CURRICULUM FOR BS RENAL DIALYSIS TECHNOLOGY

INSTITUTE OF PARAMEDICAL SCIENCES (IPMS)

KHYBER MEDICAL UNIVERSITY PESHAWAR

Prepared By: YOUSAF KHAN

LECTURER (Renal Dialysis Technology) IPMS-KMU

Mission of BS Dialysis Program:

Mission of BS Dialysis program is to produce highly qualified, knowledgeable and skillful dialysis technologist by high qualified faculty, structured curriculum, video demonstration, clinical practice and advance dialysis setups to meet the future health care needs of the national and international level. Who will be contribute in the field of diagnosis, management, technical and teaching skills in health care institutes.

Objectives of BS Dialysis Program:

1. To demonstrate in-depth knowledge of basic and dialysis both in their fundamental context and their application in the health care institutes.
2. To equip the students with relevant Professional Knowledge, Skills and Ethical values
3. To train the students in the different dialysis setups in tertiary care hospital.
4. To incorporate and demonstrate positive attitude and behavior to all personals
5. To train the students with basic research skills to understand and conduct research
6. To equip students with English language, computer and communication skills

SPECIFIC LEARNING OUTCOMES OF BS RENAL DIALYSIS TECHNOLOGY:

Following competencies will be expected from a student completing 4 years degree course in Renal Dialysis Technology, the students will be able to

- Demonstrate Counseling of patient about procedure
- Analyze Inspects a patient's dialysis access
- Write document pre-dialysis vital signs, weight, and temperature
- Preparation of the dialyzer, reprocessing and delivery systems
- Equipment maintenance
- Skills to monitor and record a patient's vital signs during procedure
- Assessment of patients for any complications that occur during a procedure
- Prepare dialysate according to established procedures and the dialysis prescription
- Assembles and prepares the dialysis extracorporeal circuit according to protocol andDialysis prescription
- Tests monitor and machine functions, including alarms, conductivity and temperature
- Sets monitor and alarms according to unit
- Administer local anesthesia, inserts needles, and initiates dialysis according to patient prescription
- Administer anticoagulant according to prescription
- Measure and adjust blood flow rate according to prescription
- Calculate and adjust fluid removal rates according to prescription
- Monitor patients and equipment, responds to alarms, and readjust treatment parameters as patient requirements
- Change fluid removal rate and patient position, and administers replacement saline as directed by the dialysis technologist, physician order
- Respond appropriately to dialysis-related emergencies such as hypotensive episodes, needle displacement or infiltration, clotting episodes, blood leaks, air emboli, etc.
- Initiate cardiopulmonary resuscitation (CPR) in the event of a cardiac arrest
- Discontinue dialysis and establishes hemostasis following according to protocol. Inspects, cleans, and dresses access etc
- Obtain and record post-dialysis vital signs, temperature, and weight.
- Discard dialysis supplies and sanitizes equipment according to manufacturer protocol.

- Patient training for at-home dialysis treatment and techniques to provide emotional support patients need for self-care.
- Maintain professional conduct, good communication skills, and confidentiality in the careof patients.
- Collaborate with the Renal Dialysis Technologist in identifying and meeting patient education goals.

FRAME WORK FOR BS RENAL DIALYSIS TECHNOLOGY

(4 YEAR PROGRAMME)

- Total numbers of Credit hours — 133(HEC recommended: 124-136)
- Duration — 4 years
- Semester duration — 16-18 weeks
- Semesters — 8
- Course Load per Semester — 15-18 Credit hours
- Number of courses per semester — 4-6

SCHEME OF STUDIES FOR 4 YEAR BS RENAL DIALYSIS TECHNOLOGY

Semester/Year	Name of Subject	CODE	Credits
First	BIOCHEMISTRY-I	PMS-601	3+1
	HUMAN PHYSIOLOGY-I	PMS-602	3+1
	HUMAN ANATOMY-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	BIOCHEMISTRY-II	PMS-607	3+1
	HUMAN PHYSIOLOGY-II	PMS-608	3+1
	HUMAN ANATOMY-II	PMS-609	3+1
	ENGLISH-II	PMS-610	2+0
	ISLAMIC STUDIES	PMS-611	2+0
			16
Third	HAEMATOLOGY-I	MT-601	2+1
	GENERAL PATHOLOGY-I	PMS-612	2+1
	MEDICAL MICROBIOLOGY-I	PMS-613	2+1
	Communication Skill	PMS-615	1+1
	G. PHARMACOLOGY-I	PMS-614	2+1
	ANTOMY AND PHYSIOLOGY OF KIDNEY	RDT-601	2+1
			17
Fourth	HAEMATOLOGY-II	MT-604	2+1
	G. PHARMACOLOGY-II	PMS-616	2+1
	MEDICAL MICROBIOLOGY-II	PMS-618	2+1
	G. PATHOLOGY-II	PMS-617	2+1
	SPECIAL PATHOLOGY OF KIDNEY	RDT-602	2+1
	PRINCIPLE AND PROCEDUR OF DIALYSIS	RDT-603	2+1
			18
Fifth	SPECIAL PATHOLOGY OF KIDENY-II	RDT-604	2+1
	ACUTE COMPLICATION OF DAILYSIS	RDT-605	2+1
	SPECILIZED DIALYSIS	RDT-606	2+1

	PERITONEAL DIALYSIS	RDT-608	2+1
	LEADERSHIP AND MANAGMENT	ANS-610	2+1
	CHRONIC COMPLICATION OF DIALYSIS-I	RDT-607	2+1
			18
Sixth	CHRONIC COMPLICATION OF DIALYSIS-II	RDT-609	2+1
	DIALYSIS IN SPECIAL SITUATION	RDT-610	2+1
	COMPLICATION OF PERITONEA DIALYSIS	RDT-611	2+1
	DIALYSIS ADEQUACY	RDT-612	2+1
	UROLOGICAL PROCEDURE-I	RDT-613	2+1
	RENAL PHARMACOLOGY	RDT-614	2+1
			18
Seventh	INFECTION CONTROL IN DIALYSIS UNIT	RDT-615	1+1
	NUTRITION AND DIET THERAPY	RDT-616	2+1
	RESEARCH METHODOLOGY	PMS-621	2+1
	EPIDIMOLOGY	PMS-623	2+0
	BIO-STATISTIC	PMS-622	2+1
	UROLOGICAL PROCEDURE-II	RDT-617	2+1
			16
Eight	RESEARCH PROJECT/FINAL PROJECT	PMS-626	6+0
	SEMINAR	PMS-627	1
	RENAL EMERGENCY	RDT-618	2+1
	BIO ETHICS	PMS-625	2+0
			12
	TOTAL CREDIT HOURS		**133**

Total credit hours= 133

HEC recommendation=124-136

1st SEMESTER COURSES

- Biochemistry-I
- Human Physiology-I
- Human Anatomy-I
- PAK-Study
- English-I
- Computer Skill

PMS-601 BIOCHEMISTRY-ICredit Hrs: 4(3+1)

Course objectives:

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

Course contents:

Biochemical composition and functions of the cell membrane; Chemistry of signals and receptors; Structure andfunction of Carbohydrates, Proteins and lipids; biochemical functions of vitamins; biochemical function ofSodium, potassium, chloride, calcium, phosphorus, magnesium, sulfur, iodine and fluoride; Composition and function of saliva, gastric juice, gastric acid(HCL), pancreatic juice, bile and intestinal secretion; Digestion and absorption of proteins, carbohydrates, lipids, vitamins and minerals; Body buffers and their mechanism of action; Acid base regulation in human body; Biochemical mechanisms for control of water and electrolyte balance; Mechanism of action of hormones.

Practicals:

1. Good laboratory Practices
2. Preparation of Solutions
3. Principles of Biochemistry analyzers(spectrophotometer, flame photometer)
4. Determination of Cholesterol, Tg, HDL, LDL, sugar, calcium and phosphorus in blood
5. SOP of centrifuge, water bath and microscope

Recommended Books

- Harper's Biochemistry Robert K. Murray, Daryl K. Granner 28th edition 2009
- Medical Biochemistry Mushtaq Ahmad vol. I and II 8th edition 2013

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

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

Practicals:

1. Introduction to microscope
2. Bleeding time
3. Clotting time
4. WBCs count and RBCs count
6. Platelets count and Reticulocytes count

Recommended Books:

- Essentials of Medical Physiology K Sembulingam, 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, AllisonGrant 2010

PMS -603 HUMAN ANATOMY-I Credit Hrs:4(3+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 musculo skeleton.
- 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, Special Senses.

Practicals:

1. Study Axial and Appendicular skeleton on human skeletal model.
2. Study musculoskeletal system on human musculoskeletal model.
3. Study organs of special senses.
4. Study and understand anatomy of Thorax, Abdomen and Pelvis through:
5. Human Models
6. Video demonstration

Recommended Books:

- Ross and Wilson Anatomy and Physiology in helth and illness 11th Edition Waugh Grant.

- Clinical Anatomy (By regions) 9th edition, Richard S. Snell.

Reference books:

- Netter Atlas of human anatomy 5th Edition Saunders.
- Gray's Anatomy for students 2nd Edition Drake VogalMitcell

PMS-604 ENGLISH –I CreditHrs: 2(2+0)

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 431350 6.
- Reading. Advanced. Brian Tomlinson and Rod Ellis. Oxford Supplementary Skills. Third Impression 1991. ISBN 0 19 453403 0.

PMS -605Pak Studies (Compulsory)Credit Hrs: 2(2+0)

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 andposing challenges to Pakistan.

Course Contents:

Historical Perspective: Ideological rationale with special reference to Sir Syed Ahmed Khan, AllamaMuhammad Iqbal and Quaid-i-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 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 ofHistorical and cultural Research, 1998.

PMS -606 COMPUTER SKILLS Credit Hrs: 2(1+1)

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 1st 2010

2nd SEMERTER COURSES

- Biochemistry-II
- Human Physiology-II
- Human Anatomy-II
- English-II
- Islamic Studies

PMS-607 BIOCHEMISTRY-II Credit Hrs: 4(3+1)

Course Objectives:

- To understand the metabolism of carbohydrates, lipids and proteins.
- To understand clinical role of enzymes in human being.
- To understand about the nutrition.

Course Contents:

Balance food, Major food groups, Nutritional status of Pakistani nation, Metabolic changes in starvation, Protein energy malnutrition, Regulation of food intake, Obesity; metabolism of carbohydrates (Citric Acid Cycle, Glycolysis, Pentose Phosphate Pathway), proteins (urea and corie cycle), nucleotides (uric acid formation) and lipids (beta oxidation); Respiratory chain and oxidative phosphorylation, components of respiratory chain, electron carriers, ATP synthesis coupled with electron flow, phosphorylation of ADP coupled to electron transfer; clinical diagnostic enzymology: clinical significance of ALT, AST, ALP, LDH, CK, CKMB, Pancreatic lipase
and amylase, cholinesterase, G6PD, GGT.

Practicals:

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

Recommended Books:

- Harper's Biochemistry Robert K. Murray, Daryl K. Granner 28th edition 2009
- Medical Biochemistry Mushtaq Ahmad vol. I and II 8th edition 2013

PMS-608HUMAN PHYSIOLOGY-IICredit Hrs: 4(3+1)

Course Objectives:

- To understand the basic concepts of physiology beginning from the organization of the systems to theirrole 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,haematopoisis, 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.

Practicals

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

Recommended Books

- Essentials of Medical Physiology K Sembulingam, PremaSembulingam Sixth Edition 2013

- Guyton And Hall Textbook Of Medical Physiology John E. Hall, Arthur C. Guyton Professor and Chair 2006

PMS -609HUMAN ANATOMY-IICredit Hrs: 4(3+1)

Course Objectives:

- To understand the basic concepts of anatomy beginning from the cell organization to organ systemfunction
- 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.

Practicals:

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

1. Human Models
2. Video demonstration
3. Study radiographs of upper and lower limb.

Recommended Books:

Essential books (text books)

- Ross and Wilson Anatomy and Physiology in health and illness 11th Edition Waugh Grant.
- Clinical Anatomy (By regions) 9th edition, Richard S. Snell.

Reference books

- Netter Atlas of human anatomy 5th Edition Saunders.
- Gray's Anatomy for students 2nd Edition Drake VogalMitcell.
- BD. Churasia Human Anatomy (All regions)

PMS -610ENGLISH –II CreditHrs: 2(2+0)

Course Objectives:

- To enhance students writing, reading and listening skills.
- To enhance language skills and develop critical thinking.

Course contents:

Writing Skill: CV and job application, Technical Report writing, Writing styles, Changing narration: Converting a dialogue into a report, Converting a story into a news report, Converting a graph or picture into ashort report or story, Active and Passive voice, Letter / memo writing and minutes of the meeting, use of library and internet recourses, Essay writing, Phrases - Types and functions, Clauses - Types and functions, Punctuation: Tenses - Types, Structure, Function, Conversion into negative and interrogative. Speaking Skill: Group Discussion (Various topics given by the teacher), Presentation by the students (individually), Role Play Activities for improving Speaking. Listening Skill: Listening Various Documentaries, Movies, and online listening activities to improve the listening as well as pronunciation of the words.

Recommended Books:

- Practical English Grammar by A.J. Thomson and A.V. Martinet. Exercises 2. Third edition. OxfordUniversity Press 1986. ISBN 0 19 431350 6.
- Practical English Grammar by A.J. Thomson and A.V. Martinet. Exercises 1. Third edition. Oxford University Press. 1997. ISBN 0194313492.
- Practical English Grammar by A.J. Thomson and A.V. Martinet. Exercises 2. Third edition. Oxford University Press. 1997. ISBN 0194313506
- Intermediate by Marie-Christine Boutin, Suzanne Brinand and Francoise Grellet. OxfordSupplementary Skills. Fourth Impression 1993. ISBN 0 19 435405 7 Pages 20-27 and 35-41.
- Reading. Upper Intermediate. Brain Tomlinson and Rod Ellis. Oxford Supplementary Skills. ThirdImpression 1992. ISBN 0 19 453402 2.

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

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 religiouslife**.**

Course Content:

Fundamental beliefs of Islam, Belief of Tawheed, Belief in Prophet hood, Belief in the Day of Judgment, Worships, Salaat / Prayer, Zakat /Obligatory Charity, Saum / 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

3rd SAMESTER COURSE

- Hematology-I
- General Pathology-I
- Medical Microbiology-I
- General Pharmacology-I
- Communication Skills
- Anatomy and Physiology ofkidney

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

Course Objectives:

- To introduce the students about the basic concepts in Hematology and acquire skill in practical workto 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 and preparation and staining of peripheral blood smear
2. total leucocyte count, RBC count and determination of absolute values

3. differential leucocyte count; platelets count and reticulocytes count and to determine the ESR
4. 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

PMS-612GENERAL PATHOLOGY-ICredit Hrs: 3(2+1)

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, compensatorymechanism of shock, possible consequences of thrombosis & difference between arterial & venousemboli, Neoplasia, Dysplasia, benign and malignant neoplasms, metastasis

Practicals:

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

PMS-613MEDICAL MICROBIOLOGY-I Credit Hrs: 3(2+1)

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 stains 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., 3rd ed. MedMaster,2004.
- Medical Microbiology and Infection at a Glance. Gillespie, S., H., Bamford, K., B., 4th 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 HillProfessional, 2008.
- Jawetz, Melnick, &Adelberg's Medical Microbiology. Brooks, G., Carroll, K., C., Butel, J., &Morse, S., 26th ed. McGraw-Hill Medical, 2012.

PMS-615Communication Skill Credit Hrs :2(1+1)

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 ofacademic writing
- Use various computer-mediated communication platforms in their academic and professionalwork
- Relate to the interpersonal and organizational dynamics that affect effective communication inorganizations.

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. OxfordUniversity Press 1986. ISBN 0 19 431350 6.
- Practical English Grammar by A.J. Thomson and A.V. Martinet. Exercises 1. Third edition. OxfordUniversity Press. 1997. ISBN 0194313492.
- Practical English Grammar by A.J. Thomson and A.V. Martinet. Exercises 2. Third edition. OxfordUniversity Press. 1997. ISBN 0194313506

- Intermediate by Marie-Christine Boutin, Suzanne Brinand and Francoise Grellet. OxfordSupplementary Skills. Fourth Impression 1993. ISBN 0 19 435405 7 Pages 20-27 and 35-41.
- Reading. Upper Intermediate. Brain Tomlinson and Rod Ellis. Oxford Supplementary Skills. ThirdImpression 1992. ISBN 0 19 453402 2.

PMS-614G. Pharmacology-I Credit Hrs: 3(2+1)

Course Objectives:

- To discuss the roles and responsibilities of the various members of the health care team in maintainingpatient 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.

Practicals:

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 8th Edition, Published byAppleton.dec 2007.

RDT-601Anatomy and Physiology of Kidney Credit Hrs: 3(2+1)

Course Objective:

At the end of this of course student will be able

- To Identify different function of kidney
- To Describe mechanism of urine formation
- To Analyze regulation of blood chemistry through kidney

Course Contents:

Introduction, anatomy of urinary system, function of kidney, endocrine function ok kidney, regulation of blood pressure, Different layers of kidney, Renal corpuscle, tubular portion of nephron, passage of urine, structure of juxtaglomerular apparatus, function of juxtaglomerular apparatus, Regulation of Glomerular blood flow and glomerular filtration, Renal blood vessels, measurement of renal blood flow, regulation of renal blood flow, special feature of renal circulation, urine formation, glomerular filtration rate, filtration fraction, tubular reabsorption, mechanism of reabsorption, route of reabsorption, site of reabsorption, tubular secretion, concentration medullary gradient, countercurrent mechanism multiplier, countercurrent mechanism exchanger, role of ADH, acidification of urine and role of kidney in acid base balance, Properties and composition of normal urine, Renal Function tests, Examination of blood and urine renal function tests.

Practical:

1. Identification of various parts of kidney structure
2. Microscopic and Structural examination of human kidney
3. Ultra sound examination of kidney
4. Laboratory analysis of blood and urine specimen of nephrology patient

Recommended Books:

- Essentials of Medical Physiology K Sembulingam, PremaSembulingam Sixth Edition 2013

- Guyton And Hall Textbook Of Medical Physiology John E. Hall, Arthur C. Guyton Professor and Chair 2006

4th Semester Courses

- Hematology-II
- General Pharmacology-II
- Medical Microbiology-II
- General Pathology-II
- Special Pathology of Kidney-I
- Principle and Procedure of Dialysis

MLT-604 HAEMATOLOGY-II Credit Hrs: 4(2+1)

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 Sidroblastic anemia, etiology and diagnosis, folat 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, ked blood group system, duffy blood 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 and its importance, blood grouping and its importance, coomb,s 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

PMS-616PHARMACOLOGY-IICredit Hrs: 3(2+1)

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 arrhythemicdrugs, antianginal drugs, Anti Hyperlipidemic drugs, Blood drugs, Diuretics, Insulin and glucose lowering drugs, Chemotheraputic drugs, Antibiotics, Drugs acting on Respiratory 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

Recommended Books:

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

PMS-618MDICAL MICROBIOLOGY-II Credit Hrs: 3(2+1)

Course objectives:

- To introduce the students with basic concepts in virology 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, control of hospital infection, biomedical waste management, introduction to virology, Viral morphology, structure, replication and classification, general properties of virus, pathogenesis and control of virus, common viral pathogen prevailing in Pakistan, introduction to parasitology, Parasite (protozoan and helminthes) morphology and classification, general principal of pathogenesis, immunology and diagnosis of parasitic infection, common parasitic pathogen prevailing in Pakistan.

Practical:

1. Cleaning of new and used glass wares for microbiological purposes.
2. Students should be familiar to use autoclave, hot air oven, water bath, steamer etc.
3. Macroscopic and microscopic examination of stool for adult worms, ova, cysts, larvae.
4. Visit to hospital for demonstration of biomedical waste management.
5. Demonstration of common serological tests used for the diagnosis of viral and parasitic infection.
6. Demonstration of malarial parasites in blood and bone marrow.
7. Demonstration of leishmania in blood film.
8. Concentration techniques for intestinal parasites in stool.

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., 3rd ed. MedMaster, 2004.

- Medical Microbiology and Infection at a Glance. Gillespie, S., H., Bamford, K., B., 4th ed. Wiley- Blackwell, 2012.
- Medical Microbiology, Kayser, F., H., &Bienz, K., A., Thieme, 2005.

PMS-617G. PATHOLOGY-II Credit Hrs : 3(2+1)

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, 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

Practicals:

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

RDT-602 SPECIAL PATHOLOGY OF KIDNEY-I Credit Hrs :3(2+1)

Course objective:

At the end of this course student will be able

- To categorize different renal disease
- To analyzeclinical diagnosis of different renal disease.
- To describe Pathological causes of different renal disease.
- To explain pathological mechanism of different renal disease.

Course content:

Clinical Manifestation of renal disease, Imaging techniques for kidney, Polyuria, proteinuria, Hematuria, urinary retention, AKI, CKD, glomerular disease, the nephrotic syndrome, the nephritic syndrome, Minimal change glomerular disease, Membranous glomerulonephritis, Membranoproliferative glomerulonephritis, IgA nephropathy, RPGN, Good Pasture syndrome, FSGN, FSGS, SLE, Diabetic nephropathy, Amyloidosis, Malarial Nephropathy, Rheumatoid arthritis, Analgesic Nephropathy,

Practical:

1. Examination of microscopic section of kidney in laboratory
2. Ultrasound examination of kidney
3. Identification of kidney in abdomen X-ray
4. Examination of kidney disease specimen
5. Laboratory analysis of stool and urine specimen of nephrology patient
6. Visit of nephrology patients (Inpatients and outpatients)

Recommended Books:

- Robbins Basic Pathology by Kumar, Abbas and Aster; 9th edition
- Fandamental of Renal Pathology, Arthur H. Cohen, Robert B. Calvin, J. Charles, Jennette, Chartes E. Alphers, 2nd Edition
- Medical diagnosis and management, Inam Danish

RDT-603 PRINCIPLE AND PROCEDURE OF DIALYSIS Cr Hrs 3(2+1)

Course objectives:

At the end of this course student will be able

- To describe principle of dialysis
- To categorize different procedure of dialysis
- To demonstrate mechanism of ultrafiltration
- To recognize machine key feature
- To describe water composition

Course Content:

History and theory of Dialysis, Principles of Hemodialysis, Factor Affecting Solute Clearance on Hemodialysis, Ultrafiltration Process during Hemodialysis, High efficiency and High Flux Hemodialysis, Dialyzer Technical Specification, Dialyzer membrane and Dialyzer types, Dialysis Machine key Feature, facilities, machine monitor and patient monitor, Water purification, dialysate solution and composition, vascular access, formation of vascular access, vascular complication, Hemodialysis procedure, order and pre – post dialysis assessment, needle placement, Prescription for 1st dialysis session for CKD, Anticoagulation

Practical:

1. Identification of parts of dialysis machine
2. Setup blood line and dialyzer on machine
3. Pre and post assessment of dialysis patient
4. Visit to water treatment plant of dialysis unit

Recommended Book:

- Handbook of dialysis, John T. Daulrdas, Peter G. Black, Todd, 5th edition
- Oxford Handbook of dialysis, Jeremy Levy, Edwina Brown, Christin Daley and Anastasia Lawrence,

- Fluid, Electrolyte and acid base Physiology, Halperin, Goldstain and Kamal, 4th Edition

5TH SAMESTER COURSE

- Special Pathology of kidney-II
- Acute complication of Dialysis
- Specialized Dialysis
- Chronic complication of dialysis-I
- Peritoneal Dialysis
- Leadarship and Management

RDT-609 SPECIAL PATHOLOGY OF KIDNEY-IICr Hrs :3(2+1)

Course Objectives:

At the end of this course student will be able

- To describe different stages of kidney failure
- To describe Pathological causes of kidney failure
- To analyze variation of Blood composition due to renal failure

Course Content:

Acute Interstitial Nephritis, Chronic interstitial Nephritis, Acute tubular necrosis, Toxic acute tubular necrosis, Ischemic acute tubular necrosis, Renal Tubular acidosis, Renal Tuberculosis, Renovascular Hypertension, Renal Osteodystrophy, Electrolyte disorder, Urinary Tract infection, Pyelonephritis, Prostatitis, urinary tract obstruction, kidney failure due to GI problem, Renal Cell carcinoma, Sickle cell nephropathy

Practical's:

1. Ultra sound examination of kidney
2. Clinical examination of renal failure patient
3. Priming of blood tube lining, dialyzer and dialysis machine
4. Laboratory analysis of renal failure patient
5. Dialyzing patient with acute renal failure

Recommended Book:

- Oxford Handbook of dialysis, Jeremy Levy, Edwina Brown, Christin Daley and Anastasia Lawrence, 4th Edition
- The Essentials Renal Pathophysiology, Helmur G. Rennke, Bradley M. Denker,3rd Edition
- Fandamental of Renal Pathology, Arthur H. Cohen, Robert B. Calvin, J. Charles, Jennette, Chartes E. Alphers, 2nd edition
- Oxford Desk Reference Nephrology, Jonatan Barratt, Kevin Harris, Peter Topham

RDT-606 Specialized Dialysis Credit Hours: 3(2+1)

Course objectives:

At the of this course student will be able

- To interpret hemodialysis and CRRT
- To operate CRRT Machine
- To identify different type of CRRT

Course Content:

Continuous Hemodialysis, continuous hemofiltration, continuous heamodifiltration, slow continuous ultrafiltration, sustained low efficiency dialysis, clinical indication, difference among C-HD, C-HF and C-HDF in clearance of small and large molecule weight solute. Vascular access for Specialized dialysis, CRRT filter, dialysis and replacement solution, prescribing and delivering of CRRT, equipment, setting the ultrafiltration rate, anticoagulation, hemodiafiltration versus hemofiltration, indication for plasmapheresis, plasmapheresis, principle of treatment, Pharmacokinetics of immnuoglobuline, technical consideration, vascular access, anticoagulation, replacement of solution, Use of dialysis and hemoperfusion in treatment of poisoning, dialysis and hemoperfusion, indication, choice of therapy, importance of volume distribution, technical point, Complication of fluid management in CRRT, Problem of solute removal in CRRT .

Practical:

1. Setup of extra corporeal circuit of CRRT
2. Priming of CRRT circuit
3. Operating of CRRT machine
4. Assessment of patient in intensive care unite

Recommended Book:

- Oxford Handbook of dialysis, Jeremy Levy, Edwina Brown, Christin Daley and Anastasia Lawrence

- Handbook of dialysis, John T. Daulrdas, Peter G. Black, Todd, 5th edition
- Oxford Handbook of Nephrology and hypertension, Simon Steddon, Neil Ashman, Alistair Chesser, John Cunnigham, 2nd edition

RDT-605 ACUTE COMPLICATION OF DIALYSIS C.H: 3(2+1)

Course Objectives:

At the end of this course student will be able

- To interpret assessment and management of different complication during dialysis
- To describe how prevent of different complication during dialysis

Course Content:

Acute complication of dialysis, hypotension, (Intradialytic), Management of hypotension, Prevention of hypotension, Prevention of Hypotension Blood volume monitoring, Muscle Cramp, Causes of Muscle Cramp, Management of Muscle Cramp, Prevention of Muscle Cramps, Nausea and Vomiting, causes of Nausea and Vomiting, management of Nausea and Vomiting , Prevention, Headache, Causes, Management, prevention, Chest pain and Back pain, causes, management, prevention , Disequilibrium Syndrome, causes, management, prevention, Dialyzer Reaction , causes, types, management prevention Seizures, causes, management , prevention, Hemolysis, causes, management, prevention , Fever and Chills, causes, management, Air Embolism, causes, management, prevention, Arrhythmia, causes, management, prevention.

Practicals:

1. Pre and post assessment of dialysis patient
2. Connecting via central line or A.V fistula
3. Intra dialytic assessment and monitoring
4. Changing setting during dialysis
5. Terminating dialysis
6. Response to emergency situation during dialysis

Recommended Book:

- Handbook of dialysis, John T. Daulrdas, Peter G. Black, Todd, 5th edition

- Oxford Handbook of dialysis, Jeremy Levy, Edwina Brown, Christin Daley and Anastasia Lawrence,
- Fluid, Electrolyte and acid base Physiology, Halperin, Goldstain and Kamal, 4th Edition

RDT-607 CHRONIC COMPLICATION OF DIALYSIS-I CH: 3(2+1)

Course Objectives:

At the of this the student will be able

- To describe chronic complication of hemodialysis
- To demonstrate therapy of chronic complication of dialysis patient
- To describe how prevention of communicable disease

Course Content:

Psychosocial Issue in End Stage renal disease, Hypertension, Hematological Abnormalities, Definition of Anemia, Consequence of Anemia, Treatment, ESA Therapy, Blood and blood product transfusion reaction, Hemolysis, coagulation problem in dialysis patient, Immune dysfunction in hemodialysis, infectious problem in dialysis patients, bacterial infection, viral infection and fungal infection, Endocrine disturbances, Bone disease, Pathophysiology, management Bone Disease, Dermatological problems in dialysis patients, Acid base problems in hemodialysis patients.

Practicals:

1. Basic diagnostic method in hematology
2. Clinical management of different complication during dialysis
3. Method of prevention to communicable disease
4. Visit of nephrology ward

Recommended Book:

- Fandamental of Renal Pathology, Arthur H. Cohen, Robert B. Calvin, J. Charles, Jennette, Chartes E. Alphers, 2nd edition

- Oxford Handbook of Nephrology and hypertension, Simon Steddon, Neil Ashman, Alistair Chesser, John Cunnigham, 2nd edition
- Oxford Handbook of Nephrology and hypertension, Simon Steddon, Neil Ashman, Alistair Chesser, John Cunnigham, 2nd edition

RDT-608 PERITONEAL DIALYSIS Credit Hrs: 3(2+1)

Couse Objectives:

At the end of this course student will be able

- To describe principle of peritoneal dialysis
- To demonstrate insertion and conformation of peritoneal catheter
- To describe peritoneal membrane complication

Course Content:

Peritoneal Dialysis, anatomy of peritoneal membrane, function of peritoneal membrane, physiology of peritoneal transport, clinical assessment and implication of peritoneal transport, principle of peritoneal dialysis, factor effecting efficiency of peritoneal dialysis, effect of dwell time of solute and fluid transfer, Apparatus for peritoneal dialysis, CAPD, automated peritoneal dialysis, hybrid regimens, peritoneal access device, acute versus chronic catheter, types of chronic catheter, placement procedure, catheter break in procedure, complication of peritoneal catheter, care of peritoneal catheter, acute peritoneal dialysis prescription, introduction, peritoneal catheter, use of automated cyclers, prescribing acute peritoneal dialysis, monitoring clearance, complication, Adequacy of peritoneal dialysis and chronic peritoneal dialysis prescription, choice of PD treatment modality, choice of prescription, nutritional issues in peritoneal dialysis, volume status and fluid overload in peritoneal. Peritoneal dialysate: assessment of fluid status, mechanism of fluid overload, diagnosis of ultrafiltration, management of fluid overload, glucose sparing strategies, hypertension and hypotension in peritoneal dialysis.

Practical:

1. Tubing of peritoneal dialysis on dialysis
2. Operating of peritoneal dialysis
3. Laboratory analysis of peritoneal dialysis patient
4. Adequacy of peritoneal dialysis

Recommended Book:

- Oxford Handbook of dialysis, Jeremy Levy, Edwina Brown, Christin Daley and Anastasia Lawrence
- Textbook of Peritoneal Dialysis, Nolph and Gokal's, 3rd Edition
- Peritoneal Dialysis: A Clinical Update, Claudio Ronco, Roberto Dell'Aquila, Maria Pia Rodighiero

ANS-610 LEADERSHIP AND MANAGEMENT Credit Hrs: (2+0)

Couse 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 modle,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, comitte organization, motivation and their thoeise, motivational technique, commutation, Controlling:span of controle, factor limiting effective control, super management, general manger, middle manger, supervior, planning and controlling relationship, management control process. budget, principles and technique of co-ordination, personal management, staffing and work distribution technique, recuretment and selection process, complaints and grievances, termination of employee, health and safety of employee, finalincal 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,.4th edition.
- How To Win Friends & Influnce.Kouzes,.M,.james,. &Posner,.Z,.barry,. 5th edition.

6th Semester course

- Chronic complication of dialysis-II
- Dialysis in Special Situation
- Complication of Peritoneal Dialysis
- Dialysis Adequacy
- Urological Procedure-I
- Renal Pharmacology

RDT-609 Chronic complication of dialysis-II CreditHrs: 3(2+1)

Course Objectives:

At the of this the student will be able

- To describe chronic complication of hemodialysis
- To demonstrate therapy of chronic complication of dialysis patient
- To describe how prevention of communicable disease

Course Content:

Cardiovascular Disease, Traditional risk factor, NonTraditional Risk factor, Ischemic Heart Disease, Valvular disease, Valvular Calcification and Stenosis, Arrhythmia, Cardiac Arrest, and Sudden Cardiac Death, Pulmonary problem in Hemodialysis patients, Gastrointestinal complication in the Hemodialysis patients, Ascites, liver disease, Pancreatitis, urogenital system complication in dialysis patients, ocular complication in dialysis patient, Musculoskeletal and Rheumatic disease, Neurological complication in dialysis patient, Nutritional complication in chronic hemodialysis, dialysis in infants and children

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Practicals:

5. Basic diagnostic method in hematology
6. Clinical management of different complication during dialysis
7. Method of prevention to communicable disease
8. Visit of nephrology ward

Recommended Book:

- Fandamental of Renal Pathology, Arthur H. Cohen, Robert B. Calvin, J. Charles, Jennette, Chartes E. Alphers, 2nd edition
- Oxford Handbook of Nephrology and hypertension, Simon Steddon, Neil Ashman, Alistair Chesser, John Cunnigham, 2nd edition
- Oxford Handbook of Nephrology and hypertension, Simon Steddon, Neil Ashman, Alistair Chesser, John Cunnigham, 2nd edition

RDT-610 DIALYSIS IN SPECIAL SITUATION Credit Hrs: 3(1+2)

Course Objectives:

At the end of this course student will be able

- To demonstrate how to manage with special complication of Dialysis Patient
- To illustrate techniques and principle of plasmapheresis

Course Content:

Dialysis in the elderly, Dialysis in the peads, complication of acute and chronic Dialysis in children, Managing Diabetic Patients on Dialysis, Problem for Diabetic Patients on Dialysis, Surgery in Dialysis Patient, Surgery in Dialysis Patient (HD and PD), Myeloma Renal Failure, Myeloma Renal failure Treatment , Pain management in ESRF, Difficulty of pain management in Renal patient, Analgesic drugs, Pregnancy in Dialysis patient, managing Pregnancy in dialysis patient, Dialysis with patient HIV, Plasmapheresis, Techniques of Plasmapheresis, Ancillary measure, Complication of Plasmapheresis, specific indication for Plasmapheresis, Immune Adsorption Techniques, Indication for Immune Adsorption, Complication during plasma exchange,

Practical:

1. Pre and post patient assessment
2. Verifying safety parameters of hemodialysis machine
3. Setting limits on Hemodialysis machine
4. Changing setting during dialysis
5. Response to emergency situation during dialysis

Recommended Book:

- Handbook of dialysis, John T. Daulrdas, Peter G. Black, Todd, 5th edition

- Oxford Handbook of dialysis, Jeremy Levy, Edwina Brown, Christin Daley and Anastasia Lawrence,
- Complication of dialysis, Norbortlameire, Ravinda L. Metha
- Oxford Desk Reference Nephrology, Jonatan Barratt, Kevin Harris, Peter Topham

RDT-611 COMPLICATION OF PERITONEAL DIALYSIS Cr H: 3(2+1)

Course Objectives:

At the of this course student will be able

- To analyze Laboratory analysis of blood and urine with dialysis patient
- To describe how to manage blood chemistry regulation through PD

Course Content:

Introduction, malfunctioning of catheters, investigation and management of malfunctioning catheters, constipation of peritoneal dialysis patient, repositioning peritoneal dialysis catheters, peritoneal dialysate problem with lactate/ dextrose, Peritonitis, incidence of peritonitis, pathogenesis, etiology, diagnosis, and treatment of initial management of peritonitis, exit site infection, mechanical complication of peritoneal dialysis, hernia formation, pathogenesis of hernia, etiology of hernia, investigation and treatment of hernia, abdominal wall and pericatheter leak, genital edema, respiratory complication, back pain, Metabolic complication of peritoneal dialysis, glucose absorption, lipid abnormalities, protein loss, hypernatremia and hyponatremia, hypokalemia and hyperkalemia, hypocalcemia and hypercalcemia, magnesium and vascular calcification, acidosis and alkalosis.

Practical:

1. Insertion of Peritoneal catheter
2. Management of peritoneal catheter
3. Preparation of peritoneal solution and operating different type of peritoneal dialysis

Recommended Book:

- Textbook of Peritoneal Dialysis, Nolph and Gokal's, 3rd Edition

- Peritoneal Dialysis: A Clinical Update, Claudio Ronco, Roberto Dell'Aquila, Maria Pia Rodighiero
- Oxford Handbook of dialysis, Jeremy Levy, Edwina Brown, Christin Daley and Anastasia Lawrence
- Handbook of dialysis, John T. Daulrdas, Peter G. Black, Todd, 5th edition

RDT-612 DIALYSIS ADEQUACY Credit Hrs: 3(2+1)

Course Objectives:

At the end of this course student will be able

- To interpret different method to calculate adequacy of dialysis
- To describe how to control dry weight of dialysis patient

Course Content:

Dialysis adequacy overview, dialysis adequacy solute clearance, urea kinetic modeling, calculation of Kt/V, other measures of solute clearance and online measure of clearance, residual renal function, other markers of adequacy, target for adequate dialysis kt/V and urea reduction ratio, increasing dialysis dose delivered, dialysis adequacy in acute renal failure, prescribing acute haemodialysis urea clearance, prescribing chronic heamodialysis dialyzer factor, laboratory test for patient on regular heamodialysis, dry weight, novel measure of dry weight, re-use of dialysers, re-use of dialyser technique, re-use of dialyser potential problems.

Practical:

1. Blood analysis to use for adequacy of dialysis
2. Measurement of residual renal function method
3. Dry weight
4. Labializing of dialyzer
5. Re-use of dialyzer technique

Recommended Book:

- Oxford Handbook of dialysis, Jeremy Levy, Edwina Brown, Christin Daley and Anastasia Lawrence
- Handbook of dialysis, John T. Daulrdas, Peter G. Black, Todd, 5th edition

RDT-613 UROLOGICAL PROCEUDRE-I Credit Hrs: 3(2+1)

Course objective:

- To provide knowledge and skills regarding urological procedures.
- To provide knowledge how to handle the kidney and ureter complication.
- To provide knowledge regarding kidney and upper urinary tract surgeries.

COURSE CONTENT

Anatomy and embryology of kidney and ureter , Congenital anomalies of kidney, Pelvic Kidney, horseshoe kidney, cross dystopia of kidney, renal ectopia, kidney calculus,hydronephrosis, Poly cystic kidney disease, Nephrolitothomy, Nepherectomy, partial Nephrectomy, Renal Tx surgery, Congenital anomalies of ureter, double ureter, megaureter, ureter calculus, Ureterolithotomy, pyelolithotomy, Pyeloplasty, Re-implantation of ureter, ESWL, Urodynamics, IVU

Practical's

- Visiting of urology ward
- Observation of urological procedure
- Assessment of urological procedure

Recommended Book:

- Nancy Marie Phillips, 11th edition. Berry Kohn's Operating Room Technique.

- Bailey and love's, 26th edition. Short practice of surgery.

RDT-614 RENAL PHARMACOLOGY C.H: 3(2+1)

Course Objectives:

At the end of this course student will be able

- To understand dose calculation for renal patients
- To understand drug induced kidney disease

Course Content:

Drug handling in renal failure, Dosing of commonly used drugs (antimicrobial, antifungal antituberculous, opioid analgesics, and cardiovascular). Drugs that do not require dosage alteration in renal failure. Drugs to be avoided in severe renal failure heamodialysis and PD. Dose adjustment and methods of dose adjustment in kidney patients. Drugs induced kidney diseases, mechanism and precautions. Pharmacokinetics alteration in kidney failure. Diuretics, antibacterials used for urinary tract infections. Bacterial resistance

Practical:

- Visit of nephrology ward and dialysis units
- Calculation of doses of some important drugs

Recommended Books:

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

7th SEMESTER COURSE

- Infection control in Dialysis Unit
- Nutrition and Diet Therapy
- Research Methodology
- Bio-statistic

- Epidemiology

RDT-615 INFECTION CONTROL IN DIALYSIS UNIT C.H: 3(2+1)

Course objectives:

- To introduce the students with basic concepts in infection control.
- To introduce the students with infection control principles and practices.
- To introduce the students with importance of immunization and hand hygiene in infection control.
- To introduce the students with the role of clinical practice in dialysis unit.

Course contents:

Introduction to infection control, principle of infection control, source and transmission of infection, infection prevention and control in HD and PD, Environmental cleaning and disinfection, Equipment cleaning and disinfection, Hand hygiene, Patient immunization and TB screening, Medication safety and injection practices, Patient and employ education, Pre surgical infection prevention, post surgical care, standard precautions, HBV isolation and precaution, Respiratory hygiene, transmission based precaution, vascular access infection prevention and control, sterilization, disinfection and antisepsis, practical disinfection, epidemiology of infectious disease, antimicrobial agents, antibiotic and their uses (prophylactic, empirical , and therapeutic), antibiotic resistance and policy.

Practical:

1. Demonstration of hand washing and hand rubbing technique.
2. Preparation of different disinfection and antiseptic solutions.
3. Demonstration of biomedical waste managements in hospitals.
4. Demonstration of cleaning and disinfection of working premises.
5. Demonstration of how to handle spills and aseptic handling.

6. Demonstration of standard precautions and PPE.

Recommended Books:

- Association for professional in infection control and epedemiology
- Fundamentals of Infection Prevention and Control: Theory and Practice.Weston, D.,Wiley-Blackwell, 2013.

RDT-616 NUTRITION AND DIET THERAPY CH:3(2+1)

Course Objectives:

At the end of this course student will be able

- To describe importance of diet for Renal dialysis patients
- To demonstrate which type of diet restricted for dialysis patient
- To discuss how to maintain body status of dialysis patient

Course Content:

Introduction to the study of nutrition, function of nutrition, food composition, relationship of nutrition and health, nutrition and their function, characteristic of good nutrition, malnutrition, cumulative effect of nutrition, nutrition assessment, digestion, absorption and metabolism of nutrition, carbohydrate , lipid, protein, minerals, vitamin and water, Principal of diet therapy and therapeutic nutrition, diet and weight control, overweight and underweight, diet and diabetes mellitus, diet and cardiovascular disease, diet and renal disease, diet and gastrointestinal problem, diet and cancer, diet and client with special needs, nutrition in fever and lung disease, dietary guideline, fluid requirement in renal failure and routes for nutritional support in acute renal failure.

Practicals:

1. Route of administration for diet use
2. Assessment of nutritional assessment
3. Laboratory analysis for dialysis patients

Recommended Books:

- Nutrition in kidney disease, Laura D.Byham Gray, JerrilynnD.Burrow 2nd edition
- Modern Nutrition in health and disease, Shils. FME & V R Young ,2nd Edition
- Nutrition and Diet therapy , Peggy S. Starfield , 3rd edition

PMS-622 BIO-STATISTIC Credit Hrs: 3(2+1)

Course Objectives:

To introduce the student with the significance of bio-statistics, statistics means basic concept, describing and exploring data, normal distribution, sapling 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 sensus, information collection during sensus, 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 neumerical data, application of statistics in social research, percentages, measure of central tendencies, means, Meidan, Mode, Quatile, 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 multivanant statistics giimm 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 Bazzar Karachi.

PMS-621 RESEARCH MATHODOLOGY Credit Hrs: 3(2+1):

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:

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

PMS-623 EPIDEMIOLOGY Credit Hrs: 2(1+1)

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

RDT-617 Urological Procedure-II C.H: 3(2+1)

Course objective:

- To provide knowledge regarding lower urinary tract complication.
- To enable dialysis technologist to know about lower urinary tract problem and how it's diagnoses.
- To provide knowledge and skills regarding different lower urinary tract surgeries and procedures.

Course outline:

Anatomy and Embryology of Bladder, Urethra, Prostate Gland, Testis and scrotum, Renal Neoplasm, Hypernephroma, Gravits tumor, ectopia vesicae, Retention of urine, vesicovaginal fistula, vesical calculus, Carcinoma of bladder, hypospadias, injuries of urethra, urethral stricture, phimosis, maldescent testis, torsion of testis, epididymo-orchitis, hydrocele, hematocele, cyste connected with epididymis, malignant neoplasm of testis, BPH, TURP, TURBT, TVP, Cystectomy, Lithotripsy, Litholopexy, Suprapubic cystostomy, Prostectomy, PCNL PCN, , Retrograde pyelography, Antigrade pyelography.

Practical's:

- Visiting of urology ward
- Observation of urological procedure

- Assessment of urological procedure

Recommended Book:

- Nancy Marie Phillips, 11th edition. Berry Kohn's Operating Room Technique.
- Bailey and love's, 26th edition. Short practice of surgery.

8th Semester Course

- Research Project
- Seminar

- Renal Emergency
- Bio Ethics

PMS-626 RESEARCH PROJECT Credit Hrs: 6(0+6)

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.

PMS-627 SEMINAR Credit Hours:1(1+0)

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.

RDT-618 RENAL EMERGENCY Credit Hrs 3(2+1)

Course Objectives:

At the end of this course student will be able

- To describe causes of death during dialysis
- To demonstrate how to prevent of causes of death during dialysis
- To discuss how to manage dialysis patient in emergency
- To describe complication of dialysis

Course Content:

Pulmonary edema, Pneumothorax, hemo thorax, pericardial effusion, Hyperkalemia, metabolic and respiratory acidosis, Respiratory and metabolic alkalosis, Electrolyte disturbance in dialysis patient, blood transfusion reaction in dialysis patient, causes of AVF burst and management, hypertension during dialysis, Air embolism, arrhythmia, hemolysis,BLS,Causes of death in patient in dialysis, cardiac arrest during dialysis, management of cardiac arrest during dialysis, end of life issue, palliative care, palliative care management of symptoms, withdrawal of dialysis, withdrawal of dialysis case histories, withdrawal of dialysis discussion of cases, withdrawal of dialysis final case history.

Practical:

1. Visit of ICU and Critical care unit
2. Performing CPR
3. Operating of ventilator machine
4. Uses of defibrillator

Recommended Books:

- Oxford Handbook of dialysis, Jeremy Levy, Edwina Brown, Christin Daley and Anastasia Lawrence
- Handbook of dialysis, John T. Daulrdas, Peter G. Black, Todd, 5th edition

PMS-625 BIO ETHICS Credit Hrs:2 (2+0)

Course Objectives:

- Use the approach of ethical principle the safety and benefits of the patients.
- Analyze bioethical issue in practice.

Course Content:

Introduction bioethics, Ethical principle, autonomy, informed consent, intentional nondisclosure, patient self determination act, the health insurance portability and Acountability act of 1996 (HIPAA) privacy and security rules, non-maleficence, slipery,slope arguments, beneficence, paternalism, justice, social justice, the patient protection and affordable care act, professional patient relationship, 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