surgical team and responding effectively.
4. Safely handle, record and use instruments in line with Policy.
5. Dispose of clinical waste safely and appropriately in line with Policy.
6. Capture and maintaining patient data / documentation and any information required for auditing / quality issues.
7. Utilize communication skills, prepare the environment and equipment and act as a link between the surgical team and other parts of the theatre and hospital.
8. Assist the Registered Practitioner in the handover of the patient to the recovery staff, providing appropriate information and documentation.
9. Notifies appropriate health physicians when immediate clinical response is necessary based on emergency in Operation Theater.
10. Involvement in research and development.

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## OBJECTIVES OF THE PROGRAMME:

Graduates of the surgery/OT lab sciences programme will:

1. Be the primary member of surgical team involved in surgical procedures.
2. Serve as responsible members in the professional community and are willing and able to assume leadership roles in the communities they serve.
3. Advocate evidence based practice and participate in high quality research programs.
4. Practice respecting the social, economic and cultural issues of practice and effectively advocate for changes in policy
5. Integrate theoretical and practical knowledge and should be creative and adaptive to different working environments.
6. Participate in continuous education for communities, patients, peers, students and others.

### BS SUR/OT Curriculum/Syllabus

#### 1<sup>st</sup> YEAR

Sr. No.	Subject Title	Theory Marks	Practical / Clinical & G. Viva Marks	Total Marks
1	ANATOMY I	100	100	200
2	PHYSIOLOGY I	100	100	200
3	BIOCHEMISTRY & GENETICS I	100	100	200
4	FUNDAMENTALS OF SURGERY/OT	100	100	200
5	ENGLISH	100	Not Applicable	100
6	INTRODUCTION TO COMPUTER	100	Not Applicable	100
	<b>TOTAL</b>	<b>600</b>	<b>400</b>	<b>1000</b>

#### 2<sup>nd</sup> YEAR

Sr. No.	Subject Title	Theory Marks	Practical / Clinical & G. Viva Marks	Total Marks
1	ANATOMY II	100	100	200
2	PHYSIOLOGY II	100	100	200
3	BIOCHEMISTRY & GENETICS II	100	100	200

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4	MEDICAL INSTRUMENTATIONS	100	100	200
5	ISLAMIC STUDIES	100	Not applicable	100
6	PAKISTAN STUDIES	100	Not applicable	100
	<b>TOTAL</b>	<b>600</b>	<b>400</b>	<b>1000</b>

### 3<sup>rd</sup> YEAR

Sr. No.	Subject Title	Theory Marks	Practical / Clinical & G. Viva Marks	Total Marks
1	GENERAL PATHOLOGY AND MICROBIOLOGY	100	100	200
2	PHARMACOLOGY	100	100	200
3	ANESTHESIA AND PATIENT CARE MANAGEMENT	100	100	200
	<b>TOTAL</b>	<b>300</b>	<b>300</b>	<b>600</b>

### 4<sup>th</sup> YEAR

Sr. No.	Subject Title	Theory Marks	Practical / Clinical & G. Viva Marks	Total Marks
1	SCIENTIFIC INQUIRY, BIostatISTICS, RESEARCH METHODOLOGY	100	Not applicable	100
2	SURGICAL PROCEDURES	100	100	200
3	OPERATION THEATRE MANAGEMENT	100	100	200
	<b>TOTAL</b>	<b>300</b>	<b>200</b>	<b>500</b>
	RRESEARCH REPORT WRITING	Qualifying		

#### Note:

1. There shall be 01 Question Paper in each subject having an equal contribution from all sections.
2. 10% marks are reserved for internal assessment based upon 3-5 Class Tests average, Class attendance, and Overall performance.

#### **CREDIT ACCUMULATION AND TRANSFER SYSTEM (CAT)**

A Credit accumulation and transfer system is a systematic way of describing an educational program based upon its components. Credit hour or credit unit is basically the academic currency of the academic activities.

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Title	Recommended	Actual		
		Teaching	Clinical/Lab work	Total
1. Contact hours 1500-1800 hrs/year 2. 25-30 Contact hours = 01 credit point 3. Number of credit points in a year= 55-60	1500-1800 hours/year	1500+1500+1200+1300=5500	300+600=900	6400/4=1600 hours/year

### DIVISION OF STUDY HOURS

#### 1<sup>st</sup> YEAR

Sr	Subject Title	Theory	Practical
1	Anatomy I	200	100
2	Physiology I	200	100
3	Biochemistry & Genetics I	200	100
5	Fundamentals of Surgery/OT	200	200
6	English	100	--
7	Introduction to Computer	100	--
	<b>TOTAL</b>	<b>1500</b>	

#### 2<sup>nd</sup> YEAR

Sr	Subject Title	Theory	Practical
1	Anatomy II	200	100
2	Physiology II	200	100
3	Biochemistry & Genetics II	200	100
5	Medical Instrumentations	200	200
6	Islamic Studies	100	--
7	Pakistan Studies	100	--
	<b>TOTAL</b>	<b>1500</b>	

#### 3<sup>rd</sup> YEAR

Sr	Subject Title	Theory	Practical
1	General Pathology and Microbiology	200	200
2	Pharmacology	200	200
3	Anesthesia and Patient Care Management	200	200
	<b>TOTAL</b>	<b>1200</b>	

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4<sup>th</sup> YEAR

Sr	Subject Title	Theory	Practical
1	Scientific Inquiry, Biostatistics, Research Methodology	200	--
2	Surgical Procedures	200	200
3	Operation Theatre Management	200	200
4	Research Report Writing	300	
	<b>Total</b>	<b>1300</b>	

BREAK DOWN OF HOURS OF CLINICAL PRACTICE/CLINICAL ROTATIONS

Year	Ward/Clinic	Hours	Period
3 <sup>rd</sup> Year	Clinical Rotation	300	06 Months
4 <sup>th</sup> Year	Clinical Rotation	600	06 Months
	<b>TOTAL</b>	<b>900</b>	

Grand Total

<b>G. TOTAL ( Theory + Practical + Report + Clinical)</b>	<b>6400</b>
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Note:

\*2/3<sup>rd</sup> of the clinical training shall be provided in the morning whereas 1/3<sup>rd</sup> shall be provided in the evening. There shall be 02 months of summer vacations in an academic session.

1. PAPER PATTERNS & MARKS DISTRIBUTION OF UNIVERSITY EXAMINATIONS

PAPER PATTERN

- I     **TOTAL MARKS = 100** (having Theory Section only)  
 II    **TOTAL MARKS = 200** (having Theory + Practical & G. Viva)

*I- TOTAL MARKS = 100 (having Theory only)*

<b>THEORY (100 marks)</b>			
Question	No of Questions	Marks for each Stem	Total marks
<b>Question 01:MCQs</b> (20 stems with 04 possible options only 01 correct)	01	01	01x20 = 20
<b>Question 02 to 09: SEQs</b> (Requiring short answer of all)	08	05	08x05 = 40
<b>Question 10 to 12: LEQs</b> (Requiring detailed answer of any 02 Qs)	02	15	02x15 = 30
<b>Total Marks</b>			<b>90</b>
<b>INTERNAL ASSESSMENT (10 MARKS)</b>			
Internal assessment Theory part			10
<b>Total Marks</b>			<b>10</b>
<b>Grand Total Marks</b>			<b>100</b>

*II- TOTAL MARKS = 200 (having both Theory and Practical & General Viva)*

<b>WRITTEN /THEORY (100 marks)</b>			
Question	No of	Marks for each	Total marks

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	Questions	Stem	
Question 01:MCQs (20 stems with 04 possible options only 01 correct)	01	01	01x20 = 20
Question 02 to 09:SEQs (Requiring short answer of all)	08	05	08x05 = 40
Question 10 to 12:LEQs (Requiring detailed answer of any 02 Qs)	02	15	02x15 = 30
<b>Total Marks</b>			<b>90</b>
<b>PRACTICAL (40 marks)</b>			
Marks for Internal			20
Marks for External			20
<b>Total Marks</b>			<b>40</b>
<b>G.VIVA (50 marks)</b>			
Marks for Internal			25
Marks for External			25
<b>Total Marks</b>			<b>50</b>
<b>INTERNAL ASSESSMENT (20 MARKS)</b>			
Internal assessment Theory part			10
Internal assessment Practical part			10
<b>Total Marks</b>			<b>20</b>
<b>Grand Total Marks</b>			<b>200</b>

**Note:**

Passing marks in each paper will be at least 50% in theory and 50% in practical/viva voice (in the case of practical subjects).

**DETAILED COURSE OUTLINE SURGERY/OT LAB SCIENCES**

**1st Year**

1. Anatomy I	200 Marks
2. Physiology I	200 Marks
3. Biochemistry & Genetics I	200 Marks
4. Fundamentals of Surgery/OT	200 Marks
5. English	100 Marks
6. Introduction to Computer	100 Marks
<b>Total Marks</b>	<b>1000 Marks</b>

**ANATOMY I**

**COURSE DESCRIPTION**

The main aim of this course is to train and teach the students of first year BS degree program in such a way that they can practically apply the concepts of this subject which forms the firm foundation for the art of healing (medicine). The curriculum equips the students with the clear and comprehensive study of human body structural organization. The knowledge sharing is done with the students as it is the science of macro/micro structure and forms of the human body. The topics

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within the domain of anatomy include general anatomy, histology or microscopic anatomy, embryology or developmental anatomy, regional or gross anatomy which highlights the importance of the study of structural anatomy. Our teaching methodology involves group discussions, lectures and practical. At the end of the course study, the student will be able to understand the basic knowledge of upper limb, lower limb and thorax of the human body.

## LEARNING OBJECTIVES

- Define basic technical terminology and language associated with anatomy
- Describe the structure, composition and functions of the organs in the human body
- Comprehend the concepts (& associated principles) for each general type of anatomical structures
- Demonstrate skills in the surface markings of clinically important structures, on normal living bodies and the correlation of structure with function
- Describe concepts of embryology and histology
- Identify histological slides of the human body
- Describe the interdependency and interactions of the structural and functional components of upper limb

## COURSE CONTENTS:

### CELL BIOLOGY

### GENERAL ANATOMY

Terms related to position and movements, the skin and subcutaneous tissues, Layers of skin, Integuments of skin, Glands associated with hair follicle, Microscopic picture of skin

### BONES AND CARTILAGES

Osteology, Functions of Bones, Classification of bones, Parts of developing long bones, Blood supply of bones, Lymphatic vessels & nerve supply, Rule of direction of nutrient foramen, Gross structure of long bone, Surface markings, Cartilage, Development of bone and cartilage and Microscopic picture of cartilage and bone

### THE MUSCLE

Introduction, Histological Classification, Functions of muscles in general, Type of skeletal muscles, Parts of skeletal muscle and their action and Nomenclature and Microscopic picture of muscle

### STRUCTURES RELATED TO MUSCLES & BONES

Tendons, Aponeurosis, Fasciae, Synovial bursae, Tendon Synovial sheaths, Rapaes, Ligaments, Condyle, Epicongyle, Ridge, Tuberosity, Tubercle, Foramen, Canal, Groove, Process and Spur

### THE JOINTS

Introduction, Functional classifications, Structural classification, Structures comprising a Synovial joint, Movements of joints, Blood supply of Synovial joints, their nerve supply and lymphatic drainage and Factors responsible for joint stability and Development of joints

### CARDIOVASCULAR SYSTEM

Definition, Division of circulatory system into pulmonary & systemic, Classification of blood vessels and their microscopic picture and Heart and its histology and Function of the Heart and Anastomosis

### NERVOUS SYSTEM

Definition, Outline of cellular architecture, Classification of nervous system, Parts of the central nervous system, Microscopic picture of cerebrum, cerebellum, spinal cord, Functional components

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of a nerve, Typical spinal nerve and Microscopic picture of nerve and Introduction of autonomic nervous system and Anatomy of neuromuscular junction

### UPPER LIMB

#### OSTEOLOGY:

Detailed description of all bones of upper limb and shoulder girdle along their musculature and ligamentous attachments

#### MYOLOGY

Muscles connecting upper limb to the axial skeletal, Muscles around shoulder joint, Walls and contents of axilla, Muscles in brachial region, Muscles of forearm, Muscles of hand, Retinacula and Palmar aponeurosis and Flexor tendon dorsal digital expansion

#### NEUROLOGY

Course, distribution and functions of all nerves of upper limb and Brachial plexus

#### ANGIOLOGY (CIRCULATION).

Course and distribution of all arteries and veins of upper limb, Lymphatic drainage of the upper limb and Axillary lymph node and Cubital fossa

#### ARTHROLOGY

Acromioclavicular and sternoclavicular joints, Shoulder joint, Elbow joint, Wrist joint, Radioulnar joints. Inter carpal joints, Joints MCP and IP and Surface Anatomy of upper limb, and Surface marking of upper limb

#### DEMONSTRATIONS:

Demonstration on Shoulder joint, attached muscles and articulating surfaces, Demonstration on Elbow joint, Demonstration on Wrist joint, Demonstration on Radioulnar joint, Demonstration on MCP and IP joints, Demonstration on acromioclavicular joint, Demonstration on sternoclavicular joint and Demonstration on Brachial plexus and Demonstration on Structure of bones

### THORAX

#### STRUCTURES OF THE THORACIC WALL:

Dorsal spine (Vertebrae), Sternum, Costal Cartilages & Ribs, Intercostal Muscles, Intercostal Nerves. Diaphragm, Blood supply of thoracic wall and Lymphatic drainage of thoracic wall and Joints of thorax

#### THORACIC CAVITY:

Mediastinum, Pleura, Trachea, Lungs, Bronchopulmonary segments, Pericardium, Heart – Its blood supply, venous drainage & nerve supply, Large veins of thorax, superior and inferior vena cava., pulmonary veins brachiocephalic veins and Large Arteries – Aorta & its branches

### LOWER LIMB

#### OSTEOLOGY

Detailed description of all bones of lower limb and pelvis along their musculature and ligamentous attachments.

#### MYOLOGY

Muscles of gluteal region, Muscles around hip joint, Muscles of thigh (anteriorly, posteriorly, laterally and medially) and Muscles of lower leg and foot

#### NEUROLOGY

Course, distribution, supply of all nerves of lower limb and gluteal region and Lumbosacral plexus.

#### ANGIOLOGY

Course and distribution of all arteries, veins and lymphatic drainage of lower limb

#### ARTHROLOGY

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Pelvis, Hip joint, Knee joint, Ankle joint, Joints of the foot, Surface Anatomy of lower limb and Surface marking of lower limb

#### GENERAL HISTOLOGY

Cell, Epithelium, Connective tissue, Bone, Muscles tissue, Nervous tissues, Blood vessels, Skin and appendages and Lymphatic organs

#### GENERAL EMBRYOLOGY:

Male and female reproductive organs, Cell division and Gametogenesis, Fertilization, cleavage, blastocyst formation and implantation of the embryo. Stages of early embryonic development in second and third week of intrauterine life, Foetal membrane (amniotic cavity, yolk sac, allantois, umbilical cord and Placenta) and Developmental defects

### Practical

During study of Gross Anatomy, emphasis should be given on applied aspect, radiological anatomy, surface anatomy and cross-sectional anatomy of the region covered in respective year.

#### RECOMMENDED BOOKS

1. *Gray's Anatomy* by Prof. Susan Standring 39th Ed.,
2. Elsevier, *Clinical Anatomy for, Medical Students* by Richard S.Snell,
3. *Clinically Oriented Anatomy* by Keith Moore,
4. *Clinical Anatomy* by R.J. Last, Latest Ed,
5. *Cunningham's Manual of Practical Anatomy* by G.J. Romanes, 15th Ed., Vol-I
6. *The Developing Human. Clinically Oriented Embryology* by Keith L. Moore, 6th Ed, *Wheater's Functional Histology* by Young and Heath,
7. Latest Ed, *Medical Histology* by Prof. Laiq Hussain, *Neuroanatomy* by Richard S.Snell.

## PHYSIOLOGY I

### COURSE DESCRIPTION:

Physiology is the integrative study of cellular and whole-body function and is the pivotal discipline linking other basic biomedical sciences on the one hand with the experimental and clinical medicine on the other. The course is designed to explain the physical and chemical mechanisms that are responsible for the origin, development, and progression of life. Two approaches are used to explain events that occur in the human body; one emphasizes the purpose of a body process and the other emphasizes the underlying mechanism by which this process occurs. Physiologists, however, explain how processes occur in the body in terms of cause and- effect sequences of physical and chemical processes. Emphasis in the course will be on normal structure and function of the human body and the approach will be to develop an understanding of the integrative nature of physiological systems to maintain the internal environment of the body within very narrow limits compatible with life.

### LEARNING OBJECTIVES

- Define the terminology related to the structure and function of the human body systems
- Compare and contrast the structural and functional characteristics of the various human body cells
- Describe basic chemical concepts and principles as they apply to the structure and functioning of the blood and neuromuscular system

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- Analyze the interrelationships of body organ systems, homeostasis, and the complementarity of structure and functioning of the blood and neuromuscular system
- Demonstrate advance techniques to investigate the body and interpret data to be used for diagnosis and treatment
- Define the principles behind medical instrumentation and their usage

## COURSE CONTENTS

### BASIC AND CELL PHYSIOLOGY

Functional organization of human body, Homeostasis, Control systems in the body, Cell membrane and its functions, Cell organelles and their functions and Genes: control and function

### NERVE AND MUSCLE

Structure and function of neuron, Physiological properties of nerve fibers, Physiology of action potential. Conduction of nerve impulse, Nerve degeneration and regeneration. Synapses, Physiological structure of muscle, Skeletal muscle contraction, Skeletal, smooth and cardiac muscle contraction. Neuromuscular junction and transmission, Excitation contraction coupling, Structure and function of motor unit

#### Clinical Module

Perform nerve conduction studies and explain their clinical importance. Myopathies and neuropathies. Peripheral nerve injuries

### CARDIOVASCULAR SYSTEM

Heart and circulation, Function of cardiac muscle, Cardiac pacemaker and cardiac muscle contraction, Cardiac cycle, ECG: recording and interpretation. Common arrhythmias and its mechanism of development, Types of blood vessels and their function, Haemodynamics of blood flow (local control systemic circulation its regulation and control). Peripheral resistance its regulation and effect on circulation, Arterial pulse, Blood pressure and its regulation, Cardiac output and its control, Heart sounds and murmurs Importance in circulation and control of venous return. Coronary circulation, Splanchnic, pulmonary and cerebral circulation, Clinical Module

Clinical significance of cardiac cycle, correlation of ECG and heart sounds to cardiac cycle. Clinical significance of cardiac cycle, interpretation of ischemia and arrhythmias. Effects of hypertension. Clinical significance of heart sounds. Effects of ischemia. Shock

### RESPIRATORY SYSTEM

Function of respiratory tract, Respiratory and non-respiratory function of the lungs, Mechanics of breathing. Production & function of surfactant and compliance of lungs, Protective reflexes, Lung volumes and capacities including dead space, Diffusion of gases across the alveolar membrane, Relationship between ventilation and perfusion. Mechanism of transport of oxygen and carbon dioxide in blood, Nervous and chemical regulation of respiration, Abnormal breathing, Hypoxia, its causes and effects, Cyanosis, its causes and effects

#### Clinical Module

Clinical importance of lung function tests. Causes of abnormal ventilation and perfusion. Effects on pneumothorax, pleural effusion, and pneumonia. Respiratory failure. Artificial respiration and uses & effects of O<sub>2</sub> therapy. Clinical significance of hypoxia, cyanosis, and dyspnoea

### BLOOD

Composition and general functions of blood, Plasma proteins their production and function, Erythropoiesis and red blood cell function, Structure, function, production and different types of haemoglobin, Iron absorption storage and metabolism, Blood indices, Function, production and type of white blood cells, Function and production of platelets, Clotting mechanism of blood, Blood groups and their role in blood transfusion, Complications of blood transfusion with reference to ABO & RH incompatibility, Components of reticuloendothelial systems, gross and microscopic structure including tonsil, lymph node and spleen, Development and function of reticuloendothelial system

#### Clinical Module

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Anemia and its different types. Blood indices in various disorders. Clotting disorders. Blood grouping and cross matching. Immunity

## SKIN AND BODY TEMPERATURE REGULATION + SPORT PHYSIOLOGY

### Practical

#### HEMATOLOGY

Use of the microscope. Determination of haemoglobin. Determination of erythrocyte sedimentation rate. Determining packed cell volume. Bleeding and clotting time tests. RBC count. Red cell indices. WBC count. Leukocyte count. Prothrombin and thrombin time

#### RESPIRATORY SYSTEM

Clinical examination of chest. Pulmonary volume, their capacities and clinical interpretation. Stethography

#### CARDIOVASCULAR SYSTEM

Cardiopulmonary resuscitation (to be coordinated with the department of medicine), Examination of arterial pulse, ECG recording and interpretation, Arterial blood pressure, Effects of exercise and posture on blood pressure, Apex beat and normal heart sounds

### RECOMMENDED BOOKS

1. Textbook of Physiology by Guyton and Hall, Latest Ed.
2. Review of Medical Physiology by William F. Ganong, Latest Ed.
3. Physiology by Berne and Levy, Latest Ed.
4. Human Physiology: The Basis of Medicine by Gillian Pocock, Christopher D. Richards
5. Physiological Basis of Medical Practice by John B. West and Taylor, 12<sup>th</sup> Ed.

## BIOCHEMISTRY & GENETICS I

### COURSE DESCRIPTION

The knowledge and skills in fundamental and introductory biochemistry is provided that are essential for further studies. This course provides a basic understanding of life processes at the biochemical molecular level. It provides an understanding of the normal biochemical processes in the human body in which the function of the various organs and tissues are integrated. It covers introduction to the biomolecules i.e. amino acid, proteins carbohydrates, fats, enzymes and nucleic acids, and the nutritional biochemistry concludes the course. It also familiarizes the students with laboratory instruments / equipment used in biochemistry laboratory.

### LEARNING OBJECTIVES

At the end of the course, the student should be able to demonstrate his knowledge and understanding on the subject with following learning objectives:

- Describe molecular and functional organization of a cell, and sub-cellular components in the context of chemistry and human biochemistry.
- Basic knowledge of structure, function and interrelationship of biomolecules and consequences of deviation from normal.
- Learning and understanding the properties, classification and functions of biomolecules with emphasis on amino acid, peptides, proteins, carbohydrates, lipids and nucleic acid.
- Having a clear understanding of the fundamental aspects of enzymology & its clinical applications.

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- Explain importance of nutritional biochemistry with emphasis on minerals, trace elements, vitamins and balance diet.

## COURSE CONTENTS

### CELL

Introduction to Biochemistry, Cell: (Biochemical Aspects), Cell Membrane Structure, Membrane Proteins, Receptors & Signal Molecules

### BODY FLUIDS

Structure and properties of Water, Weak Acids & Bases, Concept of pH & pK, Buffers & their mechanism of action, Body buffers

### BIOMOLECULES

#### AMINO ACIDS, PEPTIDES & PROTEINS

Amino acids: Classification, Acid-Base Properties, Functions & Significance, Protein Structure, Primary, Secondary & Super secondary. & Structural Motifs, Tertiary & Quaternary Structures of Proteins. Protein Domains, Classification of Proteins, Fibrous proteins, Globular proteins, Hemo-proteins and their clinical implications (such as jaundice etc)

#### ENZYMES

Introduction, Classification & Properties of Enzymes, Coenzymes, Isozymes & Proenzymes, Regulation & Inhibition of Enzyme activity & enzymes inhibitors, Clinical Diagnostic Enzymology

#### CARBOHYDRATES

Definitions, Classification, Biochemical Functions & Significance of Carbohydrates, Structure & Properties of Monosaccharides & Oligosaccharides, Structure & Properties of Polysaccharides, Bacterial cell Wall, Hetero-polysaccharides, Glycosaminoglycans (GAGs)

#### LIPIDS

Classification of Lipids, Fatty Acids: Chemistry, Classification occurrence & Functions, Structure & Properties of Triacylglycerols and Complex Lipids, Classification & Functions of Eicosanoids, Cholesterol: Chemistry, Functions & Clinical Significance, Bile acids/salts

#### NUCLEIC ACIDS

Structure, Functions & Biochemical Role of Nucleotides. Structure & Functions of DNA, Structure & Functions of RNA

#### MINERALS

Sources, RDA, Biochemical Functions & Clinical Significance of Calcium & Phosphorus. Sources, RDA. Biochemical Functions & Clinical Significance of Sodium, Potassium, Chloride. Biochemical Functions & Clinical Significance of Iron, Copper, Zinc, Manganese, Magnesium, Selenium, Iodine and Fluoride

#### VITAMINS

Sources, RDA & Biochemical Functions & Clinical Significance of Fat-Soluble Vitamins, Sources, RDA & Biochemical Functions & Clinical Significance of Water-Soluble Vitamins

#### NUTRITION

Dietary Importance of Carbohydrates, Lipids & Proteins and other dietary Ingredients. Balanced Diet. Diet in specialized conditions

### Practical

1. Working SOPs for a Biochemistry Practical Laboratory. Introduction to Laboratory Equipments and Techniques. Preparation of solution (Normal, Molar Equivalent solution etc).
2. Molisch's Test & Iodine Test. Benedict's Test & Barfoed's Test. Selivanoff's Test & Phenylhydrazine Test. Sucrose Hydrolysis. Starch Hydrolysis.
3. Biuret Test, Heat Coagulation Test & Salt Saturation Test. Ninhydrin Test, Xanthoproteic Test & Millon-Nasse's Test. Aldehyde Test, Sakaguchi's Test. Determination of Isoelectric pH of casein Protein.

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4. Emulsification of natural fat & Solubility of soap, Test for Cholesterol, Iodine & Peroxide value calculation. Saponification value calculation
5. Sample Collection & Physical Evaluation of Urine. Analysis of Normal Urine. Analysis of Abnormal Urine

### **RECOMMENDED BOOKS**

1. Harper's Biochemistry by Robbert K. Murray, Daryl K. Granner, Peter A. Mayes, Victor W. Rodwel (Latest Edition).
2. Lippincott's Illustrated Review of Biochemistry by Pamela C. Champe and Richard A. Harvey (Latest Edition).
3. Practical Clinical Biochemistry by Varley (Latest Edition).
4. Textbook of Biochemistry by Devlin (Latest Edition).
5. Textbook of Medical Biochemistry by M.A. Hashmi (Latest Edition).
6. Biochemistry by Stryer (Latest Edition).

## **FUNDAMENTALS OF SURGERY/OT**

### **COURSE DESCRIPTION**

Allied health professionals are considered the backbone of any healthcare work force and greatly influence the health care delivery system. This course is designed to give knowledge to the students about Surgery/Operation Theatre and the role of Surgery/OT professionals in medical & healthcare field. General introduction, importance, infrastructure, problems and the solutions of the problems encountered in surgery/operation theatre are the main focus of this course. This course aims at familiarizing the students with the basic surgical procedures, preparation of different types of solutions, and chemicals used in operation theatre during surgery.

### **LEARNING OBJECTIVES**

At the end of this course, the students will be:

- Able to demonstrate the basics of surgery/OT and its various sub-disciplines.
- Familiar with all the basic procedures and the principles for working in the surgery/OT department.
- Well aware of the responsibilities of surgery/OT professionals
- Know about the proper use of PPEs
- Well aware about personal protection; hygiene and trouble shooting of OT/Surgery procedures.

### **COURSE CONTENTS**

Introduction and history of surgery, Introduction to operation theatre and operating room, How hospital works: Primary, secondary and Tertiary health care hospitals, DHQs, THQs, RHCs and Private Hospitals

Task, responsibilities, code of conduct of surgeon, anesthetist, operation theatre technologist

Patient care: Direct and Indirect patient care and Maslow hierarchi of patient need

Law and Ethics in surgery/OT

Principles of operative surgery: asepsis, sterilization and antiseptics

Surgical infections and antibiotics

Principles of sterilization and disinfection

Methods of sterilization

Dry Sterilization

Wet sterilization

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Gaseous sterilization  
 Chemical sterilization  
 Sterilization by radiation (Gamma rays, ultraviolet rays)  
 Techniques of sterilization of rubber articles. (LMA, FOB, ETT, Laryngoscopes, Anesthesia machines and circuits.)  
 Technique of sterilization of carbonized articles  
 Methods of disinfection  
 Boiling  
 Chemical disinfection  
 Hazards of sterilization  
 Prevention of hazards of sterilization  
 Precautions to be taken during sterilization  
 Recent advances in the methods of sterilization  
 Operation theatres: attire, supplies and equipment's, Modern OT setups and protocols for entering in the operating room  
 Cleaning, care and maintenance of operation theatre equipments  
 Hazards in the operating room and their prevention, waste disposal of operation theatre  
 Accident and emergency surgery  
 Wound healing and wound management  
 Nutrition and metabolism  
 Informed consent and medicolegal issues  
**General Surgical Supplies**  
 Surgical Sponges, Hemostatic Agents, Syringes, Surgical Wound Dressings, Drapes, Basins  
 Skin preparing Solutions: Alcohol, Iodophors, DuraPrep, Chlorhexidine, Gluconate  
**Tube, Drains, Catheters and PostOp Splints:** Drains, Gastrointestinal Tubes, Urethral Catheters, Splints  
**Suture and Suture Needles:** Comparison of Suture Materials, Components of Suture Packaging, Suture Sizing, Suture, Surgical Needle Points, Individual Suture Needles, Solutions: Normal Saline, Ringer's Lactate, Dextrose Water, Pediatric Solution  
**Common Surgical Skills**  
**Incision of skin and subcutaneous tissue:** Langer's lines, Healing mechanism, Choice of instrument. Safe practice  
**Closure of skin and subcutaneous tissue:** Options for closure , Suture and needle choice , Safe practice  
**Knot tying:** Choice of material, Single handed, Double handed, Superficial, Deep  
**Tissue retraction:** Choice of instruments, Placement of wound retractors, Tissue forceps  
**Use of drains:** Indications, Types, Insertion, Fixation, Management/removal  
**Incision of skin and subcutaneous tissue:** Ability to use scalpel, diathermy and scissors  
**Closure of skin and subcutaneous tissue:** Accurate and tension free apposition of wound edges  
**Haemostasis:** Control of bleeding vessel (superficial), Diathermy, Suture ligation, Tie ligation, Clip application, Plan investigations, Clinical decision making,  
 Case work up and evaluation; risk management  
 Infection control in surgery/OT

## Practical

Use of PPEs, Surgical attire, Suturing, Surgical wound management, Use of antiseptics, Sterilization and Disinfection of surgical tools, Preparation or use of various chemicals/solutions used in OT, Measurements and dose calculation, Handling of various equipments, chemicals, reagents used in OT, Preparing patient for surgery, Venisection

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### **RECOMMENDED BOOKS**

1. Surgical technology principles & practice by Joanna Kotcher Fuller. Latest edition
2. Differentiating surgical equipments and supplies by Colleen J. Rutherford
3. Handbook of Operation Theatre Techniques By Kilpadi
4. Pocket Guide To The Operating Room By Maxine A. Goldman
5. Instrumentation For The Operating Room: A Photographic Manual By Shirley M. Tighe
6. Introduction to Operating-Room Technique By Edna Cornelia & Kohn, Mary Louise Berry
7. Text Book of Surgery (4th edition) (Indian Association of Surgeons) by Dr. Ahmad
8. Short Practice of Surgery by Bailey & Love Published by Chapman and Hall.

## **ENGLISH**

### **COURSE DESCRIPTION**

The course introduces the students to the underlying rules to acquire and use language in academic context. The course aims at developing grammatical competence of the learners to use grammatical structures in context in order to make the experience of learning English more meaningful enabling the students to meet their real life communication needs. The objectives of the course are to, reinforce the basics of grammar, understand the basic meaningful units of language, and introduce the functional aspects of grammatical categories and to comprehend language use by practically working on the grammatical aspects of language in academic settings. After studying the course, students would be able to use the language efficiently in academic and real life situations and integrate the basic language skills in speaking and writing. The students would be able to work in a competitive environment at higher education level to cater with the long term learners' needs.

### **LEARNING OBJECTIVES**

Enable the students to meet their real life communication needs.

### **COURSE CONTENTS:**

**Comprehension;** Answers to questions on a given text

**Translation skills;** Urdu to English

**Paragraph writing;** Topics to be chosen at the discretion of the teacher

**Paragraph writing;** Practice in writing a good, unified and coherent paragraph

**Essay writing;** Introduction

**CV and job application;** Translation skills, Urdu to English

**Study skills;** Skimming and scanning, intensive and extensive, and speed reading, summary and précis writing and comprehension

**Academic skills;** Letter/memo writing, minutes of meetings, use of library and internet

How to write a proposal for research paper/term paper

How to write a research paper/term paper (emphasis on style, content, language, form, clarity, consistency). Technical report writing, Progress Report writing

### **RECOMMENDED BOOKS**

1. Practical English Grammar by A.J. Thomson and A.V. Martinet. Exercises 1. Third edition. Oxford University Press. 1997. ISBN 0194313492

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2. Practical English Grammar by A.J. Thomson and A.V. Martinet. Exercises 2. Third edition. Oxford University Press. 1997. ISBN 0194313506
3. Writing. Intermediate by Marie-Christine Boutin, Suzanne Brinand and Francoise Grellet. Oxford Supplementary Skills. Fourth Impression 1993. ISBN 0 19 435405 7 Pages 20-27 and 35-41 45-53.
4. Reading. Upper Intermediate. Brian Tomlinson and Rod Ellis. Oxford Supplementary Skills. Third Impression 1992. ISBN 0 19 453402 2.
5. Writing. Upper-Intermediate by Rob Nolasco. Oxford Supplementary Skills. Fourth Impression 1992. ISBN 0 19 435406 5 (particularly good for writing memos, introduction to presentations, descriptive and argumentative writing).
6. Reading. Advanced. Brian Tomlinson and Rod Ellis. Oxford Supplementary Skills. Third Impression 1991. ISBN 0 19 453403 0.

## **INTRODUCTION TO COMPUTER**

### **COURSE DESCRIPTION**

This is an introductory course on information and communication technologies. Topics include ICT terminologies, hardware and software components, the internet and World wide web, and ICT based applications. Students will get basic understanding of computer software, hardware, and associated technologies. This course is aimed to introduce computer and its basic numerical methods, data bases, networking, etc. World wide web and basic terms of databases, ICT on internet will also be discussed and taught to the students. Techniques of information search, objectives include basic understanding of computer software, hardware, and associated technologies. How computers can be used in the workplace, how communications systems can help boost productivity, and how the Internet technologies can influence the workplace. The course is designed to equip and train students in basics of computers, internet resources, and several software required nowadays to complete the assignments, to design presentation. Course will also cover computer ethics and related social media norms and cyber laws.

### **LEARNING OBJECTIVES**

After completing this course, a student will be able to:

- Understand different terms associated with computer and information technology.
- Identify various components of a computer system.
- Identify the various categories of software and their usage.
- Define the basic terms associated with communications and networking.
- Understand different terms associated with the Internet and World Wide Web.
- Use various web tools including Web Browsers, E-mail clients and search utilities.
- Use text processing, spreadsheets and presentation tools.
- The enabling/pervasive features of computer and information technology.

### **COURSE CONTENTS:**

Basic Definitions & Concepts

Hardware: Computer Systems & Components

Storage Devices, Number Systems

Software: Operating Systems, Programming and Application Software

Introduction to Programming, Databases and Information Systems

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Networks

Data Communication

The Internet, Browsers and Search Engines

The Internet: Email, Collaborative Computing and Social Networking

The Internet: E-Commerce

IT Security and other issues

### **RECOMMENDED BOOKS**

1. Introduction to Computers by Peter Norton, 6th International Edition (McGraw HILL)
2. Using Information Technology: A Practical Introduction to Computer & Communications by Williams Sawyer, 6th Edition (McGraw HILL)
3. Computers, Communications & information: A user's introduction by Sarah E. Hutchinson, Stacey C. Swayer
4. Fundamentals of Information Technology by Alexis Leon, Mathewsleon Leon press

### **2<sup>nd</sup> Year**

1. Anatomy II	200 Marks
2. Physiology II	200 Marks
3. Biochemistry & Genetics II	200 Marks
4. Medical Instrumentations	200 Marks
5. Islamic Studies	100 Marks
6. Pakistan Studies	100 Marks
<b>Total Marks</b>	<b>1000 Marks</b>

## **ANATOMY II**

### **COURSE DESCRIPTION**

The main aim of this course is to train and teach the students of second year BS degree program in such a way that they can practically apply the concepts of this subject which forms the firm foundation for the art of healing (medicine). The curriculum equips the students with the clear and comprehensive knowledge of human body structural organization. The knowledge sharing is done with the students as it is the science of macro/micro structure and forms of the human body. The topics within the domain of Anatomy include Histology or Microscopic Anatomy, Embryology or Developmental Anatomy, Regional or Gross Anatomy and Neuroanatomy which highlight the importance of the structural Anatomy. Our teaching methodology involves group discussions, lectures and practical. At the end of the course study, the student will be able to understand the basic knowledge of structure, histology and development of the Abdomen, Pelvis, Head, Neck and Brain Regions.

### **LEARNING OBJECTIVES**

- Describe gross anatomy of neuro-musculoskeletal and circulatory system of lower limb, abdominal wall and pelvis.
- Demonstrate anatomical landmarks and configuration of the lower limb, abdominal wall and pelvis through dissection/identification of structures in the manicans / smart board systems supplemented with the study of charts, models, prosected materials, and radiographs.

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- Describe major stages of embryological development of the lower limb with development of the neurological and vascular supplies to the lower limb.

## **COURSE CONTENTS:**

### **EMBRYOLOGY:**

SPECIAL; Musculoskeletal system, cardiovascular system, CNS

### **THE HEAD AND NECK**

#### **THE NECK:**

Muscles around the neck, Triangles of the neck, Main arteries of the neck, Main veins of the neck, Cervical part of sympathetic trunk, cervical plexus, cervical spine (Vertebrae), Joint of neck

#### **THE FACE:**

Sensory nerves of the face, Bones of the face, Muscles of the face, Facial nerve, Muscles of mastication, Mandible, Hyoid bone, Temporomandibular joint, Brief description of orbit and nasal cavity

#### **THE SKULL:**

Bones of skull, Anterior cranial fossa, Middle cranial fossa, Posterior cranial fossa, Base of skull and Structures passing through foramina

### **NEURO ANATOMY**

Central Nervous System: Disposition, Parts and Functions, Brain stem (Pons, Medulla, and Mid Brain). Cerebrum, Cerebellum, Thalamus, Hypothalamus, Internal Capsule, Blood Supply of Brain, Stroke and its types, Ventricles of Brain, CSF circulation and Hydrocephalus, Meninges of Brain, Neural pathways (Neural Tracts), Pyramidal and Extra pyramidal System (Ascending and Descending tracts), Functional significance of Spinal cord level, Cranial Nerves with special emphasis upon IV, V, VII, XI, XII (their course, distribution, and palsies), Autonomic nervous system, its components and Nerve receptors

### **SPINAL CORD**

Gross appearance, Structure of spinal cord, Grey and white matter (brief description), Meninges of spinal cord. Blood supply of spinal cord and Autonomic Nervous system

### **ABDOMEN: ABDOMINAL WALL:**

Structures of anterior abdominal wall: superficial and deep muscles, Structure of rectus sheath, Structures of Posterior abdominal wall, Lumbar spine (vertebrae), Brief description of viscera.

### **PELVIS**

Brief description of anterior, posterior and lateral walls of the pelvis, Inferior pelvic wall or pelvic floor muscles, Sacrum, Brief description of perineum and Nerves of perineum.

## **Practical**

During study, emphasis should be given on applied aspect, radiological anatomy, surface anatomy and cross-sectional anatomy of the region covered in the respective semester /year

## **RECOMMENDED BOOKS**

1. Gray's Anatomy by Prof. Susan Standring 39th Ed., Elsevier.
2. Clinical Anatomy for Medical Students by Richard S. Snell.
3. Clinically Oriented Anatomy by Keith Moore.
4. Clinical Anatomy by R.J. Last. Latest Ed.
5. Cunningham's Manual of Practical Anatomy by G.J. Romanes, 15th Ed., Vol-I, II and III.

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6. The Developing Human. Clinically Oriented Embryology by Keith L. Moore, 6th Ed.
7. Wheater's Functional Histology by Young and Heath, Latest Ed.
8. Medical Histology by Prof. Laiq Hussain.
9. Neuroanatomy by Richard S. Snell

## PHYSIOLOGY II

### COURSE DESCRIPTION

Physiology is the integrative study of cellular and whole-body function and is the pivotal discipline linking other basic biomedical sciences on the one hand with the experimental and clinical medicine on the other. The course is designed to explain the physical and chemical mechanisms that are responsible for the origin, development, and progression of life. Two approaches are used to explain events that occur in the human body; one emphasizes the purpose of a body process and the other emphasizes the underlying mechanism by which this process occurs. Physiologists, however, explain how processes occur in the body in terms of cause and-effect sequences of physical and chemical processes. Emphasis in the course will be on normal structure and function of the human body and the approach will be to develop an understanding of the integrative nature of physiological systems to maintain the internal environment of the body within very narrow limits compatible with life.

### LEARNING OBJECTIVES

- Describe functions of gastrointestinal tract, endocrinology and cardiovascular system
- Describe physiology at the molecular, metabolic/cellular, tissue and systems levels
- Differentiate the physiological responses in normal function and disease stages

### COURSE CONTENTS:

#### NERVOUS SYSTEM

General organization of the nervous system, Classification of nerve fibers, Properties of synaptic transmission, Function of neurotransmitters and neuropeptides, Type and function of sensory receptors, Function of the spinal cord and ascending tracts, Reflex action and reflexes, Muscle spindle and muscle tone, Mechanism of touch, temperature and pain., Functions of the cerebral cortex, Difference between the sensory and motor cortex and their functions, Motor pathways including pyramidal and extrapyramidal, Basal Ganglia and its functions, Cerebellum and its function, Control of posture and equilibrium, Physiology of sleep, Physiology of memory, Mechanism and control of speech, Function of the thalamus, Function of the hypothalamus and limbic system, Production of CSF.

#### Clinical Module

Significance of dermatomes. Injuries of the spinal cord. Hemiplegia and paraplegia. Parkinsonism. Effects of cerebellar dysfunction.

#### REPRODUCTION

Production and function of testosterone and Physiological changes during male puberty, Function of the female reproductive system, Production and function of oestrogen, and progesterone, Menstrual cycle, Physiological changes during female puberty and menopause.

#### Clinical Module

Male infertility. Female infertility. Basis for pregnancy tests.

#### GASTROINTESTINAL TRACT

General function of gastrointestinal tract, Enteric nervous system, control of gastrointestinal motility and secretion, Mastication, Swallowing: mechanism and control, Function, motility and secretions of stomach, Function, motility and secretions of small intestine, Function, motility and secretions of large intestine, Function of GIT hormones, Mechanism of vomiting and its control

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pathway, Defecation and its control pathway, Functions of liver, Functions of, gallbladder and bile in digestion and Endocrine & exocrine pancreas and functions of pancreas in digestion  
Clinical Module

Dysphagia. Physiological basis of acid peptic disease. Causes of vomiting. Diarrhea and constipation in clinical settings. Jaundice and liver function tests in clinical settings

#### ENDOCRINOLOGY

Classification of endocrine glands, Mechanism of action, feedback and control of hormonal secretion, Functions of the hypothalamus, Hormones secreted by the anterior and posterior pituitary and their mechanism of action and function.. Function of the thyroid gland, Function of the parathyroid gland, Calcium metabolism and its regulation, Secretion and function of calcitonin, Hormones secreted by the adrenal cortex and medulla, and their function and mechanism of action, Endocrine functions of the pancreas, Control of blood sugar. Hormones secreted by the gastrointestinal system and their function, Function of the thymus and The endocrine functions of the kidney and Physiology of growth.

Clinical Module

Acromegaly, gigantism and dwarfism. Effects of panhypopituitarism. Diabetes insipidus. Thyrotoxicosis and myxoedema. Pheochromocytoma. Cushing's disease. Adrenogenital syndrome. Diabetes mellitus and hypoglycemia.

#### BODY FLUIDS AND KIDNEY

Components and quantitative measurements of body fluids, Fluid compartments, tissue and lymph fluid. Structure of the kidney and nephron, General function of the kidney, GFR and its regulation, Formation of urine including filtration, re-absorption and secretion, Plasma clearance., Mechanism of concentration and dilution of urine, Water and electrolyte balance with reference to the kidney, Role of the kidney in blood pressure regulation, Hormonal functions of the kidney, Acidification of urine and its importance, Acid base balance with reference to the kidney and Micturition and its control.

Clinical Module

Renal function tests and their clinical importance. Fluid excess and depletion. Renal failure and dialysis. Metabolic acidosis and alkalosis. Abnormalities of micturition.

### Practical

Nervous System

Examination of superficial and deep reflexes. Brief examination of the motor and sensory system. Examination of the cranial nerves.

#### RECOMMENDED BOOKS

1. Textbook of Physiology by Guyton and Hall, Latest Ed.
2. Review of Medical Physiology by William F. Ganong, Latest Ed.
3. Physiology by Berne and Levy, Latest Ed.
4. Human Physiology: The Basis of Medicine by Gillian Pocock, Christopher D. Richards
5. Physiological Basis of Medical Practice by John B. West and Taylor, 12th Ed

## BIOCHEMISTRY & GENETICS II

### COURSE DESCRIPTION

The knowledge and skills in fundamental and introductory biochemistry is provided that are essential for further studies. This course provides a basic understanding of life processes at the biochemical molecular level. It provides an understanding of the normal biochemical processes in the function of the various organs and tissues with the principles of metabolic integration giving the

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genetic, biochemical and molecular understanding of the biochemical basis of various disease processes. It also familiarizes the students with laboratory instruments / equipment used in biochemistry laboratory with modern biochemical techniques and their uses in the diagnosis of diseases especially genetic diseases.

## LEARNING OBJECTIVES

At the end of the course, the student should be able to demonstrate his knowledge and understanding on the subject with following learning objectives:

- To learn basic understanding with the homeostatic mechanisms through the concepts of inter-regulation of carbohydrates, lipids and protein metabolism and its relation to hormone actions in the human body.
- To learn and understand the basic biochemical processes taking place in the body, and understanding their relation with normal and abnormal human metabolism.
- To learn how large molecules are synthesized and used, and how energy is generated, stored, and retrieved (metabolism). And to have understanding and knowledge about how diseases are related to biochemical defects.
- To learn and describe respiration at cellular and molecular level and to explain the various biochemical pathways related to metabolism of carbohydrates, protein, lipids and nucleic acid.
- Applying basic knowledge of protein synthesis, post translational modification and targeting to its cellular destination.
- To learn and understand the molecular mechanisms of gene expression, the principles of genetic engineering & their applications in medicine.
- To learn and understand the basics of Molecular Medicine, Gene therapy and Stem Cell therapy in Physical Therapeutics.
- To have the basic principles and to make use of techniques/instruments to perform biochemical analysis relevant to clinical screening & diagnosis.

## COURSE CONTENTS:

### BIOENERGETICS

Introduction to Bioenergetics, Biological Oxidations and Electron Transport Chain and Oxidative Phosphorylation

### METABOLISM OF CARBOHYDRATES

Digestion & Absorption of Carbohydrates, Glycolysis & its Regulation, Citric Acid Cycle, Metabolism of Glycogen, Gluconeogenesis and regulation of blood glucose and Pentose Phosphate Pathway & its Significance, Alcohol Metabolism

### METABOLISM OF LIPIDS

Digestion & Absorption of Lipids, Metabolism & Clinical Significance of Lipoproteins, Fatty acid oxidation, fatty acid biosynthesis and metabolism of Triacylglycerols, Metabolism & clinical Significance of Cholesterol, Metabolism of Eicosanoids

### METABOLISM OF PROTEINS & AMINO ACIDS

Digestion of Proteins & Absorption of Amino Acids, Transamination & Deamination of Amino Acids and urea cycle and Specialized products formed from Amino Acids

Metabolism of Nucleic Acids

### HORMONES

Classification & Mechanism of Action of Hormones, Signal Transduction, Second Messengers and Receptors, Hypothalamic & Pituitary Hormones, Steroid Hormones: Glucocorticoids and Mineralocorticoids, Insulin & Glucagon and brief introduction to the Diseases related to hormones abnormalities

### MOLECULAR BIOLOGY

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University of Sri Lanka

Structural Organization of Chromosome and Genes, Replication, Transcription and Translation (Protein synthesis) in Prokaryotes & Eukaryotes, Regulation of Gene Expression, Mutations and DNA repair mechanisms, Recombinant DNA Technology, Polymerase Chain Reaction, Blotting Techniques, Nucleic acid hybridization assays

## Practical

1. Techniques of Instruments in Clinical Biochemistry with examples.
2. Visible Spectrophotometry. Flame photometry. UV & IR spectrophotometry. Atomic Absorption spectrophotometry. pH Metry. Chromatography and determination of Amino Acids in Urine by paper chromatography
3. Clinical quantitative analysis in Biochemistry
  - Serum Glucose Estimation. Glucose tolerance Test (GTT). Serum Cholesterol estimation (Total, HDL and HDL cholesterol). Serum Bilirubin Estimation (Total, Direct and Indirect bilirubins). Serum Proteins Estimation (Total, Albumin & Globulin). Serum Total lipids Estimation. Serum calcium Estimation (total, ionized & unionized). Serum Uric acid Estimation. Serum Urea Estimation. Serum Creatinine Estimation. Enzymes Estimation in Serum: AST, ALT, ALP, Creatine Kinase (CK) and LDH.

## RECOMMENDED BOOKS

1. Harper's Biochemistry by Robbert K. Murray, Daryl K. Granner, Peter A. Mayes, Victor W. Rodwel (Latest Edition).
2. Lippincott's Illustrated Review of Biochemistry by Pamela C. Champe and Richard A. Harvey (Latest Edition).
3. Practical Clinical Biochemistry by Varley (Latest Edition).
4. Textbook of Biochemistry by Devlin (Latest Edition).
5. Biochemistry by Stryer (Latest Edition). by Stryer, Lubert, Latest Ed

# MEDICAL INSTRUMENTATIONS

## COURSE DESCRIPTION

The main aim of this subject is to equip the undergraduate students of surgery/OT lab sciences with in-depth theoretical knowledge of relevant surgical instruments, patient monitoring devices, anaesthesia devices, agents, medical oxygen supply instrument/medical gas equipment, specialized GIT diagnostic instruments, basic life support equipment's and chemicals used in hospital operation theatre, recovery room, ambulatory surgery centres and surgical clinics. This course is designed to explain the various components of surgical instruments, their functions, operations, routine maintenance and care, and troubleshooting for their smooth functioning during procedures. On completion of this course, the student will be able for preparing and checking surgery equipment's, laying out of instrument, trolleys prior to operations. Routine maintenance of stocks, service record and inventories of the OT instruments and equipments.

## LEARNING OBJECTIVES

Upon completion, students will possess the theoretical knowledge, skills, and abilities to:

- Understand the working principles, components and their functions of biomedical instruments & Chemicals used in surgery/OT rooms.
- Operate and calibrate all these instruments mention in course content list efficiently.

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- Understand importance of precaution to be taken while working with instruments & Chemicals.
- Detect errors and dealing with the accidents due to mishandling.
- Ask for routine instruments service in time.
- Selection and buying of medical instruments.
- Care and routine maintenance of these instruments.

## COURSE CONTENTS

Different relevant Techniques used in Medical fields. The names of instruments used, based upon different Techniques for working and evaluation of different parameters in Medical fields. Normal functioning of these instruments, parts of these instruments & individual functions of these parts. Their trouble shootings and routine manipulations to obtain correct results. Maintenance of Sensitivity & Specificity of these instruments. The general study of following Medical Instruments available in Medical fields

**Surgical supplies;** Surgical Sponges, Hemostatic Agents, Syringes, Surgical Wound Dressings, Drapes, Basins, Skin preparing Solutions, Other Supplies like Tube, Drains, Catheters and PostOpDrains, Gastrointestinal Tubes, Urethral Catheters, Splints, Suture and Suture Needles, Comparison of Suture, Materials, Components of Suture, Packaging, Suture Sizing, Suture, Surgical Needle Points, Individual Suture Needles, Solutions, Normal Saline, Ringer's Lactate, Dextrose Water, Pediatric Solution. Intravenous anaesthesia agents, Inhalational anaesthetic agents. **Endotracheal intubation,** Maintenance, Monitoring.

**Electromedical/electrosurgical equipments** used in O.T. Usage and care of electronic equipments-grounding system.

**O.T Lights:** Uses, types, lamps etc; shadow less lighting- features, Types; direct, semi direct, indirect lighting; emergency lighting

**Operating Microscopes:** Principle, parts, use and care

**Gas Cylinders;** Medical gas pipeline systems & manifold room

**Suctions Machines:** Principle, component parts, use and applications

**Anesthesia Machine** with ventilator: Accessories, function of each parts, procedure for use

**BP Apparatus:** Types, Procedure for use

**Cautery machine:** Principle components and functions

**Diathermy machine:** Principle, types, constructions, applications, Care and maintenance

**Monitoring equipments:** Cardiac monitor, Pulse oxymeter

**Defibrillators:** principle, types, component parts, functions etc

**Electrosurgery:** Structure, Block diagram, Types, safety precautions; Bipolar diathermy machine; Harmonic scalpel; Vessel Sealing Devices (Ligasure)

**Fiber-optic endoscopy:** Introduction, types, procedures and care of instruments. Cystoscope, Gastroscope, Laryngoscope, Colposcope, Endoscopic Camera

**Laproscope:** Type i-e Telescope rod lens system and Digital laproscope, Component parts and other accessories, applications, advantages and disadvantages

**Transducers,**

**Optical Instruments:** Optical Magnification Tools, Fiber optic Light Transmission,

**Basic Life Support,** Protection and maintenance of patient airway

**CSSD, Sterilization and Disinfection:** Definition, Principle, Methods, Uses

### Practical

Use of PPEs, Donning and doffing, Responding to sharp injuries, Handling and maintenance of surgical instruments, Trouble shootings of surgical instruments, Anesthesia and anesthetic agents, Emergency evacuation, Spill management, Shipping of infectious material, waste management.

### RECOMMENDED BOOKS

1. Handbook of Operation Theatre Techniques By Kilpadi

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 University of Sangli

2. Pocket Guide To The Operating Room By Maxine A. Goldman
3. Instrumentation For The Operating Room: A Photographic Manual By Shirley M. Tighe
4. Introduction to Operating-Room Technique By Edna Cornelia & Kohn, Mary Louise Berry
5. Operating Room Management: Structure, Strategies, & Economics By Andrew P. Harris And William G. Zitzmann
6. Text Book of Surgery (4th edition) (Indian Association of Surgeons) by Dr. Ahmad
7. Short Practice of Surgery by Bailey & Love Published by Chapman and Hall.

## **ISLAMIC STUDIES**

### **COURSE DESCRIPTION**

This course is aimed at to provide Basic information about Islamic Studies, enhance understanding of the students regarding Islamic civilization, improve student's skill to perform prayers and other worships, enhance the skill of the students for understanding of issues related to faith and religious life. Enhance the general knowledge of the students regarding the Muslim world and its current political, economic, social, and defence problems. Students will discuss different current issues being faced by the Muslim World and the importance of unity and cooperation among Muslim countries. In this regard, they will learn about different projects and cooperation among Muslim countries, the Islamic religious tradition within historical, social and cultural contexts; visual, performative and oral expressions of the heritage of Islam, including language, literature, art, and architecture; intra-Islamic differences and issues of inter-cultural diversity and integration within the Islamic world; the political systems of Muslim majority countries.

### **LEARNING OBJECTIVES**

This course is aimed at:

- 1 To provide Basic information about Islamic Studies
- 2 To enhance understanding of the students regarding Islamic Civilization
- 3 To improve Students skill to perform prayers and other worships
- 4 To enhance the skill of the students for understanding of issues related to faith and religious life.

### **COURSE CONTENTS:**

FUNDAMENTAL BELIEFS AND PRACTICES OF ISLAM.

Tauheed (Unity of Allah), Risalat (Finality of the Prophet-hood). Akhirat (Day of Judgement)..Salat, Soum, Zakat, Hajj and Jihad

NEED OF RELIGION AND ITS ROLE IN HUMAN LIFE.

MORALITY IN ISLAM.

Concept of morality, Concept of morality and Faith., Islamic principles and methods of character building., Moral values in Islam.

RIGHTS OF THE INDIVIDUAL IN ISLAM.

QURAN AS A GUIDE FOR THE MODERN SOCIETY AND SCIENTIFIC DEVELOPMENT.

HOLY PROPHET (PEACE BE UPON HIM) AND HIS LIFE.

ISLAMIC CONCEPT OF STATE.

ISLAM AND SOCIETY.

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Role of man and women in society, Rights of women children in Islam. Concept of woman's freedom in Islam., Hukook-ul-Ibad.

IMPORTANCE OF RIZK-E-HILAL.

CONTRIBUTION OF ISLAMIC SCHOLARS IN SCIENCE AND MEDICINE.

### **RECOMMENDED BOOKS**

1. Introduction to Islam by Dr. Hamidullah.
2. Islam: Its meaning and message by Khurshid Ahmad
3. اسلام یک نظر میں مولانا صدر الدین اصلاحی
4. قرآن اور تعمیر سیرت ڈاکٹر میر ولی الدین

## **PAKISTAN STUDIES**

### **COURSE DESCRIPTION**

The course is designed to acquaint the students of BS Programs with the rationale of the creation of Pakistan. The students would be apprised of the emergence, growth and development of Muslim nationalism in South Asia and the struggle for freedom, which eventually led to the establishment of Pakistan. While highlighting the main objectives of national life, the course explains further the socioeconomic, political and cultural aspects of Pakistan's endeavours to develop and progress in the contemporary world. For this purpose, the foreign policy objectives and Pakistan's foreign relations with neighbouring and other countries are also included. This curriculum has been developed to help students analyse the socio-political problems of Pakistan while highlighting various phases of its history before and after the partition and to develop a vision in them to become knowledgeable citizens of their homeland.

### **LEARNING OBJECTIVES**

- Develop vision of historical perspective, government, politics, Contemporary Pakistan, ideological background of Pakistan.
- Study the process of governance, national development, issues arising in the modern age and posing challenges to Pakistan.

### **COURSE CONTENTS:**

#### **IDEOLOGY OF PAKISTAN.**

Definition and elucidation. Historical aspect. Ideology of Pakistan in the light of speeches and sayings of Allama Iqbal and Quaide-Azam.

#### **PAKISTAN MOVEMENT**

Basis for the creation of Pakistan. Historical developments: 1857-1947

#### **POLITICAL DEVELOPMENTS IN PAKISTAN SINCE 1947**

#### **LAND AND PEOPLE OF PAKISTAN**

Geography, Society, Culture, Natural resources, Health and education with reference to characteristics trends and problems.

### **RECOMMENDED BOOKS**

1. Ideological Orientations of Pakistan by Sharif Al Mujahid.
2. Struggle for Pakistan by I.H. Qureshi.

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Incharge  
Department of Allied Health Sciences  
Gargoti College  
University of Swat

3. The Making of Pakistan by Richard Symond

### 3<sup>rd</sup> Year

1. General Pathology and Microbiology	200 Marks
2. Pharmacology	200 Marks
3. Anesthesia and Patient Care Management	200 Marks
<b>Total Marks</b>	<b>600 Marks</b>

## GENERAL PATHOLOGY AND MICROBIOLOGY

### COURSE DESCRIPTION

General pathology and microbiology courses are offered as vital subject matter at undergraduate level programs to students who are engaged in medical studies. This subject deals with the diagnosis of diseases which is ultimately back bone of healthcare system. A good diagnosis leads to excellent treatment and prognosis. In general pathology portion, students learn about the abnormal functions of the body and with the investigation of those pathological mechanisms which are common to all tissue, cell pathology. Students will be able to describe and demonstrate the processes of cellular adaptation, inflammation, repair, immunology, cellular accumulation, and neoplasia. While, microbiology course is designed to teach students about microorganism like bacteria, viruses, fungus and parasites. In this course, students will gain knowledge about the interaction of human body with these organisms and how these organisms cause diseases in humans. Students will get familiar with different techniques of microbiology which includes the identification and quantification of microorganisms that cause human disease (qualitative and quantitative analysis) which will provide diagnostic information for therapeutic support in the clinical management of patients. At the end of this course, students will be able to collect samples and process this sample according to microbiological protocols to generate microbiology report.

### LEARNING OBJECTIVES

After completing this course, a student will be able to:

- Recognize the structural and functional causes of human disease.
- Describe the aspects of a disease process that form the core of pathology
- Describe the cause of a disease (etiology)
- Describe the mechanisms of disease development (pathogenesis)
- Describe the structural, biochemical and molecular alterations induced in cells and tissues by the disease (morphologic, molecular & biochemical changes)
- Describe the functional consequences of these changes (clinical significance)
- Describe the infectious diseases.

### COURSE CONTENTS

#### i. GEN. PATHOLOGY

Cell Injury and Death: Causes of cell injury, Necrosis, Apoptosis and Sub cellular responses. Cell Adaptations: Hyperplasia, Hypertrophy, Atrophy, Metaplasia and Intracellular accumulation. Inflammation: Acute inflammation. Vascular events, Cellular events and Chemical mediators. Chronic Inflammation. General, Granulomatous and Morphologic patterns of acute and chronic inflammation. Healing and Repair:

Normal controls, Repair by connective tissue and Wound healing. Haemodynamic Disorders. Edema. Hyperemia / congestion, Hemorrhage, Thrombosis, Embolism, Infarction and Shock.

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Diseases of Immunity. General features, Hypersensitivity reactions, Immune deficiencies, Autoimmunity and Amyloidosis. Neoplasia: Nomenclature, Molecular basis, Carcinogenic agents and Clinical aspects

## ii. MICROBIOLOGY

### Basic Bacteriology

Bacteria Compared with Other Microorganisms, Structure of Bacterial Cells, Growth, Genetics, Classification of Medically Important Bacteria, Normal Flora, Pathogenesis, Host Defenses, Laboratory Diagnosis, Antimicrobial Drugs: Mechanism of Action, Antimicrobial Drugs: Resistance, Bacterial Vaccines, Sterilization & Disinfection, Biosafety and bio risk management,

### Clinical Bacteriology

Overview of the Major Pathogens & Introduction to Anaerobic Bacteria.

**Gram-Positive Cocci;** *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Staphylococcus saprophyticus*, *Streptococcus pyogenes*, *Streptococcus agalactiae*, *Enterococcus faecalis*, Viridans streptococci, *Streptococcus bovis* and *S. pneumoniae*

**Gram-Negative Cocci;** *Neisseria meningitidis* and *Neisseria gonorrhoeae*.

**Gram-Positive Rods;** *Bacillus anthracis*, *Bacillus cereus*, *Clostridium tetani*, *Clostridium botulinum*, *Clostridium perfringens*, *Clostridium difficile*, *Corynebacterium diphtheriae* and *Listeria monocytogenes*.

**Gram-Negative Rods Related to the Enteric Tract;** *E. coli*, *Salmonella* species, *Shigella* species, *Vibrio cholerae*, *Vibrio parahaemolyticus*, *Vibrio vulnificus*, *Campylobacter jejuni*, *Helicobacter pylori*, *Klebsiella*, *Enterobacter*, *Serratia*, *Proteus*, *Providencia*, *Morganella*, *Pseudomonas spp.*, *Bacteroides* & *Prevotella*.

**Gram-Negative Rods Related to the Respiratory Tract;** *Haemophilus influenzae*, *Bordetella pertussis*, and *Legionella pneumophila*

**Gram-Negative Rods Related to Animal Sources (Zoonotic Organisms);** *Brucella* species, *Francisella tularensis*, *Yersinia pestis*, and *Pasteurella multocida*

Mycobacteria, Actinomycetes, Mycoplasmas, Spirochetes, Chlamydiae, Rickettsiae, Minor Bacterial Pathogens

### **Basic Virology**

Structure, Replication, Genetics, Classification of Medically Important Viruses, Pathogenesis, Host Defenses, Laboratory Diagnosis, Viral Vaccines.

### **Clinical Virology**

Herpes Viruses, Rabies Virus, Polio Virus, Hepatitis Viruses, Human Immunodeficiency Virus, Dengue Virus.

### **Mycology**

Basic Mycology, Cutaneous & Subcutaneous Mycoses, Systemic Mycoses, Opportunistic Mycoses,

### **Parasitology**

Intestinal & Urogenital Protozoa, Blood & Tissue Protozoa, Minor Protozoan Pathogens, Cestodes, Trematodes, Nematodes.

### **Sterilization**

#### **Laboratory Exercises:**

Each lecture will be followed by two hour practical class where the student will apply their theoretical knowledge in the understanding of related microbiological investigations, which have been proved useful for the diagnosis of human diseases.

During the other laboratory sessions, the students will be engaged in the preparation of media, the sterilization of glass ware, Antigens, Antibodies, Vaccines – haemolysin, permanent slides, laboratory reagents and also to assisting postgraduate students in the isolation of micro – organisms from clinical materials.

## Practical

- Acute Inflammation
- Chronic Inflammation
- Necrosis
- Gangrene
- Pigmentation
- Calcification
- Urine Examination
- Sterilization
- Culture Media
- Antibiotic Sensitivity testing
- Culturing bacterial pathogens
- Examination of different clinical specimens
- Blood Culture
- Anaerobic Culture
- Gram Staining
- ZN Staining
- Biochemical tests to identify bacteria (Conventional, API 20E, API 20NE, Automated systems)
- PCR
- KOH preparation for scraping
- Stool Examination
- ELISA

## RECOMMENDED BOOKS

1. Basic Pathology by Robbins Latest Edition
2. Clinical Pathology Interpretations by A.H. Nagi
3. Pocket Companion to Robbins, Pathologic basis of disease Cotran, Kumar
4. Theory and Practice of Histological Techniques by John D Bancroft

# PHARMACOLOGY

## COURSE DESCRIPTION

Pharmacology is an essential component of the modern undergraduate curriculum. The course is designed to equip the students with the latest knowledge about drugs and related issues. To prescribe a drug safely and effectively, students need to know its pharmacological aspects including their common preparations. The students are made acquainted with the general principles of pharmacokinetics and pharmacodynamics of different drugs and their groups. The mechanism of action, pharmacological actions, indications, contraindications, drug interactions and adverse reactions of the various drugs acting on body systems are elaborated. It is important to emphasize to students that the presence of disease or organ pathology may influence the actions of a drug and conditions such as age, pregnancy, concomitant administration of other drugs, and disease may alter the patient's response to a given drug. It is also highlighted that rational prescribing of drugs to a patient for selected disorders is the utmost aim of this course.

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Incharge  
2019/2020

## LEARNING OBJECTIVES

After completing this course, a student will be able to:

- Inculcate basic pharmacological understanding of rational and scientific basis of usage of drugs therapeutics
- Describe pharmacological actions and precautions to be exercised with commonly used drugs
- Relate specific adverse effect of commonly used drugs
- Correlate specific contraindications of frequently used drug
- Categorize major drug groups with their mechanism of action
- Evaluate factors such as efficiency , safety, & suitability of medications to appropriately manage patients OT set up.
- Describe the specific adverse effects and drug interactions of prototype drugs
- Acquire basic knowledge about drugs used in perfusion technology

## COURSE CONTENTS

Introduction to Pharmacology, Sources of drugs, Active principles of crude drugs, Physical nature/ classification/ nomenclature of drugs, Nature of drugs, Routes of drugs of administration, Pharmacokinetics, Principle types of drug actions, Pharmacodynamic receptors, Dose response curve, Pharmacokinetics absorption & distribution, Drug dosage, Factors modifying actions & dosage of drugs, Adverse effects of drugs

**The Evolution of Medical Drugs:** U.S. Pharmacopeia, Drug Origins and Sources, The Food and Drug Administration (FDA), British Pharmacopeia

**Drug Nomenclature:** A. Chemical name, B. Generic name, C. Trade name

**Methods of Drug Classification**

A. Chemical group, B. Mechanism/site of action, C. Primary effect

**General Pharmacologic Principles**

A. Pharmacokinetics, B. Pharmacodynamics

**Six Rights of Drug Safety**

A. The right medication, B. The right dose, C. The right patient, D. The right time, E. The right location, F. The right documentation

**Drug Categories of Relevance to Surgery/operation theatre (Uses and impacts on Patient)**

A. Analgesics, B. Anesthetic agents, C. Antiallergic and antihistamine drugs, D. Antianxiety drugs, E. Antiarrhythmic drugs, F. Antibacterial drugs, G. Anticoagulant and coagulant drugs, H. Antidepressants, I. Antiemetic drugs, J. Antihypertensive drugs, K. Anti-inflammatory drugs, L. Antiseptic and disinfectant agents, M. Bronchodilators, N. Cathartic and antidiarrheal drugs, O. Diuretics, P. Sedative and hypotonic drugs, Q. Vasodilators and vasoconstrictors

**ANTISIALAGOGUES:** Atropine, Glycopyrrolate

**SEDATIVES and ANXIOLYTICS:** Diazepam, Midazolam, Phenergan, Lorazepam, Chlorpromazine, Trichlopho

**NARCOTICS:** Morphine, Pethidine, Fentanyl, Pentazocine

**ANTIEMETICS:** Metoclopramide, Ondansetron, 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

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## INTRODUCTION TO GENERAL ANAESTHESIA

INHALATIONAL GASES: Gases - O<sub>2</sub>, N<sub>2</sub>O, Air, Agents - Ether-, Halothane, Isoflurane, Saevoflurane, Desflurane

REVERSAL AGENTS: Neostigmine, Glycopyrrolate, Atropine, Nalorphine, Naloxone, Flumazenil (Diazepam)

## ANTISEPTICS AND DISINFECTANTS

LOCAL ANAESTHETICS: Xylocaine, Preparation, Local - Bupivacaine - Topical, Prilocaine-jelly, Emla - Ointment, Etidocaine. Ropivacaine

EMERGENCY DRUGS: Adrenaline: Mode of administration, dilution, dosage, effects. Isoprenaline, Atropine, bicarbonate, calcium, ephedrine, xylocard,

Ionotropes: dopamine, dobutamine, amidaron

Aminophylline, hydrocortisone, antihistaminics, potassium.

Cardiovascular drugs: Antihypertensives, Antiarrhythmics, Beta - Blockers, Ca - Channel blockers, Vasodilators - nitroglycerin & sodium nitroprusside

Respiratory system - Bronchodilators, respiratory stimulants Broncholytic agents

Renal system - Diuretics, furosemide, mannitol

Obstetrics - oxytocin, methergin

Miscellaneous - Antibiotics NSAIDs Anticoagulants and Insulin

## Routes of Drug Administration

A. Systemic: 1. Oral, 2. Rectal, 3. Tube/catheter, 4. Inhalation

B. Parenteral: 1. Intravenous, 2. Intra-arterial, 3. Intrathecal

## Practical

Replacement Fluids & dehydration (Normal saline, half normal saline, ringer solution, dextrose solution), ORS powder. Experiments designed to observe the action of drugs on animals and isolated tissue. Experiments on the actions of selected drugs to be demonstrated to the students.

Venipuncture

A. Methods: 1. Continuous infusion, 2. Intermittent infusion, 3. Direct injection: a. Hand injection, b. Mechanical pressure injector

B. Sites of administration: 1. Peripheral, 2. Central

C. Complications: 1. Infiltration, 2. Extravasation, 3. Phlebitis, 4. Air embolism, 5. Drug incompatibility, 6. Low fluid level in container

D. Venipuncture procedures: 1. Equipment, 2. Patient identification, assessment and instructions, 3. Informed consent, 4. Dosage, dose calculations and dose response: a. Adults, b. Pediatric patients.

5. Patient preparation, 6. Application of standard precautions, 7. Procedure: a. Injection through an existing line. b. Venipuncture

8. Site observation

## RECOMMENDED BOOKS

1. Katzung and Trevors Pharmacology Examination & Board review.
2. Lippincott illustrated Reviews of Pharmacology.

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Department of Allied Health Sciences  
Sri Lanka State College of Health Sciences  
University of Kelaniya

# ANESTHESIA AND PATIENT CARE MANAGEMENT

## COURSE DESCRIPTION

This course is designed to give knowledge to the students about introduction to surgery, its indications, types of incision, types of wounds, factors affecting wound healing, trauma, metabolic responses to trauma and types of anesthesia. This course aims at familiarizing the students with the basic knowledge of preoperative assessment, preparation, types of anesthesia, postoperative treatment, complications and their management. The core of this course is clinical skills for the pre operative care of the patient, positioning the patients and monitoring. The students also acquire professional attitude in accordance with the scope of profession. This course also focuses on the manifestations of surgical conditions, indications and role of surgical procedures and general overview of a variety of surgical conditions. The students will be able to define terminologies used in the study of surgery and to describe the general principles and mechanisms of surgical conditions. At the end of the course study, the students will be able to demonstrate a satisfactory knowledge of the principles common to all surgical practices, skills and attitudes for effective patient-centered care and service to a diverse population.

## LEARNING OBJECTIVES

After completing this course, a student will be able to:

- Understand the preoperative evaluation, premedication and different anaesthesia techniques, in general
- Understand intraoperative fluid management and pain management
- Explain technique of general anaesthesia and regional anaesthesia
- Describe the pharmacology of anaesthesia and emergency drugs
- Assemble Intubation and emergency airway equipments
- Set up of intubation and drug tray
- Operate the monitoring devices and record the vital signs
- Prepare trolley for regional blocks
- Manage the patient in post-operative ward

## COURSE CONTENTS

### i. ANESTHESIA

Introduction to Anesthesia, Principles of anesthesia, Types of anesthesia

#### MEDICAL GAS SUPPLY

- Compressed gas cylinders
- Colour coding
- Cylinder valves; pin index.
- Gas piping system
- Recommendations for piping system
- Alarms & safety devices.

#### ANAESTHESIA MACHINE

- Hanger and yoke system
- Cylinder pressure gauge
- Pressure regulator
- Flow meter assembly
- Vapourizers - types, hazards, maintenance, filling and draining, etc.

#### BREATHING SYSTEM

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- General considerations: humidity & heat
- Common components - connectors, adaptors, reservoir bags.
- Capnography ETC
- Pulse oximetry
- Methods of humidification.
- Classification of breathing system Mapleson system
- Jackson Rees system, Bain circuit
- Non rebreathing valves - ambu valves
- The circle system Components Soda lime, indicators

#### FACE MASKS & AIRWAY LARYNGOSCOPES

- Types, sizes
- Endotracheal tubes - Types, sizes.
- Cuff system
- Fixing, removing and inflating cuff, checking tube position complications.

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#### ANAESTHESIA VENTILATOR AND WORKING PRINCIPLES.

#### MONITORING

- ECG
- SpO<sub>2</sub>
- Temperature
- IBP
- CVP
- PA Pressure
- LA Pressure
- Bio Medical engineering of Trouble sorting Management, care of cleaning

#### BASIC ANAESTHETIC TECHNIQUES INTRODUCTION TO ANAESTHESIA

General Anaesthesia, Regional Anaesthesia, Local Anaesthesia, Intravenous Anaesthesia

- Minimum standard of anaesthesia
- Who should give anaesthesia?

Regional Anaesthetic techniques.

a. Local anaesthetic technique, b. Nerve blocks, c. Spinal Anaesthesia, d. Epidural anaesthesia

Anaesthesia for speciality Surgeries

#### NEURO ANAESTHESIA

Glasgow 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; \* Fluid Calculation and administration, 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:

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Department of Anaesthesiology  
Sciences  
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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., Short comings

#### 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, Pre-op investigation & 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 edema, Bronchospasm, Neurological complications,

Vascular complications. Trauma to teeth, Headache, Backache, Ocular complications, Auditory complications

#### MAJOR CATASTROPHES

Mortality, Causes of death, Cerebral damage, Prevention.

### Practical

1. Supply of compressed gases:

- a. Types of gases and their chemical and physical properties.
- b. Types of containers.
- c. Their checking and maintenance.
- d. Types of compressors.
- e. Structure and mechanism of various type of gauges, liquid oxygen storage and supply system.

2. Structure of reducing valves

- a. Mechanism of pressure reducing valves.
- b. Their maintenance and safety checks

3. Structure and mechanism of flow meters, maintenance and safety checks

4. Volatile anaesthetic agents

- a. Selection of material to be used for containers of the volatile anaesthetic agents.
- b. Structure of different types of vaporizers.
- c. Principles of various vaporizers, their maintenance and safety precautions.

5. Types of circuits:

- a. Open, Semi closed and closed circuits.
- b. Non-rebreathing valves.
- c. T-piece circuit and its modifications.
- d. To and fro system and circle absorber.

6. Types of valves used in the different circuits. Structure and working of Heidbrink's valve, Rubin valve nu-man valve etc.

## ii. Pre Operative Patient Care

Patient Positioning for Surgery, Assisting during Operations, Assisting during Anesthesia, Self-protection; Gown, Gloves, Shoes, Dress. Care of unconscious patient. Position, Airway, Catheter, N. G. tube, V. I. Care of Biopsy Specimen; Preservation, Labeling, Transport to Pathology dept, Wound management, First aid Dressings/ Bandages, Fracture, Splints P.O.P, Introduction Signs Symptoms and first aid management of; Hemorrhage, Burns, Shock. Endotracheal intubation, Maintenance, Monitoring, Emergency, Balanced Anaesthesia. Core of Anaesthetized patient; Local & regional anaesthesia, Spinal and epidural anaesthesia, Intravenous anaesthesia agents, Inhalational anaesthetic agents, Anaesthetic Adjuvant drugs, Complication of general anaesthesia, Complication of local/regional anaesthesia, Blood transfusion, Difficult Intubation. Surgical supplies; Surgical Sponges, Hemostatic Agents, Syringes, Surgical Wound Dressings, Drapes, Basins, Skin preparing Solutions, Other Supplies like Tube, Drains, Catheters and Post-Op Drains, Gastrointestinal Tubes, Urethral Catheters, Splints, Suture and Suture Needles, Comparison of Suture. Materials, Components of Suture, Packaging, Suture Sizing, Suture, Surgical Needle Points, Individual Suture Needles, Solutions, Normal Saline, Ringer's Lactate, Dextrose Water, Pediatric Solution.

iii. Post Op Care of patient; Position, Monitoring, Recovery, Transportation, IVI and Drain Care, Artificial Ventilation, Vital Sign Monitoring, Blood Transfusion, Basic Life Support, Protection and maintenance of patient airway, Breathing: Flow of air through respiratory passages, Natural or artificial respiration, Assisted by emergency oxygen, The movement of blood through the beating of the heart, The emergency measure of CPR, Considerations of patient transport, Basic bandaging and without the use of adjunctive equipment. The protection of the cervical spine, Splinting and immobilization. Use of drugs or invasive skills, Automated external defibrillator or AED. Advanced Life Support, Cardiopulmonary resuscitation in cardiac arrest and related medical problems. Cardiac monitoring, Endotracheal intubation, Intravenous therapy in Hypoxia, Hypovolemia, Hyperkalemia or hypokalemia, Related disturbances of calcium or magnesium levels. Hypoglycemia, Hypothermia, Tension pneumothorax, Tamponade, Toxic and/or therapeutic, Acute trauma, Accidental amputation, acute appendicitis, Ruptured aortic aneurysm, Aortic dissection, Bleeding ectopic pregnancy, Bowel obstruction, Internal bleeding, Intestinal volvulus, Cardiac tamponade, Acute subdural hematoma, Acute airway obstruction, Limb ischemia, Acute mesenteric ischemia, Pneumothorax, Paraphimosis, Peritonitis, Priapism, Retained abortion, Stereocoral perforation, Testicular torsion, Urinary retention, Thromboembolism and related mechanical obstruction.

**Pre Operative and Post Operative investigations:** Clinical Laboratory and radiological investigations

## Practical

Identification and use of different Antiseptic Solutions e.g Pyodine, Sprit, Cidex, Savalon etc.

Identification of different suture Material Plain and chromic Catgut, Prolene Vicryl Pollydioxanone Silk, Nylon.

Different Type of Fluids Identification & their use.

A: Crystalloids: -Isotonic Fluids-5% DW -Na Cl, -D/Saline, -Ringers Lactate Sol

B: Colloids: -Plasma Expander, -Gelafundin, -Albumin,

Anesthetic techniques

Hands on training on different procedures

Suturing techniques

Positioning of patient

Post-Operative Care &Monitoring

Maintaining Artificial Ventilation

Vital Sign Monitoring

Blood Transfusion

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Monitoring of Breathing  
 Emergency measure of CPR  
 Automated external defibrillator  
 Cardiopulmonary resuscitation in cardiac arrest and related medical problems  
 Cardiac monitoring  
 Endotracheal intubation

**RECOMMENDED BOOKS**

1. Handbook Of Operation Theatre Techniques By Kilpadi
2. Operation Room Assistance Manual By T.S. Jayalakshmi
3. Pocket Guide To The Operating Room By Maxine A. Goldman
4. Instrumentation For The Operating Room: A Photographic Manual By Shirley M. Tighe
5. Introduction to Operating-Room Technique By Edna Cornelia & Kohn, Mary Louise Berry
6. Operating Room Management: Structure, Strategies, & Economics By Andrew P. Harris And William G. Zitzmann
7. Text Book of Surgery (4th edition) (Indian Association of Surgeons) by Dr. Ahmad
8. Short Practice of Surgery by Bailey & Love Published by Chapman and Hall.

**4<sup>th</sup> Year**

1. Scientific Inquiry, Biostatistics, Research Methodology	100 Marks
2. Surgical Procedures	200 Marks
3. Operation Theatre Management	200 Marks
Report Writing	Qualifying
<b>Total Marks</b>	<b>500 Marks</b>

**SCIENTIFIC INQUIRY, BIOSTATISTICS, RESEARCH  
 METHODOLOGY**

**COURSE DESCRIPTION**

This course includes discussion on basic quantitative methods and designs, including concepts of reliability and validity, interpretation of inferential statistics related to research designs, co relational statistic & designs, interclass correlation coefficients, and critical appraisal of the literature. It involves selection of appropriate statistical techniques to address questions of medical relevance; select and apply appropriate statistical techniques for managing common types of medical data; use various software packages for statistical analysis and data management; interpret the results of statistical analyses and critically evaluate the use of statistics in the medical literature; communicate effectively with statisticians and the wider medical community, in writing and orally through presentation of results of statistical analyses; explore current and anticipated developments in medical statistics

**LEARNING OBJECTIVE**

- Identify the basic concepts of research and scientific inquiry and its methodologies
- Identify appropriate research topics
- Define appropriate research problem and parameters
- Construct a project proposal to undertake a research project.
- Discuss scientific Inquiry, its principle and application in medical research
- Describe Search techniques for literature review

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 Biomedical Research Centre  
 University of Malakand

- Differentiate between different levels of evidence, appraisal and different studies with respect to their effectiveness in literature.
- Discuss necessary concepts of statistics to enable them to realize a research project in the field of Physiotherapy
- Explain Fundamentals of reading and understanding research methods, design, and statistics

## **COURSE CONTENTS**

### **i. SCIENTIFIC INQUIRY**

- Describe scientific inquiry, Evidence based approach to scientific inquiry, Principles of scientific inquiry, the application of scientific inquiry to physical therapy.
- Access digital libraries and different research databases, Effective searching and reviewing literature material.
- Interpret Critical appraisal of published research in the areas of Examination and Evaluation, Diagnosis, Prognosis, Intervention
- Interpret Critical evaluation of Randomized Control Trial (RCT), Systemic review, Diagnosis and screening tests, Case reports
- Discuss how to conduct clinical research and hierarchy of evidences in clinical researches

### **ii. BIOSTATISTICS**

- Define Statistics, Population, sample Descriptive and inferential Statistics, Observations, Data, Discrete and continuous variables, Errors of measurement, Significant digits, Rounding of a Number, Collection of primary and secondary data, Sources, Editing of Data. Exercises.

#### **PRESENTATION OF DATA**

- Introduction, basic principles of classification and Tabulation, Constructing of a frequency distribution, Relative and Cumulative frequency distribution, Diagrams, Graphs and their Construction, Bar charts, Pie chart, Histogram, Frequency polygon and Frequency curve, Cumulative Frequency Polygon or Ogive, Histogram, Ogive for Discrete Variable. Types of frequency curves. Exercises.

#### **MEASURES OF CENTRAL TENDENCY**

- Explain Different types of Averages, Quantiles, The Mode, Empirical Relation between Mean, Median and mode, Relative Merits and Demerits of various Averages. Properties of Good Average, Box and Whisker Plot, Stem and Leaf Display, definition of outliers and their detection. Exercises.

#### **MEASURES OF DISPERSION**

- Describe Absolute and relative measures, Range, The semi-Inter-quartile Range, The Mean Deviation. The Variance and standard deviation, Change of origin and scale, Interpretation of the standard Deviation, Coefficient of variation, Properties of variance and standard Deviation, Standardized variables, Moments and Moments ratios. Exercises.

#### **PROBABILITY AND PROBABILITY DISTRIBUTIONS**

- Define Discrete And Continuous Distributions: Binomial, Poisson And Normal Distribution. Exercises.

#### **SAMPLING AND SAMPLING DISTRIBUTIONS**

- Describe sample design and sampling frame, bias, sampling and non-sampling errors, sampling with and without replacement, probability and non-probability sampling, Sampling distributions for single mean and proportion, Difference of means and proportions. Exercises.

### **iii. Research Methodology**

Research Fundamentals; Research, Theory in Research, Research Ethics

Research Design; Research Problems, Questions, and Hypotheses, Research Paradigms, Design Overview and Research Validity

Experimental Designs; Group Designs and Single-System Design

Non Experimental Research; Overview of Non experimental Research, Clinical Case Reports, Qualitative Research, Epidemiology, Outcomes Research and Survey Research.

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Measurement; Measurement Theory and Methodological Research.  
Data Analysis; Statistical Reasoning, Statistical Analysis of Differences; The basics, Statistical Analysis of Differences; Advanced and special Techniques, Statistical Analysis of Relationships; The basics and Statistical Analysis of Relationships; Advanced and special Techniques  
Implementing Research; Implementing a Research Project and Publishing and Presenting Research

### **RECOMMENDED BOOKS**

1. Essentials of clinical research By Stephan P. Glasser.
2. Rehabilitation Research (Principles and Applications) 3rd Edition By Elizabeth Domholdt.
3. Walpole RE. Students study guide: introduction to statistics. 3rd ed. 1982.
4. Muhammad F. Statistical methods and data analysis. Faisalabad: KitabMarkaz; 2000
5. R. L Ott, Micheal T longnecker. An introduction to statistical methods and data analysis, 7th ed.
6. Brooks/Cole, Cengage Learning 2015

## **SURGICAL PROCEDURES**

### **COURSE DESCRIPTION**

The main aim of this course is the study of different types of surgical procedures. This course is designed to give deep insight to the students about emergency procedures, primary care organization, and administration of emergency care, and surgeries of different regions. At the end of the course, the students will be able to demonstrate a satisfactory knowledge of the principles common to all surgical practices, skills and attitudes for effective patient-centered care and service to a diverse population. The core of this course is clinical skills for the patient care, positioning the patients, monitoring, recovery and transportation. The students also acquire professional attitude in accordance with the scope of profession. This course also focuses on the manifestations of surgical conditions, indications and role of surgical procedures and general overview of a variety of surgical conditions. The students will be able to define terminologies used in the study of surgery and to describe the general principles and mechanisms of surgical conditions. This course also describes indications of procedures/techniques in selective surgical conditions.

### **LEARNING OBJECTIVES**

After completing this course, a student will be able to:

- Explore the perioperative management of genitourinary, ophthalmic, otorhinolaryngology, orthopedic, plastics, neuro, cardiothoracic, and peripheral vascular surgeries.
- Explore surgical assisting fundamentals. Topics include surgical assisting role and responsibilities, perioperative microbiology, pharmacology, electrolytes, fluid, and shock, anesthesia principles, surgical site infections, hematological principles, and all-hazards preparation.
- Introduced to concepts of surgical procedures including incision, step-by-step elements of the surgical procedures, wound closure, dressings, and drains that require a surgical assistant. Topics include principles, techniques, didactics, and laboratory practicum of basic and advanced suturing, knot tying, and wound closure for a variety of injuries, surgeries, and incisions.

### **COURSE CONTENTS**

**Basics of surgical procedures**

Incisions: Midline, Upper Paramedian, Subcostal, McBurney, Inguinal

Positioning of patient for different operations: Problems and hazards, Hypothermia and hyperthermia

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Incharge  
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Sargodha College  
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## **General surgical procedure and para-surgical equipment**

Operating tables: structure, material used, maintenance, control, Hydraulic system and Electrical system.

Different types of diathermy machine. Monopole, Bipolar, Ligasure, Harmonic Scalpel, CUSA- Principle, hazards, prevention, functioning and maintenance.

Types of operation lights and light sources: Features, Care, cleaning, sterilization and maintenance.

Operation Theatre sterilization- Different recent advances.

LAR/APR--Positioning of patient, care-Prevention of hazards.

Total thyroidectomy—with emphasis on proper positioning.

Abdomino Perineal Resection

Appendectomy: Open or Laproscopic

Chest intubation

Cholecystectomy: Open or Laproscopic

Colon Resection, Colectomy, Common Bile Duct Exploration

Draining Pancreatic Cyst

Excision and Biopsy

Esophagectomy, Liver Resection, Liver Biopsy

Transthoracic esophagectomy—Different approaches.

Venesection and Tracheostomy.

Laproscopic Cholecystectomy – Pneumoperitonium - Creation and removing, principles.

Nephrectomy

Breast surgery

Esophagogastrectomy

Excision of Pilonidal Cyst

Fundoplication

Femoral Hernia, Incisional Hernia, Inguinal Hernia: Herniotomy and Hernioraphy, Umbilical Hernia, Diaphragmatic Hernia

Fistulotomy/Fistulectomy

Gastrectomy, Gastroduodenostomy, Gastrojejunostomy, Gastrostomy,

Hemorrhoidectomy, Splenectomy, Thyroidectomy, Tracheostomy

Mastectomy; Parathyroidectomy

Blood draw from a Central Venous Catheter

Assisting with Collection of CSF

Insertion of a peripheral IV line

Insertion of Nasogastric tube, Nasogastric lavage

Administration of bolus feeding

Changing a fecal Ostomy Appliance

Emptying an Ostomy Pouch

Administration of Enema

Urinary Catheterization

Oxygen administration

Tracheostomy Monitoring

Monitoring of Endotracheal tube

**Specialized surgical procedures**

**ORTHOPEDIC SURGERY**

**THORACIC SURGERY**

**PULMONARY SURGERY**

Introduction, types of incision, types of operation, complications of pulmonary surgery, drains , tubes, pneumonectomy, lobectomy , thoracoplasty, Operations on pleura. Chest injuries, Brief description of indication for pulmonary surgery

**CARDIAC SURGERY**

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Introduction, Cardiorespiratory resuscitation, Special investigation procedures in cardiac surgery, Basic techniques in cardiac surgery, Types of incision, Types of operation, Complications of cardiac surgery, Lines, drains and tubes, Brief description of indications for cardiac surgery, Congenital heart disease, Acquired heart diseases, Diseases of the pericardium, Cardiac transplantation

#### VASCULAR SURGERY

Introduction, Investigation in vascular disease types of operation, Indication for vascular surgery, Complication of vascular surgery, Brief description of arterial occlusion, Gangrene, Detailed description of amputation, Aneurysm, Burgers disease, Raynaud's disease and syndrome, Varicose veins, Superficial and deep venous thrombosis, Venous hemorrhage, Lymph edema, Lymph adenitis and lymphomas

#### NEUROSURGERY

##### CRANIAL SURGERY

Introduction, Special investigation in brain diseases and traumas, Types of operations, indications and complications of cranial surgery, Head injuries to the brain, Acute intracranial hematomas, Fractures of the skull, Intra cranial abscess, Intracranial tumors and Intra cranial aneurysm and hydrocephalus

##### SURGERY OF VERTEBRAL COLUMN SPINAL CORD AND PERIPHERAL NERVES

Dislocation and management of dislocation of vertebral column, Tumors of vertebral column, Prolapse intervertebral disc, Disc protrusion, Spondylosis and spondylolisthesis, Spinal cord injuries and their management, Tumors of spinal cord types of operations performed on nerves, Nerve injuries and their surgical management and Brief description of lesions of cranial and spinal nerves and their management.

#### EMERGENCY PROCEDURES & PRIMARY CARE ORGANIZATION AND ADMINISTRATION OF EMERGENCY CARE

Develop and implement emergency action plan, Emergency team, Initial patient assessment and care, Emergency communication, Emergency equipment and supplies, Venue location, Emergency transportation, Emergency care facilities and Legal need and documentation

#### PHYSICAL EXAMINATION OF THE CRITICALLY INJURED PATIENT/ATHLETE

Scene assessment and safety, Body substance isolation precautions, Primary survey, Secondary survey and Vital signs

#### AIRWAY MANAGEMENT

Air way anatomy, Air way compromise, Oxygen therapy and Advanced airway devices

#### SUDDEN CARDIAC DEATH

Incidence and etiology of sudden death in general population, Sudden cardiac arrest in athletes, Screening and recognition of cardiac warning signs, Preparation for cardiac emergencies and Management of sudden cardiac arrest

#### HEAD INJURIES

Pathomechanics of brain injuries, Types of pathology, Classification of cerebral concussion, Cerebral contusion, Cerebral hematoma, Second impact syndrome, Initial on site assessment, Sideline assessment, Special tests for assessment of coordination, Special tests for assessment of cognition, Other tests, Medications and Wake ups and rest.

#### EMERGENCY CARE OF CERVICAL SPINE INJURIES

Anatomy, Mechanism of injuries, Injuries to the spinal cord, Assessment and Management

#### EMERGENT GENERAL MEDICAL CONDITIONS

Sudden death, Exercise induced anaphylaxis, Acute asthma, Diabetes mellitus, Mononucleosis, Sickle cell traits and Hypertension.

#### ENVIRONMENT-RELATED CONDITIONS

Heat related emergencies and their prevention, Cold related injuries, Lightning and Altitude related emergencies

#### Blood Transfusion

a. History of discovery of blood groups and genetics of blood groups.

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Department of Allied Health Sciences  
Sergesh Medical College  
University of Sargodha

- b. Types of blood groups and Rh factor.
- c. Coombs test.
- d. Collection of blood, its preservation and standardization.
- e. Various types of blood and blood products(Packed cells, PRP, FFP)
- f. Pre-transfusion checks.
- g. Transfusion reactions.
- h. Fluids and electrolytes
- i. Body fluid compartments and the effect of fluid administration on them.
- j. Types of fluids (crystalloids and colloids) and their chemical composition.
- k. Indications of specific fluids and their complications.

### **Practical**

Vascular Access Procedures, Vein Ligation & Stripping, Whipple's Operation  
 Clinical rotation in operation theatre, Working with surgeons and observing the procedures  
 Methods of screening before surgery, Arrangement of surgical equipments prior to surgery,

### **RECOMMENDED BOOKS**

1. Handbook of Operation Theatre Techniques By Kilpadi
2. Pocket Guide To The Operating Room By Maxine A. Goldman
3. Instrumentation For The Operating Room: A Photographic Manual By Shirley M. Tighe
4. Introduction to Operating-Room Technique By Edna Cornelia & Kohn, Mary Louise Berry
5. Operating Room Management: Structure, Strategies, & Economics By Andrew P. Harris And William G. Zitzmann
6. Text Book of Surgery (4th edition) (Indian Association of Surgeons) by Dr. Ahmad
7. Short Practice of Surgery by Bailey & Love Published by Chapman and Hall.

## **OPERATION THEATRE MANAGEMENT**

### **COURSE DESCRIPTION**

The purpose of this subject is to train lab sciences graduates for the supervision and operation of clinical laboratory with specialization, to perform most difficult and highly complex test, analyses and examinations. Clinical laboratory testing plays an essential part in the delivery of quality health care. A physician orders lab tests to diagnose, treat, manage, or monitor a patient's condition. The process begins with collection of a sample of blood, tissue, or other biological matter from the patient, which is then sent to the laboratory where it is uniquely identified and examined to make certain that it is appropriate for the testing ordered by the health care provider. Good lab practices embody a set of principles that provides a frame work in which laboratory studies are planned, performed, monitored, archived and reported. In the era of modern technology, laboratory diagnostic tests in conjunction with a patient history and physical examination confirm the diagnosis and provide valuable information about a patient health status and response to therapy. In addition to these, laboratory findings are also essential for epidemiological surveillance and research purposes. In this course, students will gain theoretical and practical knowledge about laboratory techniques to furnish and evaluate lab report.

### **LEARNING OBJECTIVES**

After completing this course, a student will be able to:

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- Explain and apply the major principles and practices of Surgery/OT administration, supervision of various sub-disciplines and budgeting.
- Use leadership skills, help his/her team and organization make progress and act in the right way.
- Implement standard operating procedures (SOPs) & influence the other staff to adhere with biosafety measures.
- Use educational methods to present information and develop instructional materials.
- Communicate effectively with laboratory personnel, other health care professionals, patients and the public.
- Understand and the plan, the structural framework of the operation theatre zones.
- Describe measures to prevent and control sepsis in operation theatre.
- Operate equipment used for sterilization and practice methods of sterilization including fumigation.
- Understand practice of universal precautions and management of needle stick injury.
- Know the significance of disposal of biomedical wastes and understand its management
- Know various applications of advanced airway equipments
- Practise the management of difficult airway.
- Describe the anaesthesia workstation and standards.
- Operate the monitoring devices.

## **COURSE CONTENTS**

**LEADERSHIP AND MANAGEMENT;** Operation management, Administration, Human Resource Management, Financial Management, Marketing Management, Quality Systems Management.

Introduction to Health Facility, Management & Standards of Surgical Practices, Infrastructure & Resources in Operation Theatre, Patient Safety, Operation Theatre Management of Information Systems, Systemic approach to surgical Procedures, Support Supervision, Effective administration of Operation Theatre, Defining Standards of performance, Budget Processing, Document control through complaints

Control of Records, Internal Audits & Management Review

## **STRATEGIC PLANNING**

**DESIGN AND SERVICE MODELS FOR OPERATION THEATRE SETUP;** Assessment, Physical Design, Identify Space for offices, Personal Facilities, Storage, Conference/Library area, Students Area, Furniture, Functional area, Ancillary and auxiliary areas, Construction of Operation Theatre and related areas.

**Overview and strategy in operation theatre:** Theatre management structure, Planning patient pathways, Staffing, Operating list management, Effective use of theatre time, Theatre design, Trauma and emergencies, Postponements.

**REGULATIONS, ACCREDITATION AND LEGISLATION;** Prospective Payment System, Deficit Reduction Act, Ergonomic Safety and Health Program Management Guidelines, Occupational Exposure to Hazardous Chemicals, Hazardous Material Regulations, Surgery-Related Governmental Agencies, Safety, Biological Hazard, Chemical Hazard, Ergonomic Hazard, Waste Disposal.

**RESOURCES;** Management, Personnel, Facilities: buildings and equipment

**PLANNING AND DESIGNING OF OPERATION THEATRE**

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 Department of Allied Health Sciences  
 Bangalore University  
 Bangalore

Planning considerations, objectives of planning, design parameters, Physical environments: Temperature, Humidity, Ventilation. Zoning in OT, OT traffic flows, Number of operating suites, Location of OT, OT Lights, Work flow,

#### **Design, layout and shielding in an Operation Theatre**

- Protection of staff
- Working environment, Personal safety and monitoring
- Patients protection, Safe design criteria for equipment
- Risks of anesthetic agents and surgical procedures
- Techniques to reduce dose of anesthetics
- Persons supporting the patient
- Reporting of incidents and accidents
- Review of facility design, Designation of areas
- Documentation of procedures and record keeping
- Accidents and incidents, Potential exposures in the different stages of the installation, acceptance and operation
- Quality management

#### **Practical**

Recruitment of Staff, Documentation

Equipments

Methods of surgery

Operation theatre design

Building requirement

Specified areas in Operation Theatre

Safety, Hygiene, Disposal of Waste

#### **RECOMMENDED BOOKS**

1. Handbook of Operation Theatre Techniques By Kilpadi
2. Pocket Guide To The Operating Room By Maxine A. Goldman
3. Instrumentation For The Operating Room: A Photographic Manual By Shirley M. Tighe
4. Introduction to Operating-Room Technique By Edna Cornelia & Kohn, Mary Louise Berry
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6. Text Book of Surgery (4th edition) (Indian Association of Surgeons) by Dr. Ahmad
7. Short Practice of Surgery by Bailey & Love Published by Chapman and Hall.

### **RESEARCH REPORT WRITING**

In the final year, a project will be allocated to a single or group of students, depending on available facilities. The In-charge / chairperson of the concerned department/institute shall allot a supervisor. This report shall be evaluated by a panel of examiners notified by the office of the controller examination from an approved panel comprising external and internal examiners. Every student shall be evaluated keeping in view their contribution, thorough understanding of work done and comprehensive presentation. If the student cannot defend his/her work in 1st annual examination, they shall reappear in the 2nd annual/supplementary examination. The details of the report are given below

- Title page
- Names of students
- Students I.D number
- Supervisor's name

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- Program name
- Name of the department
- Project title
- Abstract

### **Abstract**

A maximum of one page (200 words) on the work performed and your main conclusions. Abstract should be single line spacing, should not contain any figures, contain a maximum of 2 references, and written in Arial / New Times Roman font size 11. The title of the project should be on the first line (Arial / New Times Roman size 11, bold). The name of the student and their supervisor should appear on the next line (Arial / New Times Roman size 11, italic). The abstract should be then be included as a single paragraph. References (if required) should be included at the end (Arial / New Times Roman, size 9).

### **Points into account while writing Abstract**

Explain the purpose of your study/paper. This should optimally be only one sentence long. State the primary objectives and scope of the study or the reasons why the document was written (unless these things are already clear from the title of the document or can be derived from the rest of the abstract). Also state the rationale for your research. Why did you do the research? Is the topic you are researching an ignored or newly discovered one? In terms of Methodology (research methods), clearly states the techniques or approaches used in your study. If you want to introduce new methods or approaches in your abstract, keep in mind the need for clarity.

Describe your results (the findings of your experimentation), the data collected, and effects observed as informatively and concisely as possible. These results of course may be experimental or theoretical, but remember the difference between conjecture and fact and note them in your abstract. Give special priority in your abstract to new and verified events and findings that contradict previous theories. Mention any limits to the accuracy or reliability of your findings.

By stating your conclusions, you are in essence describing the implications of the results: why are the results of your study important to your field and how do they relate to the purpose of your investigation? Often conclusions are associated with recommendations, suggestions and both rejected and accepted hypotheses. You may wish to include information that is incidental to the main purpose of your paper, but is valuable to those outside your area of study. If you choose to include such information, be careful not to exaggerate its relative importance to the abstracted document

### **Declaration of Originality**

Place on a separate page;

"We hereby declare that this project is entirely our own work other than the counsel of our supervisor and that it has not been submitted for any academic award, or part thereof, at this or any other Educational Institution"

Signed: Authors

Counter signed: Supervisor

### **Acknowledgements (Optional)**

To include those individuals or groups of individuals you would like to thank in relation to the support you received.

### **Table of Contents**

You should list all of the sections and sub-sections, together with their corresponding page numbers

List of Tables

List of Figures

List of Appendices

### **Suggested Chapter Structure**

The following outlines a chapter structure suitable to a project, which involved a distinct component of data collection. The structure of the main body is flexible and you should discuss an appropriate structure with your supervisor. The content and importance of each section will depend

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 Department of ...  
 University of ...

on the type of project you are undertaking and again should be discussed with your supervisor before submission.

### **Chapter 1. Introduction**

- i) Introduction (Very brief review of literature and indicate significance of study)
- ii) Statement of Problem (Should include clear purpose of study)
- iii) Questions/Hypothesis
- iv) Outline Methodology
- v) Definition of Terms

The introduction should 'set the scene' for the examiners and enable them to appreciate the relevance of your work in a particular research area.

### **Chapter 2. Literature Review**

A literature review is an extended essay, which is based on source material. In simple terms, the merit of your literature review is proportional to the comprehensive nature and originality of your sources. Your writing should be confined to the questions/hypothesis being examined. A literature review is more than a listing of references. You should attempt to synthesize a new understanding of your topic, and provide a critique of what other commentators have had to say on the subject.

### **Chapter 3. Methodology**

- i) Participant Selection (Including ethical considerations)
- ii) Experimental Design
- iii) Measurement Procedures
  - Data collection procedures
  - Rationale for selecting these procedures/questions
- iv) Analysis of Data

The methodology should describe the characteristics of the subjects, award of ethical approval, and where appropriate the apparatus, calibration procedures, reliability of the methods used, experimental protocols and the statistical treatments of the data. Diagrams and photographs may be appropriate to illustrate procedures.

### **Chapter 4. Analysis of Results**

Your results should consist of tables of your findings, illustrated with graphs where appropriate. The results section should contain text, which takes the reader through your graphs and tables, pointing out the salient features. Tables should wherever possible summarize the data from several subjects in the form of means and standard deviations. You do not need to give tables of every piece of original data. If you feel it is essential to include these put them in an appendix.

### **Chapter 5. Discussion of Results**

It is good practice to begin with a summary of your findings. This is your opportunity to interpret your data in the context of what is already known from existing literature. However, make every effort to explain your findings first, justifying the arguments by reference to previously published work. NOT the other way around. The discussion is the place for explanations and opinions. Link your findings with the purpose/questions/hypothesis of your project. Include critical appraisal of your own work and that of others. Address what you would do differently with hindsight?

### **Chapter 6. Conclusion**

- Summary of main findings
- Recommendations (Impact of findings and future research)
- Conclusion

This section should summarize main findings, highlight areas where more work is needed and suggest avenues for future development of this work. An overall conclusion from the study should be included to complete the project.

**References:** A list of references must be included at the end of the project document and appropriately referenced within the text according to a recognized standard of the University.

**Appendices:** In this section, if required, include any raw data, interview transcript, computer program listings, and questionnaires etc., which were not in the results section, but which may need to be consulted.

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