CURRICULUM FOR

BS CARDIOLOGYTECHNOLOGY

SCHEME OFSTUDIES

Semester/Year	Name of Subject	COURSECODE	Credits
First	MEDICAL BIOCHEMISTRY-I	PMS-601	3+1
	HUMAN PHYSIOLOGY-I	PMS-602	3+1
	HUMANANATOMY-I	PMS-603	3+1
	ENGLISH-I	PMS-604	2+0
	PAK STUDIES	PMS-605	2+0
	COMPUTER SKILLS	PMS-606	1+1
			18
Second	MEDICAL BIOCHEMISTRY-II	PMS-607	3+1
	HUMAN PHYSIOLOGY-II	PMS-608	3+1
	HUMANANATOMY-II	PMS-609	3+1
	ENGLISH-II	PMS-610	2+0
	ISLAMIC STUDIES	PMS-611	2+0
			16
Third	HEMATOLOGY-I	MLT-601	2+1
	MEDICALMICROBIOLOGY-I	PMS-613	2+1
	CARDIOPULMONARY ANATOMY	CAR-**601**	2+1
	PHARMACOLOGY-I	PMS-614	2+1
	COMMUNICATIONSKILLS	PMS-**615**	2+0
	GENERALPATHOLOGY-I	PMS-612	2+1
			17
Fourth	HEMATOLOGY-II	MLT-604	2+1
	PHARMACOLOGY-II	PMS-616	2+1
	PATHOLOGY-II	PMS-617	2+1
	MEDICALMICROBIOLOGY-II	PMS-618	2+1
	BEHAVIOURALSCIENCES	PMS-619	2+0
	ELECTROCARDIOGRAPHY-I	CAR-602	2+1

	CARIOPULMONARPHYSIOLOGY	CAR-603	2+0
			18
Fifth	CLINICALMEDICINE-I	CAR-604	2+1
	ELECTROPHYSIOLOGY	CAR-605	2+1
	ECHOCARDIOGRAPHY-I	CAR-606	2+1
	ELECTROCARDIOGRAPHY-II	CAR-607	2+1
	INTERVENTIONAL CARDIOLOGY	CAR-608	2+1
	MEDICALPHYSICS	CAR-609	2+1
			18
Sixth	CRTICALCARE	CAR-616	2+1
	CLINICALMEDICINE-II	CAR-610	2+1
	CARDIACSURGERY	CAR-618	2+1
	DIAGNOSTIC EQUIPMENTS IN CARDIOLOGY	CAR-611	2+1
	ECHOCARDIOGRAPHY-II	CAR-612	2+1
	PULMONARYDISEASES	CAR-613	2+1
			18
Seventh	NUCLEAR CARDIOLOGY	CAR-614	2+1
	HEARTDISEASES	CAR-615	2+1
	RESEARCH METHODOLOGY	PMS-621	2+1
	PREVENTIVE CARDIOLOGY	CAR-617	2+1
	EPIDEMIOLOGY	PMS-623	2+0
	BIOSTATISTICS	PMS-622	2+1
			17
Eight	RESEARCH PROJECT	PMS-626	6+0
	SEMINAR	PMS-627	1+0
	SUBJECTOF OWNINTEREST	CAR-619	2+2

	BIOETHICS	PMS-625	2+0
	TOTAL– 124-136	PMS-	11
	TOTALCREDITHOURS	PMS-	133

PMS-601 MEDICAL BIOCHEMISTRY-I CreditHours:4(3+1)

Aims and Objectives

After successful completion of this course, students will be able to,

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

Course Detail:

Biochemicalcompositionandfunctionsofthecellmembrane;Chemistryofsignalsandreceptors;Structure and function of Carbohydrates, Proteins and lipids;biochemical functions of vitamins; biochemical function ofSodium,potassium,chloride,calcium,phosphorus,magnesium,sulfur,iodineandfluoride;Composition andfunctionofsaliva,gastricjuice,gastricacid(HCL),pancreaticjuice,bileandintestinalsecretion; Digestionandabsorptionofproteins,carbohydrates,lipids,vitaminsandminerals;Bodybuffersandtheir mechanismofaction;Acidbaseregulationinhumanbody;Biochemicalmechanismsforcontrolofwaterand electrolyte balance; Mechanism of action of hormones.

Practical:

- Good laboratory Practices
- Preparation of Solutions
- Principles of Medical BIOCHEMISTRY analyzers (sphectrophometer, flamephotometer)
- Determination of Cholesterol,Tg, HDL, LDL,sugar, calcium and phosphorus in blood
- Introduction to electrophoresis, PCR, gel documentation
- How to operate centrifuge, water bath and microscope

Recommended Books:

- Harper‟sMedical BIOCHEMISTRY Robert K.Murray, DarylK.Granner 28thedition 2009
- MedicalMedical BIOCHEMISTRY Mushtaq Ahmad vol.I and II8thedition 2013

PMS-602 HUMANPHYSIOLOGY-I Credit Hours: 4(3+1)

Aims and Objectives:

After successful completion of this course, students will be able to,

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

Course Detail:

Functionalorganizationofhumanbody,MechanismofHomeostasis,Cellstructureanditsfunction, functionofdifferentTissue,Functionsoftheskin,,Typesandfunctionofmuscle,Neuromuscular junction,functionsoftheendocrineglands,BreathingMechanism,ExchangeofrespiratoryGaseous, Transportofrespiratorygases,FunctionofdifferentpartofDigestivesystem,Functionofliverand pancreas,DigestionandAbsorptioninGastrointestinaltract,Patho-PhysiologyofGastrointestinal Disorders,FormationofUrinebytheKidney,Glomerularfiltration,Renalandassociatedmechanismfor controllingECF, Regulation ofAcid-Base Balance, Male Reproductive System(Male), Prostate gland, Spermatogenesis,FemaleReproductiveSystem,MenstrualCycleandPregnancyandparturition, Mammary Glands and Lactation and Fertility Control

Practicals:

1. Introduction to microscope
2. Bleeding time
3. Clottingtime
4. WBCs count
5. RBCs count
6. Platelets count
7. Reticulocytes count

Recommended Books:

- Essentials of Medical PhysiologyKSembulingam,PremaSembulingam Sixth Edition 2013
- Concise Physiology Dr. Raja Shahzad 1st 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 11th Edition Anne Waugh,
- Allison Grant 2010

PMS-603 HUMANANATOMY-1 CreditHours:4(3+1)

Course Objectives:

After successful completion of this course, students will be able to,

- Identify the principle structures of tissues, organs and systems
- Discuss the different concepts and terms of general anatomy including skeleton and Musculo skeletal system.
- Explain 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 ofjoints,Characteristics of synovial joints, Classification of synovial joints, Movements of synovial joints. Muscular System Parts of muscle Classification of muscles (skeletal, Cardiac, smooth) Thoracicwall: Muscles of thorax,Surface Anatomy, Trachea, lungs, pleura,mammary glands (breast), Heart and thoracic vessels. Thoracic cavity: Mediastinum, Lungs, bronchi, blood supply and lymphaticAbdominal 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. Thepelvic wall:Anterior, posterior wall,diaphragm. Pelvic cavity: Ureters, urinary bladder Male genital organs, Female genital organs, Muscles of pelvic region, blood supply, nerve supply, Special Senses.

Practicals:

- Study Axial and Appendicular skeleton on human skeletal model.
- Study musculoskeletal system on human musculoskeletal 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 inhelth and illness 11th Edition Waugh Grant.
- Clinical Anatomy (By regions) 9th edition, Richard S. Snell.

Reference books:

- Netter Atlasof human anatomy 5th Edition Saunders.
- Gray’s Anatomy for students 2nd Edition DrakeVogalMitcell

PMS-604 ENGLISH –I Credit Hours: 2+0

Aims and Objectives:

After successful completion of this course, students will be able to,

- Compose a well-constructed essay that develops a clearly defined claim of interpretation which is supported by close textual reading.
- Utilize literary terminology, critical methods, and various lenses of interpretation in their writing.
- Apply the rules of English grammar.
- Adhere to the formatting and documenting conventions of our discipline

Course Contents:

VocabularyBuildingSkills:Antonyms,Synonyms,Homonyms,OnewordSubstitute,Prefixes andsuffixes,Idiomsandphrasalverbs,Logicalconnectors,Checkspellings,PracticalGrammar &WritingSkill:PartsofSpeech,Tenses,Paragraphwriting:Practiceinwritingagood,unified andcoherentparagraph,Préciswritingandcomprehension,Translationskills:UrdutoEnglish, Readingskills:Skimmingandscanning,intensiveandextensive,andspeedreading,summaryand comprehensionParagraphs,Presentationskills:Developing,OralPresentationskill,Personality development (emphasison content, style and pronunciation)

Recommended books:

- Practical English Grammar by A.J. Thomson andA.V. Martinet. Exercises 2. Third edition. Oxford University Press 1986. ISBN 0 19431350 6.
- Reading. Advanced. Brian Tomlinson and Rod Ellis. Oxford Supplementary Skills. Third Impression 1991. ISBN 019 4534030.

PMS-605 PakistanStudies Credit Hours: 2(2+0)

Aims and Objectives

After successful completion of this course, students will be able to,

- 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.
- Inculcate patriotism in the hearts of students so that they may become a good citizen.

Course Contents:

HistoricalPerspective:IdeologicalrationalewithspecialreferencetoSirSyedAhmedKhan, AllamaMuhammadIqbalandQuaid-i-AzamMuhammad AliJinnah,FactorsleadingtoMuslim separatism,PeopleandLand,IndusCivilization,Muslimadvent,LocationandGeo-Physical features.GovernmentandPoliticsinPakistan,Politicalandconstitutionalphases:1947-58,1958-71,1971-77,1977-88,1988-99,1999onwardContemporaryPakistan:Economicinstitutionsand issues,Societyandsocialstructure,Ethnicity,ForeignpolicyofPakistanandchallenges,Futuristic outlook of Pakistan

Books Recommended:

- Akbar,S. Zaidi.*Issue inPakistan's Economy*.Karachi: OxfordUniversity Press, 2000.
- Mehmood,Safdar.*Pakistan KayyunToota,*Lahore:Idara-e-Saqafat-e-Islamia, Club Road,nd.
- Amin, Tahir.*Ethno- 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.

PMS-606 COMPUTERSKILLS CreditCourse:2(1+1)

Aims and Objectives

After successful completion of this course, students will be able to,

- Use technology ethically, safely, securely, and legally.
- Identify and analyze computer hardware, software, and network components.
- Design basic business web pages using current HTML/CSS coding standards.
- Install, configure, and remove software and hardware

Courses Contents:

IntroductiontoComputerandWindowXP/7,MSOffice2007(Word,Excel,PowerPoint);Internetaccessand differentdatabasesavailableontheinternet;Email

Recommended Books:

- ComputersciencebyMuhammadAshraf,edition1st2010

2nd Semester Courses

1. Medical BIOCHEMISTRY-II
2. Human Physiology-II
3. HumanAnatomy-II
4. English-II
5. Islamic Studies

PMS-607 MEDICAL BIOCHEMISTRY-II CreditHours:4(3+1)

Aims and Objectives:

After successful completion of this course, students will be able to,

- Describe the synthesis of proteins, lipids, nucleic acids, carbohydrates and their role in metabolic pathways along with their regulation
- Discuss the clinical role of enzymes in human being.
- Interpret and apply nutritional concepts to evaluate and improve the nutritional health of individuals with medical conditions.

Course Contents:

Balancefood,Majorfoodgroups,NutritionalstatusofPakistanination,Metabolicchangesin starvation,Proteinenergymalnutrition,Regulationoffoodintake,Obesity;metabolismof carbohydrates(CitricAcidCycle,Glycolysis,PentosePhosphatePathway),proteins(ureaandcorie cycle),nucleotides(uricacidformation)andlipids(betaoxidation);Respiratorychainandoxidativephospho rylation,componentsofrespiratorychain,electroncarriers,ATPsynthesiscoupledwithelectronflow,phospho rylationofADPcoupledtoelectrontransfer;clinicaldiagnosticenzymology:clinical significanceofALT,AST,ALP,LDH,CK,CKMB,Pancreaticlipaseandamylase,cholinesterase,G6PD, GGT.

Practicals:

1. Determination of liver, cardiac, pancreatic enzymes
2. Determination of ureaand uric acid

Recommended Books:

- Harper‟sMedical BIOCHEMISTRY Robert K.Murray, DarylK.Granner 28thedition 2009
- MedicalMedical BIOCHEMISTRY Mushtaq Ahmad vol.I and II8thedition 2013

PMS-608 HUMAN PHYSIOLOGY-II CreditHours:4(3+1)

Aims and Objectives

After successful completion of this course, students will be able to,

- Demonstrate a systematic and coherent knowledge of the physiological functioning of the central nervous system, special senses (CNS & SS), cardiovascular system and respiratory system.
- Describe the formation of the formed element components of blood.
- Identify the components and function of the lymphatic system and discuss the role of the innate immune response against pathogens

Course Contents:

PhysiologyofNervousSystem,Functionofvariouscranialnerves,Functionsofsomatic motornervoussystemFunctionsoftheautonomicnervoussystem,functionofneurons, neuroglialcellsandtheircomponents.Restingmembranepotentialandanactionpotential, functionofasynapseandreflexarc,functionsofthespecializedsenseorgans:Eye,physiology ofsite,accommodation,opticnerveandopticchiasma,Ear,functionsoftheinternal,middleand externalearPhysiologyofthehearingandbalance,Smell,physiologyofolfactorynerve. Taste, physiologyoftasteLocationofthetastebudsPhysiologyofspeech,Blood:Compositionand functionofBlood,haematopoisis,Bloodgrouping,Coagulationmechanism,Physiologyof CardiovascularsystemThePhysiologyofPulmonarySystemicCirculation:ArteriesVeinsLocal Control of BloodVessels NervousControl of BloodVessels Regulation ofArterial Pressure,The functionofLymphaticSystem,tonsils,lymphnodes,thespleenandthethymus,Classification andphysiologyofImmunesystem,AntigensandAntibodies,Primaryandsecondaryresponses toanantigenAntibody-mediatedimmunityandcell-mediatedimmunityRoleoflymphocytein immunityregulation.

Practicals:

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

Recommended Books:

- EssentialsofMedicalPhysiologyKSembulingam,PremaSembulingamSixthEdition2013
- GuytonAndHallTextbookOfMedicalPhysiologyJohnE.Hall,ArthurC.GuytonProfessorandChair2006
- RossandWilsonAnatomyandPhysiologyinHealthAndIllness11thEditionAnneWaugh,AllisonGrant2010

PMS-609 HUMANANATOMY-II CreditHours:4(3+1)

Aims and objectives

After successful completion of this course, students will be able to,

- Identify bones of the upper limb and bony landmarks that articulate at each joint with all muscular compartments of the upper limb.
- Discuss bones of the lower limb and bony landmarks that articulate at each joint with all muscular compartments of the lower limb and identify these structures on radiographic images.
- Describe the topographical and functional anatomy of the head and neck, in particular the arrangement, relations and structure of the major skeletal, muscular and neurovascular components of the head and neck

Course Detail:

The upper limb Bones of shoulder girdle andArm, 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 SystemClassification of endocrine glands, Pituitary glands,Thyroid Glands,Adrenal gland and differences between the cortex and medulla.

Practicals:

Study and understand the anatomy ofUpper limb, Lower limb, Head and Neck through:

- Human Models
- Video demonstration
- Study radiographs of upper and lower limb.

Recommended Books

Essential books (text books)

- RossandWilsonAnatomy and Physiology in health andillness11thEditionWaugh Grant.
- ClinicalAnatomy (By regions) 9thedition, RichardS. Snell.

Reference books

- NetterAtlas of human anatomy 5thEdition Saunders.
- Gray'sAnatomy for students 2ndEditionDrakeVogalMitcell.
- BD. Churasia HumanAnatomy (All regions)

PMS-610 ENGLISH–II CreditHours:2(2+0)

Aim and Objectives:

After successful completion of this course, students will be able to,

- Develop writing, reading and listening skills.
- Demonstrate integrative and independent thinking, originality, imagination, experimentation, problem solving, or risk taking in thought, expression, or intellectual engagement.
- Participate in discussions by listening to others' perspectives, asking productive questions, and articulating original ideas.

Course Contents

WritingSkill:CVandjobapplication,TechnicalReportwriting,Writingstyles,Changingnarration: Convertingadialogueintoareport,Convertingastoryintoanewsreport,Convertingagraphor picture into a shortreportor story,Active and Passive voice,Letter / memowriting and minutesof themeeting,useoflibraryandinternetrecourses,Essaywriting,Phrases-Typesandfunctions,Clauses-Typesandfunctions,Punctuation:Tenses-Types,Structure,Function,Conversionintonegativeand interrogative.SpeakingSkill:GroupDiscussion(Varioustopicsgivenbytheteacher),Presentation bythestudents(individually),RolePlayActivitiesforimprovingSpeaking.ListeningSkill:Listening VariousDocumentaries,Movies,andonlinelisteningactivitiestoimprovethelisteningaswellas pronunciation of the words.

Recommended Books:

- PracticalEnglishGrammarbyA.J.ThomsonandA.V.Martinet.Exercises2.Thirdedition.OxfordUniversityPress1986.ISBN0194313506.
- Practical English Grammar by A.J. Thomson andA.V. Martinet. Exercises 1. Third edition. Oxford University Press. 1997. ISBN 0194313492.
- Practical English Grammar by A.J. Thomson andA.V. Martinet. Exercises 2. Third edition. Oxford University Press. 1997. ISBN 0194313506
- Intermediate by Marie-Christine Boutin, SuzanneBrinand and Francoise Grellet. Oxford Supplementary Skills. Fourth Impression 1993. ISBN0 19 435405 7 Pages 20-27 and 35-41.
- Reading. Upper Intermediate. Brain Tomlinson and Rod Ellis. Oxford Supplementary Skills. Third Impression 1992. ISBN 019 4534022.

PMS-611 ISLAMIC STUDIES CreditHours:2(2+0)

Aims and Objectives:

After successful completion of this course, students will be able to,

- Recognize basic concept of Islam (faith, pillars and systems etc.) and express their impact on society.
- Present Islam as complete code of life and demonstrate understanding of Islamic Ethics.
- Demonstrate the role of a medical professional in Islam.

Course Contents:

FundamentalbeliefsofIslam,BeliefofTawheed,BeliefinProphethood,BeliefintheDayof Judgment,Worships,Salaat/Prayer,Zakat/ObligatoryCharity,Saum/Fasting,Hajj/Pilgrimage, Jihad,ImportanceofParamedicsInIslam,Ethics,ReligionandEthics,HigherIntents/Objectives ofIslamicShariaandHumanHealth,ImportanceandVirtuesofMedicalProfession,Contribution andAchievementsofMuslimDoctors,KnowledgeoftheRights,WisdomandPrudence, Sympathy/Empathy,ResponsibleLife,Patience,Humbleness,SelfRespect,Forgiveness, Kindhearted,Beneficence,SelfConfidence,ObservingPromise,Equality,Relationamongthe Doctors,Jealousy,Backbiting,Envy,EtiquettesofGathering,RelationbetweenaDoctoranda Patient,GentleSpeaking,MercyandAffection,ConsolingthePatient,Toinquirethehealthof Patient, Character building of the Patient, Responsibilities ofa Doctor

Recommended Books:

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

3rd Semester

1. **Hematology–I**
2. **Medical Microbiology–I**
3. **CardiopulmonaryAnatomy**
4. **Pharmacology– I**
5. **Communication Skills**
6. **General Pathology–I**

MLT-601 HEMATOLOGY-I CreditHours:3 (2+1)

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 Contents:

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 onmegakariopoiesis, 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 relatedto neutrophilia, neutropenia, condition relatedto 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, conditionrelated to basophillia, introductionto hemostasis, mechanism of hemostasis, function of platelets and coagulation factors, coagulation cascade, quantitative disorder of platelets, , qualitative disorder of platelets.

Practical:

- CollectionofBloodSample
- Preparation and Stainingof Peripheral Blood Smear
- TotalLeucocyteCount;RedBloodCellCount,determinationofAbsoluteValues;differentialLeucocyteCount;PlateletscountandReticulocytescount
- To determine the ESR
- DetermineBleedingTime;ProthrombinTime;Activatedpartialthromboplastintime

Recommended Books:

- Essentialof Hematology,A.VHoff Brand,6th edition 2006
- ClinicalHematology, G.C Degrunchi, 5th edition 2002
- PracticalHematology,Dacie J.V. 10th edition2012

PMS-613 MEDICALMICROBIOLOGY-I Credithour: 3(2+1)

Course objectives:

- To introduce the students with basicconcepts inbacteriologyand 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 ofprokaryotic cell, difference between prokaryotic and eukaryotic cell, bacterialgrowth 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.

Practicals:

- Introductionand demonstration of LaboratoryEquipments usedin Microbiology.
- Inoculation and isolation of pure bacterial culture and its antibiotic susceptibility testing.
- Demonstration of different types ofphysical and chemical methods ofsterilization, and disinfection.
- Students should be thorough to work with compound microscope.
- Detection of motility: Hanging dropexaminations with motile bacteria, non-motile bacteria.
- Simple staining methodsof pure culture and mixed culture.
- Gram‟s staining of pureculture and mixed culture.
- AFB staining of Normal smear, AFB positive smear.
- KOH preparation for fungal hyphae.
- Germ tube test for yeastidentification.
- Gram stain for candida.

Recommended books:

- SherrisMedical Microbiology: An Introduction to Infectious Diseases. Ryan,K. J.,Ray, C.G., 4th ed. McGraw-Hill, 2003.
- ClinicalMicrobiology Made Ridiculously Simple.Gladwin,M.,&Trattler, B.,3rd ed. MedMaster, 2004.
- MedicalMicrobiology and Infection ata Glance. Gillespie, S.,H., Bamford,K., B., 4th ed. Wiley-Blackwell, 2012.
- Medical Microbiology,Kayser, F.,H.,&Bienz, K.,A.,Thieme,2005.
- ReviewofMedical Microbiology and Immunology.Levinson,W., 10thed.McGraw Hill Professional,2008.
- Jawetz, Melnick, &Adelberg'sMedical Microbiology. Brooks,G., Carroll,K., C.,Butel, J.,& Morse,S., 26thed.McGraw-Hill Medical, 2012.

CAR-601 CARDIOPULMONARYANATOMY CreditHours:3(2+1)

Course Objectives:

- Toidentifythebones,structuresandtheirrelationswithotherstructures
- Toexaminetherespiratoryandcardiovascularsystem
- Toanalyzetheeffectsofphysicalandpathologicaldiseasesonnormalanatomyofsystem s.
- Toexplainclinicalproceduresrelatedtocardiacandpulmonaryanatomy
- Tochoosequalitypatientcareinroutineaswellasadvancedcardiopulmonaryprocedures

CourseContents:

StructureofthethoracicwallSuprapleuralMembrane,Diaphragm,TheThoracicCavityBasicAnatomy,AnteriorChestWallPosteriorChestWall,LinesofOrientation MediastinumanditscontentsRelationsofthecontentsoftheMediastinum,Pleurae,AnatomyofLarynxandtrachea,Anatomyoflungs,TheanatomyofHeart,RelationsofhearttootherStructurewithintheThorax,ThegeneralStructureofarteriesandveins,Theembryonicperiodandfetal developmentofthecardiovascularandrespiratorysystems,Cardiovascularandrespiratorychangesat birth

Practical:

- Identificationofdifferentorgansandtheircomponents
- RadiologicalPresentation&PathologicalFindingsonRadiographs
- IdentificationofcardiacvalveareasontheThoracicwall
- Identificationoflabeledstructures,theirfeaturesandrelationswithotherstructures
- Identificationofgivenribswiththeirfeatures
- Identificationofnormalapexbeatanatomically
- Toidentifymajorcoronaryarteriesandtheirbranches

RecommendedBooks:

- **ClinicalAnatomy**bySnell,in2000byChurchilllivingstone
- **Gray'sanatomy2nd edition**byWilliamswarwicDysone
- ***LastsAnatomy11th editionbyR.M.HMcminn***

PMS-614 PHARMACOLOGY-I CreditHours:3(2+1)

Course Objectives:

After successful completion of this course, students will be able to,

- Describe common terms related to pharmacology and drug therapy.
- Identify a range of drugs used in medicine and discuss their mechanisms of action.
- Report the clinical applications, side effects and toxicities of drugs used in medicine.

Course Contents:

IntroductiontoPharmacology,Pharmacokinetics,Pharmacodynamics,Adverseeffectsofdrugs, Classificationofdrugs,DrugsaffectingtheAutonomicNervousSystem,NSAID,Opioids,Drugs AffectingEndocrinesystem(Corticosteroids,ThyroidandAntiThyroid),GastrointestinalDrugs(PPI,H2 blockers andAntacids),Anti-Histamines,Anesthetics(General and local anesthetics),

Practical:

- Introduction to drug dosage form 2. Study of the action of drugs (Atropine) on the rabbit's eye

Recommended books:

- LippincottspharmacologyⓇ(textbook)byMycek6thEditionpublishedbyLippincottRaven 2012.
- Katzungtextbook of pharmacology (Reference Book) by Bertram Katzung12th Edition, Published byAppleton.

PMS-615 Communication Skills Credithours:2(1+1)

Course Objectives:

After successful completion of this 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 the interpersonal and organizational dynamics that affect effective communication in organizations..

Course Contents:

IntroductiontoCommunication,MeaninganddefinitionofCommunication,Theprocessof communication,ModelsofcommunicationEffectiveCommunicationsinBusiness,Importanceand BenefitsofeffectivecommunicationComponentsofCommunication,Communicationbarriers, Nonverbalcommunication,Principlesofeffectivecommunication,SevenCs,Communicationfor academicpurposes,Introductiontoacademicwriting,Summarizing,paraphrasingandargumentation skills,Textualcohesion,CommunicationinOrganizations,Formalcommunicationnetworksin organizations, Informalcommunicationnetworks,Computer-mediatedcommunication (videoconferencing,internet,e-mail,Skype,groupware,etc.),BusinessWriting,Memos,Letters, Reports,Proposals,Circulars,PublicSpeakingandPresentationskills,Effectivepublicpresentation skills, Audience analysis, Effective argumentation skills, Interview skills.

Recommended Books:

- PracticalEnglishGrammarbyA.J.ThomsonandA.V.Martinet.Exercises2.Thirdedition. OxfordUniversityPress1986.ISBN0194313506.
- Practical English Grammar by A.J. Thomson andA.V. Martinet. Exercises 1.Third edition. Oxford University Press. 1997.ISBN 0194313492.
- Practical English Grammar by A.J. Thomson andA.V. Martinet. Exercises 2.Third edition. Oxford University Press. 1997.ISBN 0194313506
- Intermediate by Marie-Christine Boutin, SuzanneBrinand and Francoise Grellet. Oxford Supplementary Skills. Fourth Impression 1993. ISBN0 19 435405 7 Pages 20-27 and 35-41.
- Reading. Upper Intermediate. Brain Tomlinson and Rod Ellis. OxfordSupplementary Skills. Third Impression 1992. ISBN0 19 453402 2.

PMS-612 GENERALPATHOLOGY-I Credit Hours: 3(2+1)

Course Objectives:

After successful completion of this course, students will be able to,

- Specifythe abnormalities of cell growth and differentiation.
- Describe cellular responses to stress and noxious stimuli and inflammation.
- Discuss cell injury, cell death and mechanisms involved in wound healing.
- Explain the hemodynamic disorders and neoplasia.

Course Contents:

Introduction to pathology, Cell injury, Cellular adaptation, Acute Inflammation, Chronic Inflammation, Cell Repair & WoundHealing, 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

Practicals:

- Estimation of Prothrombin Time
- Estimation of Clotting Time
- Estimation of Bleeding Time
- Estimation of Activated PartialTromboplastin Time

Recommended Books:

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

4th Semester

1. **GeneralPathology-II**
2. **MedicalMicrobiology-II**
3. **Electrocardiography-I**
4. **Cardiopulmonary Physiology**
5. **Haematology-II**
6. **Pharmacology-II**
7. **BehavioralSciences**

PMS-617 PATHOLOGY-II CreditHours:3(2+1)

Course Objectives:

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

Course Details:

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 heartdiseases, ischemic heart diseases, hypertensive heart diseases, arrhythmias, atelectasis, chronic obstructive pulmonary disease, asthma, bronchiactasis, 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:

- RobbinsBasic Pathology KumarAbbasAster 9th Edition2013
- ReviewOf General Pathology Moh.Firdaus,9th Edition
- ShortText Book of Pathology Moh. Inam Danish3rd Edition 2006

PMS-618 MedicalMicrobiology-II Credit Hours: 3(2+1)

Course objectives:

- To introduce the students with basicconcepts invirology and parasitology.
- To introduce the students with common viral and parasitic infections.
- To introduce the students with diagnosis of common viral and parasitic infections.

Course Contents:

Biosafety levels, controlof hospital infection, biomedical waste management, introduction to virology, Viral morphology, structure,replication and classification, general properties ofvirus, pathogenesis and controlof virus, common viral pathogen prevailing in Pakistan, introduction to parasitology, Parasite (protozoan andhelminthes) morphology and classification, generalprincipal of pathogenesis, immunology and diagnosis of parasitic infection, common parasitic pathogen prevailing in Pakistan.

Practical:

- Cleaning ofnew andused glasswares for microbiological purposes.
- Students should be familiar to use autoclave, hot air oven, water bath, steamer etc.
- Macroscopicand microscopic examination of stoolfor adult worms, ova, cysts, larvae.
- Visit to hospital for demonstration ofbiomedical waste management.
- Demonstration of common serological tests used for the diagnosis of viral and parasitic infection.
- Demonstration of malarial parasites in blood and bone marrow.
- Demonstration of leishmania in blood film.
- Concentration techniquesfor intestinal parasites in stool.

Recommended books:

- SherrisMedical Microbiology: An Introduction to Infectious Diseases. Ryan,K. J.,Ray, C. G., 4thed. McGraw-Hill,2003.
- ClinicalMicrobiology Made Ridiculously Simple.Gladwin,M.,&Trattler,B., 3rd ed. MedMaster,2004.
- MedicalMicrobiology and Infection ata Glance. Gillespie, S.,H., Bamford,K., B., 4th ed. Wiley-Blackwell, 2012.
- Medical Microbiology,Kayser, F.,H.,&Bienz, K.,A.,Thieme,2005.
- Review ofMedical Microbiology and Immunology.Levinson,W., 10th ed. McGraw Hill Professional,2008.
- Jawetz, Melnick, &Adelberg'sMedical Microbiology. Brooks,G., Carroll,K., C.,Butel, J.,& Morse,S., 26thed. McGraw-HillMedical, 2012.

CAR-602 ELECTROCARDIOGRAPHY-I CreditHours:3(2+1)

- **Course Objectives:**
  - TodescribethebasicconceptsofEKG
  - TorecognizethebasicelectrophysiologyusingEKG
  - TocomputedifferentbasictechnicalECGabnormalities
  - Toinferdifferenttypesofarrhythmias
  - Toidentifydifferentheartpathologiesonthebasisof EKG

Course Contents:

BasicConcepts;Rate,Rhythm,intervals,Cardiacaxis,Wavemorphologies,Step-by-StepMethodforAccuratereportingandinterpretation,P,Q,RandTWaveAbnormalities,BundleBranch Blocks, STSegmentAbnormalities

Practical:

- IdentificationofdifferentEKGelectrodes
- PlacementofElectrodesonthebody
- DemonstrationofEKGprocedure
- Findingheartrate,Rhythm,axisandintervals
- DifferenttypesofEKGwavesandcorrelationwithdifferentheartchambers

Recommended Books:

- EKGbyDaleDubin6th edition
- ECGmadeEasybyJhonR6thedition
- RapidECGinterpretationbyMr.M.GabrielKhan3rd edition
- AnIntroductiontoECGbyLeoSchamroth6th edition
- ECGInterpretationfortheclinicalexercise3rd edition
- EKGbookbyMalcolm.S4th edition
- ManualOfECG4th edition

CAR-603 CARDIOPULMONARYPHYSIOLOGY CreditHours:3(2+1)

Course Objectives:

- To describe the physiology of Cardiovascular and Respiratory system
- To illustratethe normal physiological parametersrelated tosystems
- To compute the effect of certain factors affecting normal physiology
- To explain advance concepts and calculation related to the physiological functions
- To assess the normal physiological functions for the understanding of different pathologies

Course Contents:

CellularMembranestructure &function,Physiologicanatomyof theHeart, Propagation of cardiac Impulse,The cardiac cycle, Pressure change during cardiac cycle. ThestrokevolumeandStrokeout-put,Cardiacout-putregulationofcardiacfunction.The specialexcitatoryandconductivesystemoftheheartandtheircontrolAbnormalitiesof thecardiacrhythms,Theheartsounds.Functionalclassificationofbloodvessels, Peripheralcirculation:pressureandresistance,TheArterialBloodPressure, Hypertension,TheArterialPressurePulse,ThePhysiologyOfTheVeins,TheJugular VenousPulse,ThePhysiologyOfTheCapillaries,LymphAndLymphatics,The CutaneousCirculation,CoronaryCirculation,CerebralCirculationAndPulmonary Circulation, Gas Exchange &Diffusion. Perfusion andVentilation/Perfusion.Acid- base imbalances:pathophysiologyofacidosisandalkalosisHeatExchange,Filtersand Reservoirs.

Practical:

- Measurement of Blood Pressure
- Demonstration on ECG
- Heart sounds
- Measurement of JVP
- Cardiac output measurements
- Measurement of pulses from various regions of the body
- Interpretation ofArterial blood gases
- Interpretation of different lung volumes and capacities fromLung function test
- Nebulization procedure

Recommendedbooks:

- Physiologyby Jypee 5th edition
- CardiovascularPhysiology by J.RLevick2nd edition
- Human Physiology ByGuyton and Hall 12th edition
- IllustratedPhysiology B. R Mackena 5th edition

MLT-604 HEMATOLOGY-II CreditHours:3(2+1)

Course Objectives:

- To introduce the studentsabout the basic concepts in Hematology and acquire skill in practical work to producea team of Medical Technologists steeped in knowledge of Pathology
- To equip Medical Technologists withlatest advancements in the field of hematology.

Course Contents:

Iron metabolism, introduction to iron deficiency anemia, different stages anddiagnosis, introduction to thalassemia, classification, pathophysiology andits diagnosis,introduction toSidroblastic anemia,etiology and diagnosis,folatand vitaminB_{12} metabolism, introduction to megaloblastic anemia, etiology and diagnosis, introduction to G6PD deficiencyanemia, pathophysiology and diagnosis, introduction tosickle cell anemia, pathophysiologyand diagnosis,introduction to hereditary spherocytosis,pathophysiology and diagnosis, introduction to hemolytic anemia, Immune hemolytic anemia, non-immune hemolytic anemia, aplasticanemia, etiology and diagnosis. ABO and RhD group system, kellblood groupsystem, ked blood groupsystem, duffyblood group system, donor selection criteria, phlebotomy of donor, blood products, preparation, storage and its importance, hem vigilance in blood bank, cross match, types of cross match,procedure andits importance, blood grouping and its importance,coomb's test,types and importance, introduction to hemolytic disease of newborn, types,pathophysiology, diagnosis and management, hemolytic transfusionreactions and management.

Practicals:

1. ABO blood grouping (Forward andReverse grouping)
2. Rh Bloodgrouping
3. Antibodies screening
4. Cross matching (Major and Minor)
5. Coombs tests (Direct and Indirect)
6. Separationof differentblood components
7. Du Test

Recommended books:

- EssentialofHematology,A.VHoff Brand, 6thedition 2006
- ClinicalHematology, G.CDegrunchi, 5thedition 2002
- PracticalHematology,Dacie J.V. 10thedition 2012

Course objectives:

To provide quality patient carein routine as wellas advancedprocedures.To understand themechanism ofdrugactionatmolecularaswellascellularlevel,bothdesirableandadverse.Tounderstandthe principlesofpharmacokineticsi.e.drugabsorption,distribution,metabolismandexcretionandbeable to apply these principles in therapeutic practice.

Course contents:

Drugsactingoncardiovascularsystem;Drugsforheartfailure,anti-hypertensivedrugs,antianginal drugs,AntiHyperlipidemicdrugs,Blooddrugs(Anticoagulants),Diuretics,Chemotherapeutics drugs([Anti-protozol, Anti-Malarial], Anti-Fungal,Anthelmintic), Antibiotics(Penicillin's, cephalosporin's,macrolides,aminoglycosides,fluroquinolones),DrugsactingonRespiratory system(Asthma).

Practical:

- Routes of drug administration
- Study of action pilocarpine on rabbit eye

Recommended books:

- Lippincottspharmacology(textbook)byMycek6thEditionpublishedbyLippincottRaven 2012.
- Katzungtextbookof pharmacology (Reference Book) by Bertram Katzung12thEdition, Published byAppleton.

PMS-619 BEHAVIORALSCIENCES Credit Hours: 2(2+0)

Course Objectives:

- To introduce about various diagnostic interviews
- Formulating and clarifying diagnostic findings and treatment recommendations
- Documentingevaluationandtreatmentprocedures,involvingdutiessuchasrecordingresultsof diagnosticinterviews,labstudies,and/ortreatmentplansinatimelywayaccordingtothemedical records protocols of the rotation site

Course Contents:

IntroductiontoBehavioralSciencesanditsimportanceinhealth:Bio-Psycho-SocialModelof HealthCareandtheSystemsApproach,NormalityvsAbnormality,ImportanceofBehavioral sciencesinhealth,DesirableAttitudesinHealthProfessionalsUnderstandingBehavior: Sensationandsenseorgans,Perception,Attentionandconcentration,Memory,Thinking, Communication,IndividualDifferences:Personality,Intelligence,Emotions,Motivation, Learning,StressandStressors,LifeEvents,Stress,Management,Interviewing/Psychosocial HistoryTaking,AlliedHealthEthics-Hippocraticoath,CultureandAlliedHealthpractice, Psychological reactions, Breaking Bad News, Pain, Sleep, Consciousness.

Recommended Books:

- Behavioral Sciences by M.H Rana 2007
- SociologyinaChangingWorldbyWilliamKornblum8th edition2007
- Changing Behavior: Immediately TransformYour Relationships with Easy-to-Learn, ProvenCommunicationSkillsbyGeorgianaDonadio2011

5thSemester

1. **Clinicalmedicine–I**
2. **Electrophysiology**
3. **Echocardiography–I**
4. **Electrocardiography–II**
5. **Interventionalcardiology**
6. **Medicalphysics**

CAR-604 CLINICALMEDICINE-I CreditHours:3(2+1)

Course objectives:

- Studentswillbeabletorecordclinicalhistory,Physicalexaminationandcorrelatetheknowledgetomakedifferentialdiagnosisofvariousdiseases
- Tojustifypatients,familiesandcaregiversthediagnosis,prognosisandtreatmentplanfortheircondition,andeducatethemaboutbeneficiallifestylebehaviorsandpreventivehealthmeasures.
- Tojudgeroutineprocedurescommonlyrequiredfortheevaluationandcareofpatients

Course Contents:

Introduction of diseases; their clinical features, signs, symptoms and management of diseases. Investigations and their interpretation for various diseases of the following systems:DiseasesofCardiovascularSystem,DiseasesofRespiratorySystem,Diseasesofthe Kidney&UrinarySystem,DiseasesofEndocrinesystem

Practical:

- Patient History and clinical Examination (General)
- Systematic Examination
- Radiological and Physical Investigations
- FirstAid
- Concept ofHolistic Health
- Interpretation of investigation
- Diagnosing clinical problems

Recommended Books:

- Davidson's Principles and Practice of Medicine, 21st edition
- Kumar and Clark's Clinical Medicine (Kumar, Kumar and Clark's Clinical Medicine)**, 8th edition**
- Clinical Medicine by Parveen Kumar, Michalclark in by ELBS

CAR-605 ELECTROPHYSIOLOGY Credit Hours: 3(2+1)

Course objectives:

- To describe electrophysiology of the heart
- To list the various cardiac arrhythmias
- To illustratevarious protocols for various procedures
- To select an appropriate procedure to treat arrhythmias
- To plan and prepare for Holter monitoring
- To design set up for permanent pace maker
- To set up Electrophysiology laboratory

Course Content:

IntroductiontoElectrophysiology,Basicarrhythmiaphysiologyandmechanisms, Electrophysiologydevicelabset-up,Holterandeventmonitorlaboratoryset-up, Bradyarrhythmiaandtheirmanagementbypacingandcardiacresynchronizationtherapy, Supraventriculartachyarrhythmia,Atrialflutterandfibrillation,Ventriculartachyarrhythmia, Deviceprocedures,PerformingbasicEPstudies,Basicintervalsand intracardiacECGs,Basic EPstudyprotocols, AblationofSVT,Managementandablationofatrialflutter, Ablationof normal heart ventricular tachycardia.

Practicals:

- Analysis of various arrhythmias
- Designing lab set up for electrophysiology procedures
- Steps and protocol of Permanent pace maker
- Application of Holtermonitor and reporting
- To design set up forAblation procedures

Recommended Books:

- Handbook of Cardiac Electrophysiology byAndrea Natale. Informa Healthcare 2007
- PracticalElectrophysiology byToddJ 2nd edition
- ClinicalElectrophysiology byAndrewJ3rd edition
- ElectrophysiologyofArrhythmias by ReginaldT2nd edition

CAR-606 ECHOCARDIOGRAPHY–I Credit Hours: 3(2+1)

Course objectives:

- To explain basic physical principles of ultrasound and instrumentation.
- To Correlate cardiac gross pathology with echocardiography images.
- Toevaluatecardiacchambersize,leftventricularsystolicanddiastolicfunctionandright ventricular systolic function.
- ToAnalyze and interpret echocardiographic derived hemodynamic data.
- To interpret trans esophageal images and distinguish attributes and limitations versus transthoracic echocardiography

Course Contents:

History of echocardiography, Development of various echocardiographic Technologies, Recording Echocardiograms, Cardiac Sonographers, Physics and Instrumentation, Physical Principles, Definition of BasicTerms**,** Principles ofcardiac ultrasonography, Principles of ultrasound physics and instrumentation, The Doppler principles, The anatomical echocardiographicexaminations (BasicViews),Examination andappearanceofthenormal heart,Quantificationoftheventricularperformance,Principlesof theDopplerexamination, Additional imaging formats and techniques, Contrast echocardiography,Artifacts

Practical:

Clinical application of echocardiography in:

- Acquired valvular heart disease
- Evaluation of prosthetic heart valves
- Congenital heart disease of the pericardium
- Cardiomyopathies
- Ischemic heart disease
- Diseases ofthe aorta
- Cardiac masses and tumors
- Pericarditis

Recommended Books:

- Feigunbaum'sEchocardiography,6thEdition
- EchoMade Easy, by SamKaddoura, 2ndEdition

CAR-607 ELECTROCARDIOGRAPHY–II CreditHours:3(2+1)

Course objectives:

- TodescribethebasicconceptsofEKG
- Torecognizethebasicelectro-physiologyusingEKG
- TocomputedifferentbasictechnicalECGabnormalities
- Toinferdifferenttypesofarrhythmias
- ToidentifydifferentheartpathologiesonthebasisofEKG
- TorelatetheEKGabnormalitieswiththeheartandlungpathologies

Course Contents:

ReviewofElectrocardiography-I,QWaveAbnormalities,AtrialandVentricularHypertrophy,TWaveAbnormalities,ElectricalAxisandFascicularBlock,MiscellaneousConditions,Arrhythmias,EKGofdifferentMyocardialinfarctions,EKGofDifferentcongenitalaswellasacquiredHeartpathologies;Aorticdisease,valvulardiseases,Pericardialdisease,dextrocardiaandEKGofdifferentsyndromescausingheartdisease

Practical:

- IdentificationofdifferentEKGelectrodes
- PlacementofElectrodesonthebody
- DemonstrationofEKGprocedure
- Findingheartrate,Rhythm,axisandintervals
- DifferenttypesofEKGwavesandcorrelationwithdifferentheartchambers
- Interpretationofdifferenttypeofarrhythmias
- InterpretationofMyocardialinfarction
- Interpretationofcardiacchamberhypertrophyandenlargements
- InterpretationofCardiacmyopathies
- Interpretationofvalvularpathologies
- Interpretationofdifferentaorticpathologies

Recommended Books:

- EKGbyDaleDubin6th edition
- ECGmadeEasybyJhonR6thedition
- RapidECGinterpretationbyMr.M.GabrielKhan3rd edition
- AnIntroductiontoECGbyLeoSchamroth6th edition

- ECGInterpretationfortheclinicalexercise3rdedition
- EKGbookbyMalcolm.S4thedition
- ManualOfECG4thedition

CAR-608 INTERVENTIONALCARDIOLOGY Credit Hours: 3(2+1)

Course objectives:

- To outline variousinterventional proceduresin cardiology
- To identify various catheters, wires and balloons used in interventional cardiology
- To select various catheters and wires for a particular procedure
- To recognize various interventional procedures
- To predict possible complications of various procedures
- To set up the machine and other necessary equipment's needed
- To judge the procedure and finding out any problem
- To prepare the things for the smooth running of the procedure
- To plan a particular procedure witha cardiologist

Course Contents:

AnintroductiontoInterventionalCardiology,Varioussitesofvascularaccess,Angiographic views,Practicalanalysisofguidedesignofcatheters,Guidewires,Balloonangioplasty, Stenting,Transradialapproach,Leftmainarteryprocedures,Chronictotalocclusion,Ostial lesions,InterventionsinacuteST-segmentelevationmyocardialinfarction,Interventionsin PatientsafterCoronaryarterybypassgraftSurgery,Bifurcationlesion,Complications,High- risk patients , Removal of embolized material , Inoue balloon mitral valvuloplasty , Renal artery interventions, Percutaneous intervention of cardiac congenitalanomalies

Practical:

- Identification of various catheters, wires and balloons
- Identification of Catheter types and procedure they are used for
- Analyzing the procedure by knowing the disease
- Steps of various procedures
- Identification of various lesion's
- Handling the complications

Recommended Books:

- Practical Handbook ofAdvanced Interventional Cardiology byThach Nguyen. 4Th editionWiley& Sons, Ltd., Publication
- Oxford Handbook of Interventional Cardiology

CAR-609 **MEDICALPHYSICS** **CreditHours:3(2+1)**

Course objectives:

- To list S.I units of physical quantities
- To describe the various conversions of S.I units into other units
- To interpret various equations used in medical physics
- To recognize various principles of fluid dynamics
- To sketch different graphs and their interpretation
- To relate various relations using equations

Course Contents:

Introductiontomedicalphysics,Physicalmeasurementandcalibration,TheSIunits,Thegas laws,Laminarflow,Turbulentflow,Bernoulli,VenturiandCoanda,Heatandtemperature,Latent heat,Isotherms,Solubilityanddiffusion,Osmosisandcolligativeproperties,Thevalvesandtheir typeswiththeirprinciple,Resistorsandresistance,Defibrillators,Resonanceanddamping,Pulse oximetry,Capnography, Absorptionofcarbondioxide,Cardiacoutputmeasurement,Theecho principle,TheDopplereffect,Neuromuscularblockademonitoring,Lungvolumes,Spirometry, Flow–volumeloops,Thealveolargasequation,Theshuntequation,Pulmonaryvascular resistance,Ventilation/perfusionmismatch,Deadspace,Fowler'smethod,TheBohrequation, Oxygendeliveryandtransport,Theoxyhaemoglobindissociationcurve,Carriageofcarbon dioxide,Cardiacactionpotentials,Thecardiaccycle,Pressureandflowcalculations,Central venouspressure,Pulmonaryarterialwedgepressure,TheFrank–Starlingrelationship,Venous returnandcapillarydynamics,Ventricularpressure–volumerelationship,Systemicand pulmonary vascular resistance,TheValsalva manoeuvre.

Practical:

- Measurements of length and volume
- Measurement of temperature using various thermometer
- Calculations to find out various parameters like cardiac output, dead space, Pulmonary artery wedge pressure,
- Principle of Sphygmomanometer and measurement of blood pressure
- Identification of spirometer, its various parts and analysis of lung function test
- Analyzing the resistance of body usingPsulli,s equation
- To find the gradient across the valves using various equations

Recommended books:

- Physics, Pharmacology and Physiology forAnaesthetists by Matthew E. Cross. Cambridge latest edition
- Medical Physics
- Physicsand body by JohnR 2nd edition

6TH SEMESTER

1. Criticalcare
2. ClinicalMedicine-II
3. Cardiacsurgery
4. DiagnosticEquipmentsinCardiology
5. Echocardiography-II
6. PulmonaryDisease

CAR-616 CRITICALCARE CreditHours:3(2+1)

Course objectives:

- To outlinecritical cardiovascular situations
- To recognize critical cardiovascular care in various situations
- To categorize the patientsituation
- To plan the right procedure in cardiovascular critical situations
- To accessthe critically ill patients
- To select various pharmacological and mechanical procedures

Course Contents:

An introduction to critical care, Shock, Resuscitation in intensive care, 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 ofcardiovascular 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.

Practical:

- Assessment of shock and its types
- Assessmentof arrhythmias
- Management of shock
- Management of arrhythmias
- Management of Cardiac arrest
- Management of acute Myocardial infarction
- Management of Hypertensive crisis
- Analysis of arterial blood gases
- Management of Cardiac trauma and aortic dissection

Recommended Books:

- Cardiovascular Critical Care by Mark J.D. Griffiths, Jeremy J.Cordingley and Susanna. 010 Blackwell Publishing Ltd.
- Criticalcare byAndrea G 4thedition
- Criticalcare Current diagnosis and treatmentby FredericS 3rdedition

CAR-610 CLINICALMEDICINE-II Credit Hours: 3(2+1)

Course objectives:

- Studentswillbeabletorecordclinicalhistory,Physicalexaminationandcorrelatetheknowledgetomakedif ferentialdiagnosisofvariousdiseases
- Tojustifypatients,familiesandcaregiversthediagnosis,prognosisandtreatmentplanfortheircondition ,andeducatethemaboutbeneficiallifestylebehaviorsandpreventivehealthmeasures.
- Tojudgeroutineprocedurescommonlyrequiredfortheevaluationandcareofpatients

Course Contents:

Introduction of diseases; their clinical features, signs and symptoms, management of diseases. Investigations and their interpretation for various diseases of the following systems: Diseases of theAlimentaryTract, Diseases of the Liver & Biliary System, Diseases ofthe Joints & Bones, Diseases of the Nervous System

Practicals:

1. Checking up patients
2. Systematic Examination
3. Radiological and Physical Investigations
4. FirstAid
5. Concept of Holistic Health

Recommended books:

- Kumar and Clark's Clinical Medicine (Kumar, Kumar and Clark's Clinical Medicine),8th edition
- Davidson's Principles and Practice of Medicine, 21st edition

CAR-618 CARDIACSURGERY CreditHours:3(2+1)

Course objectives:

- To describe various cardiac surgical procedures
- To identify the pathologies
- To prepare the required investigation for a specific surgery
- To prepare the patient for surgery
- To evaluate the condition of the patient
- To predict an appropriate procedure in case of an emergency

Course Contents:

Surgical approachesto the heartand great vessels(An introduction), Preparation for cardiopulmonary bypass, Surgery ofvarious heart valves; valverepair and replacement, Surgery for coronary disease, Surgery of cardiac tumors, Coarctation ofthe aorta,Atrial septal defect, Patent ductus arteriosus,Transposition of the great vessels, Coronary artery anomalies surgery.

Practical:

- Clinical examination
- History taking
- Pre-Oprequirements ofa particular procedure
- Patient assessment
- Investigation required and their interpretation with their importance
- Post-Op care of the patients

Recommended Books:

- Cardiac Surgery by SiavoshKhonsari. Lippincott 4th edition
- CardiacSurgery by Kerklin4thedition
- CardiacSurgery by CNarian2ndedition
- CardiothoracicSurgery byMichealS 2ndedition

CAR-611 DIAGNOSTIC EQUIPMENTS IN CARDIOLOGY Credithours: 3(2+1)

Course objectives:

- To name the various equipments used in cardiology
- To describe the indications of the tests
- To prepare the patient fora specific test
- To explain the test procedure and protocol
- To design an appropriatetest relatinga disease
- To predict the possible complications
- To interpret the results of a test

Course Contents:

Introduction,Principle,Indications,Contraindications,Complicationsandusesofdiagnostic equipmentsincardiology.Followingdeviceswillbeincluded:ECGmachine,ETTmachine, Pulseoximetry,Cardiacmonitors,Defibrillator,Echocardiographymachine,Ultrasound machine,CardiacCT,CardiacMRI,CardiacX-Ray,Angiographymachine,Holtermonitors, Equipments used in Electrophysiology Laboratory, Swan Ganscathter,Temporary pacemaker.

Practical:

- To identify the shown equipments
- To labeltheparts of given equipment
- Basic knowledge of operation of an equipment
- To eradicate the basic technical fault in the equipment
- To interpret the report of theequipments
- To calibrate the equipments

Recommended Books:

Not a single book but differentbooks describing the equipment and procedure protocols

CAR-612 ECHOCARDIOGRAPHY– II CreditHours:3(2+1)

Course objectives:

- To recognize the basic concept and principal of Echocardiography
- To operate Echocardiographic machine
- To identify normal cardiac functions using echocardiography
- To express different cardiac pathologies
- To explain the use of echocardiography for various procedures
- To interpret echocardiography of different diseases of the heart

Course Contents:

OverviewoftheEchocardiography-I,EchocardiographyofTricuspidandPulmonaryvalves, InfectiveEndocarditis,Prostheticvalves,StressEcho,Cardiomyopathies,Congenitalanomalies, ICUandoperativeusesofEchocardiography,DiseasesofAorta,Masses, Tumorsandsourceof Embolus and their findings, Echocardiography and clinical problems.

Practical:

- Basic demonstration of Echocardiographic machine
- Identification of various parts of machine and their functions
- Normal parameters of heart like chamber pressures, wall thicknesses, pressure gradients across valves
- Basic technique to perform the Echocardiography
- Demonstration of different Echocardiographic views of the heart
- Interpretation of Echocardiographic images
- Interpretation of different Congenital anomalies by performingEchocardiography
- Interpretation of different chambers; their wall motion thickness and any masses in them
- Interpretation of transposition of great arteries by performingEchocardiography
- Interpretation of cardiac valves; their normal function and malformations or pathologies as stenosis or regurgitation
- Interpretation of Different types of Cardiomyopathies

RecommendedBooks:

- Echocardiographyby Feigenbaum 7th edition
- Echocardiographyby GabrialA2nd edition
- ClinicalEchocardiography byMichealY2nd edition

CAR-613 PULMONARYDISEASES CreditHours:3(2+1)

Course objectives:

- To write the investigations used in respiratory medicine
- To describe various diseases of respiratory tract
- To diagnose various respiratory tract diseases
- To plan treatment for various respiratory diseases

Course Contents:

Examinationoftherespiratorysystem,Investigationusedtoinvestigaterespiratorydiseases, Diseasesoftheupperrespiratorytract,Diseasesofthelowerrespiratorytract,Asthma, Pneumonia,Tuberculosis,DiseasesoftheRespiratorysystem,Congenitalanomalies, Carcinoma,Infections,Adultrespiratorydistresssyndrome,Chronicobstructivepulmonary disease, Pulmonary hypertension, LungTransplantation, Lung reduction surgery

Practical:

- History taking in pulmonary diseases
- Clinical Examination in pulmonary diseases
- Interpretation of investigations
- Diagnose of variousrespiratory diseases
- Management plan for various respiratory diseases

Recommended Books:

- Kumar and Clark's Clinical Medicine (Kumar, Kumar and Clark's Clinical Medicine),8th edition
- Davidson's Principles and Practice of Medicine, 21st edition

7thSemester

1. NuclearCardiology
2. HeartDisease
3. ResearchMethodology
4. PreventiveCardiology
5. Biostatistics
6. Epidemiology

CAR-614 NUCLEAR CARDIOLOGY CreditHours:3(2+1)

Course objectives:

- Demonstrate a thorough knowledge of the clinical indications, general procedures (including radiopharmaceutical and dose) and Normal/Abnormal findings inCardiac nuclear scan.

Course Contents:

Discussthebasicphysicalprinciplesofnuclearmedicineimagingandinstrumentation,Basicatomicand nuclearphysics,safehandlingofradioactivematerials,Identifytheisotopes(includingphysicaland chemicalproperties)thatareusedroutinelyinthecompoundingofradiopharmaceuticalsfornuclear Cardiologyprocedures. Technicalaspectsofimageacquisition,Display,andinterpretation,Myocardial bloodflow,myocardiummetabolismandventricularfunction,Diseasedetection,riskstratificationand clinicaldecisionmaking,molecularimagingofcardiovascularsystem.Radiationprotectionin cardiology(interventionalandnuclear),theGamacamera,Collimationandcollimators,Quality assuranceandQualitycontrolinnuclearcardiology,standardoperationproceduresinnuclearcardiology, patient preparation ,scanning protocols and imaging guidelines in nuclear cardiology

Practical:

- Preparations of patients for MIBI Scan/Thallium scan
- Viability scan and ischemic scan protocols
- Gamma camera settings for different protocols
- Patient's education regarding radiation safety

Recommended Books:

- BraunwaldsHeartDisease:AtextbookofCardiovascularmedicine11th EditionbyZipes,Libby,Bonow,Manna ndTomaselli
- IntroductiontoHealthPhysics4th Edition (HermanCember&ThomasE.Johnson)McGrawHillMedicalPublisher.
- EssentialNuclearMedicinePhysics2nd Edition (RachelA.Powsner&EdwardR.Powsner)BlackwellPublisher.
- NuclearMedicineTechnologyProceduresandQuickReference2nd Edition(Pet eShackett)LippincottWilliams& WilkinsPublisher.
- ThePhysicsofRadiology4th Edition (HaroldElfordJohns&JohnRobertCunningham)CharlesCThomasPublisher.
- ClinicalNuclearMedicine (H.JBiersack&L.MFreeman)SpringerPublisher.
- Quantitative analysis inNuclear MedicineImaging by (Habib Zaidi) Springer Publisher.
- PracticalNuclear Medicine 3rd Edition (Peter F.Sharp, Howerd G. Gemmell &Alison D. Murray) Springer Publisher
- RadiationDetection and Measurement 3rd Edition (Glenn F. Knoll) JohnWiley & Sons Publishing.
- Basic Sciences of Nuclear Medicine by (Magdy M. Khalil) Springer Publisher.
- ASNC Imaging Guidelines for SPECTNuclear Cardiology Procedures.
- Radiation Protection, Radiation Emergency and RadiationWaste Management

CAR-615 HEARTDISEASES CreditHours: 3(2+1)

Course objectives:

- To describe variousrisk factors in CVD
- To recognize various cardiovascular risk factors
- To estimate the progression of the disease
- To modify life style in the prevention of the disease progression
- To select an appropriate interventionto minimize risk factors
- To design a set of care

Course Contents:

Atrial septal defects,Ventricular septal defects,Persistentatrioventricular canal defects d. Patent ductus arteriosus, Coarctation of the aorta,Aortic stenosis, Hypoplastic left heart syndrome, Right ventricular outflow obstructions,Tetralogy ofFallot,Tricuspid atresia, Ebsteinanomaly of the tricuspid valve,
Transposition of the great arteries,Total and partial anomalous pulmonary venous return, Univentricular heart, Malposition of the heart,Anomalous leftcoronary artery arising from the pulmonary artery, CardiacTransplantation
Atherosclerosis, Ischemic heartdisease,Valvular heart disease, Cardiac hypertrophy, Hypertensive heart disease, Cor pulmonale and pulmonary hypertension, Myocarditis, Cardiomyopathies, Pericardial disease, Endocrines and the heart, HeartTumors,Arrhythmias and conduction disorders, Diseasesof the aorta: aneurysms anddissections, Cardiac Transplantation, Diseases of the Respiratory system
Congenitalanomalies,Carcinoma,Infections,Adultrespiratorydistresssyndrome,Chronic obstructivepulmonarydisease,Pulmonaryhypertension,LungTransplantation,Lungreduction surgery

Practical:

- Assessment of the patient's risk factors
- Physical Examination
- Heart sounds and their interpretation
- Analysis of investigations used
- Interventions to reduce CVD
- Management of the patient's atrisk
- Exercise treadmill stresstesting

Recommended Books:

- Braunwald`s Heart Disease, 9th Edition
- Harrisons Cardiovascular Medicine2nd Edition

PMS-621 RESEARCHMETHODOLOGY Credit hours: 3(2+1)

Course Objectives:

After successful completion of this course, students will be able to,

- Recognize the basic concepts of research and the research process.
- Develop understanding on various kinds of research, objectives of doing research, research designs and sampling.
- Conduct research work and formulating research synopsis and report.

Course Contents:

Introduction to research (in simple term and a scientific term), concept of research, why do need research,advantageandscopeofresearch,identificationofresearchneedsanditsqualities,Types ofresearch;Qualitative,Quantitativeandtheirsubtypes,ResearchprocessIntroduction (Deciding,formulatingresearchquestions,planning,conductofstudy,datacollection,processing andanalysis,Researchwritingandreporting),Literaturereview(What,why,wherefrom,how andqualitiesofgoodliteratureanditsuse),Writingaresearchproblem/questionandselectionof thetitleofstudy,Identificationofvariousresearchvariables,Hypothesisitstypes,formulation andtestingofhypothesis,Researchstudydesignsusedinqualitativeandquantitativestudies, Designingofdatacollectiontools/questionnaires,Selectionofappropriatesamplingtechniquein variousstudydesigns,Conceptofvalidityandreliability,Researchproposalwriting,Ethical principlesofResearchandtheirexamplestoapplythoseprinciples,Datacollectionand processing/displayingtechniques,Writingofresearchreport(Chaptersinresearchreport/thesis, Outline/Abstract ofresearch, Referencing and Bibliography0

PracticalWork:

- LiteratureSearch
- Surveyconduct
- CitationandReferencing
- Proposalwriting
- Datacollectionanddisplaying

Recommended Books:

- Research Methodologyby Ranjit Kumar3rdEdition
- Foundation of Clinical ResearchbyPortneyLGWalkaisMPin1993,Publisherby Appleton and lauge USA
- AguidetoResearchMethodology,BiostatisticsandMedicalwritingbycollegeof physicians and surgeons Pakistan byWHO collaboration center

- Health system research project by Corlien MVarkerisser, IndraPathmanathan,Ann Brownlee in 1993 by InternationalDevelopmentResearchCenterinNewDehli, Singapore.

CAR-617 PREVENTIVECARDIOLOGY CreditHours:3(2+1)

Course objectives:

Fundamental understanding of atherosclerotic vascular disease risk assessment, screening, diagnosis, and management; cardiovascular risk reduction strategies; and management of cardiovascular risk factors.

Course Contents:

Thevascularbiologyof atherosclerosis,riskmarkersandprimarypreventionofcardiovasculardisease, systemichypertension,lipo-proteindisordersandcardiovasculardisease,nutritionandcardiovascular andmetabolicdiseases,obesityandcardio-metabolicdisease,,diabetesandcardiovascularsystem,air pollutionandcardiovasculardisease,exerciseandsportscardiology,Exercise-based,comprehensive cardiac rehabilitation, integrative approaches to the management of patients with heart disease.

Practical:

- BMI measurement
- BPmeasurement
- Lipid profile and Blood glucose measurement
- Treadmillexercise by Bruce protocol

Recommended Books:

- BraunwaldsHeartDisease:AtextbookofCardiovascularmedicine11thEditionbyZipes,Libby,Bonow,Manna ndTomaselli

PMS-623 EPIDEMIOLOGY CreditHours: 3(2+1)

Course objectives:

- After studying this course the students will beable to:
- Explain epidemiologicalterminologies
- Apply the knowledge to calculate disease risk, prevalence andincidence
- Select and choose an appropriate study design in research
- Explain confounding and Biases in studies
- Appraise SWOTanalysis

Course Contents:

IntroductiontoEpidemiologyandbasictermsusedinEpidemiology,MeasuresofDisease Occurrence;IncidenceandPrevalence,Incidence,Ratesanditstypes,Dynamicsofdisease transmission,Measurementofdiseasefrequency,risk, rateandproportion,Calculationof: Prevalence,Incidence,Duration,MortalityandMorbidity,StudyDesignOptions,Researchstudy Designs,CaseControlStudy,CohortStudy,ExperimentalStudy,RCT,Meta-analysisand systematicreview,TheCross-SectionalStudy,Case-Reports,SourcesofError;Confoundingand Biases, Odds ratio and relativerisk, SWOTanalysis, Reliability of tests by using Sensitivityand specificity

PracticalWork:

- Calculation of Sensitivity and specificity
- Calculation of Incidence and prevalence
- Finding risk of disease, rate and frequency
- SWOTanalysis

Recommended Books:

- An_Introduction_to_Epidemiology_for_Health_Professionals
- EpidemiologybyLeonGordis5th Edition

PMS-622 BIOSTATISTICS CreditHours: 3(2+1)

Course objectives:

After successful completion of this course, students will be able to,

- State the principal concepts about biostatistics; collect data relating to variable/variables.
- Examine and calculate descriptive statistics from collected data.
- Interpret data via binomial distribution and the concept of sampling.
- Apply hypothesis testing via some of the statistical distributions.

Course Contents:

IntroductiontoBiostatisticsanditstypes;Descriptiveandinferentialstatistics,Measureofcentral tendency,Measureofdispersion,Statisticaldata,PresentationofDatabyGraphs,Dataandits types,Datacollectiontools,DataanalysistoolsHealthRelatedData,Presentationofquantitative data**,**Theconceptofsampling,typesandmethodsofsample,sampledistribution,errorof sampling,Variableanditstypes,Testsusedinbiostatisticstheiruseandinterpretation(t-tests, Chi-squareANOVA,Regressionandcorrelation)Hypothesisformulationandtestingonthebasis ofstatisticsandstatisticaltests,Sampleandpopulation,Basicconsiderationsinsampling,random sampling,stratifiedrandomsampling,clustersampling,systematicsampling,determinationof samplesize,eliminationofsamplingbias**,**twotypesoferrors,acceptanceandrejectionRegions, Towsidedandonesidedtests,generalstepsinhypothesistesting,testaboutmeans,confidence interval for mean, Preparing dataanalysis by various software, Use of SPSS

PracticalWork:

- Manual calculation related to measure of central tendency andmeasure of Dispersion
- Defining variables in SPSS
- Entry of data in SPSS
- Analysis of data in SPSS

Recommended Books:

- Aquide to research methodology, biostatistics and medical writing by college of physicians and surgeons Pakistan byWHO collaboration center
- Reading understandingmultivanant statisticsgiimm LGYardAD PR, publisherAmerican Psychological association
- IlyasAnsari's community medicine (Text Book) by Ilyas andAnsari 2003 published by Medical division Urdu Bazzar Karachi

8thSemester

Research Project

Seminar

BIOETHICS

Subject of own interest

- **Adult Echocardiography**
- **Pediatrics Echocardiography**
- **Electrophysiology**
- **Interventional Cardiology**
- **Electrocardiography**
- **Medical Physics**
- **Preventive Cardiology**

PMS-626 RESEARCHPROJECT CreditHours:6

CourseObjectives:

- The student will learn some basic research methodology, gain knowledge of the specific area of radiology being researched and have the opportunity for more extensive one-on-one interaction with a member of the radiological staff. It will hopefully result in some form of presentation or publication for the student. This is most suitable for students planning to enter radiology as a career.

CourseContents:

Duringlastyeareachstudentshouldselectatopicofresearchreportwithconsultationofhis/hersupervisorandshallprepareandsubmitresearchreporttoKhyberMedicalUniversitybytheendoflastyear.

Practicals:

Studentswillprepareacomprehensivereportontheirselectedresearchtopicandwillsubmithardcopytofollowing
:

- One Copy to Examination Department
- One Copy to the Library KMU
- One Copy to the Supervisor

PMS-627 SEMINAR Credit Hours: 1

Objective of the seminar:

Duringlastyeareachstudentshouldselectatopicofresearchworkwithconsultationofhis/hersupervisor and shall present his/her research workthrougha seminar.

PMS-625 BIOETHICS CreditHours2(2+0)

Course Objectives:

After successful completion of this course, students will be able to,

- Identify ethical issues in medicine, health care and life sciences.
- Describe rational justification for ethical decisions.
- Practice the ethical principles of the Universal Declaration on Bioethics and Human Rights.
- Recognize and distinguish an ethical issue from other issues.

Course Contents:

Introductiontobioethics,ethicalprinciples,autonomy,informedconsent,intentionalnon-disclosure, patientself-determinationact,thehealthinsuranceportabilityandaccountabilityactof1996(HIPAA) privacyandsecurityrules,non-maleficence,slipperyslopearguments,beneficence,paternalism,justice, socialjustice,thepatientprotectionandaffordablecareact,professionalpatientrelationship, unavoidable trust, human dignity , patient advocacy, moral suffering, ethical dilemmas.

Recommended Books:

IIntroductiontobioethicsandethicaldecisionmakingbyKarenL.Rich(chapter2)2015

CAR-619 SUBJECTOFOWN INTEREST Credit Hours:4(2+2)

Student will have to select one optional subject from the following subjects.

- **Echocardiography**
- **Electrophysiology**
- **Interventional Cardiology**
- **Electrocardiography**
- **Medical Physics**
- **Preventive Cardiology**
- **Pediatrics Echocardiography**