

POSTGRADUATE COURSES

FOR

MPhil leading to PhD

IN

BASIC MEDICAL SCIENCES



AT



**KHYBER MEDICAL UNIVERSITY
PESHAWAR
2010**

VISION STATEMENT

IBMS will be the major hub of international quality academic and research activities in the field of basic medical sciences.

MISSION

To develop the academic faculty, flourish research and technology to international standards to benefit medical institutions and industry which ultimately will help in the economic growth of the nation.

OBJECTIVES AND FUNCTIONS OF IBMS

1. To expedite the academic growth and development in undergraduate medical education by providing properly qualified and trained basic sciences teachers.
2. To institutionalize research by producing more PhDs, particularly in the emerging fields of basic medical sciences like immunology and molecular biology.
3. To develop linkages with leading institutions nationally and internationally for collaboration and exposure of local research scholars.
4. To keep academicians updated, short refresher courses will be run to disseminate latest academic and research advancement in the field of basic medical sciences.
5. Better educated and trained health care professionals engaged as academicians, researchers and field practitioners will revamp the health care delivery system and replenish the academia in the medical education set up. The community will be the ultimate beneficiary due to better health facilities.
6. To improve health standards of the community in this underdeveloped region of the world, focus of research will be on regional medical issues.
7. Trained human resource will successfully execute and streamline the operations of the Institute and will fill the vacuum in the growing medical schools and industry.
8. Development of human resource, research and technology in this institute will ultimately help in the development of national economy.

COURSES OUTLINE

During the first year of MPhil leading to PhD program, students will have to complete their 30 credit hours course work. The course work will comprise of:

1. **Compulsory** courses for all the students irrespective of their field of specialty =08 Credit Hrs
2. **Core** courses in the respective field of specialty =22 Credit Hrs

As per HEC guidelines, all PhD scholars will be required to follow additional 18 credit hours courses in addition to the courses completed during their MPhil studies.

Note: 1 credit hour means 16 hours of lecturing. Credit hours shown as 2+1 or 2+0 means 2 credit hours of theory and 1 credit hr of practical while "0" means no practical.

<u>COMPULSORY COURSES (FOR ALL SPECIALITIES)</u>		7
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BMS: 701 Cell Biology	1+0 Credit Hrs	8
BMS: 702 Medical Genetics and Molecular Biology	2+0 Credit Hrs	9
BMS: 703 Epidemiology and Biostatistics	2+0 Credit Hrs	10
BMS: 704 Communication Skills and Medical Writing	1+0 Credit Hrs	11
BMS: 705 Journal Club and Seminars/Symposia/ Conferences/Workshops	Non Credit	12
BMS: 777 Nanomedicine	2+0 Credit Hrs	13

<u>CORE COURSES (SPECIALITY-WISE COURSES)</u>		14
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<u>MPhil leading to PhD in ANATOMY</u>		14
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BMS: 706 Developmental Anatomy (Embryology)	3+1 Credit Hrs	15
BMS: 707 Microscopic Anatomy (Histology)	3+1 Credit Hrs	16
BMS: 708 Neuroanatomy	2+1 Credit Hrs	17
BMS: 709 Microtechniques	2+0 Credit Hrs	18
BMS: 710 General Anatomy	1+0 Credit Hrs	19
BMS: 711 Anatomy of Upper Limb	1.5+0 Credit Hrs	20
BMS: 712 Anatomy of Lower Limb	1.5+0 Credit Hrs	21
BMS: 713 Anatomy of Thorax	1+0 Credit Hrs	22
BMS: 714 Anatomy of Abdomen and Pelvis	2+0 Credit Hrs	23
BMS: 715 Anatomy of Head & Neck	2+0 Credit Hrs	24

<u>MPhil leading to PhD in BIOCHEMISTRY</u>		25
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BMS: 716 Biochemistry I	3+1 Credit Hrs	26
BMS: 717 Biochemistry II	3+1 Credit Hrs	27
BMS: 718 Protein Chemistry	2+1 Credit Hrs	28
BMS: 719 Enzymology	2+1 Credit Hrs	29
BMS: 720 Biochemistry of Blood	2+0 Credit Hrs	30
BMS: 721 Chemistry of Respiration	1+0 Credit Hrs	31
BMS: 722 Biochemistry of Liver and Kidney	2+0 Credit Hrs	32
BMS: 723 Biochemistry of Cancer Radioisotopes	1+0 Credit Hrs	33
BMS: 724 Endocrinology	2+0 Credit Hrs	34

Course Code & Title	Credit Hrs	Page No
<u>MPhil leading to PhD in PHYSIOLOGY</u>		35
BMS: 725 Cell and Nerve Muscle Physiology	2+0 Credit Hrs	36
BMS: 726 Neurophysiology (Sensory, Motor, Autonomic and Special Senses)	4+1 Credit Hrs	37
BMS: 727 Blood, Cardiovascular and Respiratory Physiology	3+1 Credit Hrs	38
BMS: 728 Body Fluids, Renal & GIT Physiology	2+1 Credit Hrs	39
BMS: 729 Endocrinology & Reproductive Physiology	3+1 Credit Hrs	40
BMS: 730 Experimental Physiology	2+0 Credit Hrs	41
BMS: 731 Aviation, Space & Deep-Sea Diving Physiology	1+0 Credit Hrs	42
BMS: 732 Sports Physiology	1+0 Credit Hrs	43
<u>MPhil leading to PhD in PHARMACOLOGY</u>		44
BMS: 733 General Pharmacology	2+0 Credit Hrs	45
BMS: 734 CNS Pharmacology	2+1 Credit Hrs	46
BMS: 735 ANS Pharmacology	2+1 Credit Hrs	47
BMS: 736 GIT, Hormones & Drugs Affecting Uterus	2+1 Credit Hrs	48
BMS: 737 Kidney, CVS & Respiratory System	2+1 Credit Hrs	49
BMS: 738 Clinical Pharmacology	2+0 Credit Hrs	50
BMS: 739 Chemotherapy	1+0 Credit Hrs	51
BMS: 740 Psycho Pharmacology	2+0 Credit Hrs	52
BMS: 741 Anti inflammatory and Autacoids	2+0 Credit Hrs	53
BMS: 742 Drugs Acting on the Blood	1+0 Credit Hrs	54
<u>MPhil leading to PhD in HISTOPATHOLOGY</u>		55
BMS: 743 General Pathology	3+0 Credit Hrs	56
BMS: 744 Cardiovascular & Respiratory System	3+0 Credit Hrs	57
BMS: 745 Gastrointestinal Tract	2+1 Credit Hrs	58
BMS: 746 Urinary & Genital Systems	2+1 Credit Hrs	59
BMS: 747 Nervous System, Endocrine and Mammary Glands	3+1 Credit Hrs	60
BMS: 748 Liver, Gall bladder and Pancreas	2+1 Credit Hrs	61
BMS: 749 Lymph nodes, Spleen and Thymus	2+1 Credit Hrs	62
<u>MPhil leading to PhD in HAEMATOLOGY</u>		63
BMS: 743 General Pathology	3+0 Credit Hrs	64
BMS: 750 Disorders of Red Blood Cell	3+1 Credit Hrs	65
BMS: 751 Disorders of White Blood Cell	2+1 Credit Hrs	66
BMS: 752 Blood Group Serology & Coagulopathies	3+1 Credit Hrs	67
BMS: 753 Biochemistry of Blood	2+1 Credit Hrs	68
BMS: 754 Physiology of Blood, Blood Clotting & Immunity	2+1 Credit Hrs	69
BMS: 755 Drugs Acting on the Blood	2+0 Credit Hrs	70

Course Code & Title	Credit Hrs	Page No
<u>MPhil leading to PhD in CHEMICAL PATHOLOGY</u>		71
BMS: 743 General Pathology	3+1 Credit Hrs	72
BMS: 756 Kidney-Electrolytes & Endocrines	3+1 Credit Hrs	73
BMS: 757 Carbohydrates and Lipids	2+1 Credit Hrs	74
BMS: 758 Proteins, Enzymes & Vitamin	2+1 Credit Hrs	75
BMS: 759 Hepatobiliary, Acid Base Disorder & Reference Ranges	3+1 Credit Hrs	76
BMS: 760 Drug Monitoring	2+0 Credit Hrs	77
BMS: 761 Quality Control	2+0 Credit Hrs	78
<u>MPhil leading to PhD in MICROBIOLOGY</u>		79
BMS: 762 General Microbiology	3+1 Credit Hrs	80
BMS: 763 Systemic Clinical Bacteriology I	3+1 Credit Hrs	81
BMS: 764 Systemic Clinical Bacteriology II	3+1 Credit Hrs	82
BMS: 765 Immunology & Disorders of the Immune System	2+1 Credit Hrs	83
BMS: 766 Medical Parasitology	2+0 Credit Hrs	84
BMS: 767 Virology	2+0 Credit Hrs	85
BMS: 768 Mycology	2+0 Credit Hrs	86
<u>MPhil leading to PhD in FORENSIC MEDICINE AND TOXICOLOGY</u>		87
BMS: 769 General and Special Toxicology	3+1 Credit Hrs	88
BMS: 770 Anatomy, Odontology and Pathology (related)	2+1 Credit Hrs	89
BMS: 771 Serology DNA profile, Medicolegal aspects of Marriage, abortion and Asphyxial deaths	2+1 Credit Hrs	90
BMS: 772 Thanatology, Traumatology, Medical Jurisprudence and legal procedures	2+1 Credit Hrs	91
BMS: 773 Forensic toxicological aspects of blood, hair and body Fluids i.e., semen, saliva etc.	2+0 Credit Hrs	92
BMS: 774 Drugs Toxicology and its medicolegal aspects	2+0 Credit Hrs	93
BMS: 775 Analytical Toxicology and toxicology of Therapeutic agents.	2+0 Credit Hrs	94
BMS: 776 Blood groups, Serology, DNA profiling and its applications in Forensic Medicine.	2+1 Credit Hrs	95

<u>Course Code & Title</u>	<u>Credit Hrs</u>	<u>Page No</u>
<u>PhD Courses</u>		96
BMS: 801 Advances in Cell & Molecular Biology	3+0 Credit Hrs	97
BMS: 802 Advances in Medical Genetics	3+0 Credit Hrs	98
BMS: 803 Advances in Epidemiology and Biostatistics	3+0 Credit Hrs	99
BMS: 804 Advances in Research Methodology	3+0 Credit Hrs	100
BMS: 805 Bioethics	3+0 Credit Hrs	101
BMS: 806 Computational Biology and Medical Bioinformatics	3+0 Credit Hrs	102

COMPULSORY COURSES (FOR ALL SPECIALITIES)

<u>Course Code & Title</u>	<u>Credit Hrs</u>	<u>Page No</u>
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BMS: 703 Epidemiology and Biostatistics	2+0 Credit Hrs	10
BMS: 704 Communication Skills and Medical Writing	1+0 Credit Hrs	11
BMS: 705 Journal Club and Seminars/Symposia/ Conferences/Workshops	Non Credit	12
BMS: 777 Nanomedicine	2+0 Credit Hrs	13

Course Objectives:

Upon completion of course the students will be able to comprehend basic knowledge in the following areas:

1. Cell structure and organization
2. DNA replication, transcription, protein synthesis and enzymology
3. Molecular genetics like DNA recombination, gene structure, function and regulation as well as cell signaling pathways and cancer
4. Molecular cloning and molecular tools for studying genes and gene activity

Course Contents:

The course contents will include; Introduction to the study of cell biology, the chemical basis of life, techniques in cell and molecular biology, enzymes and metabolism, mitochondrion and aerobic respiration, the structure and function of the plasma membrane, cytoplasmic membrane systems, interactions between cells and their environment, the nature of the gene and genome, expression of genetic information, cytoskeleton and cell motility, cellular reproduction, cell signaling and cancer.

Recommended Readings:

1. Karp, Gerald. Cell and Molecular Biology: Concepts and Experiments with Student Study Guide John Wiley & Sons, Latest Ed.
2. David S. Latchman. Basic Molecular and Cell Biology Wiley Blackwell, Latest Ed.
3. Stephen L. Wolfe. Introduction to Cell and Molecular Biology. Wiley Blackwell, Latest Ed.
4. Lizabeth A. Allison. Fundamental Molecular Biology. Wiley Blackwell, Latest Ed.

Journals:

1. Biology of the Cell
2. Nature Cell Biology
3. Cell & Tissue Research
4. Journal of Cellular Physiology
5. Journal of Cellular Biochemistry
6. Journal of Molecular Cell Biology
7. Molecular and Cellular Endocrinology
8. Cellular Physiology and Biochemistry
9. Nature Reviews Molecular Cell Biology
10. International Journal of Biochemistry and Cell Biology

Course Objectives:

Upon completion of course the students will be able to comprehend basic knowledge in the:

1. DNA structure and function
2. The language of genetics and the terminology of molecular biology

Course Contents:

The course contents will include; DNA - the Genetic Code, Structure, Replication, and Manipulation of DNA, Transmission Genetics, Basic and Advanced Principles of Heredity, The Chromosomal Basis of Heredity, Gene Linkage and Genetic Mapping, Human Karyotypes and Chromosome Behavior, The Genetics of Bacteria and Viruses, Molecular Mechanisms of Prokaryotic Gene Regulation, Genetic Engineering and Genomics, Mechanisms of Mutation, Cancer, The Basics of Population Genetics

Recommended Readings:

1. Hart, D. L. and E. W. Jones. Essential Genetics: A Genomics Perspective. Sudbury, MA: Jones and Bartlett Publishers, Latest Ed.
2. Benjamin Pierce. Genetics. W. H. Freeman, Latest Ed.
3. Jeremy W. Dale, Malcolm van Schantz. From Gene to Genome. John Wiley & Sons Ltd, Latest Ed.
4. A Miches. Genetic Techniques for Biological Research. John Wiley & Sons Ltd, Latest Ed.
5. Leland Hartwell, Leroy Hood, Micheal Goldberg, Ann Reynolds, Lee Silver, Ruth Veres. Genetics: From Genes to Genomes. McGra-Hill Science, Latest Ed.

Journals:

1. Chromosome Research
2. Molecular Genetics & Genomics

Course Objectives:

Upon completion of course the students will be able to comprehend basic knowledge of epidemiology and will be able to:

1. Define epidemiology and know the principles of various study designs
2. Know how to design a study and describe the validity and reliability of a study design
3. Know the fundamental concepts and methods of statistics in the areas of medical and biological research
4. Have good command on use of statistical computer software for data analysis

Course Contents:

The course contents will include; Descriptive epidemiology, analytic epidemiology and epidemiological inference, Classification, morbidity and mortality rates, ratios, incidence, prevalence, sampling, screening, epidemiological models, Types of study design; their importance, uses, and limitations, field trials, controlled epidemiological surveys, sources of bias and causal models.

Introduction to statistics, types of statistical applications, population and samples, data analysis and presentation, variables, elementary statistical methods, tabulation, chart and diagram preparations, measures of central tendency and dispersion, sampling techniques and sample size estimation, probability and proportions, Tests of significance; normal test, t test, Chi square test etc, correlation and its applications, linear regression and multiple regression, Clinical trials and intervention studies, Measures for developing health statistical indicators: morbidity and mortality statistics, Use of latest statistical computer software for data analysis.

Recommended Readings:

1. Gordis, L. Epidemiology. Pennsylvania: W.B. Saunders Company. Latest Ed.
2. Rothman KJ. Modern Epidemiology. Boston: Little, Brown and Company, Latest Ed.
3. Kelsey JL, Thompson WD, Evans AS. Methods in Observational Epidemiology. New York: Oxford University Press, Latest Ed.
4. Kleinbaum DG, Kupper LL, Morgenstern H. Epidemiologic Research: Principles and Quantitative Methods. Belmont, CA: Lifetime Learning Publications, Latest Ed.
5. Lilienfeld DE, Stolley PD. Foundations of Epidemiology. New York: Oxford, Latest Ed.
6. Daniel WW. Biostatistics: A Foundation for Analysis in the Health Sciences. Latest Ed. John Wiley & Sons. Inc. New York.
7. Larson R and Farber B. Elementary Statistics: Picturing the World. Latest Ed, Prentice Hall Publications. New Jersey USA.
8. Oliver, M. and Combard MS. Biostatistics for Health Professions. Latest Ed. Prentice Hall Publications, New Jersey USA.
9. Statistical Software: SPSS; EPIINFO; STATA; SAS

Journals:

1. Cancer Epidemiology
2. Epidemiologic Reviews
3. Annals of Epidemiology
4. American Journal of Epidemiology
5. International Journal of Epidemiology

Course Objectives:

Upon completion of course the students will be able to:

1. Present and communicate research articles/research data in conferences and symposia
2. Critically analyze data, design a project and write up research proposals
3. Design experiments in the field of biological sciences

Course Contents:

The course contents of this subject include: strategies and methods of communication of scientific work, barriers of communication and how to improve communication skills. Literature survey, data collection, types of biomedical research, manuscripts and poster writing, research proposal, synopsis and thesis writing.

Recommended Readings:

1. Arifullah: Shahnaz. and Bhatti K.M Research process simplified, Peshawar Latest Ed.
2. W.H.O. Training manual on health research methodology Latest Ed.
3. The Psychology of Interpersonal Behaviour (Penguin Psychology) by Michael Argyle
4. Skilled Interpersonal Communication: Research, Theory and Practice, 5th Edition by Owen Hargie
5. The Interpersonal Communication Book by Joseph A. DeVito
6. The Complete Guide to Medical Writing by Mark Stuart and Mark Stuart
7. A-Z of Medical Writing by Tim Albert
8. Medical Writing: A Guide for Clinicians, Educators, and Researchers by Robert B. Taylor

Course Objectives:

Upon completion of Seminars/Workshops etc. the students will be able to:

1. Collect information from the available resources
2. Prepare a presentation on a given topic
3. Deliver a lecture and manage a question-answer session
4. Work as a productive member of a task force

Course Contents:

The student will attend regular Journal Club Meetings and actively participate with presentations and lectures, discussions, and question-answer sessions;
Participation in academic workshops will be mandatory;
Attendance in the relevant conferences will be appreciated;
Due credit will be given to publications by the student according to PMDC/HEC criteria

Recommended Activities:

1. Compulsory Journal Clubs
2. Essential Seminars
3. Conferences
4. Mandatory Workshops

Resources:

1. Internet
2. Libraries
3. Peer Advice

Course Objectives:

Upon completion of course the students will be able to:

1. Acquire basic knowledge of nanomedicine and nanobiotechnology
2. Know about the basic tools and techniques used in nanotechnologies and nanopreparation
3. Understand the use of nanoparticles for molecular diagnostics, detection and therapy

Course Contents:

Introduction to Nanomedicine and nanobiotechnology, Nanomaterials, nanofabrication, nanodevices and nanoengineering, Nanotechnology in imaging, diagnostics and detection, Nanopharmaceuticals, Nanotechnology and tissue engineering, Nanotoxicology, Nano-oncology, Nanoneurology.

Recommended Books:

1. The Handbook of Nanomedicine by Kewal K Jain
2. Bionanotechnology by V. Renugopalakrishnan and Randolph V. Lewis

Journals:

1. Nature nanotechnology
2. Nature Biotechnology
3. Journal of controlled release
4. Nanotechnology
5. International journal of pharmaceuticals
6. Nanomedicine UK

MPhil leading to PhD in ANATOMY

<u>Course Code & Title</u>	<u>Credit Hrs</u>	<u>Page No</u>
BMS: 706 Developmental Anatomy (Embryology)	3+1 Credit Hrs	15
BMS: 707 Microscopic Anatomy (Histology)	3+1 Credit Hrs	15
BMS: 708 Neuroanatomy	2+1 Credit Hrs	17
BMS: 709 Microtechniques	2+0 Credit Hrs	18
BMS: 710 General Anatomy	1+0 Credit Hrs	19
BMS: 711 Anatomy of Upper Limb	1.5+0 Credit Hrs	20
BMS: 712 Anatomy of Lower Limb	1.5+0 Credit Hrs	21
BMS: 713 Anatomy of Thorax	1+0 Credit Hrs	22
BMS: 714 Anatomy of Abdomen and Pelvis	2+0 Credit Hrs	23
BMS: 715 Anatomy of Head & Neck	2+0 Credit Hrs	24

Course Objectives:

Upon completion of course the students should be able to:

1. Understand and interpret various aspects of normal Human development
2. Know the mechanism of formation, features and clinical aspects of common congenital anomalies
3. Have basic knowledge of In Vitro Fertilization and Cloning
4. Handle religious and legal aspects of development

Course Contents:

The course contents will include:

Part I

Introduction to and history of embryology, Various terms of life span; Cell cycle, cell division & chromosomal abnormalities; Gametogenesis (Oogenesis & spermatogenesis) & Ovarian Cycle; Fertilization, contraception & Cloning including religious and legal aspects; Menstrual cycle; Implantation & ectopic pregnancies; Embryonic period (Organogenesis); Fetal period; Fetal membranes & Placenta; Multiple pregnancies; Parturition; Birth defects & pre-natal diagnosis.

Part II

Musculoskeletal system; Body Cavities, Mesenteries and Diaphragm; Cardiovascular System; Respiratory System; Digestive System; Urogenital System; Head & Neck and pharyngeal apparatus; Nervous System; Special senses (Eye & Ear); Integumentary System.

Recommended Readings:

1. Moore and Persaud. The Developing Human. Philadelphia, U.S.A, W.B. Saunders and company, Latest Ed.
2. Sandler T.W. Langman's Medical Embryology. Philadelphia, U.S.A, Lippincott Williams & Wilkins, Latest Ed.
3. Williams, P.L. Bannister, L.H, Berry, M.B, Collins, P, Dyson M, Ferguson, M.W.J. Gray's Anatomy. London, Churchill Living stone: Latest Ed.

Journals:

1. Congenital Anomalies
2. Anatomy and Embryology
3. Mechanisms of Development
4. Anatomia, Histologia, Embryologia
5. Development, Growth and Differentiation
6. International Journal of Developmental Biology
7. Birth Defects Research Part A: Clinical and Molecular Teratology
8. Birth Defects Research Part A: Developmental and Reproductive Toxicology

Course Objectives:

Upon completion of course the students should be able to:

1. Understand and interpret the microscopic structure of all the tissues and organs of the human body
2. Comprehend the functional correlation of the histological structure of clinically important tissues and organs
3. Comprehend the basic knowledge, uses and applications of all types of microscopes.
4. Handle microscopes commonly used in research and histology labs

Course Contents:

The course contents will include:

Part-I

Introduction to different types of microscopes; Cell & its organelles and cell junctions; Epithelium and surface modifications; Connective Tissue; Cartilages; Bone, Bone marrow and blood cells; Muscular tissue; Nervous Tissue; Circulatory System; Lymphoid Organs; Integumentary system.

Part-II

Digestive system including associated glands; Respiratory System; Urinary System; Male Reproductive System; Female Reproductive System; Endocrine System; Organs of Special Senses.

Recommended Readings:

1. Junqueira, L.C.Cameiro, J. Basic histology. California, U.S.A, Lange Medical publication: Latest Ed.
2. Kelly, D.E, Wood, R.L, Enders, A.C. Bailey's Text Book of Microscopic Anatomy. Baltimore, U.S.A, Williams and Wilkins: Latest Ed.
3. Burkit,H.G, Young, B, Heaith, J.W. Wheater's Functional histology London, Churchill living stone: Latest Ed.
4. Lesson, C, R, Lesson, T. S. Histology. Philadelphia .S.A, W. B. Saunders and Company Latest Ed.
5. Faucett, D.W.A Text Book of Histology. London, Chapman and hall: Latest Ed.
6. Williams, P.L.Bannister, L.H, Berry, M.B, Collins, P., Dysons M Ferguson, M.WJ. Gray's Anatomy .London, Churchill living stone: Latest Ed.

Journals:

1. Clinical Anatomy
2. Anatomia, Histologia, Embryologia
3. Archives of Histology and Cytology
4. International Journal of Developmental Biology

Course Objectives:

Upon completion of course the students should be able to:

1. Understand and interpret the gross and internal structure of various components of the nervous system including tracts and connections
2. Co-relate the anatomical knowledge of the nervous system with functions
3. Know the cross-sectional anatomy of various parts of the central nervous system
4. Have basic knowledge of common lesions and diseases related to the nervous system

Course Contents:

The course contents will include:

Introduction the nervous system and its components; Articulated Cranium and cranial cavity with relation to various parts of the brain; Spinal Cord; Meninges and subarachnoid cisterns; Medulla Oblongata; Pons; Cerebellum; Fourth ventricle; Midbrain; Diencephalons; Third ventricle; Sulci and Gyri of Telencephalon (Cerebrum); Lateral Ventricle; Limbic System; Basal ganglia; White matter of cerebrum; Blood Supply of the Nervous System; Sensory, motor, visual and auditory pathways; Nuclei of the cranial nerves and their components; Autonomic Nervous System.

Recommended Readings:

1. Carpenter. M.B. Text book of Neuroanatomy. Baltimore, U.S.A, Williams and Wilkins: Latest Ed.
2. Snell. R.S. Clinical Neuroanatomy for Medical Students. Philadelphia, U.S.A. Lippincott Williams and Wilkins: Latest Ed.
3. Williams, P.L. Bannister, LH, Berry, M.B, Collins, P. Dyson M, Ferguson, M.WJ. Grays Anatomy. London, Churchill Living Stone: Latest Ed.

Journals:

1. Muscle and Nerve
2. Mechanisms of Development
3. Anatomia, Histologia, Embryologia
4. Development Growth and Differentiation
5. International Journal of Developmental Biology

Course Objectives:

Upon completion of the course students should be able to:

1. Understand the phenomenon of fixation, dehydration, clearing, embedding.
2. Comprehend the knowledge of sectioning
3. Comprehend the knowledge of indications, procedures and correction of abnormal deviations of various staining methods.
4. Perform the above procedures

Course contents:

The course contents will include:

Fixation of tissues: Phenomenon, Common fixatives used or available: composition, advantages and disadvantages.

Clearing agents; Paraffin Embedding process; Sectioning Process: Microtomes and knives, their types and uses, Sharpening of knives, Problems encountered and their remedies.

Staining: Procedure, uses and interpretation of: Routine Haematoxylin and Eosin, Cresyl Violet for Nissl substance, Sudan Black B for Lipids, Mallory's connective tissue stain, Gomori's Aldehyde Fuchsin Stain for pancreas, Feulgen method for DNA, Periodic Acid Schiff (PAS) for glycogen, Modified Halmi's method for Pituitary gland, Some latest techniques.

Mounting; Vital and supravital dyes and study of cells; Freezing microtome and frozen sections of fresh tissues; Microscopes: Components, phenomenon and uses of: Simple and compound optical microscopes, Florescent microscope, Polarizing microscope, Dark field microscope, Electron microscope; Micrometry; Microphotography; Maintenance of microscopes.

Course Objectives:

Upon completion of course the students should be able to:

1. Understand and interpret the gross structure of various parts and regions of the human body
2. Understand the systematic and regional anatomy of the human body
3. Identify the bones, joints, muscles, nerves, viscera and blood vessels in cross sections of the human body
4. Assess the anatomy of common incisions
5. Apply the knowledge to solve clinical problems related to Anatomy

Course Contents:

The course contents will include:

- a) Terms of positions and movements
- b) Classification, ossification and blood supply of bones
- c) Classification and structure of joints
- d) Classification of muscles
- e) General aspects of nervous system
- f) General aspects of circulatory system
- g) General aspects of Integumentary system

Recommended Readings:

1. Snell. R.S. Clinical Anatomy for Medical Students. Philadelphia USA Lippincot Williams and Wilkins: Latest Ed.
2. Sinnatamby C.S. Lasts Anatomy Regional and Applied London, Churchill Living Stone: Latest Ed.
3. Williams, P.L. Bannister, L.H. Berry, M.B, Collins, P., Dyson M. Ferguson, M.WJ. Gray's Anatomy London. Churchill living stone: Latest Ed.
4. Moore K.L. Clinically Oriented Anatomy. Baltimore, U.S.A. Williams and Wilkins: Latest Ed.

Journals:

1. Journal of Anatomy
2. Anatomy and Embryology
3. Anatomia, Histologia, Embryologia

Course Objectives:

Upon completion of course the students should be able to:

1. Understand and interpret the gross structure of various parts of the upper limb
2. Identify the bones, joints, muscles, nerves, viscera and blood vessels in cross sections of the upper limb
3. Assess the anatomy of common incisions
4. Apply the knowledge to solve clinical problems related to Anatomy

Course Contents:

The course contents will include:

- a) Dry Bones
- b) Surface anatomy
- c) Breast
- d) Pectoral region
- e) Axilla
- f) Brachial plexus
- g) Scapular region
- h) Shoulder region
- i) Arm
- j) Forearm
- k) Hand
- l) Blood vessels
- m) Joints
- n) Nerves
- o) Lymphatic drainage
- p) Applied aspects

Recommended Readings:

1. Snell. R.S. Clinical Anatomy for Medical Students. Philadelphia USA Lippincot Williams and Wilkins: Latest Ed.
2. Sinnatamby C.S. Lasts Anatomy Regional and Applied London, Churchill Living Stone: Latest Ed.
3. Williams, P.L. Bannister, L.H. Berry, M.B, Collins, P., Dyson M. Ferguson, M.WJ. Gray's Anatomy London. Churchill living stone: Latest Ed.
4. Moore K.L. Clinically Oriented Anatomy. Baltimore, U.S.A. Williams and Wilkins: Latest Ed.

Journals:

1. Journal of Anatomy
2. Anatomy and Embryology
3. Anatomia, Histologia, Embryologia

Course Objectives:

Upon completion of course the students should be able to:

1. Understand and interpret the gross structure of various parts and regions of the upper limb
2. Identify the bones, joints, muscles, nerves, viscera and blood vessels in cross sections of the upper limb
3. Assess the anatomy of common incisions
4. Apply the knowledge to solve clinical problems related to Anatomy

Course Contents:

The course contents will include:

- a) Dry bones
- b) Surface anatomy
- c) Thigh
- d) Gluteal region
- e) Popliteal fossa
- f) Hip & knee joints
- g) Bursae around knee joint
- h) Leg
- i) Ankle joint
- j) Retinaculae around ankle joint
- k) Foot
- l) Nerves
- m) Blood vessels
- n) Lymphatic drainage
- o) Applied aspects

Recommended Readings:

1. Snell. R.S. Clinical Anatomy for Medical Students. Philadelphia USA Lippincot Williams and Wilkins: Latest Ed.
2. Sinnatamby C.S. Lasts Anatomy Regional and Applied London, Churchill Living Stone: Latest Ed.
3. Williams, P.L. Bannister, L.H. Berry, M.B, Collins, P., Dyson M. Ferguson, M.WJ. Gray's Anatomy London. Churchill living stone: Latest Ed.
4. Moore K.L. Clinically Oriented Anatomy. Baltimore, U.S.A. Williams and Wilkins: Latest Ed.

Journals:

1. Journal of Anatomy
2. Anatomy and Embryology
3. Anatomia, Histologia, Embryologia

Course Objectives:

Upon completion of course the students should be able to:

1. Understand and interpret the gross structure of various parts of the thorax
2. Identify the bones, joints, muscles, nerves, viscera and blood vessels in cross sections of the thorax
3. Assess the anatomy of common incisions
4. Apply the knowledge to solve clinical problems related to Anatomy

Course Contents:

The course contents will include:

- a) Thoracic cage
- b) Intercostals structures
- c) Mediastinum and its subdivisions
- d) Pericardium
- e) Heart
- f) Coronary circulation
- g) Pleura and pleural cavity
- h) Lungs
- i) Thoracic duct
- j) Venous drainage
- k) Splanchnic nerves, sympathetic trunk and cardiac plexus
- l) Oesophagus
- m) Abdominal diaphragm

Recommended Readings:

1. Snell. R.S. Clinical Anatomy for Medical Students. Philadelphia USA Lippincot Williams and Wilkins: Latest Ed.
2. Sinnatamby C.S. Lasts Anatomy Regional and Applied London, Churchill Living Stone: Latest Ed.
3. Williams, P.L. Bannister, L.H. Berry, M.B, Collins, P., Dyson M. Ferguson, M.WJ. Gray's Anatomy London. Churchill living stone: Latest Ed.
4. Moore K.L. Clinically Oriented Anatomy. Baltimore, U.S.A. Williams and Wilkins: Latest Ed.

Journals:

1. Journal of Anatomy
2. Anatomy and Embryology
3. Anatomia, Histologia, Embryologia

Course Objectives:

Upon completion of course the students should be able to:

1. Understand and interpret the gross structure of various parts of the abdomen and pelvis
2. Identify the bones, joints, muscles, nerves, viscera and blood vessels in cross sections of the abdomen and pelvis
3. Assess the anatomy of common incisions
4. Apply the knowledge to solve clinical problems related to Anatomy

Course Contents:

The course contents will include:

Bony pelvis and lumbar vertebrae; Anterior abdominal wall; Rectus sheath; Inguinal canal; Stomach; Liver and ligaments; Lesser and greater sacs; Small intestine; Large intestine; Abdominal aorta; Inferior vena cava; Spleen; Pancreas; Mesentery; Compartments and spaces of abdominal cavity; Blood supply of GIT; Kidneys; Ureters; Ovaries; Uterus; Vagina; Urinary bladder; Prostate and seminal vesicles; Urethra; Pelvic diaphragm; Perineum; Anal canal; Ischioanal fossa; Perineal pouches; Blood, nerve supply and lymphatic drainage; Spermatic cord, scrotum and testis; Surgical anatomy of incisions; Common investigations

Recommended Readings:

1. Snell. R.S. Clinical Anatomy for Medical Students. Philadelphia USA Lippincot Williams and Wilkins: Latest Ed.
2. Sinnatamby C.S. Lasts Anatomy Regional and Applied London, Churchill Living Stone: Latest Ed.
3. Williams, P.L. Bannister, L.H. Berry, M.B, Collins, P., Dyson M. Ferguson, M.WJ. Gray's Anatomy London. Churchill living stone: Latest Ed.
4. Moore K.L. Clinically Oriented Anatomy. Baltimore, U.S.A. Williams and Wilkins: Latest Ed.

Journals:

1. Journal of Anatomy
2. Anatomy and Embryology
3. Anatomia, Histologia, Embryologia

Course Objectives:

Upon completion of course the students should be able to:

1. Understand and interpret the gross structure of various parts of head and neck
2. Identify the bones, joints, muscles, nerves, viscera and blood vessels in cross sections of the head and neck
3. Assess the anatomy of common incisions
4. Apply the knowledge to solve clinical problems related to Anatomy

Course Contents:

The course contents will include:

External features of articulated skull and cervical vertebrae; Cervical fascia; Triangles of neck; Thyroid and parathyroid glands; Suprahyoid and infrahyoid muscles; Cervical plexus; Lymphatic drainage of head and neck; Carotid vessels; Mouth and oral cavity; Tongue; Pharynx; Larynx; Tonsils; Trachea and oesophagus; Face, muscles and nerve supply; Muscles of mastication; Temporomandibular joint; Parotid and other salivary glands; Vagus, facial, glossopharyngeal, hypoglossal nerves; Nose; Ear; Paranasal sinuses; Parasympathetic ganglia; Cervical ganglia; Orbit and eye ball; Dural venous sinuses; Remaining cranial nerves; Vertebral column.

Recommended Readings:

1. Snell. R.S. Clinical Anatomy for Medical Students. Philadelphia USA Lippincot Williams and Wilkins: Latest Ed.
2. Sinnatamby C.S. Lasts Anatomy Regional and Applied London, Churchill Living Stone: Latest Ed.
3. Williams, P.L. Bannister, L.H. Berry, M.B, Collins, P., Dyson M. Ferguson, M.WJ. Gray's Anatomy London. Churchill living stone: Latest Ed.
4. Moore K.L. Clinically Oriented Anatomy. Baltimore, U.S.A. Williams and Wilkins: Latest Ed.

Journals:

1. Journal of Anatomy
2. Anatomy and Embryology
3. Anatomia, Histologia, Embryologia

MPhil leading to PhD in BIOCHEMISTRY

<u>Course Code & Title</u>	<u>Credit Hrs</u>	<u>Page No</u>
BMS: 716 Biochemistry I	3+1 Credit Hrs	26
BMS: 717 Biochemistry II	3+1 Credit Hrs	27
BMS: 718 Protein Chemistry	2+1 Credit Hrs	28
BMS: 719 Enzymology	2+1 Credit Hrs	29
BMS: 720 Biochemistry of Blood	2+0 Credit Hrs	30
BMS: 721 Chemistry of Respiration	1+0 Credit Hrs	31
BMS: 722 Biochemistry of Liver and Kidney	2+0 Credit Hrs	32
BMS: 723 Biochemistry of Cancer Radioisotopes	1+0 Credit Hrs	33
BMS: 724 Endocrinology	2+0 Credit Hrs	34

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend the structure and function of carbohydrates, proteins and lipids
2. Comprehend the chemical structure and metabolism of nucleotides and nucleic acids, purine/pyrimidine and related abnormalities in their metabolism
3. Comprehend the buffer system of the body, role of kidney and lungs in regulation of the pH and related abnormalities of acid base balance
4. Comprehend the basic concepts of energy with regard to diet and nutritional aspects of various dietary components

Course Contents:

The course contents of this subject include; Chemistry of carbohydrate, protein and lipids, Chemical structure of Nucleotides/Nucleic Acid, metabolism of Purine/Pyrimidine and related abnormalities in their metabolism, Acid Base Balance and maintenance of pH of the body fluids, Diet and Nutrition with emphasis on concepts of energy, caloric requirements and nutritional aspects of various dietary components, malnutrition in pregnancy and lactation.

Recommended Readings:

1. Robert. K. Murray Harper's Illustrated Biochemistry Latest Ed.
2. MN. Chatterjea Rana Shinde. Text Book of Medical Biochemistry Latest Ed.
3. Pamedla.L. Champe Richard. A.Harvey. Dooli R.F. Reconstructing history with amino acid sequences. Protein SC Latest Ed.
4. Collins PM: "carbohydrates" Chapman and Hall Latest Ed.
5. A.S.Saini Text Book of Biochemistry Latest Ed.
6. Adams R.I.P. Knoler JT.leader DP The Biochemistry of Nucleic Acids Latest Ed. Chapman and Hall.
7. Blackburn G.M. Gait MJ. Nucleic Acids in Chemistry and Biology IRL Latest Ed.
8. D M Vasudevan and. Sreekumaris Text Book of Biochemistry Latest Ed.
9. Harris M.D. Siegel LB. Alowey J.A Gout and Hyperurieemia. Arm Family Physicians Latest Ed.
10. Burton David Rose Clinical physiology of acid-base and electrolyte disorders Latest Ed.
11. D.S.A Talha Raza Basis of Fluid ad Electrolytes Latest Ed.
12. Davidson and Passmore Human Nutrition and Dietetics Latest Ed.
13. M.Swaminathan Principles of nutrition and dietetics Latest Ed.
14. Bender DA. Bender AE Nutrition, A Reference Handbook Oxford University Press Latest Ed.
15. Carrow JS James WPT. Ralph A Human Nutrition and dietetics Latest Ed. Churchill Livingston

Journals:

1. Analytical Biochemistry
2. Essays in Biochemistry
3. Journal of Biochemistry
4. Nature Chemical Biology
5. The Journal of Biochemistry

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend the basic knowledge of biological oxidation and oxidative phosphorylation
2. Comprehend knowledge about the processes of metabolism of proteins, carbohydrates, lipids, minerals and trace elements
3. Comprehend understandings of various internal or inherited defects in metabolic pathways

Course Contents:

The course contents of this subject include; principals of biological oxidation, various process of oxidation and enzymes involved in it, electron transport chain., study of its components and various theories of oxidative phosphorylation, digestion and absorption of proteins, bio synthesis of various amino acids, catabolism of proteins and amino acid nitrogen, urea synthesis, catabolism of carbon skeleton of amino acids, synthesis of specialized products from amino acids, internal defects in metabolism of amino acids, digestion and absorption of carbohydrates, synthesis of glycogen, the process of glycogenolysis, gluconeogenesis, aerobic and anaerobic glycolysis, the reaction and importance of hexose monophosphate pathway and inter-conversion of various monosaccharide and synthesis of amino sugars, glycosaminoglycans and glucuronic acid etc. various inherited defects in the metabolic pathways of carbohydrates. digestion and absorption of lipids, transport of plasma lipids, their storage in adipose tissue, oxidation of fatty acids, synthesis of fatty acids, synthesis of ketone bodies and cholesterol and their disposal, plasma lipoproteins and their metabolism, Internal disorders of lipid metabolism, details about minerals, trace elements, their dietary sources, their biochemical role, and mechanism of action and effect of their deficiency and their role in metabolism.

Recommended Readings:

1. Harper's illustrated biochemistry Latest Ed.
2. DM. Vasudevan,Streekumaris. Text book of biochemistry Latest Ed.
3. Donald Voet and Judith G voet Latest Ed.
4. Pamela. 1. Champe. Richard. A.Hariuz biochemistry Latest Ed.
5. Lehninger, Nelson and Cox. Principals of Biochemistry Latest Ed.
6. Montgomery, Convey, Spector Biochemistry a case oriented approach Latest Ed.
7. Seriver CR et-al The metabolic and molecular bases of inherited diseases. Latest Ed. McGraw Hill.
8. M.N Chaterjea, Rana shinde. Text book of medical Biochemistry Latest Ed.
9. Mehews. Van Holde. Biochemistry Latest Ed.
10. Styere Biochemistry Latest Ed.
11. Waite. M Biochemistry of lipids, lipoproteins and membrane. Elsevier Latest Ed.
12. Davidson and Passmore Human Nutrition and dietetic Latest Ed.
13. Garrow. J-S James WPT.Rolph A Human Nutrition and dietetics Latest Ed. Churchill Livingstone.
14. Bender DA. Bender AE Nutrition: A reference handbook. Oxford University Press Latest Ed.

Journals:

1. Analytical Biochemistry
2. Essays in Biochemistry
3. Journal of Biochemistry
4. Nature Chemical Biology
5. The Journal of Biochemistry
6. International Journal of Biochemistry and Cell Biology
7. Journal of Cellular Biochemistry

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend the basic knowledge of the process of protein synthesis from DNA to mRNA and protein
2. Comprehend the basic understandings of DNA synthesis, repair mechanisms, recombinant DNA and genomic technologies
3. Comprehend knowledge of glycoprotein and extra cellular matrix synthesis
4. Have command on both qualitative and quantitative analysis tests of carbohydrates, lipids, proteins, enzymes, and blood and urine components

Course Contents:

The course will include synthesis of DNA and RNA, DNA repair, protein synthesis, genetic code, gene expression, molecular genetics, recombinant DNA and genomic technologies, synthesis 'structure and function of glycoprotein and extra cellular matrix (connective tissue) and diseases related to the abnormality in synthesis of these substances, Qualitative analysis of carbohydrates, Lipids, Proteins, Enzymes, Blood components, Urine components etc. Quantitative Analysis of Carbohydrates, Lipids, proteins, Enzymes, Blood components, Urine components etc

Recommended Readings:

1. Watson JD The Double Helix. Atheneum Latest Ed.
2. Watson JD et al. Molecular Biology of the gene, Latest Ed. Benjamin Cummings.
3. Ptashne M A genetic switch. Latest Ed. Cell press and Blackwell scientific publication.
4. Lewin. B Genes VII Oxford University Latest Ed.
5. Weatherall DJ The new genetics and clinical practice Latest Ed. Oxford University Press.
6. Anthony J.F.Frinfth, Jeffery H Miller, David T Suzuki An introduction to genetic analysis Latest Ed.
7. Harper's illustrated biochemistry Latest Ed.
8. D.M. Vasudevan, Sreekumaris. Text Book of Medical Biochemistry Latest Ed.
9. Varki A at-al Essentials of glycobiology Cold spring Harbor Laboratory Press Latest Ed.
10. Seriver CR at- al The metabolic and molecular basis of inherited diseases Latest Ed. McGraw Hill.
11. John P.Peters and Donald D.Slyke Quantitative clinical Chemistry The Williams & Wilkins Company Harold Varley Latest Ed.
12. Harold Varley Practical Clinical Biochemistry CBS Publishers & Distributors Abdus Salam & Mohammad Tayyab Clinical Chemistry. Principles and Interpretations Museum Scientific Traders Latest Ed.

Journals:

1. Nucleic acid Research
2. Essays in Biochemistry
3. Journal of Biochemistry
4. Analytical Biochemistry
5. Nature Chemical Biology
6. The Journal of Biochemistry
7. Journal of Cellular Biochemistry
8. Journal of Molecular Cell Biology
9. International Journal of Biochemistry and Cell Biology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge about the properties of enzymes and the relationship between their structure and mechanisms of catalytic action
2. Know the most important representatives of individual classes, their use in practice and basic methods for the determination of enzyme activity
3. Explain the specificity of enzymes (biochemical catalysts), and the chemistry involved in enzyme action
4. Process data from kinetic studies and interpret the results in relation to the reaction mechanism

Course Contents:

The course will include, structure, classification, properties of enzymes, enzyme kinetics, factors affecting enzymes activity, enzyme inhibition, clinical and diagnostic importance of enzymes and co-enzymes, their functions and classification.

Recommended Readings:

1. M. N. Chatterjea, Rana Shinde. Textbook of medical biochemistry Latest Ed.
2. Lehninger, Nelson and Cox. Principals of Biochemistry, Latest Ed.
3. Thomas M. Devlin Text book of biochemistry with clinical correlation, Latest Ed.
4. Stryer Biochemistry Latest Ed.

Journals:

1. Nucleic acid Research
2. Analytical Biochemistry
3. Journal of Biochemistry
4. Nature Chemical Biology
5. Methods in Enzymology
6. The Journal of Biochemistry
7. Journal of Cellular Biochemistry
8. International Journal of Biochemistry and Cell Biology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge about the structure and functions of various human hemoglobins
2. Comprehend basic knowledge about synthesis and degradation of hem
3. Comprehend the causes and mechanism of thalassemia and hyperbilirubinemias

Course Contents:

The course will cover in detail, the structure and types of various human hemoglobin. It will also include the synthesis and degradation of hem, porphyrines, thalassemia, formation of bile pigments, and various types of hyperbilirubinemias.

Recommended Readings:

1. Harper's illustrated biochemistry Latest Ed.
2. Harrison Principles of internal Medicine Latest Ed. McGraw Hill.
3. DM Vasudevan and Streekumaris "Text book of biochemistry Latest Ed.
4. Lehninger.Nelson and Cox. Principal of Biochemistry Latest Ed.

Journals:

1. Blood Reviews
2. HAEMOPHILIA
3. Annals of Hematology
4. Essays in Biochemistry
5. Journal of Biochemistry
6. Nature Chemical Biology
7. The Journal of Biochemistry
8. Journal of Cellular Biochemistry
9. American Journal of Hematology
10. Journal of Histochemistry and Cytochemistry
11. International Journal of Biochemistry and Cell Biology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge about the composition of air and mechanism of its intake
2. Understand the mechanism of Oxygen transport, its uptake by the tissues and its regulation
3. Describe CO₂ transport and factors affecting it
4. Have basic knowledge about the role of Nitrogen, free radicals and antioxidants

Course Contents:

The course includes the details of composition of air and partial pressure of gases taken in, transport of oxygen, its uptake by the tissue and the factors, which regulate this uptake. It also includes transport of carbon dioxide, factors affecting its transport, function of Nitrogen in Plasma. Etc. It will cover the topics like free radicals, antioxidants and their clinical significance.

Recommended Readings:

1. MN Chatterjea and Rana Shinde Textbook of medical biochemistry Latest Ed.
2. DM Vasudevan, Sreekumaris Textbook of Biochemistry Latest Ed.
3. Donald1 Voet and Judeth G Voet Latest Ed.

Journals:

1. Journal of Biochemistry
2. Nature Chemical Biology
3. The Journal of Biochemistry
4. Journal of Cellular Biochemistry
5. Cellular Physiology and Biochemistry
6. International Journal of Biochemistry and Cell Biology

Course Objectives:

Upon completion of course the students will be able to Comprehend:

1. Basic structure and functions of liver
2. Basic structure and functions of the kidney
3. Glomerular Filtration, Tubular Function and urine formation
4. Endocrine and Regulatory functions of the kidney

Course Contents:

The course is designed to get detailed understanding of biochemical functions of liver and kidney. It will include their role in synthesis of various substances and their functions in detail. It will also include various investigations to assess their status and diagnosis of different disorders.

Recommended Readings:

1. Harper's Illustrated Biochemistry Latest Ed.
2. M N Chatterjea and Rana shinde Text book of medical biochemistry Latest Ed.
3. Victor 1, Davidson and David B Sittna Biochemistry Latest Ed.
4. AS Saimi Text Book of Biochemistry Latest Ed.
5. K.Sembulingan and Drema Sembulingan. Essentials of Medical Physiology Latest Ed.

Journals:

1. Liver
2. Analytical Biochemistry
3. Journal of Biochemistry
4. Nature Chemical Biology
5. The Journal of Physiology
6. Diabetes Obesity and Metabolism
7. European Journal of Applied Physiology
8. Diabetes Metabolism, Research and Review
9. Journal of Gastroenterology and Hepatology
10. Canadian Journal of Applied Physiology Reviews

Course Objectives:

Upon completion of course the students will be able to:

1. Describe what cancer is and how cancer cells go wrong, grow, invade and metastasized
2. Understand the role of oncogenes, tumor suppressor genes, and growth factors in cancer initiation and progression
3. Have an understanding of radioisotopes in medicine and their hazards

Course Contents:

The course will include the study of growth and spread of cancer cells, their special properties of invading and metastasizing. It will also include the study of oncogenes tumor suppressor genes, growth factor etc. The course will also cover the role of isotopes in medicine and their hazards.

Recommended Readings:

1. Harpers illustrated Biochemistry Latest Ed.
2. Vogelstein B, Konzler k.w. The Genetic basis of Cancer Mc. Graw Hill Latest Ed.
3. Zetter B R. Angiogenesis of tumor metastasis. Latest Ed.
4. M.N. Chaterjea & Rana Shine Medical Biochemistry Latest Ed.

Journals:

1. BMC Cancer
2. Tumor Biology
3. Annals of Oncology
4. Cancer Cytopathology
5. Nature Reviews Cancer
6. Cancer and Metastasis Reviews
7. Nature Reviews Clinical Oncology
8. Critical Reviews in Oncology Hematology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge of endocrine system and hormone
2. Comprehend the structure and function of hormones
3. Comprehend basic knowledge of hormone synthesis and regulation mechanisms

Course Contents:

The course is designed to cover the structure and functions of hormones. It will also include their synthesis, control of their syntheses, and mechanism of action of hormones. A detail about disease related to hormone hypo and hyper secretions will also be included.

Recommended Readings:

1. Harper's Illustrated Biochemistry Latest Ed.
2. Lehninger Nelson and Cox
3. Principals of Biochemistry Latest Ed.
4. Thomas. M. Develin Text Book of Biochemistry with Clinical Correlation Latest Ed.
5. Monming. M Transcriptional Regulation by Cyclic AMP Ann: Rev. Biochem Latest Ed.

Journals:

1. Neuro Endocrinology
2. Nature Reviews Endocrinology
3. Molecular and Cellular Endocrinology

MPhil leading to PhD in PHYSIOLOGY

<u>Course Code & Title</u>	<u>Credit Hrs</u>	<u>Page No</u>
BMS: 725 Cell and Nerve Muscle Physiology	2+0 Credit Hrs	36
BMS: 726 Neurophysiology (Sensory, Motor, Autonomic and Special Senses)	4+1 Credit Hrs	37
BMS: 727 Blood, Cardiovascular and Respiratory Physiology	3+1 Credit Hrs	38
BMS: 728 Body Fluids, Renal & GIT Physiology	2+1 Credit Hrs	39
BMS: 729 Endocrinology & Reproductive Physiology	3+1 Credit Hrs	40
BMS: 730 Experimental Physiology	2+0 Credit Hrs	41
BMS: 731 Aviation, Space & Deep-Sea Diving Physiology	1+0 Credit Hrs	42
BMS: 732 Sports Physiology	1+0 Credit Hrs	43

Course Objectives:

Upon completion of course the students will be able to comprehend:

1. Functions of cells, cell membranes and its organelles
2. Membrane potential, mechanism of action of nerves and muscles
3. Architecture of the skeletal and smooth muscle and mechanism of contraction
4. Excitation-contraction coupling
5. Isotonic and isometric contraction

Course Contents:

The course will include: Physiology of cell, cell organelles and cell membranes, membrane potential, action potential;

Structure and functions of nerve and muscle, neuromuscular transmission, contraction of muscles, neuromuscular blockers, tetanization, fatigue, pathophysiology of skeletal system

Recommended Readings:

1. Benjamin Cummings: Interactive Physiology 10-System Suite. Benjamin-Cummings Publishing Company, Subs of Addison Wesley Longman, Inc. Latest Ed.
2. Best and Taylor: Text Books of Physiology Latest Ed.
3. Cindy L. Stanfield: Principles of Human Physiology. Benjamin Cummings, Latest Ed.
4. Dee Undglaub Silverthorn: Human Physiology: An Integrated Approach. Benjamin Cummings, Latest Ed.
5. Ganong WF: Review of Physiology Latest Ed.
6. Guyton AC: Textbook of Physiology Latest Ed.
7. Samson Wright's Applied Physiology

Journals:

1. APS Journals: Cell Physiology
2. APS Journals: Journal of Neurophysiology
3. Canadian Journal of Applied Physiology Reviews
4. Cellular Physiology and Biochemistry
5. European Journal of Applied Physiology
6. Journal of Applied Physiology
7. Pakistan Journal of Physiology
8. The Journal of Physiology

Course Objectives:

Upon completion of course the students will be able to comprehend:

1. Functions of cells, cell membranes and its organelles
2. Membrane potential, mechanism of action of nerves and muscles
3. Parts of central and peripheral nervous system and their physiology
4. knowledge of autonomic nervous system

Course Contents:

Structure and functions of nerve, nervous system, synapse and synaptic transmission, types and functions of sensory receptors, organization and functions of spinal cord and reflexes, ascending and descending tracts, muscle spindle and normal muscle tone, functions of thalamus, structure and functions of Cerebral Cortex, Cerebellum, Classification and functions of Basal Ganglia, Hypothalamus and Limbic system, Intellectual functions of Brain, Autonomic nervous system; physiology of sleep, memory and epilepsy; Physiology of smell, taste, hearing and vision, optics of vision, errors of refraction and their correction, colour vision, hearing tests; pathophysiology of the nervous system and special senses.

Recommended Readings:

1. Benjamin Cummings: Interactive Physiology 10-System Suite. Benjamin-Cummings Publishing Company, Subs of Addison Wesley Longman, Inc. Latest Ed.
2. Best and Taylor: Text Books of Physiology Latest Ed.
3. Cindy L. Stanfield: Principles of Human Physiology. Benjamin Cummings, Latest Ed.
4. Dee Undglaub Silverthorn: Human Physiology: An Integrated Approach. Benjamin Cummings, Latest Ed.
5. Ganong WF: Review of Physiology Latest Ed.
6. Guyton AC: Textbook of Physiology Latest Ed.
7. Samson Wright's Applied Physiology

Journals:

1. APS Journals: Cell Physiology
2. APS Journals: Journal of Neurophysiology
3. Canadian Journal of Applied Physiology Reviews
4. Cellular Physiology and Biochemistry
5. Clinical Neurophysiology
6. European Journal of Applied Physiology
7. Journal of Applied Physiology
8. Pakistan Journal of Physiology
9. Physiology and Behaviour
10. The Journal of Physiology

Course Objectives:

Upon completion of course the students will be able to:

1. Understand components of blood, functions of blood, plasma and plasma proteins
2. Understands blood grouping and principles of transfusion
3. Comprehend the body defence systems
4. Comprehend the basic structure and function of heart, ECG recording and interpretation
5. Understand haemodynamics and respiratory adjustments under resting and exercising conditions
6. Understand physiological principles to manage a person in shock due to various reasons
7. Comprehend organization of respiratory tract and lungs.
8. Comprehend the mechanism of breathing and respiration
9. Discuss disorders of the blood, CVS and respiratory system

Course Contents:

Origin and formation of blood and its components, functions of the formed elements and plasma, plasma proteins, blood grouping and cross-matching, principles of transfusion, types of anaemia and their causes;

body defence systems, mechanism of immunity and vaccination, cellular and humoral immunity; Physiology of cardiac muscle, Conductive system of the heart, Cardiac cycle, Regulation of cardiac function, ECG Recording and interpretation, Recognition of changes in ECG during different pathological conditions, Cardiac output and its regulation, Heart sounds and murmurs, Blood pressure and its regulation, Cardiovascular regulation during exercise, Coronary circulation; Organization of respiratory tract, Mechanics of breathing, Lung volumes and capacities, Dead space and lung compliance, Respiratory membrane and diffusion of gases, Transport of gases, Regulation of respiration, Respiratory adjustment during exercise, Non-respiratory function of respiration, Hypoxia and Cyanosis.

Recommended Readings:

1. Benjamin Cummings: Interactive Physiology 10-System Suite. Benjamin-Cummings Publishing Company, Subs of Addison Wesley Longman, Inc. Latest Ed.
2. Best and Taylor: Text Books of Physiology Latest Ed.
3. Cindy L. Stanfield: Principles of Human Physiology. Benjamin Cummings, Latest Ed.
4. Dee Undglaub Silverthorn: Human Physiology: An Integrated Approach. Benjamin Cummings, Latest Ed.
5. Ganong WF: Review of Physiology Latest Ed.
6. Guyton AC: Textbook of Physiology Latest Ed.
7. Samson Wright's Applied Physiology
8. West JB: Respiratory Physiology–The essentials

Journals:

1. APS Journals: Heart and Circulatory Physiology
2. APS Journals: Lung Cellular and Molecular Physiology
3. Canadian Journal of Applied Physiology Reviews
4. European Journal of Applied Physiology
5. Journal of Applied Physiology
6. Pakistan Journal of Physiology
7. The Journal of Physiology

Course Objectives:

Upon completion of course the students will be able to comprehend:

1. Body fluid compartments, ICF, ECF, Interstitial fluid, Lymph
2. Basic structure and function of the kidney
3. Glomerular Filtration, Tubular Function and urine formation
4. Endocrine and Regulatory functions of the kidney
5. Defence of Osmolality, Volume and composition of body fluids
6. General structure and organization of gastro-intestinal tract
7. Functions of stomach, small and large intestine
8. Regulation of the GIT function
9. Enteric nervous system and hormones of GIT

Course Contents:

Body fluid compartments, Intracellular, extracellular, and interstitial fluid, lymph and its drainage; Functional Structure of the kidney and nephron, General functions of the kidney, Formation of urine, Formation of concentrated and dilute urine, Endocrine and regulatory functions of the kidney, role in Acid-base balance, defence of volume and tonicity of the ECF, Micturition and its abnormalities, oedema formation

Structure and general organization, Enteric nervous system, Mastication and swallowing, Functions of stomach, Functions and movements of small and large intestine, Functions and regulation of Hormones of GIT, Functions of the Liver and biliary tract, Defecation and its control, Pathophysiology of Vomiting and Diarrhoea.

Recommended Readings:

1. Benjamin Cummings: Interactive Physiology 10-System Suite. Benjamin-Cummings Publishing Company, Subs of Addison Wesley Longman, Inc. Latest Ed.
2. Best and Taylor: Text Books of Physiology Latest Ed.
3. Cindy L. Stanfield: Principles of Human Physiology. Benjamin Cummings, Latest Ed.
4. Dee Undglaub Silverthorn: Human Physiology: An Integrated Approach. Benjamin Cummings, Latest Ed.
5. Ganong WF: Review of Physiology Latest Ed.
6. Guyton AC: Textbook of Physiology Latest Ed.
7. Samson Wright's Applied Physiology

Journals:

1. APS Journals: Renal Physiology
2. APS Journals: Gastrointestinal and Liver Physiology
3. Canadian Journal of Applied Physiology Reviews
4. European Journal of Applied Physiology
5. Journal of Applied Physiology
6. Pakistan Journal of Physiology
7. The Journal of Physiology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend the classification of endocrine glands, their functions and feedback control mechanisms
2. Comprehend the functional anatomy of male and female reproductive systems
3. Comprehend the physiological processes involved in spermatogenesis, ovulation, menstrual cycle, conception and pregnancy, functions of placenta, lactation and neonatal physiology

Course Contents:

General principles (classification, mechanism of action and feedback control), transport, metabolism, actions and control of secretion of the Endocrine system;

Functional anatomy of male and female reproductive systems, Hormonal and neural control, Spermatogenesis, Oogenesis and Ovulation, Puberty, Functions and regulation of Oestrogen, Progesterone, Leutinizing Hormone; Menstrual cycle, Pregnancy and Lactation, Functions of Placenta, Neonatal physiology, changes taking place in foetal circulation after birth; Physiological principles and methods of contraception

Recommended Readings:

1. Benjamin Cummings: Interactive Physiology 10-System Suite. Benjamin-Cummings Publishing Company, Subs of Addison Wesley Longman, Inc. Latest Ed.
2. Best and Taylor: Text Books of Physiology Latest Ed.
3. Cindy L. Stanfield: Principles of Human Physiology. Benjamin Cummings, Latest Ed.
4. Dee Undglaub Silverthorn: Human Physiology: An Integrated Approach. Benjamin Cummings, Latest Ed.
5. Ganong WF: Review of Physiology Latest Ed.
6. Guyton AC: Textbook of Physiology Latest Ed.
7. Samson Wright's Applied Physiology

Journals:

1. APS Journals: Endocrinology and Metabolism
2. APS Journals: Physiological Reviews
3. Canadian Journal of Applied Physiology Reviews
4. European Journal of Applied Physiology
5. Journal of Applied Physiology
6. Pakistan Journal of Physiology
7. Physiology
8. The Journal of Physiology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend ethical considerations in using animals for research experiments
2. Use the equipment in a physiology research laboratory
3. Prepare an animal model for research
4. Exhibit attitude towards research on human volunteers and ethical aspects
5. Interpret the results and draw inference

Course Contents:

Study of various equipment in a physiology research laboratory, using the modern equipment like PowerLab®, Physiographs, use of transducers, Spirometry, blood gas analysis, treadmill exercise experiments, ECG recording in resting and exercise, hearing tests on audiograph, tuning fork tests, animal preparation and experiments on laboratory animals, maintenance of animal house; Routine physiology experiments on animals and humans.

Recommended Readings:

1. Cindy L. Stanfield: Principles of Human Physiology. Benjamin Cummings, Latest Ed.
2. Dee Undglaub Silverthorn: Human Physiology: An Integrated Approach. Benjamin Cummings, Latest Ed.
3. Ganong WF: Review of Physiology Latest Ed.

Journals:

1. Canadian Journal of Applied Physiology Reviews
2. European Journal of Applied Physiology
3. Journal of Applied Physiology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge of aviation, Physiology at high altitude and deep sea diving
2. Discuss hazards of space flight, physiological adjustments to weightlessness
3. Describe and distinguish the long-term effects of high altitude on body and its readjustments
4. Comprehend knowledge of deep sea physiology and principles of management in Dysbarism

Course Contents:

The course will include acute and long term effects of high altitude on the body and readjustments to the situations, Physiology of Deep-sea diving, principles of management and prevention of dysbarism; special adjustments of the body in weightlessness and special environment in space flight; effects of acceleratory forces on body systems, hazards of cosmic rays and other hazards; physiological adjustments on return to earth.

Recommended Readings:

1. Benjamin Cummings: Interactive Physiology 10-System Suite. Benjamin-Cummings Publishing Company, Subs of Addison Wesley Longman, Inc. Latest Ed.
2. Cindy L. Stanfield: Principles of Human Physiology. Benjamin Cummings, Latest Ed.
3. Dee Undglaub Silverthorn: Human Physiology: An Integrated Approach. Benjamin Cummings, Latest Ed.
4. Ganong WF: Review of Physiology Latest Ed.
5. Guyton AC: Textbook of Physiology Latest Ed

Journals:

1. APS: Journal of Applied Physiology
2. APS: Physiological Reviews
3. Aviation, Space and Environmental Medicine
4. European Journal of Applied Physiology
5. Exercise and Sport Sciences Reviews
6. High Altitude Medicine & Biology
7. Pakistan Journal of Physiology
8. Physiology
9. Recent Advances in Physiology
10. The Journal of Physiology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend Physiological re-adjustments of body systems during exercise
2. Comprehend the bodily effects of exercise
3. Discuss physiological principles of muscle wasting and disuse atrophy

Course Contents:

Physiology of Exercise and changes in various body systems during exercise, Cardiovascular and respiratory re-adjustments during exercise; body-building and disuse atrophy

Recommended Readings:

1. Benjamin Cummings: Interactive Physiology 10-System Suite. Benjamin-Cummings Publishing Company, Subs of Addison Wesley Longman, Inc. Latest Ed.
2. Cindy L. Stanfield: Principles of Human Physiology. Benjamin Cummings, Latest Ed.
3. Dee Undglaub Silverthorn: Human Physiology: An Integrated Approach. Benjamin Cummings, Latest Ed.
4. Ganong WF: Review of Physiology Latest Ed.
5. Guyton AC: Textbook of Physiology Latest Ed

Journals:

1. APS: Journal of Applied Physiology
2. APS: Physiological Reviews
3. Canadian Journal of Applied Physiology Reviews
4. European Journal of Applied Physiology
5. Exercise and Sport Sciences Reviews
6. High Altitude Medicine & Biology
7. Pakistan Journal of Physiology
8. Physiology
9. Science
10. The Journal of Physiology

MPhil leading to PhD in PHARMACOLOGY

<u>Course Code & Title</u>	<u>Credit Hrs</u>	<u>Page No</u>
BMS: 733 General Pharmacology	2+0 Credit Hrs	45
BMS: 734 CNS Pharmacology	2+1 Credit Hrs	46
BMS: 735 ANS Pharmacology	2+1 Credit Hrs	47
BMS: 736 GIT, Hormones & Drugs Affecting Uterus	2+1 Credit Hrs	48
BMS: 737 Kidney, CVS & Respiratory System	2+1 Credit Hrs	49
BMS: 738 Clinical Pharmacology	2+0 Credit Hrs	50
BMS: 739 Chemotherapy	1+0 Credit Hrs	51
BMS: 740 Psycho Pharmacology	2+0 Credit Hrs	52
BMS: 741 Anti inflammatory and Autacoids	2+0 Credit Hrs	53
BMS: 742 Drugs Acting on the Blood	1+0 Credit Hrs	54

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge of pharmacology, drugs nomenclature and divisions of pharmacology
2. Describe and comprehend the principles of pharmacopoeias, routes of administration, absorption and related topics
3. Comprehend the mechanism of drug action, bioavailability and excretion
4. Comprehend knowledge of pharmacokinetics and pharmacodynamics
5. To discuss the types of adverse drug reactions and outline the process of drug development and approval

Course Contents:

The course contents of this subject include; Definition of Pharmacology, definition of drug and drug nomenclature, Branches/Divisions of Pharmacology, Sources of drugs, Active principles of drugs and Pharmacopoeias, Dosage forms and doses of drugs, Drug administration, Absorption of drugs and processes involved in drug absorption, Factors modifying absorption of drugs, Transport of drugs across cell-membrane, Bioavailability, its clinical significance and factors affecting bioavailability, Drugs reservoirs, distribution of drugs, plasma protein binding, Biotransformation of drugs, enzyme induction, enzyme inhibition and entero-hepatic circulation, Plasma half-life of drugs, its clinical importance and factors affecting it, Excretion of drugs, Mechanism of drug action, Dose response curves, structure- activity relationship, Factors modifying action doses of drugs, Standardizations of drugs, Biostatistics, Pharmacokinetics, Pharmacodynamics and Receptors.

Recommended Readings:

1. Basic & Clinical Pharmacology by Katzung et al. Latest Ed.
2. Basis of Pharmacology by Goodman & Gillman Latest Ed.
3. Rang & Dale's Pharmacology by H.P. Rang, M.M. Dale, R.J. Flower. Latest Ed.
4. Lippincott's Illustrated Reviews: Pharmacology by Richard A Harvey, Pamela C. Champe, Richard Finkel, and Luigi X. Cubeddu. Latest Ed.

Journals:

1. Acta Pharmacologica Sinica
2. Journal of Clinical Pharmacology
3. Biomedicine and Pharmacotherapy
4. European Journal of Pharmacology
5. Teaching and Learning in Medicine
6. British Journals of Clinical Pharmacology
7. Pharmacology, Biochemistry and Behavior
8. European Journal of Clinical Pharmacology
9. Canadian Journal of Physiology & Pharmacology
10. Clinical and Experimental Pharmacology and Physiology

Course Objectives:

Upon completion of course the students will be able to:

1. Describe neurotransmitters and the principles of neurotransmission in central nervous system.
2. Characterize the major neuronal systems in the CNS and describe the ways in which neuronal system may be altered by diseases and drugs
3. Classify and give examples of drugs that affect the CNS
4. Describe and comprehend the methods of demonstration of anesthesia and its stages and classification.
5. Explain the pharmacokinetics and the action of general anesthetic agents.
6. Describe the drugs used in epilepsy and the management of different types of epilepsy.
7. Identify drugs used to treat Parkinson's disease.
8. Describe the drug management of migraine.
9. Know what drug dependence and drug abuse is and how to treat insomnia.

Course Contents:

The course contents of this subject include; History, Introduction, methods of administration, Pre-anesthetic medication, Stages for anaesthesia, Classification, Mechanism of action, Pharmacokinetics of inhalational anaesthetics, Volatile liquids, Gases, Intravenous General Anaesthetics, Neurohumoral transmission and the CNS, Sedative and hypnotics, Classification, Benzodiazepines, Barbiturates, Phthaldehyde, Chloral hydrate, Alcohol, Principles of treatment of insomnia, Opioid analgesics and narcotic antagonists, Drug dependence and drug abuse, Local Anaesthetics,

Recommended Readings:

1. Basic & Clinical Pharmacology by Katzung Latest Ed.
2. Basis of Pharmacology by Goodman & Gillman Latest Ed.
3. Drilling's Pharmacology Latest Ed.
4. Lippincott's Illustrated Reviews: Pharmacology by Richard A Harvey, Pamela C. Champe, Richard Finkel, and Luigi X. Cubeddu. Latest Ed.

Journals:

1. Neuropsychopharmacology
2. Acta Pharmacologica Sinica
3. Clinical Neuropharmacology
4. Journal of Psychopharmacology
5. Journal of Clinical Pharmacology
6. European Journal of Pharmacology
7. Biomedicine and Pharmacotherapy
8. British Journals of Clinical Pharmacology
9. Pharmacology, Biochemistry and Behavior
10. European Journal of Clinical Pharmacology
11. Canadian Journal of Physiology & Pharmacology
12. Clinical and Experimental Pharmacology and Physiology

Course Objectives:

Upon completion of the course the student will be able to:

1. Explain the general principles and steps in neurochemical transmission in ANS
2. Characterize major neuronal systems in ANS and describe ways in which neuronal system may be altered by disease and drugs
3. Discuss the types of shock, physiologic responses to shock, and the use of adrenergic drugs in the treatment of shock
4. Explain the uses, drug actions, general adverse reactions, contraindications and interactions of adrenergic blocking drugs
5. Discuss the uses, drug actions, adverse reactions , contraindications and interactions of the cholinergic drugs
6. Discuss the uses, drug actions, adverse reactions , contraindications and interactions of the cholinergic blocking drugs
7. Classify and explain different classes of antihypertensive agents and the rationale for the management of hypertension

Course Contents:

Physiology of ANS, Neurohumoral transmission, The autonomic and somatic motor nervous system, Types of receptors and their role, Cholinergic agonists, Choline esters, Natural alkaloids, Anticholinesterases, Antimuscrinic drugs, Natural alkaloids i.e atropine & hyoscine, Semi-synthetic anticholinergic drugs, Ganglion blocking drugs i.e. Trimetaphan, Neuro-muscular blocking drugs, Adrenergic drugs, Catecholamines, Non-catecholamines, A adrenergic receptor blocking drugs & ergot alkaloids, β adrenergic receptor blocking drugs, Adrenergic neuron blocking drugs, Drugs acting a neuromuscular junction and autonomic ganglia.

Recommended Readings:

1. Basic & Clinical Pharmacology by Katzung Latest Ed.
2. Basis of Pharmacology by Goodman & Gillman Latest Ed.
3. Drilling's Pharmacology Latest Ed.
4. Lippincott's Illustrated Reviews: Pharmacology by Richard A Harvey, Pamela C. Champe, Richard Finkel, and Luigi X. Cubeddu. Latest Ed.

Journals:

1. Neuropsychopharmacology
2. Acta Pharmacologica Sinica
3. Clinical Neuropharmacology
4. Journal of Psychopharmacology
5. Journal of Clinical Pharmacology
6. European Journal of Pharmacology
7. Biomedicine and Pharmacotherapy
8. British Journals of Clinical Pharmacology
9. Pharmacology, Biochemistry and Behavior
10. European Journal of Clinical Pharmacology
11. Canadian Journal of Physiology & Pharmacology
12. Clinical and Experimental Pharmacology and Physiology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge of drugs acting on GIT and uterus.
2. Comprehend the classification of hormones and their mechanism of action on the targeted sites.

Course Contents:

The course contents of this subject include; Treatment of Peptic ulcer, Antacids, H₂ receptor antagonists, Ulcer healing drugs, Purgatives, Anti-diarrhoeals, Anti- emetics, Carminatives, Corticosteroids, Insulin and oral anti- diabetic drugs, Anti- thyroid drugs, Estrogens, Progestins, Oral contraceptives, Anabolic steroids, Oxytocin, Prostaglandins, Ergot alkaloids.

Recommended Readings:

1. Basic & Clinical Pharmacology by Katzung Latest Ed.
2. Basis of Pharmacology by Goodman & Gillman Latest Ed.
3. Drilling's Pharmacology Latest Ed.
4. Lippincott's Illustrated Reviews: Pharmacology by Richard A Harvey, Pamela C. Champe, Richard Finkel, and Luigi X. Cubeddu. Latest Ed.

Journals:

1. Acta Pharmacologica Sinica
2. Journal of Clinical Pharmacology
3. The American Journal of Medicine
4. European Journal of Pharmacology
5. Biomedicine and Pharmacotherapy
6. Pharmacology, Biochemistry and Behavior
7. European Journal of Clinical Pharmacology
8. Canadian Journal of Physiology & Pharmacology
9. Clinical and Experimental Pharmacology and Physiology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge of drugs used for treatments of complications of the kidney, cardiovascular and respiratory systems
2. Comprehend the mechanism of action of drugs on kidney, cardiovascular system and respiratory system

Course Contents:

The course contents of this subject include; Antihypertensive drugs and drug therapy of hypertension, Cardiac glycosides and treatment of cardiac failure, Anti-anginal drugs, Anti-arrhythmic drugs, Lipid lowering drugs, Diuretics, Carbonic anhydrase inhibitors, Thiazide diuretics, Loop diuretics, K⁺ sparing diuretics, Osmotic diuretics, Anti- diuretics agents, Oxytocin, Expectorants, Mucolytics, Antitussives.

Recommended Readings:

1. Basic & Clinical Pharmacology by Katzung Latest Ed.
2. Basis of Pharmacology by Goodman & Gillman Latest Ed.
3. Drilling's Pharmacology Latest Ed.
4. Lippincott's Illustrated Reviews: Pharmacology by Richard A Harvey, Pamela C. Champe, Richard Finkel, and Luigi X. Cubeddu. Latest Ed.

Journals:

1. Acta Pharmacologica Sinica
2. Journal of Clinical Pharmacology
3. The American Journal of Medicine
4. European Journal of Pharmacology
5. Biomedicine and Pharmacotherapy
6. Pharmacology, Biochemistry and Behavior
7. European Journal of Clinical Pharmacology
8. Canadian Journal of Physiology & Pharmacology
9. Clinical and Experimental Pharmacology and Physiology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge of how to carry out clinical trials.
2. Describe and comprehend the teratogenic and immunosuppressive drugs
3. Know about the effects of drugs and vaccines on active and passive immunity
4. Comprehend the mechanisms of drugs used for general and local anaesthesia, and the role of hormones in therapeutics

Course Contents:

The course contents of this subject include; Clinical trials, Bioavailability, Iotogenic disease, Teratogenic drugs, Immunosuppressants, Active immunity, Passive immunity, Storage, Uses of vaccines antisera, Immunoglobulins, General and local anaesthetics, Role of hormones in therapeutics.

Recommended Readings:

1. Basic & Clinical Pharmacology by Katzung Latest Ed.
2. Basis of Pharmacology by Goodman & Gillman Latest Ed.
3. Drilling's Pharmacology Latest Ed.
4. Lippincott's Illustrated Reviews: Pharmacology by Richard A Harvey, Pamela C. Champe, Richard Finkel, and Luigi X. Cubeddu. Latest Ed.

Journals:

1. Acta Pharmacologica Sinica
2. Journal of Clinical Pharmacology
3. The American Journal of Medicine
4. European Journal of Pharmacology
5. Biomedicine and Pharmacotherapy
6. Pharmacology, Biochemistry and Behavior
7. European Journal of Clinical Pharmacology
8. Canadian Journal of Physiology & Pharmacology
9. Clinical and Experimental Pharmacology and Physiology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend the basic principles of chemotherapy
2. Comprehend good command on all sorts of drug prescription for various diseases and health complications

Course Contents:

The course contents of this subject include; General Principals of Chemotherapy, Sulphonamides, Trimethoprim & co-trimoxazole, Penicillins, Cephalosporins, Macrolide antibiotics, Tetracyclines, Chloramphenicol, Aminoglycoside antibiotics, Quinolones, Urinary antiseptics, Antituberculous drugs, Treatment of Leprosy, Antimalarial drugs, Antifungal drugs, Anti- amoebic drugs, Anti viral drugs, Anthelmintics, Cytotoxic drugs, Alkylating agents, Anti- tumor antibiotics, Anti-metabolites, Vinca alkaloids, Miscellaneous agents.

Recommended Readings:

1. Basic & Clinical Pharmacology by Katzung Latest Ed.
2. Basis of Pharmacology by Goodman & Gillman Latest Ed.
3. Drilling's Pharmacology Latest Ed.
4. Lippincott's Illustrated Reviews: Pharmacology by Richard A Harvey, Pamela C. Champe, Richard Finkel, and Luigi X. Cubeddu. Latest Ed.

Journals:

1. Acta Pharmacologica Sinica
2. Journal of Clinical Pharmacology
3. The American Journal of Medicine
4. European Journal of Pharmacology
5. Biomedicine and Pharmacotherapy
6. Pharmacology, Biochemistry and Behavior
7. European Journal of Clinical Pharmacology
8. Canadian Journal of Physiology & Pharmacology
9. Clinical and Experimental Pharmacology and Physiology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge of antiepileptic, antipsychotic, anti manic and antidepressant drugs etc.
2. Comprehend the mechanism of action of these drugs and effects on the nerve inhibitors and nerve stimulators.

Course Contents:

The course contents of this subject include; Antiepileptics, Anti- psychotics, Phenothiazines with prototype chlorpromazine in detail, Butyrophenones with particular reference to Haloperidol, Miscellaneous groups Thiothixene etc., Anti- manic drugs, Lithium carbonate, Anti-depressants, Tricyclic anti-depressants, SSR inhibitors, MAO inhibitors with specific reference to drug interactions, Anti- Parkinsonian drugs, Levodopa and dopaminergic drugs, Anticholinergics, Anti-histamines with anticholinergic activity.

Recommended Readings:

1. Basic & Clinical Pharmacology by Katzung Latest Ed.
2. Basis of Pharmacology by Goodman & Gillman Latest Ed.
3. Drilling's Pharmacology Latest Ed.
4. Lippincott's Illustrated Reviews: Pharmacology by Richard A Harvey, Pamela C. Champe, Richard Finkel, and Luigi X. Cubeddu. Latest Ed.

Journals:

1. Neuropsychopharmacology
2. Journal of Psychopharmacology
3. European Journal of Pharmacology
4. Pharmacology, Biochemistry and Behavior
5. Canadian Journal of Physiology & Pharmacology

Course Objectives:

Upon completion of course the students will be able to:

1. Describe the mediators of inflammation and immune reactions
2. Comprehend basic knowledge of anti-inflammatory drugs and autocoids
3. Comprehend the major inflammatory diseases and their therapeutics
4. Describe the current therapies based on manipulation of the immune system

Course Contents:

The course contents of this subject include; Histamine, bradykinin, 5-hydroxytryptemine and their antagonists, Anti-histamine i.e, H1 blockers, Eicosanoids and prostaglandins, Drugs used in the treatment of bronchial asthma, NSAIDS, Treatment of rheumatoid arthritis, Treatment of gout.

Recommended Readings:

1. Basic & Clinical Pharmacology by Katzung Latest Ed.
2. Basis of Pharmacology by Goodman & Gillman Latest Ed.
3. Drilling's Pharmacology Latest Ed.
4. Lippincott's Illustrated Reviews: Pharmacology by Richard A Harvey, Pamela C. Champe, Richard Finkel, and Luigi X. Cubeddu. Latest Ed.

Journals:

1. Acta Pharmacologica Sinica
2. Journal of Clinical Pharmacology
3. Biomedicine and Pharmacotherapy
4. European Journal of Pharmacology
5. Pharmacology, Biochemistry and Behavior
6. Canadian Journal of Physiology & Pharmacology

Course Objectives:

Upon completion of course the students will be able to:

1. Describe the drugs acting on coagulation cascade
2. Comprehend basic knowledge of platelet adhesion and activation and the drugs acting as anti-platelet and thrombolytics

Course Contents:

The course contents of this subject include; Anti- coagulants and their classification, heparin, warfarin, heamatinics, antiplatelets and fibrinolytics.

Recommended Readings:

1. Basic & Clinical Pharmacology by Katzung Latest Ed.
2. Basis of Pharmacology by Goodman & Gillman Latest Ed.
3. Drilling's Pharmacology Latest Ed.
4. Lippincott's Illustrated Reviews: Pharmacology by Richard A Harvey, Pamela C. Champe, Richard Finkel, and Luigi X. Cubeddu. Latest Ed.

Journals:

1. Acta Pharmacologica Sinica
2. Journal of Clinical Pharmacology
3. European Journal of Pharmacology
4. Biomedicine and Pharmacotherapy
5. Pharmacology, Biochemistry and Behavior
6. Canadian Journal of Physiology & Pharmacology

MPhil leading to PhD in HISTOPATHOLOGY

<u>Course Code & Title</u>	<u>Credit Hrs</u>	<u>Page No</u>
BMS: 743 General Pathology	3+0 Credit Hrs	56
BMS: 744 Cardiovascular & Respiratory System	3+1 Credit Hrs	57
BMS: 745 Gastrointestinal Tract	2+1 Credit Hrs	58
BMS: 746 Urinary & Genital Systems	2+1 Credit Hrs	59
BMS: 747 Nervous System, Endocrine and Mammary Glands	3+1 Credit Hrs	60
BMS: 748 Liver, Gall bladder and Pancreas	2+1 Credit Hrs	61
BMS: 749 Lymph Nodes, Spleen and Thymus	2+0 Credit Hrs	62

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge of cell pathology, like cell injuries, death, and various adaptations
2. Comprehend general pathological conditions like inflammation, haemodynamic disorders, diseases of immunity, genetic disorders, neoplasia, skin problems and problems of lymph nodes and spleens
3. Have an updated knowledge of current research and therapeutic approaches of all these diseases

Course Contents:

The course contents of this subject include; Reversible and irreversible cell Injury, Necrosis Types, Apoptosis Cell death, Hyperplasia, Atrophy, Dysplasia, Intracellular Accumulation Calcification/ Pigmentation, definition of Inflammation, Acute Inflammation, Vascular changes/ Mediators, Granulomatous, Inflammation Repair, Cell Cycle/Wound Healing, Thrombosis, Shock, Oedema Haemorrhage, Thrombosis Embolism, Infarction, General Features of immune System, Cell/ Humoral Immunity, Hyper sensitivity, Autoimmune Disorders, Amyloidoses, Definition Benign/ Malignant, Epidemiology, Carcinogenesis, Metastasis, Grading/ Staging, Basic Concept & (Normal Karyotypes) Mutation, Autosomal dominant disease.

Recommended Readings:

1. Vinay Kumar, Abul K. Abbas, Nelson Fausto, Richard Mitchell. Robbins Basic Pathology. Saunders. Latest Ed.
2. Pathologic Basis of Diseases by Corton, Kumar and Collins, Latest Ed.
3. General Pathology by Walter and Israel Latest Ed.
4. General and Systematic Pathology by Underwood, Latest Ed.

Journals:

1. Pathology
2. Histopathology
3. Human Pathology
4. Pathology and Pathobiology
5. Journal of Clinical Pathology
6. Analytical Cellular Pathology
7. Annals of Diagnostic Pathology
8. Blood Cells, Molecules and Diseases
9. Experimental and Molecular Pathology
10. Experimental and Toxicologic Pathology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge of pathology of heart, blood vessels and respiratory system
2. Comprehend the causes and mechanism of pathogenesis of various diseases of heart, blood vessels and lungs

Course Contents:

The course contents of this subject include; Atherosclerosis, Hypertension, Ischemic heart disease/myocardial disease, Aneurysms/inflammatory disease, Valvular heart disease/cardiac failure, Obstructive pulmonary disease/infection, Diffuse interstitial disease, Tumors, Diseases of pleura.

Recommended Readings:

1. Modern Surgical Pathology by Weidner et al., Latest Ed.
2. Anderson Pathology by Damjanor & Linder Latest Ed.
3. Pathology illustrated by Macfarlane, Reid, Callander Latest Ed.

Journals:

1. Pathology
2. Histopathology
3. Human Pathology
4. Pathology and Pathobiology
5. Journal of Clinical Pathology
6. Analytical Cellular Pathology
7. Annals of Diagnostic Pathology
8. Experimental and Molecular Pathology
9. Experimental and Toxicologic Pathology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge of pathology of gastrointestinal tract, liver and pancreas
2. Comprehend the causes and mechanism of pathogenesis of diseases of gastrointestinal tract, liver and pancreas

Course Contents:

The course contents of this subject include; Esophagus/tumors, Stomach/ulcers/ tumors, Small & large intestinal, Enterocolitis/ inflammatory bowel diseases, Mal-absorption syndromes/ tumors.

Recommended Readings:

1. Modern Surgical Pathology by Weidner et al., Latest Ed.
2. Surgical Pathology of the GI Tract, Liver, Biliary Tract and Pancreas by Robert D. Odze and John R. Goldblum . Saunders. Latest Ed.
3. Anderson Pathology by Damjanor & Linder Latest Ed.
4. Pathology illustrated by Macfarlane, Reid, Callander Latest Ed.

Journals:

1. Pathology
2. Histopathology
3. Human Pathology
4. Pathology and Pathobiology
5. Journal of Clinical Pathology
6. Analytical Cellular Pathology
7. Annals of Diagnostic Pathology
8. Canadian Journal of Gastroenterology
9. Experimental and Molecular Pathology
10. Experimental and Toxicologic Pathology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge of pathology of urinary and genital systems
2. Comprehend the causes and mechanism of pathogenesis of various diseases of urinary and genital systems of male and female

Course Contents:

The course contents of this subject include; Kidneys, Glomerular/ tubulo-interstitial diseases, Blood vessels diseases/ congenital anomalies, Tumors of the kidney, Ureters, Inflammation/ tumors, Urinary Bladder, Inflammation/ tumors, External & internal genitalia, Inflammation/ tumors, Congenital anomalies, Vulva/inflammation/tumors, Vagina, Cervix, Inflammation/ tumors, Uterus/inflammation/ endometriosis, Hyperplasia/ tumors, Tubes and Ovaries/ Tumors, Placental disorder.

Recommended Readings:

1. Modern Surgical Pathology by Weidner et al., Latest Ed.
2. Anderson Pathology by Damjanor & Linder Latest Ed.
3. Pathology illustrated by Macfarlane, Reid, Callander Latest Ed.

Journals:

1. Pathology
2. Histopathology
3. Human Pathology
4. Pathology and Pathobiology
5. Journal of Clinical Pathology
6. Analytical Cellular Pathology
7. Annals of Diagnostic Pathology
8. Experimental and Molecular Pathology
9. Experimental and Toxicologic Pathology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge of pathology of nervous system
2. Comprehend basic knowledge of the pathology of endocrine and mammary glands
3. Comprehend the causes and mechanism of pathogenesis of various diseases of CNS, PNS, endocrine and mammary glands.

Course Contents:

The course contents of this subject include; Central Nervous System Inflammation and Tumors, Disease of peripheral Nerves, Disease of Skeletal muscles, Pituitary/ Thyroid/ Parathyroid, Adrenal gland/ Thymus/ Pineal Gland, Neoplasia, The Breast; Inflammation/ tumors, Gynaecomastia, Carcinoma.

Recommended Readings:

1. Modern Surgical Pathology by Weidner et al., Latest Ed.
2. Anderson Pathology by Damjanor & Linder Latest Ed.
3. Pathology illustrated by Macfarlane, Reid, Callander Latest Ed.

Journals:

1. Pathology
2. Histopathology
3. Human Pathology
4. Pathology and Pathobiology
5. Journal of Clinical Pathology
6. Analytical Cellular Pathology
7. Annals of Diagnostic Pathology
8. Experimental and Molecular Pathology
9. Experimental and Toxicologic Pathology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge of pathology of liver, gall bladder and pancreas
2. Comprehend the causes and mechanism of pathogenesis of various diseases of liver, gall bladder and pancreas

Course Contents:

The course contents of this subject include; Liver/ cirrhosis/ hepatic failure, Viral hepatitis/ abscess, Inborn errors of metabolism, Tumors, Congenital anomalies, Gallbladder inflammation/ gall stones, Disorder of extra-hepatic duct/ tumors, Pancreatitis/ pancreatic Tumors, Diabetes mellitus/ islet cell tumors.

Suggested Readings:

1. Modern Surgical Pathology by Weidner et al., Latest Ed.
2. Surgical Pathology of the GI Tract, Liver, Biliary Tract and Pancreas by Robert D. Odze and John R. Goldblum. Saunders. Latest Ed.
3. Anderson Pathology by Damjanor & Linder Latest Ed.
4. Pathology illustrated by Macfarlane, Reid, Callander Latest Ed.

Journals:

1. Pathology
2. Histopathology
3. Human Pathology
4. Pathology and Pathobiology
5. Journal of Clinical Pathology
6. Analytical Cellular Pathology
7. Annals of Diagnostic Pathology
8. American Journal of Hematology
9. Experimental and Molecular Pathology
10. Experimental and Toxicologic Pathology

Course Objectives:

Upon completion of course the students should be able:

1. To identify the anatomic regions of the normal lymph node, spleen and thymus
2. To Know the relationship between lymph node, spleen and thymus structure and their immunologic functions in the immune system
3. To classify major histologic subtypes of the non-Hodgkin's lymphomas and Hodgkin's disease.
4. To possess the basic knowledge of diagnosis and treatment of the diseases related to lymph node, spleen and thymus

Course Contents:

The course contents of this subject include; Overview of the lymphoid immune system, Lymph node anatomy, Cytology of the lymph node, Non neoplastic diseases of lymph nodes, Non-Hodgkin's Lymphomas, Hodgkin's Lymphoma, Normal anatomy and histology of spleen, Infectious/inflammatory disorders of spleen, tumors of spleen (hematogenous and vascular neoplasms), non neoplastic disorders of spleen, Normal anatomy and histology of thymus gland, tumors of thymus.

Recommended Readings:

1. Loachim's lymph node pathology, by Harry L Loachim and L Jeffery Medeiros Latest Ed.
2. Illustrated pathology of the spleen By Bridget Wilkins, Dennis Howard Wright Latest Ed.
3. Disorders of the spleen, by Richard et al. Latest Ed.
4. Thymus Gland pathology; clinical, diagnostic and therapeutic features, By Corrado Lavini latest Ed.
5. Modern Surgical Pathology by Weidner et al., Latest Ed.
6. Anderson Pathology by Damjanor & Linder Latest Ed.
7. Pathology illustrated by Macfarlane, Reid, Callander Latest Ed.

Journals:

1. Tumor Biology
2. Pathology
3. Histopathology
4. Human Pathology
5. Pathology and Pathobiology
6. Journal of Clinical Pathology
7. Analytical Cellular Pathology
8. Annals of Diagnostic Pathology
9. American Journal of Hematology
10. Experimental and Molecular Pathology
11. Experimental and Toxicologic Pathology

MPhil leading to PhD in HAEMATOLOGY

<u>Course Code & Title</u>	<u>Credit Hrs</u>	<u>Page No</u>
BMS: 743 General Pathology	3+0 Credit Hrs	64
BMS: 750 Disorders of Red Blood Cell	3+1 Credit Hrs	65
BMS: 751 Disorders of White Blood Cell	2+1 Credit Hrs	66
BMS: 752 Blood Group Serology & Coagulopathies	3+1 Credit Hrs	67
BMS: 753 Biochemistry of Blood	2+1 Credit Hrs	68
BMS: 754 Physiology of Blood, Blood Clotting & Immunity	2+1 Credit Hrs	69
BMS: 755 Drugs Acting on the Blood	2+0 Credit Hrs	70

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge of cell pathology, like cell injuries, death, and various adaptations
2. Comprehend general pathological conditions like inflammation, haemodynamic disorders, diseases of immunity, genetic disorders, neoplasia, skin problems and problems of lymph nodes and spleens
3. Have an updated knowledge of current research and therapeutic approaches of all these diseases

Course Contents:

The course contents of this subject include; Reversible and irreversible cell Injury, Necrosis Types, Apoptosis Cell death, Hyperplasia, Atrophy, Dysplasia, Intracellular Accumulation Calcification/ Pigmentation, definition of Inflammation, Acute Inflammation, Vascular changes/ Mediators, Granulomatous, Inflammation Repair, Cell Cycle/Wound Healing, Thrombosis, Shock, Oedema Haemorrhage, Thrombosis Embolism, Infarction, General Features of immune System, Cell/ Humoral Immunity, Hyper sensitivity, Autoimmune Disorders, Amyloidoses, Definition Benign/ Malignant, Epidemiology, Carcinogenesis, Metastasis, Grading/ Staging, Basic Concept & (Normal Karyotypes) Mutation, Autosomal dominant disease, Disorder of pigmentation, Benign / Malignant epidermal tumors, Tumor of Dermis, Bulous Diseases, Bones, Developmental anomalies, Fractures/ Osteonecrosis, Infections/ Bone tumors, Joints in soft tissue tumors, Malignant Lymphomas, Hodgkin's Non-Hodgkin's, Plasma Cell Dyscrasias, Histiocytosis, Spleen, Splenomegaly, Neoplasms.

Recommended Readings:

1. Vinay Kumar, Abul K. Abbas, Nelson Fausto, Richard Mitchell. Robbins Basic Pathology. Saunders. Latest Ed.
2. Pathologic Basis of Diseases by Corton, Kumar and Collins, Latest Ed.
3. General Pathology by Walter and Israel Latest Ed.
4. General and Systematic Pathology by Underwood, Latest Ed.

Journals:

1. Pathology
2. Histopathology
3. Human Pathology
4. Pathology and Pathobiology
5. Journal of Clinical Pathology
6. Analytical Cellular Pathology
7. Annals of Diagnostic Pathology
8. Blood Cells, Molecules and Diseases
9. Experimental and Molecular Pathology
10. Experimental and Toxicologic Pathology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend anaemia and different types of anaemic conditions
2. Comprehend the basic causes of anaemia
3. Comprehend the adverse effects of anaemia on health

Course Contents:

The course contents of this subject include: Nutritional Anaemia; Iron Deficiency Anaemia, Megaloblastic Anaemia, Bone Marrow Failure/Dyserythropoietic Anaemia; Aplastic Anaemia, Porphyria/sideroblastic Anaemia, Congenital Dyserythropoietic Anaemia, haemolytic anaemia; hereditary acquired.

Recommended Readings:

1. William's Haematology Last Ed.
2. Wintrobe's Clinical Haematology Last Ed.
3. Postgraduate Haematology Last Ed. by AV Hoffbrand
4. Practical Haematology by Decie Last Ed.
5. Colour atlas of Haematology Last Ed.

Journals:

1. Pathology
2. Human Pathology
3. Annals of Hematology
4. Journal of Clinical Pathology
5. Analytical Cellular Pathology
6. Annals of Diagnostic Pathology
7. American Journal of Hematology
8. Blood Cells, Molecules and Diseases
9. Experimental and Molecular Pathology
10. Critical Reviews in Oncology Hematology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend various types of disorders of white blood cells
2. Differentiate between leukaemic and non-leukaemic myelodysplastic disorders
3. Describe and differentiate between benign and malignant tumors

Course Contents:

The course contents of this subject include: Benign Disorders of WBC; Granulocytes, Monocytes, Lymphocytes, Leukaemia/MDS; Etiology/Leukaemogenesis, Acute, Chronic, Myelodysplastic syndrome, Non-Leukaemic MPD; Polycythaemia, Thrombocythaemia, Lymphoma/Plasma Cell dyscrasias; Etiology, Classification, Hodgkin/non-Hodgkin, Myelomatosis.

Recommended Readings:

1. William's Haematology Last Ed.
2. Wintrobe's Clinical Haematology Last Ed.
3. Postgraduate Haematology Last Ed. by AV Hoffbrand
4. Practical Haematology by Decie Last Ed.
5. Colour atlas of Haematology Last Ed.

Journals:

1. Blood Reviews
2. Leukemia Research
3. Annals of Hematology
4. Nature Reviews Immunology
5. Analytical Cellular Pathology
6. American Journal of Hematology
7. Blood Cells, Molecules and Diseases
8. Clinical and Experimental Immunology
9. Experimental and Molecular Pathology
10. Seminars in Thrombosis and Homeostasis
11. Critical Reviews in Oncology Hematology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge of various blood groups
2. Comprehend the basic composition of blood and role of blood proteins
3. Comprehend the principles of blood transfusion
4. Describe various bleeding disorder
5. Describe thrombosis and its therapy

Course Contents:

The course contents of this subject include: Blood Group Serology; Antigens in human blood, Blood/Components, Blood Transfusion, Bleeding Disorders; Platelet disorders, Hereditary bleeding disorders, Acquired bleeding disorders, Thrombosis and Anti Thrombotic Therapy

Recommended Readings:

1. William's Haematology Last Ed.
2. Wintrobe's Clinical Haematology Last Ed.
3. Postgraduate Haematology Last Ed. by AV Hoffbrand
4. Practical Haematology by Decie Last Ed.
5. Colour atlas of Haematology Last Ed.

Journals:

1. Blood Reviews
2. HAEMOPHILIA
1. Leukemia Research
2. Annals of Hematology
3. Analytical Cellular Pathology
4. Nature Reviews Immunology
5. American Journal of Hematology
6. Blood Cells, Molecules and Diseases
7. Experimental and Molecular Pathology
8. Clinical and Experimental Immunology
9. Critical Reviews in Oncology Hematology
10. Seminars in Thrombosis and Homeostasis

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend the basic idea about the structure and functions of various human hemoglobins
2. Have knowledge about synthesis and degradation of heme
3. Comprehend the causes and mechanism of thalassemia and hyperbilirubinemia

Course Contents:

The course will cover in detail, the structure and types of various human hemoglobin. It will also include the synthesis and degradation of heme, porphyrins, thalassemia, formation of bile pigments, and various types of hyperbilirubinemia.

Recommended Readings:

1. Harper's illustrated biochemistry Latest Ed.
2. Harrison Principles of internal Medicine Latest Ed. McGraw Hill.
3. DM Vasudevan and Streekumaris "Text book of biochemistry Latest Ed.
4. Lehninger.Nelson and Cox. Principles of Biochemistry Latest Ed.

Journals:

1. Blood Reviews
2. HAEMOPHILIA
3. Essays in Biochemistry
4. Annals of Hematology
5. Journal of Biochemistry
6. Nature Chemical Biology
7. The Journal of Biochemistry
8. Journal of Cellular Biochemistry
9. American Journal of Hematology
10. Journal of Histochemistry and Cytochemistry
11. International Journal of Biochemistry and Cell Biology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend the composition and general functions of the blood.
2. Demonstrate what blood groups are and how they are determined
3. Comprehend basic understanding immune system and role of blood proteins in body immunity

Course Contents

The course will include the Composition and general functions of blood, Formed elements of blood and their functions, Haemostasis, Blood groups and hazards of blood transfusion, Functions of plasma proteins, Reticuloendothelial system.

Recommended Readings:

1. William's Haematology Last Ed.
2. Wintrobe's Clinical Haematology Last Ed.
3. Postgraduate Haematology Last Ed. by AV Hoffbrand
4. Practical Haematology by Decie Last Ed.
5. Colour atlas of Haematology Last Ed.

Journals:

1. Blood Reviews
2. HAEMOPHILIA
3. Leukemia Research
4. The Journal of Physiology
5. Nature Reviews Immunology
6. Journal of Cellular Physiology
7. Blood Cells, Molecules and Diseases
8. Clinical and Experimental Immunology
9. European Journal of Applied Physiology
10. Seminars in Thrombosis and Homeostasis
11. Canadian Journal of Applied Physiology Reviews

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge of anti-coagulating drugs and their mechanism of action
2. Comprehend the classification of anti-coagulating drugs

Course Contents:

The course contents of this subject include; Anti- coagulants and their classification, heparin, warfarin, heamatinics.

Recommended Readings:

1. Basic & Clinical Pharmacology by Katzung Latest Ed.
2. Basis of Pharmacology by Goodman & Gillman Latest Ed.
3. Drilling's Pharmacology Latest Ed.
4. Lippincott's Illustrated Reviews: Pharmacology by Richard A Harvey, Pamela C. Champe, Richard Finkel, and Luigi X. Cubeddu. Latest Ed

Journals:

1. Acta Pharmacologica Sinica
2. Journal of Clinical Pharmacology
3. Biomedicine and Pharmacotherapy
4. European Journal of Pharmacology
5. Pharmacology, Biochemistry and Behavior
6. Canadian Journal of Physiology & Pharmacology

MPhil leading to PhD in CHEMICAL PATHOLOGY

<u>Course Code & Title</u>	<u>Credit Hrs</u>	<u>Page No</u>
BMS: 743 General Pathology	3+1 Credit Hrs	72
BMS: 756 Kidney-Electrolytes & Endocrines	3+1 Credit Hrs	73
BMS: 757 Carbohydrates and Lipids	2+1 Credit Hrs	74
BMS: 758 Proteins, Enzymes & Vitamin	2+1 Credit Hrs	75
BMS: 759 Hepatobiliary, Acid Base Disorder & Reference Ranges	3+1 Credit Hrs	76
BMS: 760 Drug Monitoring	2+0 Credit Hrs	77
BMS: 761 Quality Control	2+0 Credit Hrs	78

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge of cell pathology, like cell injuries, death, and various adaptations.
2. Comprehend general pathological conditions like inflammation, haemodynamic disorders, diseases of immunity, genetic disorders, neoplasia, skin problems and problems of lymph nodes and spleens
3. Have an updated knowledge of current research and therapeutic approaches of all these diseases

Course Contents:

The course contents of this subject include; Reversible and irreversible cell Injury, Necrosis Types, Apoptosis Cell death, Hyperplasia, Atrophy, Dysplasia, Intracellular Accumulation Calcification/ Pigmentation, definition of Inflammation, Acute Inflammation, Vascular changes/ Mediators, Granulomatous, Inflammation Repair, Cell Cycle/Wound Healing, Thrombosis, Shock, Oedema Haemorrhage, Thrombosis Embolism, Infarction, General Features of immune System, Cell/ Humoral Immunity, Hyper sensitivity, Autoimmune Disorders, Amyloidoses, Definition Benign/ Malignant, Epidemiology, Carcinogenesis, Metastasis, Grading/ Staging, Basic Concept & (Normal Karyotypes) Mutation, Autosomal dominant disease, Disorder of pigmentation, Benign/ Malignant epidermal tumors, Tumor of Dermis, Bulous Diseases, Bones, Developmental anomalies, Fractures/ Osteonecrosis, Infections/ Bone tumors, Joints in soft tissue tumors, Malignant Lymphomas, Hodgkin's Non-Hodgkin's, Plasma Cell Dyscrasias, Histiocytosis, Spleen, Splenomegaly, Neoplasms.

Recommended Readings:

1. Vinay Kumar, Abul K. Abbas, Nelson Fausto, Richard Mitchell. Robbins Basic Pathology. Saunders. Latest Ed.
2. Pathologic Basis of Diseases by Corton, Kumar and Collins, Latest Ed.
3. General Pathology by Walter and Israel Latest Ed.
4. General and Systematic Pathology by Underwood, Latest Ed.

Journals:

1. Pathology
2. Histopathology
3. Human Pathology
4. Pathology and Pathobiology
5. Journal of Clinical Pathology
6. Analytical Cellular Pathology
7. Annals of Diagnostic Pathology
8. Blood Cells, Molecules and Diseases
9. Experimental and Molecular Pathology
10. Experimental and Toxicologic Pathology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge of diagnosis and screening for renal diseases
2. Describe and interpret the role of electrolytes in kidney diseases
3. Comprehend basic knowledge of major glands of hormones, hormones composition and action

Course Contents:

The course contents of this subject include; Kidney-electrolytes;Diagnosis and screening for renal diseases, Specimens for electrolytes determination,Plasma and urine abnormality,Interpretation of electrolytes in diseases,Endocrines; Hypothalamus and pituitary,Adrenal cortex, Thyroid function, Reproductive system.

Course Contents:

The course contents of this subject include; Specific drug groups, Clinical application, Analytical requirement.

Recommended Readings:

1. Teit's Text Book of Clinical Chemistry Latest Ed.
2. Clinical Chemistry in Diagnosis and Management by Zelwa Latest Ed.
3. Clinical Chemistry (Illustrated) by Marshall Latest Ed.

Journals:

1. Pathology
2. The Journal of Biochemistry
3. Journal of Clinical Pathology
4. Nature Reviews Endocrinology
5. Molecular and Cellular Endocrinology
6. Experimental and Molecular Pathology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge of role of carbohydrates and lipids in normal and disease states
2. Know various techniques and protocols for measuring the levels these fundamental nutritional components of the body
3. Diagnose disorders caused by the excess or deficiencies of lipids & carbohydrates

Course Contents:

The course contents of this subject include; Carbohydrates and lipids; Diabetes, Determination of glucose in body fluids, Clinical significance of lipids, Measurements of lipids.

Recommended Readings:

1. Teit's Text book of Clinical Chemistry Latest Ed.
2. Clinical chemistry in diagnosis and management by Zelwa Latest Ed.
3. Clinical chemistry (Illustrated) by Marshall Latest Ed.

Journals:

1. Pathology
2. Journal of Clinical Pathology
3. The Journal of Biochemistry
4. Experimental and Molecular Pathology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge of role of proteins, enzymes and vitamins in normal in disease states
2. Know various techniques and protocols for measuring the levels of all these fundamental nutritional components of the body
3. Diagnose disorders caused by the excess or deficiencies of proteins, enzymes and vitamins

Course Contents:

The course contents of this subject include; Amino Acids and Plasma Proteins; Aminoacidurias, Analysis of amino acid, Protein analysis in diseases, Plasma Enzyme in Diagnosis; Principles of diagnostic enzymology, Iso-enzyme and their diagnostic role, Liver, cardiac, Digestive and Pancreatic enzyme, Miscellaneous enzyme, Vitamins; Classification, Vitamins essential for humans, Diagnostic importance.

Recommended Readings:

1. Teit's Text book of Clinical Chemistry Latest Ed.
2. Clinical chemistry in diagnosis and management by Zelwa Latest Ed.
3. Clinical chemistry (Illustrated) by Marshall Latest Ed.

Journals:

1. Pathology
2. Journal of Clinical Pathology
3. The Journal of Biochemistry
4. Experimental and Molecular Pathology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge clinical manifestation of liver diseases and the diagnostic strategies
2. Comprehend the role of buffer systems in normal and diseased states of the body
3. Comprehend quality control, how to select reference individuals and interpret the reference ranges

Course Contents:

The course contents of this subject include; Liver and Gall Stones; Clinical manifestation of liver disease, Enzyme released from diseased liver tissue, Diagnostic strategy, Acid Base Disorder; Buffer systems, Conditions associated with abnormal acid base status, Graphic representation of acid bases of the blood, Reference Ranges; Selection of reference individual, Specimen collection, Subject based reference values, Importance of quality control.

Recommended Readings:

1. Teit's Text Book of Clinical Chemistry Latest Ed.
2. Clinical Chemistry in diagnosis and management by Zelwa Latest Ed.
3. Clinical Chemistry (Illustrated) by Marshall Latest Ed.

Journals:

1. Pathology
2. The Journal of Biochemistry
3. Journal of Clinical Pathology
4. Nature Reviews Endocrinology
5. Molecular and Cellular Endocrinology
6. Experimental and Molecular Pathology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend various drugs groups, their clinical applications and analytical requirements.

Course Contents:

The course contents of this subject include; Specific drug groups, Clinical application, Analytical requirement.

Recommended Readings:

1. Teit's Text book of Clinical Chemistry Latest Ed.
2. Clinical chemistry in diagnosis and management by Zelwa Latest Ed.
3. Clinical chemistry (Illustrated) by Marshall Latest Ed.

Journals:

1. Pathology
2. Human Pathology
3. Analytical Cellular Pathology
4. Annals of Diagnostic Pathology
5. Experimental and Molecular Pathology
6. Experimental and Toxicologic Pathology
7. Journal of Toxicology, Clinical Toxicology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge quality management
2. Comprehend mechanism of solving problems
3. Comprehend control and how to select internal and external controls

Course Contents:

The course contents of this subject include; Fundamental of Quality Management, Problem solving mechanism, L.J. chart, Internal and external quality control.

Recommended Readings:

1. Teit's Text book of Clinical Chemistry Latest Ed.
2. Clinical chemistry in diagnosis and management by Zelwa Latest Ed.
3. Clinical chemistry (Illustrated) by Marshall Latest Ed.

Journals:

1. Pathology
2. Human Pathology
3. Analytical Cellular Pathology
4. Annals of Diagnostic Pathology
5. Experimental and Molecular Pathology
6. Experimental and Toxicologic Pathology
7. Journal of Toxicology, Clinical Toxicology

MPhil leading to PhD in MICROBIOLOGY

<u>Course Code & Title</u>	<u>Credit Hrs</u>	<u>Page No</u>
BMS: 762 General Microbiology	3+1 Credit Hrs	80
BMS: 763 Systemic Clinical Bacteriology I	3+1 Credit Hrs	81
BMS: 764 Systemic Clinical Bacteriology II	3+1 Credit Hrs	82
BMS: 765 Immunology & Disorders of the Immune System	3+1 Credit Hrs	83
BMS: 766 Medical Parasitology	2+0 Credit Hrs	84
BMS: 767 Virology	2+0 Credit Hrs	85
BMS: 768 Mycology	2+0 Credit Hrs	86

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge of bacterial structure, function and classification
2. Comprehend basic knowledge about the morphology and genetic makeup of bacteria
3. Know how bacterial infections take place and how they get resistant to certain antibiotics
4. Have full command on various technique related to bacterial sterilization and vaccines

Course Contents:

The course contents of this subject include: Bacterial Physiology, Classification morphology, metabolism, Growth, genetics, normal flora, Pathogenesis, bacterial resistance, Sterilization Disinfection, Bacterial diagnosis, Antimicrobial agents, Vaccines, hospital acquired infections.

Recommended readings:

1. Medical Microbiology by Greenwood D, R Slack, J Peutherer Latest Ed Churchill Livingstone.
2. Medical Microbiology by Mims, Dockrell, Goering, Roitt, Wakelin, Zuckerman Latest Ed. Elsevier.
3. Color Atlas and Text book of Diagnostic Microbiology by Koneman, Allen, Janda, Schreckenberger, Winn Jr. Latest Ed. Lippincott Williams & Wilkins.
4. Manual of Clinical Microbiology, Latest Ed. by Murray, Baron, Pfaller, Tenover, Tenover, ASM Press USA.
5. Foundations in Microbiology by Talaro and Talaro, WCB. Latest Ed
6. Microbiology and Immunology by Jawetz, Lewinson Latest Ed
7. Cheesbrough, M. Latest Ed Medical Laboratory Manual for Tropical Countries. Microbiology, tropical health technology, Butterworth and Co (pubs) Ltd, Borough Green, Sevenonaks, Kent TN15 8PH.
8. Kingsbury, D. T., and G. E. Wagner. Microbiology. Latest Ed, Williams and Wilkins, Baltimore
9. Mendel, G. L., R. G. Douglas, J. E. Bennett, Latest Ed. Principles and Practice of Infectious Disease. Churchill Living stone Inc,
10. Park, J. E. Latest Ed Park's textbook of Preventive and Social Medicine. M/S Banarsides Bhanot (pub), 1167, Prem Nagar, Jabalpur, 4820021, India.

Journals:

1. Nature Reviews Microbiology
2. Archives and Microbiology
3. Cellular Immunology
4. Cellular Microbiology
5. Critical Reviews in Microbiology
6. Journal of Molecular Microbiology and Biotechnology
7. Journal of Microbiological Methods

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge of mycobacterial infections
2. Comprehend various sexually transmitted diseases and how to avoid them
3. Have an understanding of chlamydial and rickettsial infections
4. Comprehend zoonotic organisms are and how they spread diseases/infections

Course Contents:

The course contents of this subject include: Mycobacterial infections, Sexually Transmitted diseases (STDs) Chlamydial and Rickettsial infections, Zoonotic organisms, hospital acquired infections, re-emerging bacterial infections.

Recommended readings:

1. Medical Microbiology by Greenwood D, R Slack, J Peutherer Latest Ed Churchill Livingstone.
2. Medical Microbiology by Mims, Dockrell, Goering, Roitt, Wakelin, Zuckerman Latest Ed. Elsevier.
3. Color Atlas and Text book of Diagnostic Microbiology by Koneman, Allen, Janda, Schreckenberger, Winn Jr. Latest Ed. Lippincott Williams & Wilkins.
4. Manual of Clinical Microbiology, Latest Ed. by Murray, Baron, Pfaller, Tenover, Tenover, ASM Press USA.
5. Foundations in Microbiology by Talaro and Talaro, WCB. Latest Ed
6. Microbiology and Immunology by Jawetz, Lewinson Latest Ed
7. Cheesbrough, M. Latest Ed Medical Laboratory Manual for Tropical Countries. Microbiology, tropical health technology, Butterworth and Co (pubs) Ltd, Borough Green, Sevenonaks, Kent TN15 8PH.
8. Kingsbury, D. T., and G. E. Wagner. Microbiology. Latest Ed, Williams and Wilkins, Baltimore
9. Mendel, G. L., R. G. Douglas, J. E. Bennett, Latest Ed. Principles and Practice of Infectious Disease. Churchill Living stone Inc,
10. Park, J. E. Latest Ed Park's textbook of Preventive and Social Medicine. M/S Banarsides Bhanot (pub), 1167, Prem Nagar, Jabalpur, 4820021, India.

Journals:

1. Nature Reviews Microbiology
2. Archives and Microbiology
3. BMC Infectious Diseases
4. Cellular Immunology
5. Cellular Microbiology
6. Critical Reviews in Microbiology
7. Journal of Molecular Microbiology and Biotechnology
8. Journal of Microbiological Methods
9. Microbial Pathogenesis

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge immune system and its components
2. Know various immune system disorders, their causes and mechanisms
3. Comprehend a sound knowledge structure and function of antigen and antibodies
4. Comprehend the basics of allergy and immunodeficiency

Course Contents:

The course contents of this subject include: Immunology, structure, types of Antigens and , structure, types of Antibodies, Humeral and cell- mediated immunity, Complement, Disorders of immune system, Hypersensitivity (Allergy), Immunodeficiency, autoimmunity.

Recommended readings:

1. Medical Microbiology by Greenwood D, R Slack, J Peutherer Latest Ed Churchill Livingstone.
2. Medical Microbiology by Mims, Dockrell, Goering, Roitt, Wakelin, Zuckerman Latest Ed. Elsevier.
3. Color Atlas and Text book of Diagnostic Microbiology by Koneman, Allen, Janda, Schreckenberger, Winn Jr. Latest Ed. Lippincott Williams & Wilkins.
4. Manual of Clinical Microbiology, Latest Ed. by Murray, Baron, Pfaller, Tenover, Tenover, ASM Press USA.
5. Foundations in Microbiology by Talaro and Talaro, WCB. Latest Ed
6. Microbiology and Immunology by Jawetz, Lewinson Latest Ed
7. Cheesbrough, M. Latest Ed Medical Laboratory Manual for Tropical Countries. Microbiology, tropical health technology, Butterworth and Co (pubs) Ltd, Borough Green, Sevenonaks, Kent TN15 8PH.
8. Kingsbury, D. T., and G. E. Wagner. Microbiology. Latest Ed, Williams and Wilkins, Baltimore
9. Mendel, G. L., R. G. Douglas, J. E. Bennett, Latest Ed. Principles and Practice of Infectious Disease. Churchill Living stone Inc,
10. Park, J. E. Latest Ed Park's textbook of Preventive and Social Medicine. M/S Banarsides Bhanot (pub), 1167, Prem Nagar, Jabalpur, 4820021, India.

Journals:

1. Nature Reviews Immunology
2. Cellular Immunology
3. Clinical and Experimental Immunology
4. Nature Reviews Microbiology
5. Archives and Microbiology
6. Cellular Microbiology
7. Critical Reviews in Microbiology
8. Journal of Molecular Microbiology and Biotechnology
9. Journal of Microbiological Methods

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge medical Parasitology and entomology
2. Comprehend knowledge about protozoan, cestodes and nematodes and related infections

Course Contents:

The course contents of this subject include: Medical parasitology and entomology, Protozoans, Cestodes, and Nematodes.

Recommended readings:

1. Medical Microbiology by Greenwood D, R Slack, J Peutherer Latest Ed Churchill Livingstone.
2. Medical Microbiology by Mims, Dockrell, Goering, Roitt, Wakelin, Zuckerman Latest Ed. Elsevier.
3. Color Atlas and Text book of Diagnostic Microbiology by Koneman, Allen, Janda, Schreckenberger, Winn Jr. Latest Ed. Lippincott Williams & Wilkins.
4. Manual of Clinical Microbiology, Latest Ed. by Murray, Baron, Pfaller, Tenover, Tenover, ASM Press USA.
5. Foundations in Microbiology by Talaro and Talaro, WCB. Latest Ed
6. Microbiology and Immunology by Jawetz, Lewinson Latest Ed
7. Cheesbrough, M. Latest Ed Medical Laboratory Manual for Tropical Countries. Microbiology, tropical health technology, Butterworth and Co (pubs) Ltd, Borough Green, Sevenonaks, Kent TN15 8PH.
8. Kingsbury, D. T., and G. E. Wagner. Microbiology. Latest Ed, Williams and Wilkins, Baltimore
9. Mendel, G. L., R. G. Douglas, J. E. Bennett, Latest Ed. Principles and Practice of Infectious Disease. Churchill Living stone Inc,
10. Park, J. E. Latest Ed Park's textbook of Preventive and Social Medicine. M/S Banarsides Bhanot (pub), 1167, Prem Nagar, Jabalpur, 4820021, India.

Journals:

1. Nature Reviews Microbiology
2. Archives and Microbiology
3. Cellular Microbiology
4. Critical Reviews in Microbiology
5. Journal of Molecular Microbiology and Biotechnology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basic knowledge of structure and function of virus and its classification.
2. Comprehend the mechanism of pathogenesis of different viruses.
3. Have sound knowledge of techniques and protocols to diagnose different viral infections.
4. Comprehend basic knowledge of hepatitis and AIDS, HFVs, and other important viruses.
5. Comprehend knowledge about precautionary measures for protection against them.

Course Contents:

The course contents of this subject include: Classification of viruses, structure of viruses, pathogenesis, life cycle of viruses, diagnosis in the laboratory of viral infections like Hepatitis, AIDS etc. Basics of antiviral therapy.

Recommended readings:

1. Medical Microbiology by Greenwood D, R Slack, J Peutherer Latest Ed Churchill Livingstone.
2. Medical Microbiology by Mims, Dockrell, Goering, Roitt, Wakelin, Zuckerman Latest Ed. Elsevier.
3. Color Atlas and Text book of Diagnostic Microbiology by Koneman, Allen, Janda, Schreckenberger, Winn Jr. Latest Ed. Lippincott Williams & Wilkins.
4. Manual of Clinical Microbiology, Latest Ed. by Murray, Baron, Pfaller, Tenover, Tenover, ASM Press USA.
5. Foundations in Microbiology by Talaro and Talaro, WCB. Latest Ed
6. Microbiology and Immunology by Jawetz, Lewinson Latest Ed
7. Cheesbrough, M. Latest Ed Medical Laboratory Manual for Tropical Countries. Microbiology, tropical health technology, Butterworth and Co (pubs) Ltd, Borough Green, Sevenonaks, Kent TN15 8PH.
8. Kingsbury, D. T., and G. E. Wagner. Microbiology. Latest Ed, Williams and Wilkins, Baltimore
9. Mendel, G. L., R. G. Douglas, J. E. Bennett, Latest Ed. Principles and Practice of Infectious Disease. Churchill Living stone Inc,
10. Park, J. E. Latest Ed Park's textbook of Preventive and Social Medicine. M/S Banarsides Bhanot (pub), 1167, Prem Nagar, Jabalpur, 4820021, India.

Journals:

1. Advances in Virus Research
2. Nature Reviews Microbiology
3. Archives and Microbiology
4. Cellular Microbiology
5. Critical Reviews in Microbiology
6. Journal of Molecular Microbiology and Biotechnology
7. Journal of Microbiological Methods

MPhil leading to PhD in FORENSIC MEDICINE & TOXICOLOGY

<u>Course Code & Title</u>	<u>Credit Hrs</u>	<u>Page No</u>
BMS: 769 General and Special Toxicology	3+1 Credit Hrs	88
BMS: 770 Anatomy, Odontology and Pathology (related)	2+1 Credit Hrs	89
BMS: 771 Serology DNA profile, Medicolegal aspects of Marriage, abortion and Asphyxial deaths	2+1 Credit Hrs	90
BMS: 772 Thanatology, Traumatology, Medical Jurisprudence and legal procedures	2+1 Credit Hrs	91
BMS: 773 Forensic toxicological aspects of blood, hair and body Fluids i.e., semen, saliva etc.	2+0 Credit Hrs	92
BMS: 774 Drugs Toxicology and its medicolegal aspects	2+0 Credit Hrs	93
BMS: 775 Analytical Toxicology and toxicology of Therapeutic agents.	2+0 Credit Hrs	94
BMS: 776 Blood groups, Serology, DNA profiling and its applications in Forensic Medicine.	2+1 Credit Hrs	95

Course Objectives:

Upon Completion of course the students will be able to:

1. Comprehend general aspects and principles of toxicology
2. Comprehend analytical techniques used in toxicology
3. Comprehend basic knowledge about specific poisons, their sources, signs and symptoms and management
4. Comprehend the basic knowledge about the hazards of therapeutic agents, commonly used households, agricultural and environmental poisons and their management

Course Contents:

The course contents of this subject include: General aspects of poisoning of medico-legal nature, examination of the poisoned person and its management also forms part of the course, analytical techniques used in toxicology like, chromatometry, spectrophotometry, chromatography, electrophoresis and ELISA. Specific poisons regarding their sources, signs and symptoms, fatal dose, fatal period and management. The course will also enable the student to know different households, occupational, agricultural, environmental poisons and their management.

Recommended Readings:

1. C.J Poison essential of toxicology raven press latest Ed.
2. Gossel clinical toxicology, William and wilknins latest Ed.
3. Warely, clinical chemistry: Harper and row Latest Ed.

Journals:

1. Toxicology
2. Forensic Science.
3. Neuro-toxicology
4. Medical Law review
5. Toxicological Sciences
6. Archives of Toxicology
7. Cell Biology and Toxicology
8. Food and chemical Toxicology
9. Journal Of clinical Forensic Medicine
10. Journal Of clinical Forensic and legal Medicine
11. Journal Of International Criminal Justice.
12. Journal of Toxicology, clinical toxicology.

Course objectives:

Upon Completion of course the students will be able to:

1. Comprehend basic knowledge of human embryology and its importance in Forensic Medicine
2. Comprehend the anatomy of tooth and bone, its development and applications in forensic medicine
3. Know how to study and interpret the pathology of any diseased leading to death

COURSE CONTENTS:

The course contents of this subject include: development of human being from conception to adult age, microscopic anatomy and bone development, the anatomy of tooth, its development and its application in Forensic Medicine. Pathology of any diseased condition leading to ill health and death. The process of disease and repair, growth and tumours, haemorrhage and shock and its relationship to unexpected deaths will be dealt with in detail.

Recommended readings:

1. R.J last Anatomy, Churchill Livingstone Longman group latest Ed.
2. R.J snell embryology little brown & Co New York Latest Ed.
3. W.M Krogman. Human skeleton in forensic medicine latest ed.
4. Romance, grays Anatomy latest Ed.
5. Bernard knight, forensic pathology
6. Walter Israel, Pathology . Churchill livingstone Latest Ed.

Journals:

1. Toxicology
2. Forensic Science
3. Toxicological Sciences
4. Archives of Toxicology
5. Cell Biology and Toxicology
6. Food and chemical Toxicology
7. Journal Of clinical Forensic Medicine
8. Journal Of clinical Forensic and legal Medicine
9. Journal Of International Criminal Justice.

BMS: 771 Serology DNA profile, Medicolegal aspects of Marriage, abortion and Asphyxial deaths **2+1 Credit Hrs**

Course objectives:

Upon Completion of course the students will be able to:

1. Comprehend the basic techniques and protocols used in serology and DNA profiling from body fluids
2. Know and comprehend the medico-legal aspects of DNA profiling in disputed paternity and maternity cases, mass disaster, calamities and identification of criminals
3. Know how to use and interpret the knowledge of serology and DNA profiling in criminal investigations
4. Comprehend deaths caused through violent asphyxia

Course contents:

The course contents of this subject include; physiology of blood ranging from the morphology of human blood and its comparative study, examination of different body fluids like, blood, semen and saliva for medico-legal purposes, different blood group systems and its application for disputed paternity and maternity cases and cases of mass disaster and calamities, different asphyxial deaths and its medico-legal aspects, medico-legal aspects of marriage and abortion including sexual offences natural and unnatural, child abuse and infant killing.

Recommended readings:

1. Gordon shapiro, forensic Medicine, Churchill livingstone Latest Ed.
2. Kathllien: Barbra e.Dodd Blood group serology
3. C.J. Poison essential of forensic medicine, paragon press oxford latest Ed.
4. Francis camp. Gradwl lofs legal medicine Bristol john wright and sons ltd latest Ed.

Journals:

1. Toxicology
2. Forensic Science
3. Medical law review
4. Toxicological Sciences
5. Archives of Toxicology
6. Cell Biology and Toxicology
7. British journal of criminology
8. Food and chemical Toxicology
9. Journal of clinical Forensic Medicine
10. Journal of clinical Forensic and legal Medicine
11. Journal of International Criminal Justice.

BMS: 772 Thanatology, Traumatology, Medical Jurisprudence and legal procedures
2+1 Credit Hrs

Course objectives:

Upon completion of course the students will be able to:

1. Comprehend the basic techniques and protocols used in thanatology and traumatology
2. Know how to examine and interpret unexpected sudden deaths
3. Comprehend basic understanding of matters related to medical jurisprudence
4. Comprehend legal procedures in the courts of law

Course contents:

The course contents of this subject include: The course is aimed at knowing the different forms of death and its medico-legal aspects, by studying in detail the autopsy, types , protocol, hazards and precautions, unexpected sudden death, different weapons and the type of injuries they produce, basic matters relevant to medical jurisprudence, principles of medical ethics, rules governing the medical profession, courts procedures and law related to medical practitioner in court also constitute part of the study.

Recommended Readings:

1. DeMio, Gun shot wounds. CRC Press London latest Ed.
2. Abdullah Fatten Gun shot wounds postmortem procedures latest Ed.
3. Spitz and Fischer Medico-legal investigation of death latest Ed.
4. Bernard Knight. Taylor's principles and practice of medical jurisprudence Churchill livingstone Latest Ed.
5. Burgess. Practical police surgeon, Major and Minor acts PMDC booklet and PMDC Gazette Latest Ed.

Journals:

1. Toxicology
2. Neurotoxicology
3. Forensic Science
4. Medical law review
5. Toxicological Sciences
6. Archives of Toxicology
7. Cell Biology and Toxicology
8. British journal of criminology
9. Food and chemical Toxicology
10. Journal Of clinical Forensic Medicine
11. Journal Of clinical Forensic and legal Medicine
12. Journal Of International Criminal Justice.

BMS: 773 Forensic toxicological aspects of blood, hair and body Fluids i.e., semen, saliva etc. 2+0 Credit Hrs

Course Objectives:

Upon Completion of course the students will be able to:

1. Comprehend basic knowledge about the structure and functions of various human hemoglobin
2. Comprehend knowledge about synthesis and degradation of hemoglobin
3. Comprehend the basic technique and the protocol used in serology, body fluids and hair with their medicolegal importance

Course contents:

The course will cover in detail the structure and types of various human hemoglobin. It will also include the synthesis and degradation of hemoglobin, porphyrins, formation of bile pigments and various types of hyperbilirubinemia

Recommended Readings:

1. Harper's illustrated Biochemistry Latest Ed.
2. Harrison Principles of internal Medicine latest Ed. McGraw Hill.
3. DM Vasudevan and Streekumaris Text book of Biochemistry latest Ed.
4. Lehninger, Nelson and Cox Principle of Biochemistry latest Ed.

Journals:

1. Blood review
2. Haemophilia.
3. Annals of Hematology
4. Essays in biochemistry
5. Journals of Biochemistry
6. Nature chemical Biology
7. The journal of Biochemistry
8. Journal of cellular Biochemistry
9. American Journal of hematology
10. Journal of Histo-chemistry and Cyto-chemistry
11. International Journal of Biochemistry and cell biology.

Course Objectives:

Upon Completion of course the students will be able to:

1. Comprehend the drugs with reference to toxicity, management and medicolegal aspects

Course contents:

The course contents of this subject include: The course is aimed at knowing the general aspects of poisoning caused by drugs including signs and symptoms, fatal dose, fatal period and management

Recommended readings:

1. Basic & clinical Pharmacology by Katzung latest Ed.
2. Basic of Pharmacology by Goodman & Gillman Latest Ed.
3. Drilling's Pharmacology latest Ed.
4. Lippincott's Illustrated reviews: Pharmacology by Richard A Harvey, Pamela c. Champe Richard finkel and luigi X cubeddu Latest Ed.

Journals:

1. Acta pharmacological Sinica
2. Journal of clinical Pharmacology
3. Biomedicine and Pharmacology
4. European Journal of Pharmacology
5. Pharmacology, Biochemistry and Behavior
6. Canadian Journal of physiology & Pharmacology

Course Objectives:

Upon Completion of course the students will be able to:

1. Comprehend various therapeutic agents their clinical applications and analytical requirements

Course contents:

The course contents of this subject include: therapeutic agents clinical applications and analytical requirements.

Recommended Readings:

1. Teit's Textbook of Clinical Chemistry latest Ed.
2. Clinical Chemistry in Diagnosis and Management by Zelwa latest Ed.
3. Clinical Chemistry (illustrated) by Marshall latest Ed.

Journals:

1. Pathology
2. Human Pathology
3. Analytical cellular Pathology
4. Annals of Diagnostic pathology
5. Experimental and Molecular Pathology
6. Experimental and toxicologic Pathology
7. Journal of toxicology, clinical toxicology.

Course Objectives:

Upon Completion of course the students will be able to:

1. Comprehend basic knowledge of various blood groups
2. Understand the basic composition of blood and role of blood proteins
3. Comprehend the principles of blood transfusion
4. Comprehend DNA, molecular biology and forensic genetics

Course contents:

The course contents of this subject include; Blood group serology; Antigens in human blood, blood/components. Blood transfusion, bleeding disorders; platelet disorders, hereditary and acquired bleeding disorders.

Recommended Readings:

1. William's Haematology latest Ed.
2. Wintrobe's Clinical Haematology latest Ed.
3. Postgraduate Haematology latest Ed By AV Hoffbrand
4. Practical Haematology by Decie Latest Ed.
5. Colour Atlas of Haematology latest Ed.

Journals:

1. Blood Reviews
2. Haemophilia
3. Leukemia research
4. Annals of Hematology
5. Nature reviews immunology
6. Analytical cellular pathology
7. American journal of heamatology
8. Blood cells molecules and diseases
9. Experimental and molecular pathology
10. Clinical and experimental immunology
11. Clinical Reviews in oncology Hematology
12. Seminars in thrombosis and homeostasis

PhD Courses

<u>Course Code & Title</u>	<u>Credit Hrs</u>	<u>Page No</u>
BMS: 777 Advances in Cell & Molecular Biology	3 Credit Hrs	97
BMS: 778 Advances in Medical Genetics	3 Credit Hrs	98
BMS: 779 Advances in Epidemiology and Biostatistics	3 Credit Hrs	99
BMS: 780 Advances in Research Methodology	3 Credit Hrs	100
BMS: 781 Bioethics	3 Credit Hrs	101
BMS: 782 Computational Biology and Medical Bioinformatics	3 Credit Hrs	102

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend in details the cell structure and organization
2. Know the methods of DNA replication, transcription, protein synthesis and enzymology
3. Know the molecular genetics of like DNA recombination, gene structure, function and regulation as well as cell signaling pathways and cancer
4. Have expertise in molecular cloning and molecular tools for studying genes and gene activity

Course Contents:

The course contents will include; Introduction to the Study of Cell Biology, The Chemical Basis of Life, Techniques in Cell and Molecular Biology, Enzymes and Metabolism, Mitochondrion and Aerobic Respiration, The Structure and Function of the Plasma Membrane, Cytoplasmic Membrane Systems, Interactions Between Cells and Their Environment, The Nature of the Gene and Genome, Expression of Genetic Information, Cytoskeleton and Cell Motility, Cellular Reproduction, Cell Signaling and Cancer. Methods in molecular biology; Transcription in Prokaryotes & Eukaryotes; RNA Polymerase & their promoters, Transcription Factors & Activators, Chromatin Structure and its effects on Transcription; Posttranscriptional events: Splicing, Capping & Polyadenylation; Translation Mechanism: Initiation, Elongation & Termination; Ribosomes & Transfer RNA; DNA Replication, Recombination and Transposition: Mechanism & Enzymology; Homologous Recombination; Site-specific Recombination & Transposition.

Recommended Books:

1. Karp, Gerald. Cell and Molecular Biology: Concepts and Experiments with Student Study Guide John Wiley & Sons, Latest Ed.
2. David S. Latchman. Basic Molecular and Cell Biology Wiley Blackwell, Latest Ed.
3. Stephen L. Wolfe. Introduction to Cell and Molecular Biology. Wiley Blackwell, Latest Ed.
4. Lizabeth A. Allison. Fundamental Molecular Biology. Wiley Blackwell, Latest Ed.
5. Harvey Lodish et. al., Molecular Cell Biology. W.H. Freeman & Co, Latest Ed.
6. Robert Weaver, Molecular Biology, McGraw Hill, Latest Ed.

Journals:

1. Biology of the Cell
2. Nature Cell Biology
3. Cell & Tissue Research
4. Journal of Cellular Physiology
5. Journal of Cellular Biochemistry
6. Journal of Molecular Cell Biology
7. Molecular and Cellular Endocrinology
8. Cellular Physiology and Biochemistry
9. Nature Reviews Molecular Cell Biology
10. International Journal of Biochemistry and Cell Biology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend the language of genetics and the terminology of molecular biology
2. Have an understanding of the role of genetics in diseases and disorders
3. Know how to operate various screening and diagnostic technologies in genetic diseases
4. Have knowledge of gene therapy and genetic counseling

Course Contents:

The course contents will include: Fundamentals of Genetics; The Cellular and Molecular Basis of Inheritance, Developmental Genetics; Transmission Genetics; Polygenic and Multifactorial Inheritance, Genetics of Behavior, Gene Mutations; Genetics in Medicine: Hemoglobin & the Hemoglobinopathies; Biochemical Genetics; Immunogenetics; Cancer Genetics; Genetic Factors in Common Diseases, Clinical Genetics: Congenital Abnormalities and Dysmorphic Syndromes, Genetic Counseling, Chromosomal Disorders, Single-Gene Disorders, Genetic Technologies: Screening for Genetic Diseases, Prenatal Testing and Reproductive Genetics, The Human Genome Project, Gene Therapy, Ethical and Social Issues. Contemporary topics in molecular medicine: Applications of r-DNA technology in Fetal and Neonatal Medicine; Medical Microbiology; Medical Oncology; Therapeutics; and Forensic Medicine; These topics include: Pharmacological manipulation of cell death; Telomeres, stem cells, senescence, and cancer; Viral, Bacterial infections & vaccine strategies and development; Molecular and genetic etiology of human disease like asthma, heart failure; hyperlipidemia, thrombopoiesis; diabetes.

Recommended Books:

1. Human Genetics: Concepts and Applications. Ricki Lewis, McGraw Hill, Latest Ed.
2. Medical Genetics: Jorde, LB, Carey JC, Bamshad MJ, White RL. Mosby, Latest Ed.
3. EMERY's Elements of Medical Genetics PD Turnpenny and S Ellard Elsevier Churchill Livingstone, Latest Ed.
4. Molecular Medicine: An Introductory Text. RJ Trent; Churchill Livingstone, Latest Ed.
5. Science and Medicine Latest Ed.

Journals:

1. Journal of Medical Genetics
2. American Journal of Medical Genetics (AJMG)
3. Journal of Human Genetics
4. Chromosome Research
5. Molecular Genetics & Genomics

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basics of epidemiology and principles of various study designs
2. To design a study and describe the validity and reliability of a study design
3. Comprehend concepts and methods of statistics in Biomedical research
4. Have good command on use of statistical computer softwares for data analysis

Course Contents:

The course contents will include; Descriptive epidemiology, analytic epidemiology and epidemiological inference, Classification, morbidity and mortality rates, ratios, incidence, prevalence, sampling, screening, epidemiological models, Types of study design; their importance, uses, and limitations, field trials, controlled epidemiological surveys, sources of bias and causal models.

Introduction to statistics, types of statistical applications, population and samples, data analysis and presentation, variables, elementary statistical methods, tabulation, chart and diagram preparations, measures of central tendency and dispersion, sampling techniques and sample size estimation, probability and proportions, Tests of significance; normal test, t test, Chi square test etc, correlation and its applications, linear regression and multiple regression, logistic regression, sign test, Wilcoxon signed rank test, Mann Whitney test, Kruskal Wallis test, Spearman rank correlation, Clinical trials and intervention studies, Measures for developing health statistical indicators: morbidity and mortality statistics, Use of latest statistical computer softwares for data analysis.

Recommended Readings:

1. Gordis, L. Epidemiology. Pennsylvania: W.B. Saunders Company. Latest Ed.
2. Rothman KJ. Modern Epidemiology. Boston: Little, Brown and Company, Latest Ed.
3. Kelsey JL, Thompson WD, Evans AS. Methods in Observational Epidemiology. New York: Oxford University Press, Latest Ed.
4. Kleinbaum DG, Kupper LL, Morgenstern H. Epidemiologic Research: Principles and Quantitative Methods. Belmont, CA: Lifetime Learning Publications, Latest Ed.
5. Lilienfeld DE, Stolley PD. Foundations of Epidemiology. New York: Oxford, Latest Ed.
6. Daniel WW. Biostatistics: A Foundation for Analysis in the Health Sciences. Latest Ed. John Wiley & Sons. Inc. New York.
7. Larson R and Farber B. Elementary Statistics: Picturing the World. Latest Ed, Prentice Hall Publications. USA.
8. Oliver, M. and Combard MS. Biostatistics for Health Professions. Latest Ed. Prentice Hall Publications, New Jersey.
9. Statistical Software: SPSS; EPIINFO; STATA; SAS

Journals:

1. Cancer Epidemiology
2. Epidemiologic Reviews
3. Annals of Epidemiology
4. American Journal of Epidemiology
5. International Journal of Epidemiology

Course Objectives:

Upon completion of course the students will be able to:

1. Comprehend basics of research methodology
2. To select and design a research project
3. To critically analyze and communicate scientific data
4. To review and write research articles in journals of international standards

Course Contents:

The course contents will include: Selection of a field for research, drivers for health research, participation in collaborative international research, participation in pharmaceutical company research, research ideas, criteria for a good research topic, types of research design, selecting research design, defining and refining research questions, generating research hypothesis, study sample and size, qualitative research, questionnaire design, research in health economics, ethics in research design, writing the research protocol, submitting a research proposal; application for funding & components of research proposal, implementing the research project, describing and analyzing research results, interpreting research results, communicating research, writing a scientific paper and dissertation or thesis, publishing a scientific paper, making a scientific presentation, assessment and evaluation of research.

Recommended Readings:

1. Mahmoud F. Fathalla. A Practical Guide for Health Researchers. WHO Regional Office for the Eastern Mediterranean Cairo, 2004.
2. Catherine Dawson. Introduction to Research Methods: A Practical Guide for Anyone Undertaking a Research Project. How to Books Ltd. Latest Ed.
3. Arlene Fink. Conducting Research Literature Reviews: From the Internet to Paper. Sage Pubns, Latest Ed.
4. Bjorn Reino Olsen, Petter Laake, Haakon Breien Benestad. Research Methodology in the Medical and Biological Sciences. Academic Pr. Latest Ed.
5. Bausell R. Barker. Advanced Research Methodology: An Annotated Guide to Sources. Scarecrow Pr. Latest Ed.
6. Debbie Holmes, Peter Moody, Diana Dines. Research Methods for the Biosciences. Oxford University Press, Latest Ed.

Journals:

1. BMC Medical Research Methodology
2. Health Services and Outcomes Research Methodology

Course Objectives:

Upon completion of course the students will be able to:

1. Analyze bioethics literature critically and comprehend the foundations of Bioethics theory
2. Know how to deal with patients within the boundaries of ethics
3. Know how to improve the basic health care services on ethical grounds
4. Comprehend basic knowledge of the ethical issues in biomedical research

Course Contents:

The course contents will include: death and dying; health professional patient relationship; method and theory in bioethics; ethics and children; organ transplantation, concepts of distributive justice in health care; defining health care needs; research ethics; reproduction and fertility; genetics and the human future.

Recommended Readings:

1. John Arras and Bonnie Steinbock. *Ethical Issues in Modern Medicine*, Mayfield, Latest Ed.
2. Françoise Baylis, Jocelyn Downie, Benjamin Freedman, Barry Hoffmaster, and Susan Sherwin. *Health Care Ethics in Canada*. Harcourt Brace, Latest Ed.
3. Tom L. Beauchamp and James F. Childress. *Principles of Biomedical Ethics*. Latest Ed. Oxford University Press.
4. Jonathan Glover, *Causing Death and Saving Lives*. Penguin Books, Latest Ed..
5. Glenn C. Graber and David C. Thomasma. *Theory and Practice in Medical Ethics*. Continuum, Latest Ed.
6. Thomas A. Mappes and David Degrazia. *Biomedical Ethics*, 4th ed. McGraw-Hill, Latest Ed.
7. Ronald Munson and Christopher A. Hoffman. *Intervention and Reflection: Basic Issues in Medical Ethics*. Latest Ed. Wadsworth.
8. Gregory E. Pence. *Classic Cases in Medical Ethics*. 2nd ed., McGraw-Hill, 1990.
9. Michael Yeo. *Concepts and Cases in Nursing Ethics*. Broadview, Latest Ed.
10. Françoise E. Baylis. *The Health Care Ethics Consultant*. Humana Press, Latest Ed.

Journals:

1. Bioethics
2. Cambridge Quarterly of Healthcare Ethics
3. Hastings Center Report
4. Journal of Clinical Ethics
5. Journal of Medical Ethics
6. Journal of Medicine and Philosophy
7. Kennedy Institute of Ethics Journal
8. Nursing Ethics

Course Objectives:

Upon completion of course the students will be able to:

1. Develop basic skills in operating computer
2. Comprehend the basic principles of presenting scientific data at national and international platforms using computer and IT technology
3. Comprehend the basic principles of bioinformatics and its role in biomedical sciences
4. Comprehend basic knowledge of genome database (Genbank), protein structure and homology based drug design, vaccine development, gene manipulation using computer models

Course Contents:

The course contents will include: Organizing and preparing data in a clear and concise manner at national meetings, basic principles of organizing data for presentation and then learn through the actual presentation of data in simulated platform sessions held in the course. Principles of bioinformatics and the pivotal role that it plays in medical sciences; Introduction to information technology and bioinformatics, concepts, Biological database, protein identification resource-sequence database, structure of proteins, molecular graphics visualization tools, protein microarrays, homology modeling, ligand docking and structure based drug design, drug discovery and testing, personalized Medicine, genome database and human genome project.

Recommended Readings:

1. Russell Schwartz. Biological Modeling and Simulation; A Survey of Practical Models, Algorithms, and Numerical Methods. The MIT press 2008.
2. James M. Bower and Hamid Bolouri. Computational Modeling of Genetic and Biochemical Networks. The MIT press. 2004.
3. Fabian J. Theis and Anke Meyer-Base. Biomedical Signal Analysis; Contemporary Methods and Applications. The MIT press, 2010.
4. Neil D. Lawrence, Mark Girolami, Magnus Rattray and Guido Sanguinetti. Learning and Inference in Computational Systems Biology. The MIT press 2010.
5. Darbeshwar Roy. Bio-informatics. Alpha Science International Ltd, Latest Ed.
6. Ramsden Jeremy. Bioinformatics. An introduction series. Computational Biology Vol.10. Springer, Latest Ed.
7. Hochreiter, Sepp; Wagner, Roland. Bioinformatics Research and Development. Series Lecture notes in Computer Science, Springer, Latest Ed.
8. Mandoiu, Ion; Narasimhan, Giri; Zhang, Yanqing. Bioinformatics Research and Applications Series: Lecture Notes in Computer Science. Springer, Latest Ed.

Journals:

1. Journal of Bioinformatics and Computational Biology (JBCB)
2. BMC Bioinformatics
3. International Journal of Computational Biology and Drug Design (IJCBD)
4. PLoS Computational Biology
5. Nature Biotechnology
6. Critical Reviews in Biotechnology
7. Biotechnology and Bioengineering