



# **CURRICULUM**

## **BS Anesthesia Technology**

**WAZIR MUHAMMAD INSTITUTE OF ALLIED HEALT SCIENCES**

**GANDHARA UNIVERSITY PESHAWAR**

**SEMESTER WISE SUBJECTS BS ANESTHESIA**

<b>Semester/Year</b>	<b>Name of Subject</b>	<b>CODE</b>	<b>Credits</b>
<b>First</b>	ANATOMY-I	WMI-601	4(3+1)
	BIOCHEMISTRY-I	WMI-602	4(3+1)
	PHYSIOLOGY-I	WMI-603	4(3+1)
	PAKISTAN STUDIES	WMI-604	2(2+0)
	ENGLISH-I	WMI-605	2(2+0)
	COMPUTER SKILLS	WMI-606	2(1+1)
<b>Second</b>	ANATOMY-II	WMI-607	4(3+1)
	BIOCHEMISTRY-II	WMI-608	4(3+1)
	PHYSIOLOGY-II	WMI-609	4(3+1)
	ISLAMIC STUDIES	WMI-610	2(2+0)
	COMMUNICATION SKILLS	WMI-611	2(2+0)
<b>Third</b>	ANATOMY RELATED TO ANESTHESIA	ANT-601	3(2+1)
	GENERAL PATHOLOGY-I	WMI-612	3(2+1)
	GENERAL PHARMACOLOGY-I	WMI-613	3(2+1)
	BIOETHICS	WMI-615	2(2+0)
	HAEMATOLOGY-I	WMI-636	3(2+1)
	MEDICAL MICROBIOLGY	WMI-637	3(2+1)
<b>Fourth</b>	PHYSIOLOGY RELATED TO ANESTHESIA	ANT-602	3(2+1)
	PHYSICS RELATED TO ANESTHESIA	ANT-604	3(2+1)
	COMMUNITY MEDICINE	ANT-605	2(2+0)
	GENERAL PATHOLOGY-II	WMI-616	3(2+1)
	GENERAL PHARMACOLOGY-II	WMI-617	3(2+1)
	HAEMATOLOGY-II	WMI-639	3(2+1)
			<b>17</b>
<b>Fifth</b>	ANESTHESIA EQUIPMENT	ANT-603	3(2+1)

	PHARMACOLOGY RELATED TO ANESTHESIA	ANT-606	3(2+1)
	HISTORY TAKING PRE-OP MANAGEMENT AND POST-OP CARE	ANT-607	3(2+1)
	ANESTHESIA AND CO-EXISTING DISEASE	ANT-608	3(2+1)
	CRITICAL CARE	ANT-609	3(2+1)
	LEADERSHIP AND MANAGEMENT	ANT-620	2(2+0)
Sixth			<b>17</b>
	DIFFERENT TYPES OF ANESTHESIA	ANT-610	<b>3(2+1)</b>
	ANESTHESIA RELATED COMPLICATION AND THEIR MANEGEMENT	ANT-611	<b>3(2+1)</b>
	ANESTHSIA FOR CARDIO THORASIC SURGERY	ANT-612	<b>3(2+1)</b>
	ANESTHESIA FOR NEURO GERIATIC AND EMERGENCY SURGERY	ANT-613	<b>3(2+1)</b>
	BIOSTATISTICS	ANT-630	<b>3(2+1)</b>
	RESEARCH METHADODOLOGY	ANT-631	<b>3(2+1)</b>
			<b>18</b>
Seventh	ANESTHESIA FOR GENERAL SURGERY, ORTHODPEDIC AND UROLOGICAL PROCEDURE	ANT-614	<b>3(2+1)</b>
	ANESTHESIA FOR EYE SURGICAL PROCEDURE	ANT-615	<b>3(2+1)</b>
	ANESTHESIA FOR EAR, NOSE, THROAT	ANT-616	<b>3(2+1)</b>
	ANESTHESIA FOR OBSTETRIC, AND PEDIATRIC SURGERY	ANT-617	<b>3(2+1)</b>
	ELECTROCARDIOGRAPHY FOR ANESTHETIST	ANT-618	<b>3(2+1)</b>
	EPIDEMIOLOGY	WMI-632	<b>2(2+0)</b>
			<b>17</b>
Eight	ANESTHESIA FOR DENTAL, MAXILLOFACIAL, HEAD AND NECK SURGERY	ANT-619	<b>3(2+1)</b>
	RESEARCH PROJECT	ANT-633	<b>6+0</b>
	SEMINAR	ANT-634	<b>1+0</b>
			<b>10</b>
	TOTAL CREDIT HOURS		<b>130</b>

1<sup>st</sup> Semester

<b>First</b>	ANATOMY-I	WMI-601	4(3+1)
	BIOCHEMISTRY-I	WMI-602	4(3+1)
	PHYSIOLOGY-I	WMI-603	4(3+1)
	PAK STUDIES	WMI-604	2(2+0)
	ENGLISH-I	WMI-605	2(2+0)
	COMPUTER SKILLS	WMI-606	2(2+1)

**Course Objectives:**

- To understand the basic concepts of anatomy beginning from the cell organization to organ system function
- To understand the basic concepts of general anatomy including skeleton and musculoskeletal.
- To Understand the anatomy of Thorax Abdomen and pelvis

**Course contents:**

Musculo skeletal system (Axial and Appendicular), Axial Skeleton, Different bones of human body, Axial and Appendicular Skeleton, Classification on the basis of development, region and function, General concept of ossification of bones, parts young bone, Blood supply of long bones. Joints Structural Regional and functional classification of joints, Characteristics of synovial joints, Classification of synovial joints, Movements of synovial joints. Muscular System Parts of muscle Classification of muscles (skeletal, Cardiac, smooth) Thoracic wall: Muscles of thorax, Surface Anatomy, Trachea, lungs, pleura, mammary glands (breast), Heart and thoracic vessels. Thoracic cavity: Mediastinum, Lungs, bronchi, blood supply and lymphatic Abdominal wall: Skin, nerve and blood supply, Muscles of anterior abdominal wall. Abdominal cavity: General Arrangement of the Abdominal Viscera, Peritoneum, Omenta, mesenteries, Stomach, blood, nerve, lymphatic supply, small intestine, blood, nervous and lymphatic supply, Large intestine: blood nerve and lymphatic supply. The pelvic wall: Anterior, posterior wall, diaphragm. Pelvic cavity: Ureters, urinary bladder Male genital organs, Female genital organs, Muscles of pelvic region, blood supply, nerve supply.

**Practical's:**

- Study Axial and Appendicular skeleton on human Skeletal model.
- Study musculoskeletal system on human Musculo Skeletal model.
- Study organs of Special senses.
- Study and understand anatomy of Thorax, Abdomen and Pelvis through:
  - Human Models
  - Video demonstration.

**Recommended Books:**

Ross and Wilson Anatomy and Physiology in health and illness 11<sup>th</sup> Edition Waugh Grant.

Clinical Anatomy (By regions) 9<sup>th</sup> edition, Richard Snell.

**Reference books:**

- Netter Atlas of Anatomy 5<sup>th</sup> Edition Saunders.
- Gray's Anatomy for student's 2<sup>nd</sup> Edition Drake Vogel Mitchell.

**Course objectives:**

- To understand the chemical composition, biochemical role, digestion and absorption of macro and micro molecules of the cell.
- To understand different biochemical reactions in cell.
- To understand mechanism of action of hormones.

**Course contents:**

Acids, bases, pH and buffers, Biochemical composition and functions of the cell membrane, Transport across the cell membrane, Carbohydrates: Introduction, structure, function, digestion and absorption, Amino acids and proteins: Introduction, structure, function, digestion and absorption, Lipids: Introduction, structure, function, digestion and absorption, Vitamins and minerals, Fluid, electrolyte and acid base balance, Cell signaling and hormone action, Body secretions: Composition and function of saliva, gastric acid (HCL), pancreatic juice, bile, hormones and GI functions

**Practical's:**

- Blood sample collection for Biochemical analysis
- Preparation and calculation of Solutions
- Principles of Biochemistry analyzers (spectrophotometer, flame photometer)
- Determination of Cholesterol, TG, HDL, LDL, sugar, calcium and phosphorus in blood

**Recommended Books**

- Harper's Biochemistry Robert K. Murray, Daryl K. Graner 28<sup>th</sup> edition 2009
- Biochemistry by Dr. U. Satyanarayana, UChakrapani Lehninger Principles of Biochemistry, 6E
- Marks' Essentials of Medical Biochemistry A Clinical Approach, Second Edition

**Course Objectives:**

- To understand the basic concepts of physiology beginning from the cell organization to organ system function.
- To understand the organization of cell, tissue organ and system with respect to their functions.
- To Understand the physiology of Respiration, G.I.T, Urinary system and Endocrine system

**Course contents:**

Functional organization of human body, Mechanism of Homeostasis, Cell structure and its function, function of different Tissue, Functions of the skin, , Types and function of muscle, Neuromuscular junction, functions of the endocrine glands, Breathing Mechanism, Exchange of respiratory Gaseous, Transport of respiratory gases, Function of different part of Digestive system, Function of liver and pancreas, Digestion and Absorption in Gastrointestinal tract, Patho-Physiology of Gastrointestinal Disorders, Formation of Urine by the Kidney, Glomerular filtration, Renal and associated mechanism for controlling ECF, Regulation of Acid-Base Balance, Male Reproductive System ( Male ), Prostate gland, Spermatogenesis, Female Reproductive System, Menstrual Cycle and Pregnancy and parturition, Mammary Glands and Lactation and Fertility Control

**Practical's:**

- Introduction to microscope
- Bleeding time
- Clotting time
- WBCs count
- RBCs count
- Platelets count
- Reticulocytes count

**Recommended Books:**

- Essentials of Medical Physiology K Sembulingam, Prema Sembulingam Sixth Edition 2013
- Concise Physiology Dr. Raja Shahzad 1<sup>st</sup> Edition 2012
- Guyton And Hall Textbook of Medical Physiology John E. Hall, Arthur C. Guyton Professor and Chair 2006
- Ross and Wilson Anatomy and Physiology in Health and Illness 11<sup>th</sup> Edition Anne Waugh, Allison Grant 2010

**Course Objectives:**

- To develop vision of Historical Perspective, Government, Politics, Contemporary Pakistan, ideological background of Pakistan.
- To study the process of governance, national development, issues arising in the modern age and posing challenges to Pakistan.

**Course Contents:**

Historical Perspective: Ideological rationale with special reference to Sir Syed Ahmed Khan, Allamah Muhammad Iqbal and Quaid-e-Azam Muhammad Ali Jinnah, Factors leading to Muslim separatism, People and Land, Indus Civilization, Muslim advent, Location and Geo-Physical features. Government and Politics in Pakistan, Political and constitutional phases:1947-58,1958-71,1971-77,1977-88,1988-99,1999 onward  
Contemporary Pakistan: Economic institutions and issues, Society and social structure, Ethnicity, Foreign policy of Pakistan and challenges, Futuristic outlook of Pakistan.

**Books Recommended:**

Akbar, S. Zaidi. *Issue in Pakistan's Economy*. Karachi: Oxford University Press,2000.

Mehmood, Safdar. *Pakistan Kayyun Toota*, Lahore: Idara-e-Saqafat-e-Islamia, Club Road, Nd.

Amin, Tahir. *Ethnos - National Movement in Pakistan*, Islamabad: Institute of Policy Studies, Islamabad.

Afzal, M. Rafique. *Political Parties in Pakistan*, Vol. I, II & III. Islamabad: National Institute of Historical and cultural Research,1998.



**Course Objective:**

- To enable the students to meet their real-life communication needs
- To enhance language skills and develop critical thinking

**Course Contents:**

Vocabulary Building Skills: Antonyms, Synonyms, Homonyms, One word Substitute, Prefixes and suffixes, Idioms and phrasal verbs, Logical connectors, Check spellings, Practical Grammar & Writing Skill: Parts of Speech, Tenses, Paragraph writing: Practice in writing a good, unified and coherent paragraph, Précis writing and comprehension, Translation skills: Urdu to English, Reading skills: Skimming and scanning, intensive and extensive, and speed reading, summary and comprehension Paragraphs, Presentation skills: Developing, Oral Presentation skill, Personality development (emphasis on content, style and pronunciation)

**Recommended books:**

- Practical English Grammar by A.J. Thomson and A.V. Martinet. Exercises 2. Third edition. Oxford University Press 1986. ISBN 0 19 4313506.
- Reading. Advanced. Brian Tomlinson and Rod Ellis. Oxford Supplementary Skills. Third Impression 1991. ISBN 0 19 4534030.

**Course objectives:**

To understand the basic of computer

To utilize the MS office, internet and email

**Course Contents:**

Introduction to Computer and Window XP/7; MS Office 2007 (Word, Excel, PowerPoint); Internet access and different data bases available on the internet; Email.

**Recommended Books:**

Computer science by Muhammad Ashraf, edition 1<sup>st</sup>2010

2<sup>ND</sup> Semester

<b>Second</b>	ANATOMY-II	WMI-607	<b>4(3+1)</b>
	BIOCHEMISTRY-II	WMI-608	<b>4(3+1)</b>
	PHYSIOLOGY-II	WMI-609	<b>4(3+1)</b>
	ISLAMIC STUDIES	WMI-610	<b>2(2+0)</b>
	COMMUNICATION SKILLS	WMI-611	<b>2(2+0)</b>

**Course Objectives:**

- To understand the basic concepts of anatomy beginning from the cell organization to organs system function
- To understand the anatomy of upper limb, lower limb and head and neck.
- To understand the knowledge about endocrine system

**Course contents:**

The upper limb Bones of shoulder girdle and Arm, Muscles, Axilla, Brachial plexus, Cubital fossa, the forearm, hand bones, muscles, Blood supply, Nerve supply, lymphatics, The lower limb Fascia, Bones, Muscles, Femoral triangle, Blood supply, Nerve supply, Lymphatic supply. Head and neck Skull, Mandible, Cranial nerves, cranial cavity, Meninges, Brain, Orbit, Neck, Endocrine System Classification of endocrine glands, Pituitary glands, Thyroid Glands, Adrenal gland and differences between the cortex and medulla.

**Practical's:**

- Study and understand the anatomy of Upper limb, Lower limb, Head and Neck through:
- Human Models.
- Video demonstration
- Study radiographs of upper and lower limb.

**Recommended Books:**

- Essential books (text books)
- Ross and Wilson Anatomy and Physiology in health and illness 11<sup>th</sup> Edition Waugh Grant.
- Clinical Anatomy (By regions) 9<sup>th</sup> edition, Richard S. Snell.

**Reference books**

- Netter Atlas of Anatomy 5<sup>th</sup> Edition Saunders.
- Gray's Anatomy for students 2<sup>nd</sup> Edition Drake Vogel Mitchell.
- BD. Chourasia Anatomy (Allregions)

**Course objective:**

By the end of this course the students of BS technology will be able to:

- Discuss the basic concept of biomolecules and its metabolism in human body
- Describe the significance of various enzymes and hormones in human body
- Demonstrate various enzymes and hormones on biochemistry analyzer and interpret its result for the diagnosis and monitoring

**Course Content:**

Carbohydrates metabolism (Glycolysis, Glycogenolysis, Gluconeogenesis, Glycogenesis, Pentose phosphate pathway, Fermentation and ethanol metabolism, Krebs cycle, ETC, Cori cycle, Glucose alanine cycle), Protein and amino acids metabolism (synthesis and degradation of amino acids, Lipid metabolism (Beta oxidation, Cholesterol metabolism), Nucleotide metabolism ( Purine and pyrimidine degradation, uric acid formation), Nutrition (Major food groups, Balanced diet , Metabolic changes in starvation, Protein energy malnutrition, Obesity, kwashiorkor, Marasmus), Clinical diagnostic enzymology: clinical significance of ALT, AST, ALP, GGT, LDH and isoenzymes, CK and isoenzymes, Pancreatic lipase and amylase, cholinesterase, G6PD, ACP, cardiac troponins, ANP, BNP and pro-BNP)

**Practical:**

- Determination of liver, cardiac, pancreatic enzymes
- Determination of urea and uric acid
- Demonstration of ELISA, CMIA and CLIA instrument

**Books:**

- Biochemistry by Dr. U. Satyanarayana, U Chakrapani
- Marks' Essentials of Medical Biochemistry A Clinical Approach, Second Edition Harper's Illustrated Biochemistry a LANGE medical book twenty-sixth edition Lehninger Principles of Biochemistry, 6E
- Mc Graw Hill's Manual of laboratory and diagnostic tests by DENISE D. WILSON, PHD, APN, FNP, ANP

**Course Objectives:**

- To understand the basic concepts of physiology beginning from the organization of the systems to their role in the body.
- Understand the organization and function of various systems
- Understand the physiology of Blood, CVS, Nervous System and special senses
- Students will be able to understand immunity, its types and immune reactions

**Course Contents:**

Physiology of Nervous System, Function of various cranial nerves, Functions of somatic motor nervous system Functions of the autonomic nervous system, function of neurons, neuroglial cells and their components. Resting membrane potential and an action potential, function of a synapse and reflex arc, functions of the specialized sense organs: Eye, physiology of site, accommodation, optic nerve and optic chiasma, Ear, functions of the internal, middle and external ear Physiology of the hearing and balance, Smell, physiology of olfactory nerve. Taste, physiology of taste Location of the taste buds Physiology of speech, Blood: Composition and function of Blood , hematopoiesis, Blood grouping, Coagulation mechanism, Physiology of Cardiovascular system The Physiology of Pulmonary Systemic Circulation: Arteries Veins Local Control of Blood Vessels Nervous Control of Blood Vessels Regulation of Arterial Pressure, The function of Lymphatic System, tonsils, lymph nodes, the spleen and the thymus, Classification and physiology of Immune system, Antigens and Antibodies, Primary and secondary responses to an antigen Antibody- mediated immunity and cell-mediated immunity Role of lymphocyte in immunity regulation.

**Practical's**

- Spirometry
- Electrocardiography
- Blood Pressure Measurement.
- Normal and abnormal ECG interpretation.
- Pulse rate measurement
- Heart sounds

**Recommended Books**

- Essentials of Medical Physiology K Sembulingam, Prema Sembulingam Sixth Edition 2013
- Guyton And Hall Textbook Of Medical Physiology John E Hall, Arthur C. Guyton Professor and Chair 2006
- Ross and Wilson Anatomy and Physiology in Health And Illness 11<sup>th</sup> Edition Anne Waugh, Allison Grant 2010

**Course Objectives:**

- To learn about Islam and its application in day-to-day life.
- To provide Basic information about Islamic Studies
- To enhance understanding of the students regarding Islamic Civilization
- To improve Students skill to perform prayers and other worships
- To enhance the skill of the students for understanding of issues related to faith and religious life.

**Course contents:**

Fundamental beliefs of Islam, Belief of Towhead, Belief in Prophet hood, Belief in the Day of Judgment, Worships, Salaat / Prayer, Zakat /Obligatory Charity, Suam / Fasting, Hajj / Pilgrimage, Jihad, Importance of Paramedics In Islam, Ethics, Religion and Ethics, Higher Intents / Objectives of Islamic Sharia and Human Health, Importance and Virtues of Medical Profession, Contribution and Achievements of Muslim Doctors, Knowledge of the Rights, Wisdom and Prudence, Sympathy /Empathy, Responsible Life, Patience, Humbleness, Self Respect, Forgiveness, Kindhearted, Beneficence, Self Confidence, Observing Promise, Equality, Relation among the Doctors, Jealousy, Backbiting, Envy, Etiquettes of Gathering, Relation between a Doctor and a Patient, Gentle Speaking, Mercy and Affection, Consoling the Patient, To inquire the health of Patient, Character building of the Patient, Responsibilities of a Doctor,

**Recommended Books:**

Islamiyat (Compulsory) for Khyber Medical University, Medical Colleges and Allied Institutes

**Course Objectives**

By the end of the course students will be able to:

- Communicate effectively both verbally and non-verbally
- Apply the requisite academic communication skills in their essay writing and other forms of academic writing
- Use various computer-mediated communication platforms in their academic and professional work
- Relate to the interpersonal and organizational dynamics that affect effective communication in organizations.

**Course contents:**

Introduction to Communication , Meaning and definition of Communication, The process of communication, Models of communication, Effective Communications in Business, Importance and Benefits of effective communication, Components of Communication, Communication barriers, Non verbal communication, Principles of effective communication, Seven Cs, Communication for academic purposes, Introduction to academic writing, Summarizing, paraphrasing and argumentation skills, Textual cohesion, Communication in Organizations, Formal communication networks in organizations, Informal communication networks, Computer- mediated communication (videoconferencing, internet, e-mail, skype, groupware, etc.), Business Writing , Memos, Letters, Reports, Proposals, Circulars, Public Speaking and Presentation skills, Effective public presentation skills, Audience analysis, Effective argumentation skills, Interview skills.

**Recommended Books:**

- Practical English Grammar by A.J. Thomson and A.V. Martinet. Exercises 2. Third edition. Oxford University Press 1986. ISBN 0 19 4313506.
- Practical English Grammar by A.J. Thomson and A.V. Martinet. Exercises 1. Third edition. Oxford University Press. 1997. ISBN0194313492.
- Practical English Grammar by A.J. Thomson and A.V. Martinet. Exercises 2. Third edition. Oxford University Press. 1997. ISBN0194313506
- Intermediate by Marie-Christine Boutin, Suzanne Brinand and Françoise Grellet. Oxford Supplementary Skills. Fourth Impression 1993. ISBN 0 19 435405 7 Pages 20-27 and 35-41.
- Reading. Upper Intermediate. Brian Tomlinson and Rod Ellis. Oxford Supplementary Skills. Third Impression 1992. ISBN 0 19 4534022.



<b>Third</b>	ANATOMY RELATED TO ANESTHESIA	ANT-601	3(2+1)
	GENERAL PATHOLOGY-I	WMI-612	3(2+1)
	GENERAL PHARMACOLOGY-I	WMI-613	3(2+1)
	BIOETHICS	WMI-615	2(2+0)
	HAEMATOLOGY-I	WMI-636	3(2+1)
	MEDICAL MICROBIOLGY	WMI-637	3(2+1)
			<b>17</b>

**Course Object:**

- Students are expected to understand relevant basic anatomical structures knowledge which helps in the identification of various organs position need for anesthesia practice.

**Course Contents**

Heart and pericardium, great and major vessels, fetal circulation, mouth nose and pharynx, larynx, trachea and bronchi, pleura and lungs, diaphragm, brain and spinal cord, spinal nerves, cervical plexus, brachial plexus, intercostal nerves, lumbar plexus, sacro-coccygeal plexus, autonomic nervous system satellite ganglion, coeliac plexus, cranial nerves, vertebral Column, vertebrae, sacrum, ligaments, thoracic inlet, intercostal spaces, abdominal wall and inguinal region, antecubital fossa,

Large veins of neck and leg.

**Practical:**

1. Demonstration of surface feature of the heart
2. Demonstration of great vessels and its branches
3. Demonstration on surface marking of lungs
4. Demonstration on larynx cartilages (cricoids, thyroid, epiglottis cartilages)
5. Demonstration on trachea
6. Demonstration of Brain and Spinal cord

**Recommended books:**

- Concise Anatomy for Anesthesia. Erdmann., Andres., 2<sup>nd</sup> edition
- Essential Anatomy for Anesthesia Black., sue., M., Chambers., Alatair., W.,
- Atlas of human anatomy. Netter., Frankh., 5<sup>TH</sup> edi.

**Course Objectives:**

- To understand different pathological processes
- To the processes blood coagulation and embolism
- To understand the mechanism of wound healing and regeneration

**Course Contents:**

Introduction to pathology, Cell injury, Cellular adaptation, Acute Inflammation, Chronic Inflammation, Cell Repair & Wound Healing, Regeneration & Repair, Haemodynamic Disorders, Edema, Haemorrhage, Thrombosis, Embolism, Infarction & Hyperaemia, Shock, compensatory mechanism of shock, possible consequences of thrombosis & difference between arterial & venous emboli, Neoplasia, Dysplasia, benign and malignant neoplasms, metastasis

**Practical:**

1. Estimation of Prothrombin Time
2. Estimation of Clotting Time
3. Estimation of Bleeding Time
4. Estimation of Activated Partial Tromboplastin Time

**Recommended Books:**

- Robbins Basic Pathology Kumar Abbas Aster 9th Edition 2013
- Review of General Pathology Moh. Firdaus 9th Edition
- Short Text Book of Pathology Moh. Inam Danish 3rd Edition 2006

**Course Objectives:**

- To discuss the roles and responsibilities of the various members of the health care team in maintaining patient safety during drug therapy.
- To define common terms related to pharmacology and drug therapy.
- To discuss relevant historical, legal, and ethical issues related to pharmacology and drug therapy.

**Course Contents:**

Definitions of a drug pharmacology, clinical pharmacology, therapeutics, pharmacogenetics, therapeutic index, Pharmacokinetics: Drug passage across cell membrane, Plasma half-life, Steady state concentration, biological half life, Absorption: sites, enterohepatic circulation, bioavailability, factors affecting systemic availability, pre-systemic elimination, effect of food on drug kinetics, Distribution: protein binding, Metabolism: results of metabolism of drugs, sites of metabolism, phases of metabolism, enzyme induction, enzyme inhibition, Elimination: Excretion, Mechanism of drug action: Different mechanisms of drug action. Receptors: Drug binding to receptors, second messenger, receptor regulation. Dose-response relationship: agonist, antagonist, affinity, potency, efficacy, factors modifying drug response. Drug interactions: Definitions. Types of interaction: harmful and useful. Pharmacological basis of drug interaction: pharmacokinetic interactions; pharmacodynamics interactions; antagonism, synergism. An overview of Drugs acting on parasympathetic system, Antihypertensive drugs, An overview of Analgesics: Narcotics and Non-narcotics, An overview of Drugs acting in gastrointestinal tract, Drugs acting on respiratory tract, An overview of Drugs acting on endocrine system.

**Practical:**

1. Routes of drug administration
2. Dose-Response Curves
3. Affect of adrenaline on pulse rate
4. Affect of beta blockers on heart rate after exercise
5. Source of drug and identification of some raw materials that are source of drug
6. Weight conversions and measurements
7. Preparation Sulfur ointment
8. Preparation of pilocarpine drops
9. Prescription writing

**Course Objectives:**

Use the approach of ethical principles the safety and benefits of the patients

Analyze bioethical issues in practice

**Course Contents:**

Introduction of bioethics ,ethical principles ,autonomy ,informed consent, intentional non disclosure ,patient self determination act ,the health insurance portability and accountability act of 1996(HIPAA),privacy and security rules , non maleficence ,slippery slope arguments, benefiance, paternalism, justice, social justice , the patient protection and affordable care act, professional patient relationships ,unavoidable trust ,human dignity , patient advocacy ,moral suffering ,ethical dilemmas

**Recommended Books:**

Introduction to bioethics and ethical decision making by Karen L. Rich (chapter 2).2015

**Course Objectives:**

- To introduce the students about the basic concepts in Hematology and acquire skill in practical work to produce students steeped in knowledge of Hematology.
- To equip students with latest advancements in the field of hematology.

**Course Outlines:**

Introduction to hematology, physiology of blood and composition, introduction to bone marrow, structure and function of bone marrow, blood formation in the body (Intra-uterine and extra-uterine), factors governing hematopoiesis, erythropoiesis, different stages and factor effecting on erythropoiesis, granulopoiesis, different stages and factor effecting on granulopoiesis, megakariopoiesis, different stages and factor effecting on megakariopoiesis, introduction to hemoglobin structure, synthesis and function, complete blood count and its importance, morphology of red blood cells and white blood cells, introduction to anemia and classification of anemia, introduction to hemolysis (physiological and pathological), introduction to WBC disorders, introduction to leukemia, etiology, pathogenesis and its classification, leukocytosis, leukopenia, neutrophilia, condition related to neutrophilia, neutropenia, condition related to neutropenia, eosinophilia, condition related to eosinophilia, eosinopenia, condition related to eosinopenia, monocytosis, condition related to monocytosis, monocytopenia, condition related to monocytopenia, lymphocytosis, condition related to lymphocytosis, lymphopenia, condition related to lymphopenia, basophilia, condition related to basophillia, introduction to hemostasis, mechanism of hemostasis, function of platelets and coagulation factors, coagulation cascade, quantitative disorder of platelets, , qualitative disorder of platelets.

**Practical:**

1. collection of blood sample
2. preparation and staining of peripheral blood smear
3. total leukocyte count, RBC count
4. determination of absolute values
5. differential leukocyte count; platelets count and reticulocytes count
6. to determine the ESR
7. determine bleeding time; prothrombin time; activated partial thromboplastin time

**Recommended Books:**

- Essential of Hematology, A.V Hoff Brand, 6th edition 2006
- Clinical Hematology, G.C Degrunchi, 5th edition 2002
- Practical Hematology, Dacie J.V. 10th edition 2012

**Course objectives:**

- To introduce the students with basic concepts in bacteriology and mycology.
- To introduce the students with common bacterial and fungal infections.
- To introduce the students with diagnosis of common bacterial and fungal infections.

**Course contents:**

Historical review and scope of microbiology, sterilization, disinfection and antisepsis, structure and function of prokaryotic cell, difference between prokaryotic and eukaryotic cell, bacterial growth and metabolism, bacterial classification, normal microbial flora of human body, mechanism of bacterial pathogenesis, host parasite interaction, Immune response to infection, common bacterial pathogen prevailing in Pakistan, introduction to fungi, fungal characteristic, morphology, structure, replication and classification, mechanism of fungal pathogenesis, common fungal pathogen prevailing in Pakistan.

**Practical:**

1. Introduction and demonstration of Laboratory Equipments used in Microbiology.
2. Inoculation and isolation of pure bacterial culture and its antibiotic susceptibility testing.
3. Demonstration of different types of physical and chemical methods of sterilization, and disinfection.
4. Students should be thorough to work with compound microscope.
5. Detection of motility: Hanging drop examinations with motile bacteria, non-motile bacteria.
6. Simple staining methods of pure culture and mixed culture.
7. Gram's staining of pure culture and mixed culture.
8. AFB staining of Normal smear, AFB positive smear.
9. KOH preparation for fungal hyphae.
10. Germ tube test for yeast identification.
11. Gram stain for candida.

**Recommended books:**

- Sherris Medical Microbiology: An Introduction to Infectious Diseases. Ryan, K. J., Ray, C. G., 4th ed. McGraw-Hill, 2003.
- Clinical Microbiology Made Ridiculously Simple. Gladwin, M., & Trattler, B., 3<sup>rd</sup> ed. MedMaster, 2004.
- Medical Microbiology and Infection at a Glance. Gillespie, S., H., Bamford, K., B., 4<sup>th</sup> ed. Wiley-Blackwell, 2012.
- Medical Microbiology, Kayser, F., H., & Bienz, K., A., Thieme, 2005.
- Review of Medical Microbiology and Immunology. Levinson, W., 10th ed. McGraw Hill Professional, 2008.
- Jawetz, Melnick, & Adelberg's Medical Microbiology. Brooks, G., Carroll, K., C., Butel, J., & Morse, S., 26th ed. McGraw-Hill Medical, 2012.

<b>FORTH SEMESTER</b>		
WMI-232	Physiology related to Anesthesia	2+1
WMI-233	Physics related to Anesthesia	2+1
WMI-295	Community Medicine	2+0
WMI-226	Haematology – II	2+1
WMI-221	General Pathology-II	2+1
WMI-220	General Pharmacology-II	2+1
<b>Total Semester Credit Hour</b>		<b>17</b>



**Course objectives:**

- Students are expected to understand various physiological mechanisms, principles, and application these, in anesthesia practice. To demonstrate abilities to maintained the
- Various physiological variables within normal range.

**Course contents**

Heart rate regulation, cardiac performance, coronary circulation, cardiac output and its regulating factors, blood pressure, heart sound, pulse, ECG, mechanism of respiration, control of respiration, lung volumes and capacities, transport of respiratory gases, respiratory reflexes, hypoxia, artificial respiration, formation and circulation of cerebrospinal fluid(CSF),intra cranial pressure, Receptors, muscles, neuromuscular junction, Synapses, Acid base balance, Diuretics, mechanism of vomiting, liver physiology and anesthesia, pancreas physiology and anesthesia, gall bladder, thermoregulation ,pain mechanism,

**Practical:**

1. Recording of blood pressure and pulses rate normal & following exercise
2. Electro Cardio Gram (ECG) tracing on a normal and pathological conditions
3. Auscultation of heart sounds and interpretation
4. Spirometry and description of normal and pathological findings
5. Different pulse and measurement
6. Understand pain scale and its application
7. Normal hemoglobin level

**Recommended books:**

- Pharmacology and physiology in anesthesia.K.,Robert,. Stoelting,.Hiller,.C,. Simon,. 2<sup>nd</sup> edi.
- Text book of Medical physiology. Guyton & Hill,. 12<sup>th</sup> edition.
- Fundamental of anesthesia.Smith,.Tim,. Colin pinock,. Ted line,. Johan,.Robert,. 3<sup>RD</sup> edition.

**Course objectives:**

- Students are expected to understand states of matter, principles of dynamics of gases and fluid, apply knowledge in practice, and to demonstrate abilities in the anesthesia management of in the realm of physics

**Course contents:**

Fundamental concepts in systemic international unit, temperature, gas laws, kinetic theory of gas, color coding of anesthetic gases, cylinders, medical gas pipeline system and station, air compressor, oxygen concentrator, gas administration devices, oxygen therapy, humidification, aerosol spray. Dynamics of inhalational anesthesia, anesthetic transfer process, measure flow system, hypobaric state, hyperbaric state, laminar flow, turbulent flow, dalton's law, minimum alveolar concentration (mac), specific heat, heat vaporization, pneumothorax, air embolism, square-root-of-time rule and anesthetic uptake, anesthesia machine resistance, turbulent flow, rebreathing, dilution, leak, humidity, heat, second gas effect, principle of doppler ultrasound ,waste gas evacuation, mechanical dead space, oxygen purification detector device

**Practical:**

1. Understanding of anesthesia cylinder, color coding, arrangement of different type of cylinder
2. Medical gas pipeline system
3. Understanding administration of gas flow
4. Simple oxygen administration devices
5. Method of controlling gas flow
6. Oxygen concentrator
7. Use of oxygen purity meter

**Recommended books:**

- Physics in anesthesia for ODPS, Nurse Anesthetists. Middleton,.Ben,. Stacey,.Thomas,.Rik,. Tustin,. Phillips,.3<sup>rd</sup> edition.
- Basic physics and measurement in anesthesia.Davis,. Pual,. Kenny,.Gravin,. 5<sup>th</sup> edition.
- Physics related to anesthesia,.D,. Johan ,. 2<sup>ND</sup> edition.

**Course Objectives:**

- Students are expected to understand the knowledge regard to community base health problems, communicable and non-communicable diseases, apply knowledge in practice. To highlight the significance of the community medicine in medical and applied social sciences regarding its history applications and development.

**Course Contents:**

Basic definition, primary health care, health education and its methods, personal hygiene, dental hygiene, nutrition, water supply, WHO criteria for safe water, sanitation, mother and child health (MCH), family planning, immunization, mental health, drug abuse, common communicable diseases, air pollution and measures to control it, common vector of diseases and methods to hamper them.

**RECOMMENDED BOOKS:**

- Ilyas Ansari's community medicine (Text Book) by Ilyas and Ansari 2003 published by Medical division Urdu Bazaar Karachi.
- K Park's community medicine (Reference Book) by K Park 2003 Published by Banarside Bhanot Jaipur India

**Course objectives:**

- To provide quality patient care in routine as well as advanced procedures.
- To understand the mechanism of drug action at molecular as well as cellular level, both desirable and adverse.
- To understand the principles of pharmacokinetics i.e. drug absorption, distribution, metabolism and excretion and be able to apply these principles in therapeutic practice.

**Course contents:**

Drugs acting on cardiovascular system; Drugs for heart failure, anti hypertensive drugs, anti arrhythmic drugs, antianginal drugs, Anti Hyperlipidemic drugs, Blood drugs, Diuretics, Insulin and glucose lowering drugs, Chemotherapeutic drugs, Antibiotics, Drugs acting on Respiratory system, Anesthetics.

**Practical:**

1. Routes of drug administration
2. Dose-Response Curves
3. Affect of adrenaline on pulse rate
4. Affect of beta blockers on heart rate after exercise
5. Source of drug and identification of some raw materials that are source of drug
6. Weight conversions and measurements
7. Preparation Sulfur ointment
8. Preparation of pilocarpine drops
9. Prescription writing

**Recommended Books:**

- Lippincott's pharmacology (text book) by Mycek 2ndEdition published by Lippincott Raven 2000.
- Katzung textbook of pharmacology (Reference Book) by Bertram Katzung 8<sup>th</sup> Edition, Published by Appleton.dec 2007.

**Course Objectives:**

- To introduce students with different environmental hazards
- To gain knowledge of some basic systemic diseases

**Course contents:**

Health effects of climate change, toxicity of chemical and physical agents, environmental pollution, effect of tobacco, effect of alcohol, injury by therapeutic drugs and drugs of abuse, general principles of microbial pathogenesis, special techniques for identifying infectious agents, agents of bioterrorism, heart failure, congenital heart diseases, ischemic heart diseases, hypertensive heart diseases, arrhythmias, atelectasis, chronic obstructive pulmonary disease, asthma, bronchiectasis, pneumonias, pneumothorax, hemothorax, nephrotic syndrome, renal stone, hydronephrosis, aphthous ulcer, gastritis, peptic ulcer, hemorrhoid, jaundice, liver cirrhosis, viral hepatitis, cholecystitis, urinary tract infections, arthritis, facial palsy

**Practical:**

1. Helicobacter pylori test
2. Diagnosis methods of UTI
3. Determination of renal function tests
4. Determination of liver function tests
5. Determination of cardiac profile

**Recommended Books:**

- Robbins Basic Pathology Kumar Abbas Aster 9th Edition 2013
- Review Of General Pathology Moh.Firdaus, 9th Edition
- Short Text Book of Pathology Moh. Inam Danish 3rd Edition 2006

**Course Objectives:**

- To introduce the students about the basic concepts in Hematology and acquire skill in practical work to produce a team of Medical Technologists steeped in knowledge of Pathology.
- To equip Medical Technologists with latest advancements in the field of hematology.

**Course Outlines:**

Iron metabolism, introduction to iron deficiency anemia, different stages and diagnosis, introduction to thalassemia, classification, pathophysiology and its diagnosis, introduction to Sideroblastic anemia, etiology and diagnosis, folate and vitamin B12 metabolism, introduction to megaloblastic anemia, etiology and diagnosis, introduction to G6PD deficiency anemia, pathophysiology and diagnosis, introduction to sickle cell anemia, pathophysiology and diagnosis, introduction to hereditary spherocytosis, pathophysiology and diagnosis, introduction to hemolytic anemia, Immune hemolytic anemia, non immune hemolytic anemia, aplastic anemia, etiology and diagnosis. ABO and Rh D group system, Kell blood group system, Kidd blood group system, Duffy blood group system, donor selection criteria, phlebotomy of donor, blood products, preparation, storage and its importance, hemovigilance in blood bank, cross match, types of cross match, procedure and its importance, blood grouping and its importance, Coombs test, types and importance, introduction to hemolytic disease of newborn, types, pathophysiology, diagnosis and management, hemolytic transfusion reactions and management.

**Practical:**

1. ABO blood grouping (Forward and Reverse grouping)
2. Rh Blood grouping
3. Antibodies screening
4. Cross matching (Major and Minor)
5. Coombs tests (Direct and Indirect)
6. Separation of different blood components
7. Du Test

**Recommended books**

- Essential of Hematology, A.V Hoff Brand, 6th edition 2006
- Clinical Hematology, G.C Degrunchi, 5th edition 2002
- Practical Hematology, Dacie J.V. 10th edition 2012

## FIFTH SEMESTER

Fifth Semester	ANESTHESIA EQUIPMENT	ANT-603	3(2+1)
	PHARMACOLOGY RELATED TO ANESTHESIA	ANT-606	3(2+1)
	HISTORY TAKING PRE-OP MANAGEMENT AND POST-OP CARE	ANT-607	3(2+1)
	ANESTHESIA AND CO-EXISTING DISEASE	ANT-608	3(2+1)
	CRITICAL CARE	ANT-609	3(2+1)
	LEADERSHIP AND MANAGEMENT	ANT-620	2(2+0)
			17

**Course Objective:**

- Students are expected to understand the working principles various tools use for anesthesia provision, to ensure safe practice. To demonstrate abilities in managing technical fault arise intra-operatively and correct the calibration of different anesthetic instruments/equipment.

**Course contents:**

Anesthesia machine its different parts, working principles, medical gas supply devices, vaporizers, pulse oximeter, face masks and laryngoscope, breathing circuits, anesthesia ventilator and working principles, monitoring devices, manual resuscitation bags, defibrillator and its working principles, methods of autoclaving, glucometer, nerve stimulator, laryngeal mask airway, endo tracheal tubes(ETT), airways(oral and nasal ),suction machine, infusion pump, reservoir bags, resuscitator bags, thermometer ,spagymometer, stethoscope, oxygen purity meter,

Operation theater table, flexible endoscope, intravenous cannulas, spinal needle, epidural catheter, Magill gag, Magill incubating forceps, latest technology.

**Practical:**

- 1) Arrangement of anesthesia Machine
- 2) Anesthesia Machine safety system
- 3) Sterilization of anesthesia equipment
- 4) Arrangement of anesthesia breathing circuits
- 5) Use of stethoscope and blood pressure apparatus

**Recommended Books**

- Anesthesia equipment principles and applications. Ehrenwerth, Jan., Eisenkraft, James, Berry, James, 2<sup>nd</sup> edition.
- Manual of anesthesia. K., Arun, 4<sup>th</sup> edition. Paul Jaypee Brothers Medical Publisher (P) Ltd.
- Essential of Anesthesia equipment. Sakaih, Bahal al., & Stacey, Simon, 3<sup>rd</sup> edi.
- Clinical anesthesiology. Morgan & Mikhail's, 5<sup>TH</sup> edit.
- Text book of Anesthesia. Aitkenhead, Alan, R., 5<sup>TH</sup> edition.



**Course Objective:**

- Students are expected to understand pharmacodynamics and kinetics of anesthetic agents and its application in anesthesia practice. To demonstrate abilities of preparation of dosages as per requirement of the individual and manage complications arise as consequences of anesthetic agent administration.

**Course contents:**

Narcotic analgesic, pharmacokinetics, pharmacodynamics, Opioid receptors, Classification of opioids, Non-narcotic analgesics, Local anesthetics drugs, intravenous anesthetic agents, inhalational anesthetic agents, muscle relaxants, reversal agents, anti-emetic drugs, anxiolytic drugs, emergency drugs.

**Practical:**

- 1) Preparation and dosage of drugs relevant to anesthesia
- 2) Labeling of drugs
- 3) Construct emergency trolley
- 4) Check out date of expire
- 5) color of the drugs and variation

**Recommended Books:**

- Anesthetic pharmacology. Evers, Alex, & Maze, Mervyn, Kharasch, D., even, 2<sup>nd</sup> edition.
- Principles and practice of pharmacology for anesthesia. Calvey, Norman & William, Norton, 5<sup>th</sup> edition.
- Text book of Anesthesia. Aitkenhead, Alan, R., 5<sup>TH</sup> edition.
- Lippincott's pharmacology. Howland, Richard, D., & Mycek, Mary, J., 3<sup>rd</sup> edit.
- Clinical anesthesiology. Morgan & Mikhail's, 5<sup>TH</sup> edit.

**Course Objective:**

- Students are expected to understand various health problem and their negative impacts on the practice of safe anesthesia. To demonstrate abilities of predicating morbidity and mortality and utilize their skills and knowledge to minimize such impacts.

**Course contents:**

History taking, physical examination, systemic examination, laboratory investigation, predication of pre-operative morbidity and mortality, predication of specific events arise inter-operatively, patient preparation, anesthesia equipment preparation, medication requires pre-operatively, post-operative airway care, pain management, cardiovascular system stability, renal system stability.

**Practical:**

- 1) Taking history in surgical ward for elective case
- 2) History taking in surgical Accident & Emergency department
- 3) Pre of equipment and anesthesia machine preparations
- 4) Develop various predicating risk scale for patient health related problems
- 5) Special attention to check list of the patient
- 6) Airway examination
- 7) Risk assessment

**Recommended Books:**

- Pre-operative assessment and Pre-operative management. Radford,.Mark,.
- Pre-operative assessment & Mngemnt.Sweitzer,.Bobbie,.Jean,2<sup>nd</sup> edition.
- Evidence-based Practice of Anesthesiology.Fleisher,.A,.lee,3<sup>rd</sup> edition.
- Text book of Anesthesia. Aitkenhead,.Alan,.R,. 5<sup>TH</sup> edition.
- Clinical anesthesiology. Morgan & Mikhail's,. 5<sup>TH</sup> edit.
- Apractice of anesthesiology.Healy,.E,.J,.Thomas,7<sup>th</sup> edition.
- Fundamental of Anesthesia. Smith,.Tim,. Pinock,.Colin,. line,.Ted,.Johan ,.Robert,3<sup>rd</sup> edition.

**Course Objective:**

- Students are expected to understand common diseases and its negative impacts in anesthesia practice and to demonstrate abilities which minimize morbidity and mortality in such patients.

**Course contents:**

Diabetes Mellitus, Hypertension, Ischemic heart disease, Arrhythmia & heart blocks ,Obesity, Shock, Chronic renal failure, chronic liver disease/failure, hematological disorder, Epilepsy, cerebral vascular accident (CVA), bronchial asthma, Thyroid disease, pheochromocytoma, COPD, pneumonia, upper respiratory tract infection(UTI),myasthenia gravis, pulmonary edema, pregnancy associated diseases, renal disorder, fluid and electrolyte imbalance,

Respiratory tract infection, acromegaly, rheumatoid arthritis, alcohol abuse, obstructive sleep apnea, hemophilia, spinal cord disorder.

**Practical:**

- 1) Calculate dosage of insulin for patient intra-operatively
- 2) Determine ischemic heart diseases through ECG interpretation.
- 3) Setting of ventilator modes for various respiratory diseases
- 4) Compilation of data related to blood disorders
- 5) Collection of electrolyte disturbance data in various renal diseases.
- 6) Collection of data relevant to liver abnormal biochemistry

**Recommended books:**

- Anesthesia and co-existing diseases. Roberta l.hines,.6<sup>th</sup> edition.
- Evidence-based practice of anesthesiology.fleisher,.a,.lee,.3<sup>rd</sup> edition.
- Text book of anesthesia. Aitkenhead,.alan,.r,. 5<sup>th</sup> edition.
- Clinical anesthesiology. Morgan & mikhail's,. 5<sup>th</sup> edit.
- Apractice of anesthesiology.healy,.e,.j,.thomas,.7<sup>th</sup> edition.
- Fundamental of anesthesia. Smith,.tim,. Pinock,.colin,. Line,.ted,.johan ,.robert,.3<sup>rd</sup> edition.

**Course Objective:**

- Students are expected to understand various critical cardiovascular situations, categorize the patient, assess critically ill patient, and know about pharmacological intervention - mechanical procedure necessary to stabilize the pumping system of the human body.

**Course contents:**

An introduction to critical care, Shock, Resuscitation in intensive care an operation theater, Cardiovascular monitoring in critical care, Cardiovascular investigation of the critically ill, Hematological Aspects of cardiovascular critical care, Cardiovascular support: Pharmacological, Arrhythmias, Mechanical heart failure therapy, Care of the high risk patient undergoing surgery, Common complications of cardiovascular critical illness , Acute coronary syndromes and myocardial infarction, Cardiogenic shock, Aortic dissection, Emergency management of cardiac trauma, Hypertensive crises, Endocrine problems and cardiovascular critical care fluid and electrolytes, acid and base balance

**Practical:**

- 1) Assessment of shock and its types
- 2) Assessment of arrhythmias
- 3) Management of shock
- 4) Management of arrhythmias
- 5) Management of Cardiac arrest
- 6) Management of acute Myocardial infarction
- 7) Management of Hypertensive crisis
- 8) Analysis of arterial blood gases
- 9) Management of Cardiac trauma and aortic dissection

**Recommended books:**

- Principles of critical care.Hall,schmidt,and wood,s,4<sup>th</sup> edition.
- Principle of critical care.Farokh,erach,udwadia,3<sup>rd</sup> edition.
- Critical care manual.wilson,. francis,.robert,2<sup>nd</sup> edition.
- Cardiovascular Critical Care. Mark J.D. Griffiths,. Jeremy J. Cordingley and Susanna ., 010 Blackwell Publishing Lt d.
- Rosen emergency medicine manual.Adams,.Barsan,.Biros,.Danzl,. 5<sup>th</sup> edition.

**Course Objectives:**

- Students are expected to understand various leadership models, styles of leadership, to gain the expertise to maximize result with minim effort, to utilize the resources in skill full manner and ensure human betterment and justice.

**Course contents:**

Introduction of leadership, theories, process model, skill of leadership, principles of leadership, emotional intelligence, professionalism. introduction of management, scope policy making, procedure and method of planning, limitation of planning, importance of organization, line relationship, staff relation, functional relation, committee organization, motivation and their thoeise, motivational technique, commutation, Controlling:span of controle, factor limiting effective

control, super management, general manger, middle manger, supervisor, planning and controlling relationship, management control process. budget, principles and technique of co-ordination, personal management, staffing and work distribution technique, recurement and selection process, complaints and grievances, termination of employee, health and safety of employee, finalinal management, profit maximation, retrun maximation, short, midlle, longe term finicaing,

**Recommended books:**

- The art of medical leadership. Suzan Oran. Scott Conrad
- Strategic management. Ritson, .neil
- Management basics. Quinn, .susan, .
- Emotional intelligence. MTD training
- On Becoming A Leader. Bennis, .warren, .4<sup>th</sup> edition.
- How To Win Friends & Influnce. Kouzes, M, .james, . & Posner, Z, .barry, . 5<sup>th</sup> edition.

## SIXTH SEMESTER

Sixth Semester	DIFFERENT TYPES OF ANESTHESIA	ANT-610	<b>3(2+1)</b>
	ANESTHESIA RELATED COMPLICATION AND THEIR MANEGEMENT	ANT-611	<b>3(2+1)</b>
	ANESTHESIA FOR CARDIO THORASIC SURGERY	ANT-612	<b>3(2+1)</b>
	ANESTHESIA FOR NEURO GERIATIC AND EMERGENCY SURGERY	ANT-613	<b>3(2+1)</b>
	BIOSTATISTICS	ANT-630	<b>3(2+1)</b>
	RESEARCH METHADODOLOGY	ANT-631	<b>3(2+1)</b>
			<b>18</b>

**Course Objectives:**

- Students are expected to understand various anesthetic procedures, build specific anatomical ground need for local blocs, instill the confidence to handle problems and overcome the complication born as consequences of various anesthetic procedure, to know about the material use in various blocs and anesthetic procedure.

**Course contents:**

Definition of anesthesia, Regional anesthesia era, Intravenous anesthesia era, Modern anesthesia era, , General anesthesia, retrograde tracheal intubation, total intravenous anesthesia, anesthesia with ketamin, subarchanid and epidural anesthesia and analgesia , Bier's block, axillary block, ankle block, caudal block (adult and pediatric), central line placement, cervical plexus block, digit block, femoral block, penile block, sciatic nerve block, supraclavical block, regional anesthesia for thorax, field block, surface anesthesia

**Practical:**

- 1) Understanding various spinal needles
- 2) Use of local anesthetic agents and quantity require as per the need
- 3) Enlist the complications observed by the candidate during their clinical rotation
- 4) Expert in the reliability of different instrument in use

**Recommended books:**

- Peripheral nerve blocks. Hadzic, .admir, .2<sup>nd</sup> edition.
- Ultrasound guided regional anesthesia. Grant, .A., .stuart, .& Auyong, .B., .david. 2<sup>nd</sup> edition.
- Evidence-based Practice of Anesthesiology. Fleisher, .A., .lee, .3<sup>rd</sup> edition.
- Text book of Anesthesia. Aitkenhead, .Alan, .R., . 5<sup>TH</sup> edition.
- Clinical anesthesiology. Morgan & Mikhail's, . 5<sup>TH</sup> edit.
- Practice of anesthesiology. Healy, .E., .J., .Thomas, .7<sup>th</sup> edition.
- Fundamental of Anesthesia. Smith, . Tim, . Pincock, . Colin, . line, . Ted, . Johan, . Robert, .3<sup>rd</sup> edition.

**Course Objectives:**

Students are expected to understand various complications and unwanted event emerged intra operatively, post operatively and its proper management to ensure patient safety.

**Course contents:**

Laryngospasm, bronchospasm, pneumothorax, atelectasis, difficult intubation, injury during airway management, one lung intubation, aspiration of gastric content, hiccups, hypotension, hypoxemia, apnea, hypercapnea, hypertension, bradycardia, tachycardia, arrhythmias, myocardial infarction, hemorrhage, embolus, awareness, central nervous system ischemia, Malignant hyperthermia, hypersensitivity, local anesthetic toxicity, ophthalmic injury, thermal and electric injury, miscellaneous, choline apnea,

**Practical:**

- 1) Identification of laryngospasm and its management
- 2) Maintenance of proper supply of medical gases
- 3) Measurement of partial pressure of carbon dioxide through capnograph
- 4) Electrical device and its safe use
- 5) N/G tube placement in case of full stomach patient
- 6) Maintenance of emergency tray
- 7) Instrument need for emergency chest intubation

**Recommended books:**

- Clinical anesthesiology. Morgan & Mikhail's, 5<sup>TH</sup> edit.
- Text book of Anesthesia. Aitkenhead, Alan, R., 5<sup>TH</sup> edition.
- Anesthesia and co-existing diseases. Roberta L.Hines, 6<sup>TH</sup> edition.
- Evidence-based Practice of Anesthesiology. Fleisher, A., Lee, 3<sup>rd</sup> edition.
- A practice of anesthesiology. Healy, E., J., Thomas, 7<sup>th</sup> edition.
- Fundamental of Anesthesia. Smith, Tim., Pincock, Colin., Line, Ted., Johan, Robert, 3<sup>rd</sup> edition



**Course Objectives:**

- Students are expected to understand relevant principles, apply knowledge in practice, and to demonstrate abilities in the anesthesia management of cardiothoracic surgery. These include:

**Course contents:**

NYHA classification, arrhythmias, angina, dyspnea, echocardiography, angiography, monitoring and preparation, care and use of arterial and venous line, anesthesia for open heart surgery, transport to ICU and its management, chest tube management, pulmonary function test, pre-operative preparation and medication, check list, use of double lumen tube, monitoring and pain management, extubation and transferring to ICU, sore throat, nausea and vomiting, neurological complication, neurological complications, ocular and auditory complication, headache and backache and vascular complication.

**Practical:**

- 1) Perfusion machine and its significance for anesthesia
- 2) Cardiologic drugs and dosage
- 3) Infusion pump and its significance
- 4) Double lumen tube and its use
- 5) Need for one lung ventilation
- 6) Reducing dead space in anesthesia circuit

**Recommended books:**

- Cardiovascular and thoracic anesthesia. Gothard, John, Andrea, Kelleher & Haxby, Eliabeth, 2<sup>nd</sup> edition.
- Anesthesia for cardiac surgery. DiNardo, A, James, & Zvara, A, David, 3<sup>rd</sup> edition.
- Pediatric cardiac anesthesia. Coral, I, Lake, & Peter, D, Booker, 4<sup>th</sup> edition.
- Cardiac anesthesia. Jr. Hensley, A, Frederick, Martin, E, Donald, & Glenn, P, Gravlee, 5<sup>th</sup> edition.
- Thoracic anesthesia. Kaplan, A, Joel, & Slinger, D, Peter, 3<sup>rd</sup> edition.

**Course Objectives:**

- Students are expected to understand relevant principles, apply knowledge in practice, and to demonstrate abilities in the anesthesia management of neurosurgery, emergency and geriatric.

**Course contents**

Glass cow coma scale, premedication, investigation ,check list of equipemnt, induction of anesthesia, use of reinforce ETT, positing in neurosurgery, intracranial pressure, air embolism, reversal of the patient, transferring to ICU, resuscitation of shock patient and their circulatory management, rapid sequence induction, physiology of aging, diseases of aging, nervous system, geriatric pharmacokinetic and pharmakodynamic, nervous system dysfunction,

**Practical:**

- 1) Setting and maintenance of OT table
- 2) Ensure proper I.V line
- 3) Use of sevoflurne vaporizer in neurosurgery
- 4) Exertion of cricoid pressure in emergency surgery
- 5) N/G tube placement
- 6) Blood transfusion
- 7) Arrangement of colloid and crystalloid fluid
- 8) Maintenance and ensure availability of defibrillator
- 9) Urethral catheter placement
- 10) Suction machine function surety
- 11) Labeling of drugs and dosage preparation in aged patient

**Recommended books:**

- Anesthesia Emergencies.Ruskin,.J,.keith,.& Rosenbum,.H,.stanley.
- A Practical Approach to Anesthesia for Emergency surgery. Manju,.N,.Gandhi,.Malde,. D,.Anila,. Amala,.G,.kudalkar,.Karnik,.S,.Hemangi.
- Clinical Anesthesia in Neurosurgery.Frost,A,.M,.Elizabeth,.2<sup>nd</sup> edition.
- Applied Geriatric Anesthesia.Paul,.kumar,.Arun,.7<sup>th</sup> edition.

**Course Objectives:**

- To introduce the student with the significance of bio-statistics, statistics means basic concept, describing and exploring data, normal distribution, sampling distribution and hypothesis testing, basic concept of probability and application of statistics and social research.

**Course Contents:**

Topics in univariate statistics: basic, Introduction, important terms, senses, method uses for taking census, information collection during census, method of estimating the population of any year, measurement scale, describing and exploring data, measures of central tendency and variability, health statistics, percentiles, quartiles and deciles, normal distribution, the standard normal distribution SND, using tables of SND, measures related to 'Z' scores, sampling distribution and hypothesis testing, basic concepts of probability, data collection (purpose and technique), categorical data and numerical data, application of statistics in social research, percentages, measure of central tendencies, means, Median, Mode, Quartile, decile and percentile

**Recommended Books:**

- Statistical methods for psychology by howell DC in 7th edition 2013.
- A guide to research methodology, biostatistics and medical writing by college of physicians and surgeons Pakistan by WHO collaboration center
- Reading understanding multivariate statistics gimm LG Yard AD PR, in 1995 publisher American Psychological association
- Ilyas Ansari's community medicine (Text Book) by Ilyas and Ansari 2003 published by Medical division Urdu Bazaar Karachi.

**Course Objectives:**

- To introduce the significance of research methodology foundation, concept of measurement, design clinical research and health system research to the students.

**Course contents:**

Introduction to research (in simple term and a scientific term), concept of research, why do need research, advantage of research, identification of research need and its qualities, component of research, ethical and legal aspect of research and objective of research (definition, purpose, structure) Relevance, Avoidance of duplication, Physibility, Political acceptability, Applicability, Cost efficiencies, work plan, budget required for research work, literature searching, statistical help, material, type of manuscript, printing of manuscript for submission and postage, Principles and reliability of measurement, errors and sources of measurement, types of measurement, measure of disease frequency and screening (introduction, validity and screening test) Studies design (introduction, selection of design), research questionnaire, validity and reliability of research finding, confounding factors, strategies to deal with threats to validity, hypothesis testing, sampling, collect data, data collection procedure, step and data collection survey questionnaire, starting questionnaire

**Recommended Books:**

- Foundation of Clinical Research by Portney LG Walkais MP in 1993, Publisher by Appleton and lauge USA
- A guide to Research Methodology, Biostatistics and Medical writing by college of physicians and surgeons Pakistan by WHO collaboration center
- Health system research project by Corlien M Varkerisser, Indra Pathmanathan, Ann Brownlee in 1993 by International Development Research Center in New Dehli, Singapore.

SEVENTH SEMESTER

Seventh	ANESTHESIA FOR GENERAL SURGERY, ORTHODPEDIC AND UROLOGICAL PROCEDURE	ANT-614	<b>3(2+1)</b>
	ANESTHESIA FOR EYE SURGICAL PROCEDURE	ANT-615	<b>3(2+1)</b>
	ANESTHESIA FOR EAR, NOSE, THROAT	ANT-616	<b>3(2+1)</b>
	ANESTHESIA FOR OBSTETRIC, AND PEDIATRIC SURGERY	ANT-617	<b>3(2+1)</b>
	ELECTROCARDIOGRAPHY FOR ANESTHETIST	ANT-618	<b>3(2+1)</b>
	EPIDEMIOLOGY	WMI-632	<b>2(2+0)</b>
			<b>17</b>

**Course Objectives:**

- Students are expected to understand relevant principles, apply knowledge in practice, and to demonstrate abilities in the anesthesia management of orthopedic, urological and general surgical procedure.

**Course contents:**

Pre-operative assessment, pre-existing medical problems, physical examination, choice of anesthetic technique, regional anesthesia, intra and post-operative analgesia, special positioning for orthopedic surgery, risk of peripheral nerve injury, blood loss, intra operative hypotension, venous thrombosis, spinal cord injury, tracheal intubation, respiratory consideration, cardiovascular consideration, succinylcholine hyperkalemia, temperature control and minting spinal cord integrity, knee arthroscopy, ankle and foot surgery, pediatric orthopedic surgery, tourniquet application, use of methyl methacrylate, fiber optic cystoscopy, transurethral resection of prostate, TURP syndrome, transurethral resection of bladder tumor, nephrectomy, laparoscopic urological surgery, renal transplant

**Practical:**

- 1) Spinal block preparation
- 2) airway equipment
- 3) Mentoring of aged patient in particular
- 4) Use of defibrillator
- 5) Positioning of patient in prolong surgery
- 6) Blood transfusion

**Recommended books:**

- Evidence-based Practice of Anesthesiology. Fleisher, A., Lee, 3<sup>rd</sup> edition.
- Text book of Anesthesia. Aitkenhead, Alan, R., 5<sup>TH</sup> edition.
- Clinical anesthesiology. Morgan & Mikhail's, 5<sup>TH</sup> edit.
- Anesthesia and co-existing diseases. Roberta L.Hines, 6<sup>TH</sup> edition.

**Course Objectives:**

- Students are expected to understand relevant principles, apply knowledge in practice, and to demonstrate abilities in the anesthesia management of eye surgery and the use of latest technology. These include:

**Course contents:**

Understanding, Anatomy and physiology of extremes of age, Anatomy of orbit and contents, Physiology of intraocular pressure, Ocular perfusion, Eye reflexes (oculocardiac, oculo-respiratory, oculoemetic), extra ocular muscles, blood vessels, lacrimal apparatus, Local anaesthetic agents for eye surgery, Other drugs for eye surgery, for example, topical agents, vasoconstrictors, mydriatics, miotics, and agents to reduce intraocular pressure. general anesthesia for eye surgery including: examination under anesthesia, Laser eye surgery, Intraocular surgery, extraocular surgery, retinal detachment, Plastic and orbital surgery, emergency eye surgery and use of suxamethonium in penetrating eye injury, Monitoring, Postoperative care, management of nausea and vomiting, principles of regional retro bulbar and peribulbar block and choosing between general and regional anesthesia techniques, Sedation for eye procedures, principles of anesthesia for day, Pediatric considerations.

**Practical:**

- Pre-operative preparation of the patient
- Equipment preparation
- Airway devices
- Monitoring devices adjustment
- Labeling of anesthesia drugs

**Recommended books:**

- Ophthalmic anesthesia. C. Dodds, G. Fanning, C. Kumar.
- Anesthesia for ophthalmic surgery. Mostafa, Morsy, Sobhy.
- Anesthesia and co-existing diseases. Roberta L. Hines, 6<sup>TH</sup> edition.
- Evidence-based Practice of Anesthesiology. Fleisher, A. Lee, 3<sup>rd</sup> edition.
- Text book of Anesthesia. Aitkenhead, Alan, R., 5<sup>TH</sup> edition.
- Clinical anesthesiology. Morgan & Mikhail's, 5<sup>TH</sup> edit.
- A practice of anesthesiology. Healy, E. J., Thomas, 7<sup>th</sup> edition.
- Fundamental of Anesthesia. Smith, Tim, Pincock, Colin, line, Ted, Johan, Robert, 3<sup>rd</sup> edition.

**Course Objectives:**

- Students are expected to understand relevant principles, apply knowledge in practice, and to demonstrate abilities in the anesthesia management of ear, nose and throat (ENT) surgery.

**Course contents**

Pre-operative airway assessment, examination under anesthesia tonsillectomy and adenoidectomy, including quinsy and postoperative bleeding, micro laryngoscopy, radical head and neck surgery.laryngectomy, pharyngolaryngectomy,Laser surgery,Nasal and sinus operations, Parotid tumor surgery,myringoplasty.,Middle ear surgery,microsurgery of the ear, managing partial airway obstruction including, epiglottitis, foreign bodies, laryngeal tumors, oropharyngeal cysts and abscesses, elective and emergency tracheostomy. Pediatric problems, for example, relating to disease, airway, larynx and craniofacial disorders, post-operative care.

**Practical:**

- Preparation of patient
- Preparation of equipment
- Airway management
- Drugs preparation
- Post-op airway management
- Post-op bleeding management in tonsillectomy
- Patient positioning

**Recommended books:**

- Text book of Anesthesia. Aitkenhead,.Alan.,R., 5<sup>TH</sup> edition.
- Clinical anesthesiology. Morgan & Mikhail's,. 5<sup>TH</sup> edit.
- Anesthesia and co-existing diseases. Roberta L.Hines,.6<sup>TH</sup> edition.
- Evidence-based Practice of Anesthesiology.Fleisher,.A.,lee,.3<sup>rd</sup> edition
- Apractice of anesthesiology.Healy,.E.,J.,Thomas,.7<sup>th</sup> edition.
- Fundamental of Anesthesia. Smith,.Tim., Pinock,.Colin., line,.Ted,.Johan ,.Robert,.3<sup>rd</sup> edition.



**Course Objectives:**

- Students are expected to understand relevant principles, apply knowledge in practice, and to demonstrate abilities in the anesthesia management of Obstetric and pediatric surgeries.

**Course contents:**

Difference between normal and pregnant lady, risk for anesthesia, precaution to take, regional anesthesia, epidural analgesia, anesthesia for pre-eclampsia, APGAR score, induction, maintenance and recovery, resuscitation of the newborn, manual removal of placenta, APH, PPH, rupture uterine, ectopic pregnancy, theater setting for pediatric, check list, premedication and intubation, reversal and extubation problem, pain managing.

**Practical:**

- 1) Placement of N/G tube
- 2) Positioning in c/section
- 3) Airway management gadgets and its arrangement
- 4) Spinal trolley setting
- 5) Medical gases supply surety
- 6) Adjustment of ventilator as per patient minute ventilation
- 7) I.v cannulation in children
- 8) Selection of ETT size as per patient age
- 9) Safety measure in communicable diseases
- 10) Advance life support drill

**Recommended books:**

- Obstetric Anesthesia Principles and Practice.
- David, H., Chestnut, Cynthia, A., Wong, Lawrence, C., Tsen, Warwick, D., Nagan, Kee, 5<sup>th</sup> edition.
- Obstetric Anesthesia. Brenda, A., Buckin, David, R., Gambling, & David, Wlody,
- A practice of anesthesia for infants and children. Cote, J., Charles, Leman, Jerrold & Anderson, Brian, 5<sup>th</sup> edition.
- Evidence-Based Obstetric Anesthesia. Halpern, H., Stephen, & Douglas, M., Joanne, 3<sup>rd</sup> edition.
- Handbook of Pediatric Anesthesia. Houck, J., Philipp, Manon, Hache, & Sun, S., Lena,

**Course objectives:**

- To describe the basic concepts of EKG
- To recognize the basic electro-physiology using EKG
- To compute different basic technical ECG abnormalities
- To infer different types of arrhythmias
- To identify different heart pathologies on the basis of EKG
- To relate the EKG abnormalities with the heart and lung pathologies

**Course Contents:**

Conduction problems, heart rhythm, wave abnormalities(P,QRS,T), Atrial and Ventricular Hypertrophy, T Wave Abnormalities, Electrical Axis and Fascicular Block, , Conditions, Arrhythmias, ECG of different Myocardial infarctions, EKG of Different congenital as well as acquired Heart pathologies; Aortic disease, valvular diseases, Pericardial disease, how to use the ECG.

**Practical:**

Finding heart rate, Rhythm, axis and intervals  
Different types of EKG waves and correlation with different heart chambers  
Interpretation of different type of arrhythmias  
Interpretation of Myocardial infarction  
Interpretation of cardiac chamber hypertrophy and enlargements  
Interpretation of Cardiac myopathies  
Interpretation of valvular pathologies  
Interpretation of different aortic pathologies

**Recommended Books:**

- ECG MADE EASY BY JOHAN R.HMAPTON
- EKG BY DALE DUBIN 6<sup>TH</sup> EDITION
- ECG MADE EASY BY JHON R 6TH EDITION
- RAPID ECG INTERPRETION BY MR. M. GABRIEL KHAN 3<sup>RD</sup> EDITION

**Course Objectives:**

- To introduce to the students the know-how of the subject of epidemiology in order to apply the knowledge of the subject regarding the community and community relate disease.

**Course Contents:**

Introduction to epidemiology, Determinants: Primary and Secondary, Clinical epidemiology, Occupational epidemiology, Importance of epidemiology, Definitions of common terms related to epidemiology, Health indication

**Recommended Books:**

- Public Health by Ilyas Ansari
- Public Health by J Park

**EIGHT SEMESTER**

Eight Semester	ANESTHESIA FOR DENTAL, MAXILLOFACIAL, HEAD AND NECK SURGERY	ANT-619	<b>3(2+1)</b>
	RESEARCH PROJECT	ANT-633	<b>6+0</b>
	SEMINAR	ANT-634	<b>1+0</b>
			<b>10</b>

**Objectives:**

- Students will learn some basic research methodology and gain knowledge about research.
- It will hopefully result in some of presentation or publication for the students and will provide a research oriented environment

**Course contents:**

During last year each student should select a topic of research report with consultation of his/her supervisor and shall prepare and submit research report to Khyber Medical University by the end of last year.

**Practical:**

A hard copy of research project should submit to examination for degree requirements fulfillment.

During last year each student should select a topic of research work with consultation of his/her supervisor and shall present his/her research work through a seminar.

- Students are expected to understand relevant principles, apply knowledge in practice, and to demonstrate abilities in the anesthesia management of dental, head and neck surgery

**Course contents:**

Outpatient dental procedures; sedation and general anesthesia, Inpatient dental surgery, Dental procedures on the mentally handicapped, Dental procedures on patients with bleeding disorders, Oral surgery, Fractured jaw, Maxillary fractures according to the Le Fort, tracheostomy classification, Dental sepsis, Pre-operative airway assessment. Management of anesthesia for major maxillofacial surgery, which may involve prolonged anesthesia, major blood loss, hypothermia and multiple procedures, Management of anesthesia for facial trauma: emergency and semi-elective, including fractured jaw and maxilla Management of anesthesia for cancer, plastic and cosmetic surgery on the face, head and neck, including surgery for cleft palate. Thyroid surgery, Stabilization of thyroid and parathyroid disorders, post-op, thyroid storm management, Sedation for head and neck procedures, Post-operative care.

**PRACTICAL:**

1. Nasal intubation
2. Observation of tracheostomy
3. Airway management in maxillo facial patient
4. Post- op monitoring and airway care
5. Use of equipment in dental anesthesia
6. Local block observation

**RECOMMENDED BOOKS:**

- Anesthesia for oral and maxillofacial surgery. shaw, Ian, kumar, chandra, & Dodds, christopher, 3<sup>rd</sup> edition.
- Handbook of local anesthesia. Malamed, F., stanely, 6<sup>th</sup> edition.
- Clinical anesthesiology. Morgan & Mikhail's, 5<sup>TH</sup> edit.
- Text book of Anesthesia. Aitkenhead, Alan, R., 5<sup>TH</sup> edition

