BAHRIA UNIVERSITY HEALTH SCIENCES POSTGRADUATE INSTITUTE (BUHS-PGI) KARACHI

Prospectus MPhil Programs Medical Sciences

2024-2026

BAHRIA UNIVERSITY HEALTH SCIENCES POSTGRADUATE INSTITUTE

KARACHI

CONTENTS

1. Introduction to MPhil Programs 2
2. Program Outcomes 3
3. Program Learning Objective 3
4. MPhil Programs Overview & Mission 4
5. MPhil Programs Content 5
6. Description of MPhil Programs Core Courses 6
7. Structure MPhil Program Anatomy 9
8. MPhil Anatomy -Roadmap 10
9. Description of MPhil Anatomy Program Courses..... 14
10. MPhil Anatomy Program Supervisor`s Profile 17
11. Structure MPhil Program Pathology 18
12. MPhil Pathology –Roadmap 19
13. Description of MPhil Pathology Program Courses 23
14. MPhil Pathology Program Supervisor`s Profile 25
15. Structure MPhil Program Pharmacology 26
16. MPhil Pharmacology -Roadmap 27
17. Description of MPhil Pharmacology Program Courses 32
18. MPhil Pharmacology Program Supervisor`s Profile 36
19. Structure MPhil Program Biochemistry 37
20. MPhil Biochemistry - Roadmap 38
21. Description of MPhil Biochemistry Program Courses 42
22. MPhil Biochemistry Program Supervisor`s Profile 44
23. Structure MPhil Program Physiology 45
24. MPhil Physiology -Roadmap 46
25. Description of MPhil Physiology Program Courses 50
26. MPhil Physiology Program Supervisor`s Profile 53
27. Multidisciplinary Research Laboratory (MDRL) 54
28. Animal House 61
29. Photo Gallery Batch 7& 3 62

Introduction to MPhil Programs

Bahria University Health Sciences Postgraduate Institute (BUHS-PGI) is committed to the pursuit of excellence in medical and dental education. The Master of Philosophy (MPhil) degree programs under BUHS-PGI aims to prepare postgraduates for medical education institutions particularly in areas of basic medical science research and teaching. This will promote education in basic medical sciences fields and provide opportunity for junior faculty including Bahria University Medical & Dental College (BUMDC) to enhance their professional career as a teacher and researcher in the field of basic medical sciences for the improvement of the community.

Our programs are aligned with the vision of Bahria University:

To become a knowledge and creativity driven international university that contributes towards development of society

They follow the mission statement of the parent college, Bahria University Medical College (BUMC) from which they were started in 2017 under the name of Postgraduate Programs Training & Monitoring (PGP-TM) Department. The mission statement of BUMC is:

To produce humane, ethical, competent and skilled health professionals, educators and researchers by ensuring excellence in health education, applied research and practices supported through national and international linkages for improving the health of community and society

The PGP-TM Department was upgraded to Bahria University Health Sciences Postgraduate Institute (BUHS-PGI) in 2022 and Master of Philosophy (MPhil) degree programs are running under its umbrella since then. The mission statement of BUHS-PGI is:

To attain highest standards in knowledge through creativity driven health professional skills of learning, teaching and transformative research involving national and international linkages for prevention, diagnosis, treatment of human illnesses and community care

MPhil programs are focused to facilitate: faculty development in higher education, creation of a culture of critical inquiry, promotion of evidence-based teaching and research, conduction of original research under supervision with ethical and moral values, publishing and presenting research work in national and international scientific forums and journals.

The development of professionals by MPhil programs will play the role of a productive leader equipped with professional attitudes, ethical and moral values, theoretical, analytical, and synthesis capabilities for application, implementation and self-critical analysis with communication, social, team work and lifelong learning skills

PROGRAM OUTCOMES

To produce competent MPhil graduates who are:

a) Professionals with ethical values
b) Critical thinker
c) Researcher with analytical skills
d) Efficient facilitator
e) Team players for their peers

PROGRAM LEARNING OBJECTIVES

The candidates of MPhil program at the end of two years of training will be able to:

- Excel in the areas of basic medical sciences teaching and research.
- Work as a team member for faculty development in the field of basic medical sciences.
- Instill professional and ethical values in their students to fulfill their social and professional responsibilities towards the community.
- Facilitate use of evidence based theoretical knowledge as a teacher and researcher.
- Use the interpersonal skills to communicate with peers and students.
- Develop the life-long learning skills.
- Present the research results in national / international scientific forums and publishing in journals.

MPhil Programs Overview & Mission

The objective of our MPhil programs is to develop outstanding academicians and professionals for academic and healthcare world. The goal of Master level research program at BUMDC is to contribute to existing body of knowledge. This can be achieved when an MPhil candidate unveils new knowledge either by the discovery of new facts or by the formulation of theories or by the innovative reinterpretation of known data and established ideas.

The MPhil programs comprises of coursework and supervised research thesis in any one of the five disciplines - Anatomy, Biochemistry, Pathology, Pharmacology and Physiology. The programs are meant for graduates seeking to extend and deepen their knowledge by undertaking research investigation under the supervision of faculty member of the departments of Anatomy, Biochemistry, Pathology, Pharmacology and Physiology.

MPhil programs curriculum will enable candidates to master the concepts and skills of research directly relevant to health sciences in terms of care and management of problems. A successful MPhil graduate is someone who can bring ideas from his/her research findings, to bear on important health issues within the context of his/her individual workplace.

The MPhil coursework components are conducted by highly qualified faculty members of BUMDC. The coursework environment for candidates is stimulating and challenging that requires substantial commitment of the candidate.

The mission of MPhil Programs Anatomy / Biochemistry /Pathology/ Pharmacology/ Physiology is: **To produce humane, ethical, effective teachers and researchers in basic and applied fields for improving the health status of the community**

MPhil Programs Content

THE COURSE WORK

The MPhil course work will introduce each student to a range of theories and methodologies used in health sciences research. The coursework component of each MPhil program, Anatomy, Biochemistry, Pathology, Pharmacology and Physiology, consists of common six (6) core courses to be taken up by all students, stretching over the first semester. Four of these courses have credit hours while two, teaching internship and journal club are essential with no credit hours. These latter 2 courses will continue vertically till third semester. Each program has five (5) subject courses
(3) in semester-2 and (2) in semester 3 with two (2) essential courses without credit hours. The course content will progress from broader aspects of research, to the specific skills required to conduct and deliver a compelling research design and literature review relevant to the topic. The student must thrive hard throughout the course work to enable progression towards the thesis in semester-3 and completion of thesis in semester- 4.

THE THESIS

In accordance with HEC guidelines, thesis work is scheduled in the 2nd year of MPhil programs. Thesis supervision will be conducted individually and student`s guidance will take place in the form of supervisory meetings. The aim of the thesis is to demonstrate that the candidate has made a distinctive and original contribution towards improvement of theories, professional practices and strategies in the field of health sciences. In each program a comprehensive thesis research project will be undertaken by a student on an individual basis. To facilitate the thesis process, each student will be allocated a principal supervisor, and co-supervisor(s) with expertise in the nominated discipline. The principal supervisor will be a PhD permanent faculty member of the chosen program, who has undergone an appropriate research experience and has been approved for supervision by the PMDC and HEC. After the completion of required coursework, student will defend the thesis proposal. If accepted, he/ she will work on the thesis in close consultation with his principal supervisor. Similarly, the completed theses upon approved evaluation report will be presented for defense of thesis examination according to the university requirements.

DURATION AND MODE

The minimum duration of MPhil program is two (2) years and maximum duration is four (4) years, in special circumstances and subject to approval by the competent authority. MPhil coursework of each program involves lectures, laboratory training sessions, journal club and teaching internship of five days per week. During lectures, students shall have the opportunity to learn from the faculty member (s) and also from their peers. Lectures will be highly interactive with content linked directly to the real-world health issues as well as some philosophical underpinnings for knowledge production. Laboratory training sessions, journal club and teaching internship will provide them skill expertise and updated knowledge relevant to chosen discipline which they can successfully use for their professional grooming.

Description of MPhil Programs Core Courses

MED 701 RESEARCH METHODOLOGY, BIOSTATISTICS, EPIDEMIOLOGY:

Preamble:

This course will introduce the basic knowledge regarding research, study designs, work feasibility, organization, categorization and analysis of the collected data. Students will be facilitated to translate the acquired knowledge through application of fundamental concepts and methods of statistics, epidemiology, synopsis components and plagiarism in the areas of medical and biological research. Special emphasis will also be given to teach and subsequently use the statistical computer software like SPSS for data entry and analysis by the scholars.

Objectives:

1. Describe research, methods of research, research studies, their designs and work feasibility.
2. Describe types of data and ways of collection of data.
3. Comprehend organization, categorization and analyses of collected data.
4. Describe the fundamental concepts and methods of statistics in the areas of medical research.
5. Demonstrate use of statistical computer software for data analysis.
6. Explain the concepts and methods of epidemiology in the areas of medical research.
7. Describe advantages and disadvantages of epidemiological studies.
8. Describe the components of synopsis and consequences of

plagiarism Assessment Tools:

Quiz, Assignment, Presentation, Mid-term exam, Final-term semester exam

MED 712 MEDICAL BIOLOGY & GENETICS:

Preamble:

This course comprises of an interdisciplinary field of medical biology that bridges the fields of chemistry, structure and biology. It seeks to understand life and cellular processes at the molecular level. In the midst of this "omics" era that is producing vast databases cataloguing the molecular components of cells, this course will highlight the ways to discover the basic mechanisms, producing differentiated properties that coordinate the activities of a living cell. This is dependent on the hereditary material-genes in our DNA. They make proteins by reading and copying the specific DNA code from the nucleus of a cell through various chemical processes. Diseases may be caused by a specific change even at the level of a single gene.

Objectives:

1. Introduction to the study of cell and molecular biology.
2. Explain the chemical basis of life with respect to molecular bonding
3. Explain the structure function of plasma membrane.
4. Describe the cytoplasmic membrane system.
5. Explain the concept & importance of interaction between cell & their environment.
6. Describe the cytoskeleton & cell motility with clinical significance
7. Describe the nature of the gene & genome.

8. Comprehend the process of gene expression, gene transcription, epigenetics
9. Explain the structure of nucleotides with its importance
10. Describe the metabolism of purine and pyrimidine with their clinical significance
11. Describe the process of DNA replication & repair with their clinical significance
12. Describe the process of transcription & post transcription with their clinical significance
13. Describe the process of translation & post-translational modification with their clinical significance.
14. Describe the cell signaling & signal transduction process.

Assessment Tools: Quiz, Assignments, Presentation, Mid-term exam, Final-term semester exam

MED 713 MEDICAL EDUCATION, ETHICS & WRITING:

Preamble:

This course will teach the concepts of medical education to health professionals for effective application of educational and administrative technological advances taking place in teaching and learning theories. Biomedical ethics is a system of moral principles that apply values and judgments to the practice of medicine. As a scholarly discipline, biomedical ethics encompasses its practical application in clinical settings as well as work on its history, philosophy and sociology. Students will also be exposed to strategies of literature search, typical components of research proposal, thesis, article and grant writing.

Objectives:

1. Understand the principles of adult learning and assessment
2. Comprehend principles of objective writing, development of MCQs & SEQs
3. Apply effective teaching skills including small group & large group learning activities
4. Describe skills of writing test items for knowledge, skills and behavioral objectives
5. Comprehend concepts of bioethics, principles of contextual ethics & related issues in biomedical research
6. Describe the rationale for the use of subjects and animals in research
7. Describe literature search and ways to conduct this search
8. Describe the components and write up of research proposal, thesis, article and grants Assessment Tools: Quiz, Assignment, Presentations, Mid-term exam, Final-term semester exam

MED 714 INSTRUMENTS AND ANIMAL USE IN RESEARCH:

Preamble:

This course will introduce key analytical instruments used for analysis in medical research. It will highlight their principles, working and application guidelines along with the requirements of specimen collection and sample processing for them. The course will also encompass the principles and concepts regarding the use, handling, techniques and ethics of laboratory animals in biomedical research. Students will be acquainted with the knowledge of genetically manipulated animals and preparation of disease models to discover more

effective and safe methods of diagnosis and treating diseases and hence to promote human health.

Objectives:

1. Explain laboratory safety and its standard guidelines
2. Identify laboratory hazards and their types
3. Comprehend bio-safety awareness with reference to tools
4. Explain the principals of instruments used in medical research
5. Describe standard operative procedure (SOP) of instruments used in medical research
6. Perform laboratory measurements and calculations
7. Explain techniques of fluids/ tissue/ organ, specimen collection and processing for various instruments
8. Identify the need of laboratory animals in teaching, research and drug testing.
9. Understand the salient characteristics of commonly used laboratory animals.
10. Describe the factors associated with laboratory animal`s health care and welfare
11. Understand the importance of genetic quality and strains of laboratory animals.
12. Demonstrate the techniques of animal handling, restraining, drug administration and blood drawing.
13. Explain techniques of reducing stress, analgesia, anesthesia, euthanasia etc. and preparation of disease models in laboratory animals

Assessment Tools: Quiz, Assignment, Presentation, MCQ`s, SAQ`s, OSPE

MED 715, 716 & 717 JOURNAL CLUB:

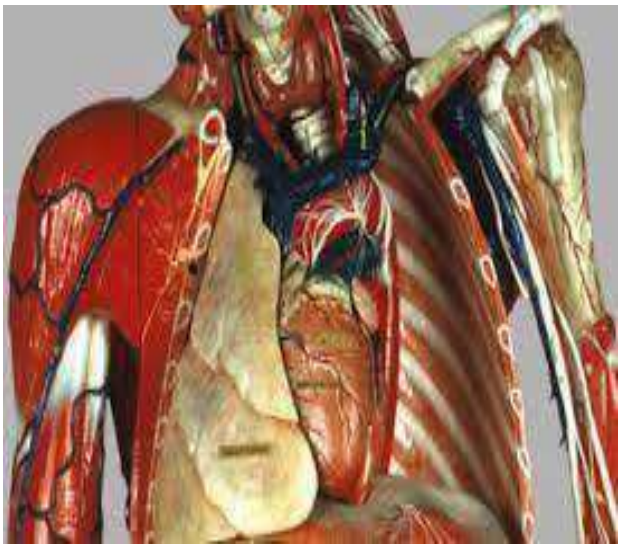
Critically reviewing the published paper(s) of choice and elaborating in detail the findings described on regular basis in the research journal club/seminar, critical thinking on the provided research literature, report writing, presentations.

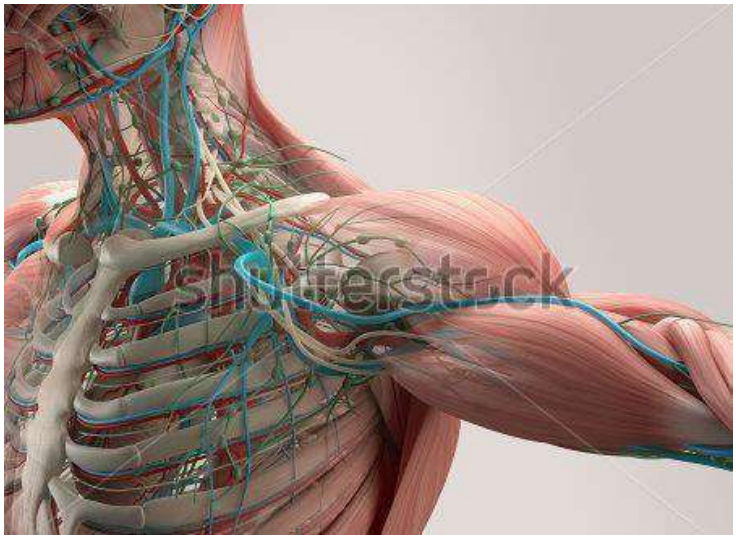
MED 718, 719 & 720 TEACHING INTERNSHIP:

Working and duties, academic and administerial tasks performed by the student in the department and institution as departmental member including taking up of lectures, case based sessions, problem based learning sessions, demonstrations, mentoring of undergraduate students etc.

Structure MPhil Program-Anatomy

The structure of MPhil program- Anatomy comprises of an extensive “Course Work" followed by the "Supervised Research Thesis." This program fulfills the requirement of Higher Education Commission (HEC). The coursework components are specifically designed to maximize learning and to develop a comprehensive skill base required to undertake thesis research. Assessment of course content in each semester will consist of a combination of continuous assessments and examinations. In line with academic standards MPhil students will be required to pass coursework to progress to the thesis research work.





MPHIL ROAD MAP ANATOMY
Summary of Credit Hours

Sr. No.	Courses as per HEC new GE Policy 2023	Credit Hours/Contact Hours Proposed New Road Map
1.	Generic-MED Courses as per PMDC Rules part V point 01 (Semester-I)	9 CH
2.	Major/Disciplinary (Semester-II)	6 CH
3.	Electives toward specialization (Semester-II 01 course, Semester-III 02 course)	9 CH
4.	Thesis (THS 700 Semester-III, THS 701 Semester-IV)	6 CH
5.	Deficiency course in case of candidate from other domain or interdisciplinary domain	NOT APPLICABLE • MBBS student can take admission in any basic medical sciences MPhil program as they study all subjects at under graduate level • BDS student can take admissions in all basic medical sciences MPhil programs except Pathology (Histopathology) as they do not study this subject at undergraduate level
	Total	**30 CH**

Semester 1

Sr. No.	Road map aligned with HEC GEP Policy				
	Pre-requisite Course Code	Course Code	Course Title	Credit Hours	17 UN SDGs alignment (please mention relevant SDG No.
1	Level 6 (MBBS/ BDS)	MED 701	Research Methodology	3+0	UN SDGs No. 3 Good Health & Well Being
2		MED 712	Medical Biology & Genetics	2+0	
3		MED 713	Medical Education, Ethics & Writing	2+0	
4		MED 714	Instruments & Animal use in research	2(1+1)	
5		MED 715	Journal Club -I	No credit Hour	
6		MED 718	Teaching Internship -I	No credit Hour	
Total Credit Hours				**9**	

Semester 2

Sr. No.	Road map aligned with HEC GEP Policy				
	Pre-requisite Course Code	Course Code	Course Title	Credit Hours	17 UN SDGs alignment (please mention relevant SDG No.
1	Semester-I	ANA 730	Neuro-Anatomy with Head & Neck	3(2+1)	UN SDGs No. 3 Good Health & Well Being
2		ANA 731	GIT with related abnormalities	3(2+1)	
3	ANA 730 & 731	XXX XXX	Elective-I	3 (2+1)	
4	MED 715	MED	Journal Club –II	No	
		716		Credit hour	
5	MED 718	MED 719	Teaching Internship -II	No credit hour	
			Total Credit Hours	**9**	

Semester 3

Sr. No.	Road map aligned with HEC GEP Policy				
	Pre-requisite Course Code	Course Code	Course Title	Credit Hours	17 UN SDGs alignment (please mention relevant SDG No.
1	ANA 730 & 731	XXX XXX	Elective-II	3+0	UN SDGs No. 3 Good Health & Well Being
2		XXX XXX	Elective-III	3+0	
3	-	THS 700	Thesis-I	3+0	
4	MED 716	MED 717	Journal Club -III	No credit hour	
5	MED 719	MED 720	Teaching Internship-III	No credit hour	
			Total Credit Hours	**9**	

Semester 4

Sr. No.	Road map aligned with HEC GEP Policy				
	Pre-requisite Course Code	Course Code	Course Title	Credit Hours	17 UN SDGs alignment (please mention relevant SDG No.
1	THS 700	THS 700	THS 701	Thesis-II	UN SDGs No. 3 Good Health & Well Being
Total Credit Hours				**3**	

List of Elective Courses

Sr. No.	Road map aligned with HEC GEP Policy				
	Pre-requisite Course Code	Course Code	Course Title	Credit Hours	17 UN SDGs alignme (please mentio relevan SDG No
1		MED 706	Tissue processing	3 (1+2)	UN SDG No. 3 Good Health Well Being
2		MED 708	Cadaveric dissection	3 (1+2)	
3		MED 709	Advanced microscopic techniques	3 (1+2)	
4	ANA 730 & 731	ANA 732	Microscopic structure of Tissue	3 (2+1)	
5		ANA 733	Developmental Anatomy	3 (2+1)	
6		ANA 734	Musculoskeletal system	3 (2+1)	
7		ANA 735	Cardiovascular & Respiratory system	3 (2+1)	
8		ANA 736	Urogenital system	3 (2+1)	
9		ANA 737	Reticuloendothelial system	3 (2+1)	

Description of MPhil Anatomy Program Courses

MED 706

Microscopes: components, phenomenon and uses of simple and compound optical microscopes; maintenance of microscopes; tissue processing; differences between different types of fixatives, factors affecting the quality of fixation, and fixatives used for selected individual tissues; types of clearing agents; paraffin embedding process; microtomes and knives, their types and uses, sharpening of knives, problems encountered and their remedies; sectioning of paraffin embedded tissue; procedure, uses and interpretation of routine Haematoxylin and Eosin staining

MED 708

Better and dissected understanding of gross anatomy of body; 3D understanding of anatomical relation of an organ with the surrounding organs, tissues, bones, fascia etc.; study of dissected specimen

MED 709

Microscopes: components, phenomenon and uses of florescent microscope, polarizing microscope, dark field microscope, and electron microscope; differences between phase contrast, interference, polarized and fluorescence microscopy; micrometry; use of cryotomes; frozen sectioning, microphotography; Maintenance of microscopes; Special stains: Oil Red-O for Lipids, Mallory's connective tissue stain, Periodic Acid Schiff (PAS) for glycogen; histochemical stains; immunohistocytochemistry

ANA 730

Osteology of head & neck; gross structure, cross sections & blood supply of spinal cord and brain stem; gross structure of cerebellum and its connections; structure and functions of diencephalon, RAS & limbic system; meninges, dural venous sinuses and ventricular system; gross features of cerebrum with cortical areas; cranial nerves with clinical correlates; autonomic nervous system; microscopic features of peripheral nerve, spinal cord, cerebellum and cerebrum; blood supply of brain; development of nervous system; Parotid and Temporal region, infratemporal and pterygopalatine fossae; Face, muscles and nerve supply; ; Muscles of mastication with TMJ; Ear and auditory pathway with clinical correlates; Nose & olfactory pathway; Eye, extraocular muscles and visual pathway with clinical correlates; Cervical fascia, Suprahyoid and infrahyoid muscles and triangles of neck, Cervical plexus and ganglia present in head & neck; lymphatic drainage of head & neck; Development of skull, cervical vertebrae, pharyngeal apparatus, face and special sense organs

ANA 731

Structures of anterior abdominal wall and formation of inguinal canal; bony pelvis & lumbar vertebrae; peritoneum, peritoneal reflections, compartments and spaces of abdominal cavity; gross & microscopic features of oral cavity, tongue, salivary glands, oropharynx, oesophagus, stomach, small and large intestine, rectum, anal canal, and spleen; development of foregut, midgut and hindgut; gross & microscopic structure of liver, gall bladder & pancreas; sites of porto- systemic anastomosis; major blood vessels of abdomen, structure of posterior abdominal wall, radiological examination of GIT; abdominal examination on a simulated subject; surgical anatomy of incisions; investigations related to GIT

ANA 732

Types of lenses and their abberrations; principles and stages of tissue processing and differentiate between automated and manual tissue processing; chemical basis of staining; cell junctional complexes and surface modifications of cells; microscopic features of epithelial tissues, connective tissues, muscle tissue, cartilage, bone, blood vessels, integumentary system, reticuloendothelial system, respiratory system, urinary system and reproductive system

ANA 733

Cell cycle, cell division and chromosomal abnormalities; gametogenesis (oogenesis and spermatogenesis), ovarian Cycle; fertilization; menstrual cycle; implantation and ectopic pregnancies; embryonic period (organogenesis); fetal period; fetal membranes and placenta; multiple pregnancies; birth defects and pre-natal diagnosis; development of cardiovascular, respiratory, urinary and reproductive systems

ANA 734

Brachial plexus and injuries at various levels; muscles of anterior and posterior compartments of arm and forearm with neurovascular supply; joints of upper and lower limbs; structures present in gluteal region, thigh, leg and foot including bones, muscles, nerves, blood vessels and joints; structure of mammary gland and back; surface anatomy of arteries and nerves of upper and lower limbs, radiological anatomy of limbs

ANA 735

Surface anatomy of lungs, pleura, borders and valves of heart; structure, neurovascular supply and lymphatic drainage of thoracic cage; intercostal spaces with their muscles and neurovascular bundle; mediastinum, its subdivisions and contents; pericardium; location, structure and relations of heart with neurovascular supply; pleural cavity with layers, extent and nerve supply of pleura; gross and microscopic structure of lungs with neurovascular

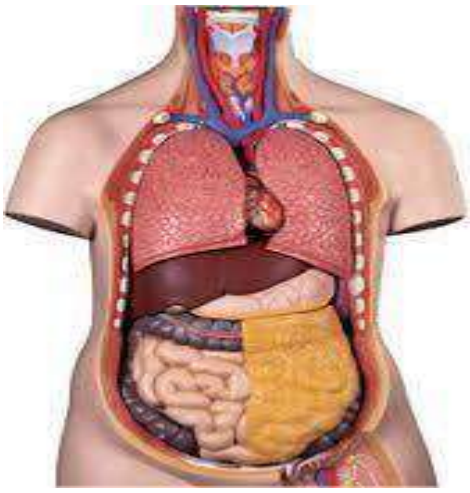
supply; thoracic duct; arterial supply and venous
drainage of thoracic cavity; splanchnic nerves, sympathetic trunk and cardiac plexus;
structure and nerve supply of diaphragm

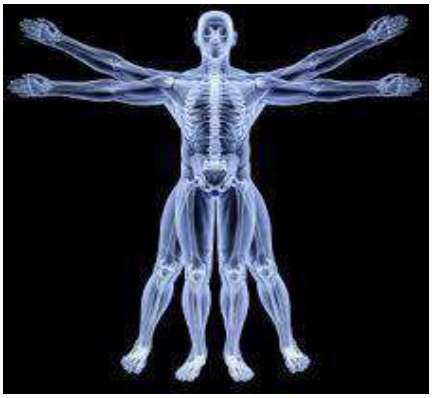
ANA 736

Gross structure, microscopic features and development of kidneys, ureter, urinary bladder, urethra, prostate, seminal vesicles, ovary, uterine tube, uterus and vagina; pelvic diaphragm; neurovascular supply and lymphatic drainage of pelvis; perineum; perineal pouches; spermatic cord, scrotum and testis

ANA 737

Gross and microscopic structure of bone marrow, lymph nodes, tonsils, thymus and spleen; developmental anatomy of lymphoid organs; clinical correlation of lymphoid organs with different diseases



MPhil Anatomy Program Supervisor`s Profile

Human Anatomy is the branch of Basic Health Sciences that deals with morphology or structure of the body. It is divided into Gross Anatomy, Microscopic Anatomy and Embryology or developmental anatomy. Gross Anatomy is the study of external and internal structure of the body. Microscopic Anatomy is the study of cells and tissues and is done by using microscope, also known as histology. Development anatomy or Embryology deals with the growth and development of the human beings before birth. Clinical Anatomy is the term used for the study of all disciplines, such as gross, histology and embryology as they relate to the practice of medicine and other health sciences. The history of anatomy is characterized by a progressive understanding of the functions of the organs and structure of human body. Methods have improved dramatically advancing from the examination of animals by dissection of the cadaver to 20th century, where imaging techniques including X-Ray, ultrasound, CT scan and MRI scan are widely available.

PROGRAM OFFERED & DURATION

MPhil ---------- 2 years

PHD FACULTY

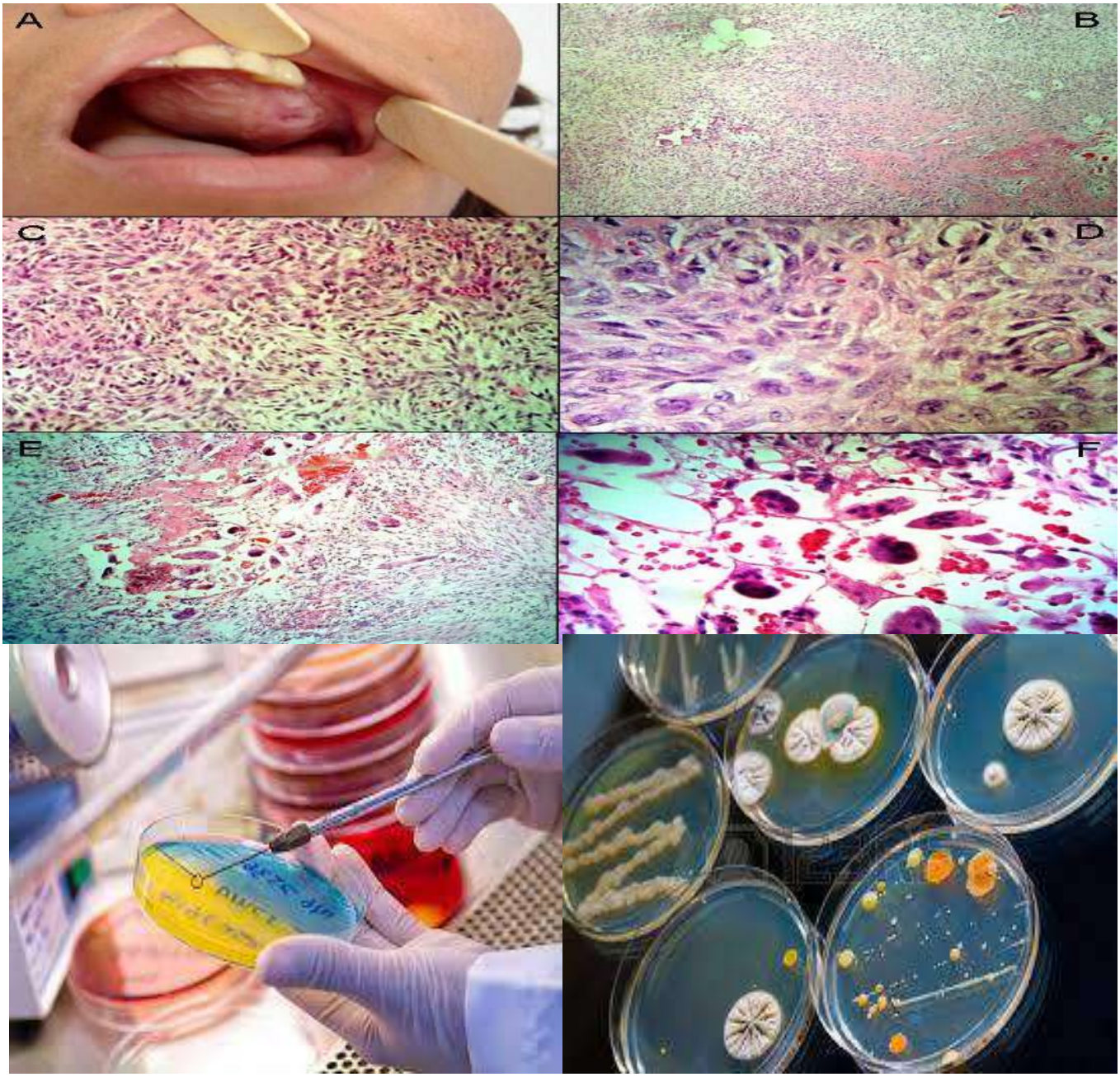
Dr. Yasmeen Maher
Professor & HOD
MBBS, MPhil

Dr. Tasneem Fatima
Professor
MSc, MPhil, PhD

Dr. Aisha Qamar
Professor
MBBS, MPhil

Structure MPhil Program-Pathology

The structure of BUMDC MPhil program- Pathology comprises of an extensive “Course Work" followed by the "Supervised Research Thesis." This program fulfills the requirement of Higher Education Commission (HEC). The coursework components are specifically designed to maximize learning and to develop a comprehensive skill base required to undertake thesis research. Assessment of course content in each semester will consist of a combination of continuous assessments and examinations. In line with academic standards MPhil students will be required to pass coursework to progress to the thesis research work.



MPHIL PATHOLOGY- ROADMAP

Summary of Credit Hours

Sr. No.	Courses as per HEC new GE Policy 2023	Credit Hours/Contact Hours Proposed New Road Map
1.	Generic-MED Courses as per PMDC Rules part V point 01 (Semester-I)	9 CH
2.	Major/Disciplinary (Semester-II)	6 CH
3.	Electives toward specialization (Semester-II 01 course, Semester-III 02 course)	9 CH
4.	Thesis (THS 700 Semester-III, THS 701 Semester-IV)	6 CH
5.	Deficiency course in case of candidate from other domain or interdisciplinary domain	NOT APPLICABLE FOR HISTOPATHOLOGY • MBBS student can take admission in any basic medical sciences MPhil program as they study all subjects at under graduate level • BDS student can take admissions in all basic medical sciences MPhil programs except Pathology (Histopathology) as they do not study this subject at undergraduate level
	Total	**30 CH**
		APPLICABLE FOR MICROBIOLOGY
		• Feb-June deficiency course (zero semester) for Non-Medical Students only, BS / MSc Microbiology (Agenda item 3610, inclusion of non-med, 36th ACM page no. 28 & 29)

Semester 1

Sr. No.	Road map aligned with HEC GEP Policy				
	Pre-requisite Course Code	Course Code	Course Title	Credit Hours	17 UN SDGs alignment (please mention relevant SDG No.
1		MED 701	Research Methodology	3+0	
2		MED 712	Medical Biology & Genetics	2+0	
3		MED 713	Medical Education, Ethics & Writing	2+0	

4	Level 6 (MBBS / BDS(except Histopathology	MED 714	Instruments & Animal use in research	2(1+1)	UN SDGs No. 3 Good Health & Well Being
5		MED 715	Journal Club -I	No credit hour	
6		MED 718	Teaching Internship -I	No credit hour	
Total Credit Hours				**9**	

Semester 2

Sr. No.	**Road map aligned with HEC GEP Policy**				
	Pre-requisite Course Code	Course Code	Course Title	Credit Hours	17 UN SDGs alignment (please mention relevant SDG No.
1	Semester- I	PAT 740	General Pathology & Basic Microbiology	3 (2+1)	UN SDGs No. 3 Good Health & Well Being
2		PAT 750	Special Pathology*	3 (2+1)	
3		PAT 751	Microbiology & Mycology**	3 (2+1)	
4	PAT 740, 750* & 751**	XXXXXX	Elective- I	3(1+2)	
5	MED 715	MED 716	Journal Club - II	No credit hour	
6	MED 718	MED 719	Teaching Internship-II	No credit hour	
Total Credit Hours				**9**	

*core subject course for Pathology (Histopathology) with PAT 740

** core subject course for Pathology(Microbiology) with PAT 740

Semester 3

Sr. No.	Road map aligned with HEC GEP Policy				
	Pre- requisite Course Code	Course Code	Course Title	Credit Hours	17 UN SDGs alignment (please mention relevant SDG No.
1	PAT 740, 750* & 751**	XXX XXX	Elective-II	3+0	UN SDGs No. 3 Good Health & Well Being
2		XXX XXX	Elective-III	3+0	
3	-	THS 700	Thesis-I	3+0	
4	MED 716	MED 717	Journal Club -III	No credit hour	
5	MED 719	MED 720	Teaching Internship -III	No credit hour	
Total Credit Hours				**9**	

Semester 4

Sr. No.	Road map aligned with HEC GEP Policy				
	Pre- requisite Course Code	Course Code	Course Title	Credit Hours	17 UN SDGs alignment (please mention relevant SDG No.
1	THS 700	THS 700	THS 701	Thesis-II	UN SDGs No. 3 Good Health & Well Being
Total Credit Hours				**3**	

List of Elective Courses

Sr. No.	Road map aligned with HEC GEP Policy				
	Pre- requisite Course Code	Course Code	Course Title	Credit Hours	17 UN SDGs alignment (please mention relevant SDG No.
1	PAT 740, 750* & 751**	PAT 742	Tissue processing for histopathology	3(1+2)	UN SDGs No. 3 Good Health & Well Being
2		PAT 743	Histopathology laboratory procedures & reporting	3(1+2)	
3		PAT 744	Endocrine & Renal disorders	3(1+2)	
4		PAT 745	Molecular pathology laboratory-related to tissue pathology	3(1+2)	
5		PAT 746	Microbiology laboratory - procedures & reporting	3(1+2)	
6		PAT 747	Molecular pathology laboratory-related to infectious diseases	3(1+2)	
7		PAT 748	Virology	3(1+2)	
8		PAT 749	Parasitology	3 (1+2)	

Description of MPhil Pathology Program Courses

MED 706

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, special and latest histological techniques. Mounting; Vital and supravital dyes and study of cells; Freezing microtome and frozen sectioning

MED 710

Understanding of control of cell cycle, cell proliferation and death, Malignancy, Genetic repair mechanisms, Molecular mechanisms of oncogenesis, Molecular basis for the known risk factors for tumours, such as viral infections and environmental carcinogens, familial cancer and its molecular basis, tumour growth, angiogenesis, tissue invasion and metastasis, tumour classification systems, Role of pathology in cancer diagnosis, molecular sub-classification, assessment of aggressiveness (prognosis), and characterization of metastases, Molecular Techniques and Lab Methods, Quality Assurance and Lab Regulation and Lab Management.

PAT 740

General concepts of pathology. Terms and definitions. Mechanisms of cell injury. Process of inflammation and wound healing as well as factors influencing them. Knowledge regarding important phenomena such as thrombosis, embolism, shock and hemorrhage. Basic concepts of tumor formation and progression as well as applied oncology. Bacteria compared with other micro-organisms. Structure of bacterial cell, growth & bacterial genetics. Classification of medically important bacteria. Colonization by normal flora. Pathogenesis and disease production in infectious diseases. Sterilization and disinfection. Basic knowledge of the immune system and pathogenesis of immune system disorders.

PAT 750

Etiology, pathogenesis, diagnostic and clinical features of diseases related to the urinary tract, male and female genital tract, breast, endocrine organs, cardiovascular system, central nervous system, skin, bones and joints, gastro-intestinal, hepatobiliary and respiratory systems.

PAT 751

Gram positive and gram negative cocci species. Gram positive rods (spore forming aerobic and anaerobic rods) Non-spore forming gram-positive rods. Gram-negative rods related to the enteric tract (Pathogens within and outside). Genus vibrio and helicobacter. Gram-negative rods (respiratory and zoonotic). Mycobacteria (Tuberculosis, Leprosy, Atypical mycobacteria). Mycoplasma, Spirochetes species. Intracellular and Minor bacterial pathogens. Basic mycology, cutaneous and subcutaneous mycosis, systemic mycosis, opportunistic mycosis.

PAT 743

Tissue sectioning and staining protocols. Morphology of oral cavity lesions. Morphology of gastrointestinal tract diseases. Morphology of liver and biliary tract disorders. Morphology of respiratory system diseases. Morphology of uro-genital tract lesions. Morphology of endocrine gland diseases. Morphology of female breast lesions. Morphology of musculo-skeletal diseases.

Morphology of central and peripheral nervous system disorders. Morphology of skin diseases

PAT 744

General rules of conduct in the laboratory. Laboratory equipment and microscope. Sterilization and disinfection, hot air oven, autoclave, filtration, inoculation, incubation. Computers in laboratory. Indenting and storage of reagents and culture media. Hazards in laboratory and safety precautions. Quality control. Collection, transport, storage and disposal of specimens. Identification of Gram-positive cocci, Gram negative cocci, Gram positive bacilli, Gram negative bacilli, Spirochetes, Mycobacteria, Mycoplasma, Chlamydia, Rickettsia, Malarial parasite and Leishmania. Diagnosis of Filariasis, Intestinal parasites, Fungal infections and viral diseases.

PAT 745

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 of Endocrines, Hypothalamus and pituitary, Adrenal cortex, Thyroid function and Reproductive system.

PAT 746

General principles of laboratory hematology: sample collection and handling of blood, reference ranges and normal values, blood cell morphology, basic hematological techniques and preparation of blood and bone marrow films, interpretation of disorders related to red blood cells, white blood cells and hemostasis, laboratory aspects of blood transfusion.

PAT 747

Sample collection, basic techniques and instruments used in clinical pathology. Physical, chemical and microscopic examination of urine, faeces, cerebrospinal fluid and aspiration fluids. Sputum examination, semen analysis and basic immunological tests.

MPhil Pathology Program Supervisor`s Profile

A dynamic and rapidly evolving field, Pathology is the study of disease. As an intellectual discipline, pathology bridges the basic and clinical sciences. Basic research into the causes and mechanisms of disease (experimental pathology) goes hand in glove with identifying the morphologic and biochemical manifestations of disease in human patients (anatomic and clinical pathology, respectively). All of these aspects of pathology have important diagnostic and therapeutic implications for patient care. Teaching of this body of knowledge at various medical and scientific levels of interest and understanding provides a unifying component to laboratory and clinic.

PROGRAMS OFFERED & DURATION

MPhil (Histopathology, Microbiology) ---------- 2 years

FACULTY

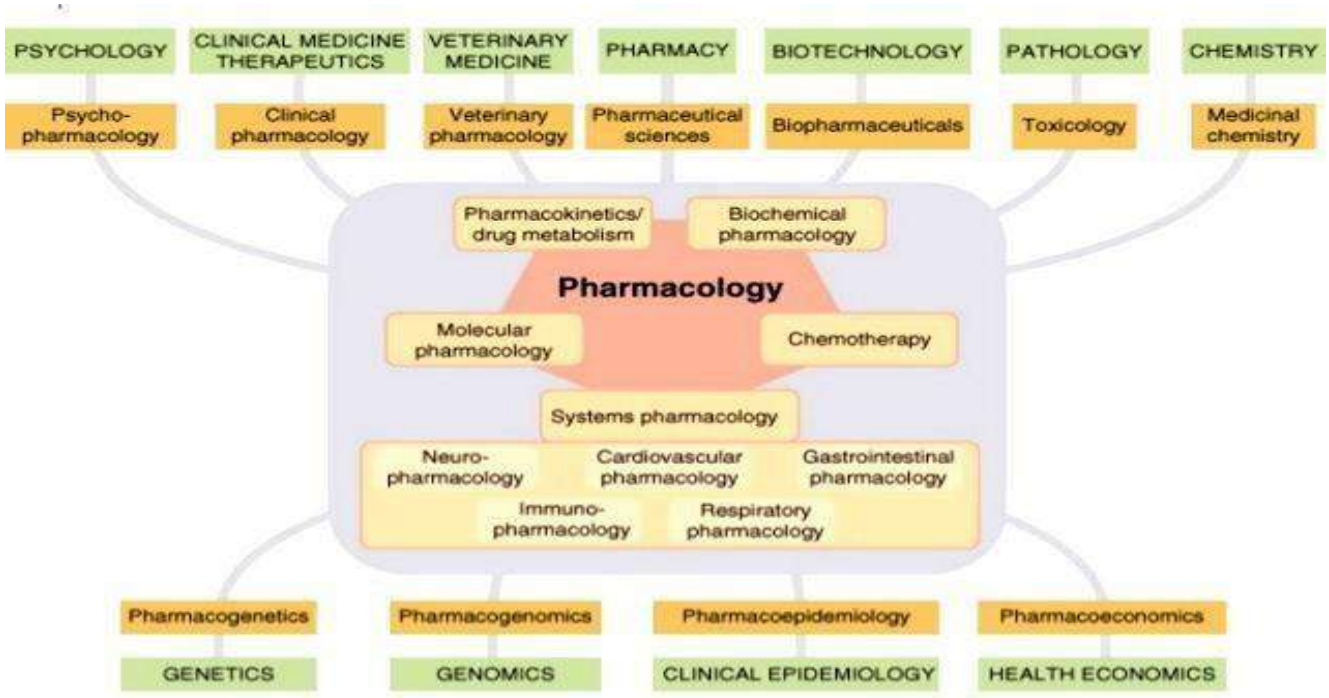
Dr. Yasmeen Taj
Professor (Microbiology)
&
HOD
MBBS, MPhil, PhD

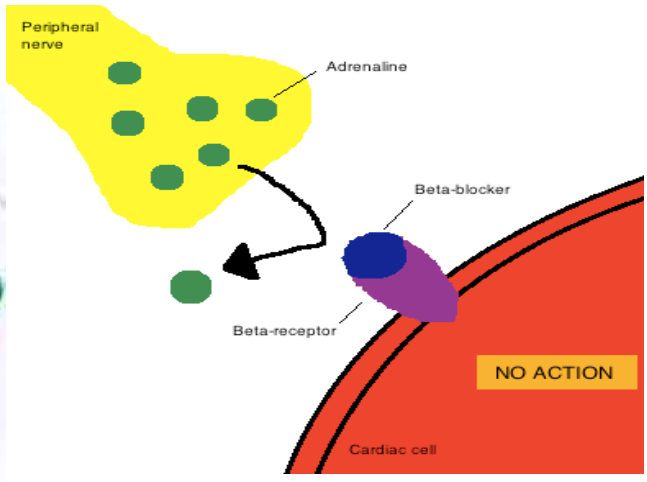
Dr. Naveed Faraz
Professor (Microbiology)
MBBS, MPhil

Dr. Summayya Shawana
Professor (Histopathology)
MBBS, MPhil

Structure MPhil Program-Pharmacology

The structure of MPhil program- Pharmacology comprises of an extensive “Course Work" followed by the "Supervised Research Thesis." This program fulfills the requirement of Higher Education Commission (HEC). The coursework components are specifically designed to maximize learning and to develop a comprehensive skill base required to undertake thesis research. Assessment of course content in each semester will consist of a combination of continuous assessments and examinations. In line with academic standards MPhil students will be required to pass coursework to progress to the thesis research work.





MPHIL ROAD MAP PHARMACOLOGY

Summary of Credit Hours

Sr. No.	Courses as per HEC new GE Policy 2023	Credit Hours/Contact Hours Proposed New Road Map
1.	Generic-MED Courses as per PMDC Rules part V point 01 (Semester-I)	9 CH
2.	Major/Disciplinary (Semester-II)	6 CH
3.	Electives toward specialization (Semester- II 01 course, Semester-III 02 course)	9 CH
4.	Thesis (THS 700 Semester-III, THS 701 Semester-IV)	6 CH
5.	Deficiency course in case of candidate from other domain or interdisciplinary domain	NOT APPLICABLE • Non-medical cannot apply to MPhil Pharmacology as Pharmacy council endorse degree supervised by Pharmacist only. • MBBS student can take admission in any basic medical sciences MPhil program as they study all subjects at undergraduate level • BDS student can take admissions in all basic medical sciences MPhil programs except Pathology (Histopathology) as they do not study this subject at undergraduate level
	Total	**30 CH**

Semester 1

Sr.No.	Road map aligned with HEC GEP Policy				
	Pre-requisite Course Code	Course Code	Course Title	Credit Hours	17 UN SDGs alignment (please mention relevant SDG No.
1	Level 6 (MBBS/ BDS)	MED 701	Research Methodology	3+0	UN SDGs No. 3 Good Health & Well Being
2		MED 712	Medical Biology & Genetics	2+0	
3		MED 713	Medical Education, Ethics & Writing	2+0	
4		MED 714	Instruments & Animal use in research	2(1+1)	
5		MED 715	Journal Club -I	No credit hour	
6		MED 718	Teaching Internship -I	No credit hour	
Total Credit Hours				**9**	

Semester 2

Sr. No.	Road map aligned with HEC GEP Policy				
	Pre-requisite Course Code	Course Code	Course Title	Credit Hours	17 UN SDGs alignment (please mention relevant SDG No
1	Semester- I	PHM 721	Pharmacological concepts & Adrenergic Pharmacology	3(2+1)	UN SDGs No. 3 Good Health & Well Being
2		PHM 722	Cholinergic & Cardio-Respiratory Pharmacology	3+0	
3	PHM 721 & 722	XXX XXX	Elective –I	3+0	
4	MED 715	MED 716	Journal Club -II	No credit hour	
5	MED 718	MED 719	Teaching Internship -II	No credit hour	
Total Credit Hours				**9**	

Semester 3

Sr. No.	Road map aligned with HEC GEP Policy				
	Pre- requisite Course Code	Course Code	Course Title	Credit Hours	17 UN SDGs alignment (please mention relevant SDG No.
1	PHM 721 & 722	XXX XXX	Elective-II	3+0	UN SDGs No. 3 Good Health & Well Being
2		XXX XXX	Elective-III	3+0	
3	-	THS 700	Thesis-I	3+0	
4	MED 716	MED 717	Journal Club -III	No credit hour	
5	MED 719	MED 720	Teaching Internship -III	No credit hour	
Total Credit Hours				**9**	

Semester 4

Sr. No.	Road map aligned with HEC GEP Policy				
	Pre- requisite Course Code	Course Code	Course Title	Credit Hours	17 UN SDGs alignment (please mention relevant SDG No.
1	THS 700	THS 700	THS 701	Thesis-II	UN SDGs No. 3 Good Health &
Total Credit Hours		**3**	**Total Credit Hours**	**3**	Well Being

List of Elective Courses

Sr. No.	Road map aligned with HEC GEP Policy				
	Pre- requisite Course Code	Course Code	Course Title	Credit Hours	17 UN SDGs alignment (please mention relevant SDG No.
1		MED 706	Tissue Processing	3(1+2)	UN SDGs No. 3 Good Health & Well Being
2		MED 707	Drug Bio-screening & Herbal Medications	3(2+1)	
3	PHM 721 & 722	PHM 723	Neuropharmacology	3+0	
4		PHM 724	Endocrine & Gastrointestinal Pharmacology	3+0	
5		PHM 725	Chemotherapy	3+0	
6		PHM 726	Toxicology	3+0	
7		PHM 727	Pharmacogenetics	3+0	
8		PHM 728	Autacoids & Analgesics	3+0	
9		PHM 729	Age Specific Pharmacology	3+0	
10		PHM 730	Dental Pharmacology	3+0	

Description of MPhil Pharmacology Program Courses

PHM 721

General concepts of pharmacological agents and substances, sources and route of drug administration, pharmacokinetics, absorption, distribution, metabolism, excretion of drugs, pharmacodynamics, receptors, receptor interactions, agonist, antagonist, trans-membrane signaling, receptor binding, antagonism and its types, receptor diseases, dose response curve, dosing and the time course of drug action, rational use of drugs, drug regulation, neurohumoral transmission, autonomic and somatic motor nervous system, adrenergic drugs, catecholamines, non- catecholamines, adrenergic receptor blocking drugs, ergot alkaloids, adrenergic neuron blocking drugs, drugs acting on neuromuscular junction and autonomic ganglia.

PHM 722

Types of cholinergic receptors and their role, cholinergic agonists, choline esters and natural alkaloids as pilocarpine, anticholinesterases, antimuscarinics, natural alkaloids as atropine and hyoscine, semi-synthetic anticholinergic drugs, antihypertensive drugs, cardiac glycosides and treatment of cardiac failure, anti-anginal drugs, anti-arrhythmic drugs, lipid lowering drugs, diuretics as carbonic anhydrase inhibitors, thiazide diuretics, loop diuretics, K+ sparing and osmotic diuretics, anti-diuretic agents, anti-coagulants-parenteral and oral, heamatinics, anti-platelets and fibrinolytics, NSAIDS, opioid analgesics, immuno-suppressives and immuno-modulators, drugs used for treatment of osteo-arthritis, rheumatoid arthritis and gout, histamine, bradykinin, 5-hydroxy- tryptamine, ergot alkaloids and their antagonists, migraine, eicosanoids and prostaglandins, drugs used in the treatment of bronchial asthma, expectorants, mucolytics, antitussives.

PHM 723

Neurohumoral transmission and CNS, sedatives and hypnotics, pre-anesthetic medications, stages for anesthesia, mechanism of action, pharmacokinetics of inhalational anesthetics, volatile liquids, gases, intravenous general anesthetics, local anesthetics, insomnia, drug dependence and drug abuse, alcohol, drugs used in treatment of epilepsy and Parkinson's disease, anti-psychotics, phenothiazines, butyrophenones, haloperidol, thiothixene, anti-manic drugs, lithium, anti- depressants, tricyclic anti-depressants, SSRI inhibitors, MAO inhibitors.

PHM 724

Treatment of peptic ulcer, antacids, H_2 receptor antagonists, proton pump inhibitors, ulcer healing drugs, purgatives, anti-diarrheals, drugs used in inflammatory bowel disease and chron`s disease,emetics and anti-emetics, Insulin and oral anti-diabetic drugs, anti-thyroid drugs, estrogens, progestins, oral contraceptives, selective estrogen receptor modulators, anabolic steroids, oxytocin, prostaglandins, ergot alkaloids, drugs acting on bone mineral metabolism

PHM 725

General principles of pharmacotherapy, penicillins, cephalosporins, carbapenams, monobactams, vancomycin, clindamycin, macrolides, sulphonamides, trimethoprim, co-trimoxazole, , tetracyclines, chloramphenicol, aminoglycosides, quinolones, urinary antiseptics, antituberculosis, antileprosy, antimalarial, antifungal, anti-amoebic , anti -viral, anthelmintics, antiprotozoal, anticancer and dermatological drugs.

PHM 726

Toxicology and its scope, disposition of xenobiotics: ADME and factors modifying these processes, principles of toxicodynamics, heavy metals, chelators, management of poisoned patient, neurotoxicology, genetic toxicology, chemical carcinogenesis, developmental toxicology and endocrine disruption with reproductive toxicology, factors effecting safety issues, legal and social issues, occupational toxicology and public health, environmental health and aspects of clinical toxicology, management of poisoned patient, laboratory and imaging procedures, toxic syndrome caused by acetaminophen, amphetamines, anticholinergic agents, antidepressants, antipsychotics, aspirin, beta blockers, calcium channel blockers, carbon monoxide and other gases, cholinesterase inhibitors,, cyanide, digoxin, sedatives and hypnotics, alcohols, iron, opioids, theophylline and rattle snake venom

PHM 727

Genetic variation in the effects of drugs and xenobiotics, body's reactions to drugs
,pharmacologically relevant genetic and genomic variation in humans and animals, single nucleotide polymorphisms, large structural variations, polymorphisms in different ethnicities, effects on gene expression and function, method and strategy development, clinical significance, exploration and applications of clinical translation, epigenetic and non-genetic factors to drug disposition and drug response, nucleic acid-based therapies, use of genome editing tools, nanoparticle manufacturing, dosage forms, mechanism of action, toxicities

PHM 728

Histamine, bradykinin, 5-hydroxytryptamine and their antagonists, anti-histamine, H1 blockers, eicosanoids and prostaglandins, drugs used in the treatment of migraine and bronchial asthma, NSAIDS, treatment of rheumatoid arthritis, treatment of gout, opioid analgesics, angiotensin, kinins, vasopressin, natriuretic peptides, endothelins, VIP, substance P, neurotensin, calcitonin gene related peptide

PHM 729

Lipid solubility , molecular size, pH, placental transporters, protein binding, placental and fetal metabolism of drug, maternal and fetal drug actions, toxic drug actions in fetus, absorption, distribution, metabolism and excretion in infants and children, pediatric dosage forms, pediatric drug dosage, pharmacokinetic and pharmacodynamic changes with aging, sedative hypnotics, analgesics, antipsychotic, antidepressant, anti-Alzheimer`s disease, antihypertensive, antiarrhythmic, antimicrobial, anti-inflammatory, ophthalmic drugs use in geriatrics, adverse drug reactions in elderly

PHM 730

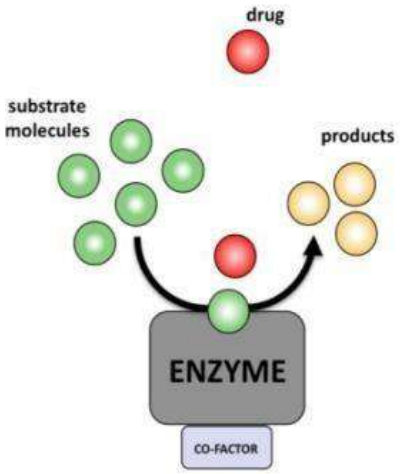
General principles: of drug action, drug interactions, prescription writing, Drugs used in dentistry: autonomic drugs, non-opioid analgesics, opioid analgesics and antagonists, anti-infective agents, antifungal and antiviral agents, local anesthetics ,anti-anxiety agents, general anesthetics, vitamins and minerals, oral conditions and their treatment, Drugs that may alter dental treatment: cardiovascular drugs, anticonvulsants, psychotherapeutic agents, autacoids and antihistamines, adrenocorticosteroids, other hormones, antineoplastic drugs ,respiratory and gastrointestinal drugs, Special situations: emergency drugs

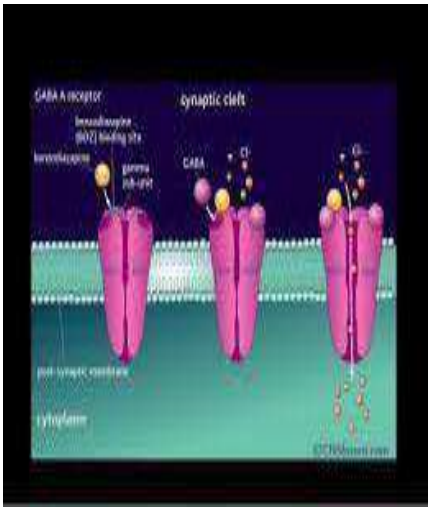
MED 706

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, special and latest histological techniques. Mounting; Vital and supravital dyes and study of cells; Freezing microtome and frozen sectioning

MED 707

Drug screening , in- vitro and in-vivo methods of drug screening, drug screening on isolated tissue, screening of the drug and their metabolites in biological fluids, instrumental methods of drug screening, thin layer chromatography, gas chromatography, spectroscopic methods, high performance liquid chromatography, pitfalls and problems of drug screening, botanical substances as Echinacea, Garlic. Ginkgo, Ginseng, Milk thistle, St. John`s Wort, Saw palmetto, Coenzyme Q 10, Glucosamine, Melatonin, therapeutic properties of herbal medications, use of herbal medications in treating gastrointestinal, respiratory, immune and other disorders, herbal manufacturing techniques for liquid, solid and semisolid preparations





MPhil Pharmacology Program Supervisor`s Profile

Pharmacology is the branch of Basic Health Science that revolves around drug. It deals with the identification of potential drugs, development of drugs, use of existing drugs, exploration of new uses of existing drugs, use of drugs in rational manner and drug delivery systems. It involves the study of the effects of chemical substances on the functions of living system. This is accounted as mechanism of action and adverse effects produced by the drugs. As a science it was born in the mid-19th century based on the principles of experimentation. The knowledge of pharmacology is essential as modern medicine relies heavily on drugs as main tool of therapeutics to prevent, treat, palliate any disease and even to provide a boost to existing health. Hence the horizon of Pharmacology includes understanding of why, when and how to give a drug? How the given drug will interact with the target & other tissues as well as with other simultaneously administered drugs leading to production of therapeutic effects and or adverse effects?

PROGRAM PROPOSED & DURATION

MPhil ---------- 2 years

PHD FACULTY

Dr. Nasim Karim
Principal BUHS-PGI
Professor & HOD
MBBS, MPhil, PhD,
Post-doc (USA)

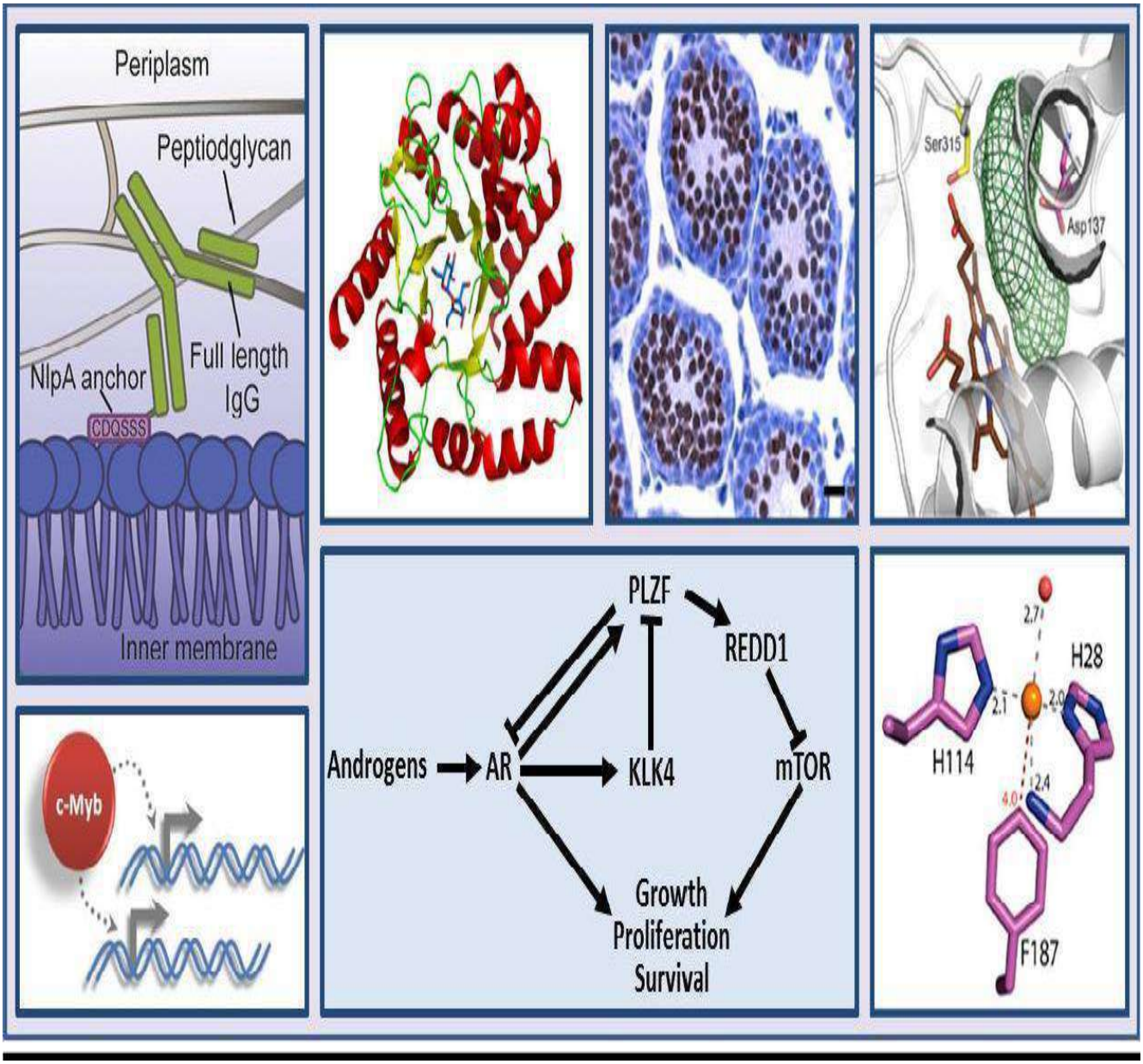
Dr. Syed Ijaz Hussain Zaidi
PHD-Coordinator &
Professor MBBS, PhD

Dr. Khalid Mustafa
Vice Principal (Medical)
& Professor
MBBS, MPhil

Dr. Talea Hoor
Professor
MBBS, MPhil

Structure MPhil Program-Biochemistry

The structure of MPhil program- Biochemistry comprises of an extensive “Course Work" followed by the "Supervised Research Thesis." This program fulfills the requirement of Higher Education Commission (HEC). The coursework components are specifically designed to maximize learning and to develop a comprehensive skill base required to undertake thesis research. Assessment of course content in each semester will consist of a combination of continuous assessments and examinations. In line with academic standards MPhil students will be required to pass coursework to progress to the thesis research work.



MPHIL ROAD MAP BIOCHEMISTRY

Summary of Credit Hours

Sr. No.	Courses as per HEC new GE Policy 2023	Credit Hours/Contact Hours Proposed New Road Map
1.	Generic-MED Courses as per PMDC Rules part V point 01 (Semester-I)	9 CH
2.	Major/Disciplinary (Semester-II)	6 CH
3.	Electives toward specialization (Semester-II 01 course, Semester-III 02 course)	9 CH
4.	Thesis (THS 700 Semester-III, THS 701 Semester-IV)	6 CH
5.	Deficiency course in case of candidate from other domain or interdisciplinary domain	APPLICABLE Spring (9 CH) • Feb-June deficiency course (zero semester) only for Non-Medical Students BS / MSc Biochemistry • MBBS student can take admission in any basic medical sciences MPhil program as they study all subjects at under graduate level • BDS student can take admissions in all basic medical sciences MPhil programs except Pathology (Histopathology) as they do not study this subject at undergraduate level
	Total	**39 CH**

Semester 1

Sr. No.	Road map aligned with HEC GEP Policy				
	Pre-requisite Course Code	Course Code	Course Title	Credit Hours	17 UN SDGs alignment (please mention relevant SDG No.
1	Level 6 (MBBS/ BDS) Level 6 (BS or MSc Biochemistry	MED 701	Research Methodology	3+0	UN SDGs No. 3 Good Health & Well Being
2		MED 712	Medical Biology & Genetics	2+0	
3		MED 713	Medical Education, Ethics & Writing	2+0	
4		MED 714	Instruments & Animal use in research	2(1+1)	
5		MED 715	Journal Club -I	No credit hour	
6		MED 718	Teaching Internship -I	No credit hour	
Total Credit Hours				**9**	

Semester 2

Sr. No.	Road map aligned with HEC GEP Policy				
	Pre- requisit e Course Code	Course Code	Course Title	Credit Hours	17 UN SDGs alignment (please mention relevant SDG No.
1	Semester-I	BIO 750	Advances in Biochemistry and neurosciences	3+0	
2	Semesterer-I	BIO 751	Advances in Clinical Biochemistry	3(2+1	UN SDGs No. 3 Good Health & Well Being
3	BIO 750 & 751	XXXXXX	Elective –I	3+0	
4	MED 715	MED 716	Journal Club - II	No credit hour	
5	MED 718	MED 719	Teaching Internship-II	No credit hour	
Total Credit Hours				**9**	

Semester 3

Sr. No.	Road map aligned with HEC GEP Policy				
	Pre- requisit e Course Code	Course Code	Course Title	Credit Hours	17 UN SDGs alignment (please mention relevant SDG No.
1	BIO 750 & 751	XXX XXX	Elective-II	3+0	UN SDGs No. 3 Good Health & Well Being
2		XXX XXX	Elective-III	3+0	
3	-	THS 700	Thesis-I	3+0	
4	MED 716	MED 717	Journal Club -III	No credit hour	
5	MED 719	MED 720	Teaching Internship - III	No credit hour	
Total Credit Hours				**9**	

Semester 4

Sr. No.	Road map aligned with HEC GEP Policy				
	Pre- requisite Course Code	Course Code	Course Title	Credit Hours	17 UN SDGs alignment (please mention relevant SDG No.
1	THS 700	THS 700	THS 701	Thesis- II	UN SDGs No. 3 Good Health & Well Being
Total Credit Hours				**3**	

List of Elective Courses

Sr.No.	Road map aligned with HEC GEP Policy				
	Pre- requisite Course Code	Course Code	Course Title	Credit Hours	17 UN SDGs alignment (please mention relevant SDG No.
1	BIO 750 & 751	BIO 752	Chemical basis of Diet, Nutrition & recent trends in immunology	3(2+1)	UN SDGs No. 3 Good Health & Well Being
2		BIO 753	Advances in Endocrinology	3+0	
3		BIO 754	Fluids and electrolyte disorder	3+0	
4		BIO 755	Enzymology and vitamins	3+0	
5		BIO 756	Acid base disorders	3+0	
6		BIO 757	Molecular mechanism of cancer	3+0	
7		BIO 758	Mineral and	3+0	

ZERO SEMESTER SPRING FOR MPHIL BIOCHEMISTRY

Sr. #	Course Code	Course Title	Credit Hours
1	BIO 750	Advances in Biochemistry and neurosciences	3+0
2	BIO 751	Advances in Clinical Biochemistry	3+0
3	XXXXXX	Elective –I	3+0
Total Credit Hours in Zero Semester			**9**

Description of MPhil Biochemistry Program Courses

BIO 750

Concept of generation of energy by biological oxidation and election transport chain, 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, glycogenolysis, gluconeogenesis, aerobic and anaerobic glycolysis , tricarboxylic acid cycle, hexose monophosphate pathway and inter-conversion of various monosaccharide and synthesis of amino sugars, glycosaminoglycan and glucuronic acid, digestion and absorption of lipids, transport of plasma lipids oxidation of fatty acids, synthesis of fatty acids, metabolism of ketone bodies and metabolism of cholesterol and metabolism of plasma lipoproteins

BIO 751

The course will provide the detailed understanding of biochemical functions of liver, kidney and thyroid. 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. The course also provides the knowledge of the structure and types of hemoglobin. It will also include the synthesis and degradation of heam, porphyria, hemoglobinopathies, formation of bile pigments, and various types of hyperbilirubinemias.

BIO 752

The course will provide the knowledge of chemistry of carbohydrates, proteins, plasma protein, immunoglobulin, lipids and diet. The course also provides knowledge of nutrition with the integrated overview of the physiological requirements and biochemical role of carbohydrates, lipids and proteins that are determinants of health and diseases in human populations.

BIO 753

The course will provide the knowledge of structure and functions of different hormones. It will also include their synthesis, control of their syntheses, and mechanism of action of hormones. A detail about diseases related to hormone hypo and hyper secretions will also be included.

BIO 754

This course provide the knowledge of biochemical role of water and electrolytes in maintenance of homeostasis, also provides the concept of dehydration and water intoxication , regulation of water by different organs, effect of sodium and potassium disorder in water loss

BIO 755

The course will provide the knowledge of structure, classification, properties of enzymes, enzyme kinetics, factors affecting enzymes activity, enzyme inhibition, functions clinical and diagnostic importance of enzymes, co-enzymes and isoenzymes. This course will also provide information of biochemical role of water soluble and fat soluble vitamins along with their clinical disorders.

BIO 756

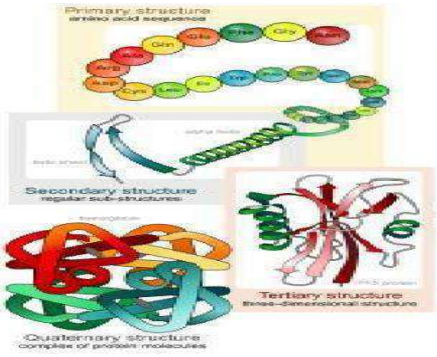
This course will provide the biochemical knowledge of the acid base disorder; buffer systems, conditions associated with abnormal acid base status, graphic representation of acid bases of the blood with reference ranges

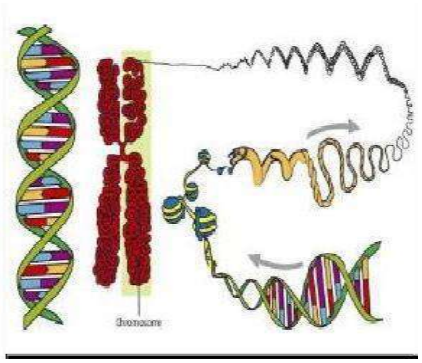
BIO 757

The course will provide the basic knowledge 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 provide knowledge regarding structural and morphological changes in apoptosis

BIO 758

The course will provide the knowledge of different minerals and their biochemical role in health and diseases. This course also provide the knowledge of biotransformation of toxic compound into nontoxic through different chemical reaction.





MPhil Biochemistry Program Supervisor's Profile

Biochemistry is the language of all biology sciences. The study of Biochemistry is essential to understand basic functions of the body. This study will give information regarding the functioning of cells at the molecular level. Modern day medical practice is highly dependent on the laboratory analysis of body fluids, especially the blood. The disease manifestations are reflected in the composition of blood and other tissues. Hence, the demarcation of abnormal from normal constituents of the body is another aim of the study of Biochemistry.

Advances in genomics like RNA interference for silencing of genes and creation of transgenic animals by gene targeting of embryonic stem cells are opening up new vistas in therapy of diseases like cancer and AIDS. It is hoped that in future, the physician will be able to treat the patient, by understanding his biochemical and molecular genetic basis, so that very efficient "designer medicine" could cure the diseases. Medical practice is now depending more on the science of Medical Biochemistry.

PROGRAM PROPOSED AND DURATION

MPhil -------2 YEARS

PHD FACULTY

Dr. Hasan Ali
Professor and HOD
MBBS, MPhil

Dr. Bibi Kulsoom
Professor
MBBS, MPhil, PhD

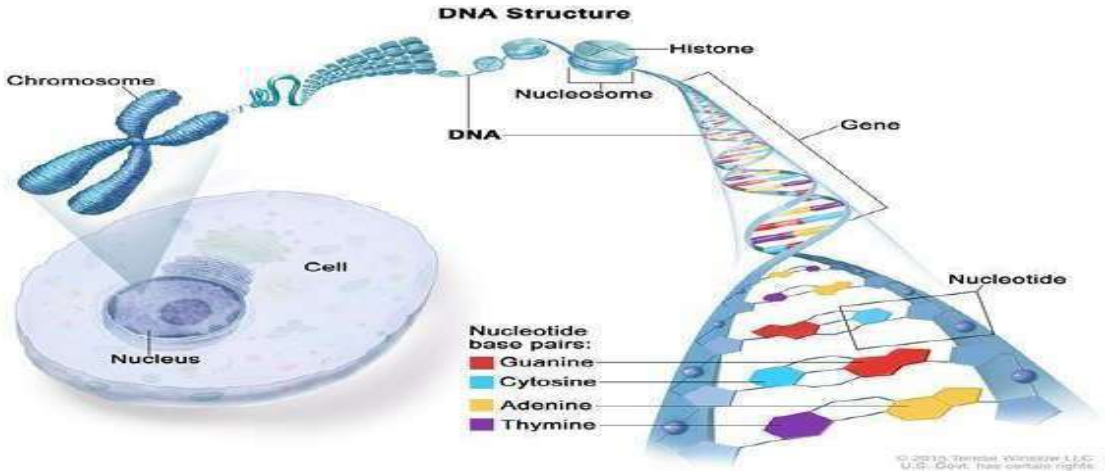
Dr. Mahreen Latif
Professor
MSc, MPhil, PhD

Dr. Sana Ahmad
Associate Professor
MSc, MPhil, PhD

Dr. Muhammad Faraz Anwar
Assistant Professor,
MSc, PhD

Structure MPhil Program-Physiology

The structure of MPhil. Program-Physiology comprises of an extensive "Course Work" followed by the "Supervised Research Thesis". This program fulfills the requirement of Higher Education Commission (HEC). The coursework components are specifically designed to maximize learning and to develop a comprehensive skill base required to undertake thesis research. Assessment of course content in each semester will consist of a combination of continuous assessments and examinations. In line with academic standards MPhil students will be required to pass coursework to progress to the thesis research work.



MPHIL ROAD MAP PHYSIOLOGY

Summary of Credit Hours

Sr.No.	Courses as per HEC new GE Policy 2023	Credit Hours/Contact Hours Proposed New Road Map
1.	Generic-MED Courses as per PMDC Rules part V point 01 (Semester-I)	9 CH
2.	Major/Disciplinary (Semester-II)	6 CH
3.	Electives toward specialization (Semester-II 01 course, Semester-III 02 course)	9 CH
4.	Thesis (THS 700 Semester-III, THS 701 Semester- IV)	6 CH
5.	Deficiency course in case of candidate from other domain or interdisciplinary domain	APPLICABLE Spring (9 CH) • Feb-June deficiency course (zero semester) for Non- Medical Students only, BS / MSc Physiology • MBBS student can take admission in any basic medical sciences MPhil program as they study all subjects at under graduate level • BDS student can take admissions in all basic medical sciences MPhil programs except Pathology (Histopathology) as they do not study this subject at undergraduate level
	Total	**39 CH**

Semester 1

Sr. No.	Road map aligned with HEC GEP Policy				
	Pre-requisite Course Code	Course Code	Course Title	Credit Hours	17 UN SDGs alignment (please mention relevant SDG No.
1	Level 6 (MBBS/ BDS)	MED 701	Research Methodology	3+0	UN SDGs No. 3 Good Health & Well Being
2		MED 712	Medical Biology & Genetics	2+0	
3	Level 6 (BS or MSc Physiology)	MED 713	Medical Education, Ethics & Writing	2+0	
4		MED 714	Instruments & Animal use in research	2(1+1)	
5		MED 715	Journal Club -I	No credit hour	
6		MED 718	Teaching Internship -I	No credit hour	
Total Credit Hours				9	

Semester 2

Sr. No.	Road map aligned with HEC GEP Policy				
	Pre- requisite Course Code	Course Code	Course Title	Credit Hours	17 UN SDGs alignment (please mention relevant SDG No.
1	Semester-I	PHY 760	General, Neuromuscular and Blood Physiology	3+0	UN SDGs No. 3 Good Health & Well Being
2		PHY 761	Cardiorespiratory Physiology	3(2+	
3	PHY 760 & 761	XXXXX	Elective –I	3+0	
4	MED 715	MED 716	Journal Club- II	No credit hour	
5	MED 718	MED 719	Teaching Internship- II	No credit hour	
Total Credit Hours				**9**	

Semester 3

Sr. No.	Road map aligned with HEC GEP Policy				
	Pre- requisite Course Code	Course Code	Course Title	Credit Hours	17 UN SDGs alignment (please mention relevant SDG No.
1	PHY 760 & 761	XXXX	Elective-II	3+0	UN SDGs No. 3 Good Health & Well Being
2		XXXXX	Elective-III	3+0	
3	-	THS 700	Thesis-I	3+0	
4	MED 716	MED 717	Journal Club- III	No credit hour	
5	MED 719	MED 720	Teaching Internship- III	No credit hour	
Total Credit Hours				**9**	

Semester 4

Sr. No.	Road map aligned with HEC GEP Policy				
	Pre- requisite Course Code	Course Code	Course Title	Credit Hours	17 UN SDGs alignment (please mention relevant SDG No.
1	THS 700	THS 700	THS 701	Thesis-II	UN SDGs No. 3 Good Health & Well Being
Total Credit Hours				**3**	

List of Elective Courses

Sr. No.	Road map aligned with HEC GEP Policy				
	Pre- requisite Course Code	Course Code	Course Title	Credit Hours	17 UN SDGs alignment (please mention relevant SDG No.
1	PHY 760 & 761	PHY 762	Physiology of Health, Fitness & Exercise	3+0	UN SDGs No. 3 Good Health & Well Being
2		PHY 763	Haeme & Immune system	3+0	
3		PHY 764	Gastrointestinal Physiology	3+0	
4		PHY 765	Neurophysiology and special senses	3+0	
5		PHY766	Renal Physiology	3+0	
6		PHY 767	Endocrine and Reproductive Physiology	3+0	
7		PHY 768	Electrophysiology	3 (1+2)	

ZERO SEMESTER SPRING FOR MPHIL PHYSIOLOGY

Sr. No.	Course Code	Course Title	Credit Hours
1	PHY 760	General ,Neuromuscular and Blood Physiology	3+0
2	PHY 761	Cardiorespiratory Physiology	3+0
3	XXXXX	Elective –I	3+0
Total Credit Hours in Zero Semester			**9**

Description of MPhil Physiology Program Courses

PHY 760

In this course students will learn about the general concepts of homeostasis and consequences of derangement of homeostasis. They would also be able to describe the general concepts of membrane transport, carrier mediated transport, active transport, and different types of vesicular transport. Students will be able to discuss the concepts of cytoskeleton, structure & function of neuromuscular junction. They would be able to describe the classification of hormones, their mechanism of action, functions and regulation. They would be able to appreciate the physiological significances of meninges, cerebrum, cerebellum, brainstem, and diencephalon. Students will be able to explain various sensory modalities, their transduction, transmission and sensation. Moreover they will be able to describe different receptors present in the special senses organs, mechanism of stimulation and processing of signaling. Moreover they would also be able to compare and contrast the sensory processes in the related senses of smell and taste. Students would be able to explain the Physiology of autonomic nervous system.

PHY 761

Studies in this course will make students describe the properties of cardiac muscles, cardiac conducting system, and cardiac action potential. They would also be able to explain blood pressure & its regulation, dynamics of blood flow and pathophysiology of shock. They would be able to understand and describe the concept of diffusion & transport of gases in the body, regulation of respiration, pulmonary functions tests and their importance in clinical practice. Students will be able to describe the functional organization of the kidneys, concept of glomerular filtration rate (GFR), its determinants & regulation. They would be able to describe the processes of renal tubular reabsorption, counter current mechanism and the role kidney plays in the acid base balance.

PHY 762

Through this course students will be able to comprehend the concept of bioenergetics, importance of exercise and balanced nutrition. They would also be able to correlate exercise with energy production and consumption, mechanism of energy transfer in resting condition and exercise. Moreover, they will be able to discuss the roles of lungs, skeletal muscles and endocrine system in energy delivery and utilization and the adaptations. Students will be able to explain enhancement of energy capacity, training of aerobic and anaerobic power, muscle strength due to training and identify exercise performance and environmental stress and factors affecting performance. They would also be able to explain exercise at higher altitude, thermal stress, stress in diving and microgravity.

PHY 763

This course will help students describe the development, function, and regulation of cells of immune system and explain the mechanism and pattern of cell migration and mechanism of inflammation. Students will also be able to explain the components and importance of complement system in immune system. Moreover, they would also be able to comprehend the molecular and cellular basis of T cell recognition and histocompatibility molecule complex. Students will be able to enlist the cytokine secretory cells, cytokine receptor families and correlate the structure and function of antibodies. They would also be able to discuss the cell cooperation in antibody response, antibody diversity, immunoglobulin gene recombination and describe the antigen presenting cells, antigen processing and presentation.

PHY 764

This course will provide knowledge of the drugs which maintain the integrity of the gastrointestinal tract and hypothalamic-pituitary axis with their releasing factors. It will also cover the kinetics and dynamics of the drugs regulating the menstrual cycle promoting/ preventing conception and parturition.

PHY 765

This course will help students to describe localization of lesion, explain epilepsy, stroke, movement disorders, multiple sclerosis, and paediatric neurology. They would also be able to discuss and explain the raised intracranial pressure, intracranial hemorrhage, concussion, radiculopathy, spinal cord compression, and neocortical emergencies

PHY 766

In this course students will be able to discuss the determination of renal blood flow by PAH acid clearance, haematocrit and factors influencing renal blood flow. They will be able to calculate rate of net tubular reabsorption and secretion of a substance, given the filtered and excreted amounts. Students will be able to discuss the magnitude and mechanisms of solute and water reabsorption in proximal and distal nephron and explain the counter-current mechanisms responsible for production of osmotically concentrated urine. They would also be able to explain the actions of aldosterone, ADH, parathormone, ANP, angiotensin II on various parts of nephron. Students will be able to describe the compartmentalization of body fluids and state composition of ECF, ICF etc. and summarize the three processes involved in urine acidification. Moreover, they would be able to describe the mechanisms that maintain the stability of intracellular pH and list four simple acid base disturbances; their causes, chemical buffering processes, respiratory and renal compensations.

PHY 767

In this course students will be able to explain the mechanism of hormone signalling and response of target cells and also state the general concepts of endocrine control system. They would be able to discuss the three important hypothalamo-pituitary-target organ axes and outline the functional significances of hormones of anterior and posterior pituitary glands. They would also be able to list and describe the disorders of hypothalamus and anterior pituitary glands. Students will also be able to describe the disorders of thyroid gland and growth and state the disorders of bone and mineral metabolism. They would be able to describe the disorders of endocrine pancreas and adrenal cortex and identify the general concepts of ectopic hormone production. Moreover, students will be able to comprehend and explain the hypothalamic control and role of FSH and LH in relation to gonadal hormones and state the stages of spermatogenesis and functions of testosterone. They would be able to summarize the phases of ovarian and uterine cycles and correlate it with their functions. Furthermore, they would be able to describe the process of fertilization, implantation, placental function, parturition and lactation.

PHY 768

In this course students will learn effect of exercise on cardiovascular system and Respiratory muscles using Lab Tutor Teaching Suite, Power Lab 15T/556k5T, with its transducers and specialized accessories. Students will interpret the generated data to investigate effects of exercise cardiovascular physiology. Furthermore, to emphasize diagnostic approach of study, students will record compare and analyse bio potentials including ECG, EMG and EEG from human subjects both in cases and controls. Human Physiology Teaching System II used in this course also includes the Human Respiratory Kit for teaching spirometry and exercise physiology for the trainee researchers. Students will get hands on experience on this teaching /Research system to be able to record and interpret normal ECG in human subject. Moreover, students will be able to auscultate/interpret heart sounds, describe their types and basis of different normal and abnormal heart sounds. Students will be able to distinguish between normal and abnormal heart sounds. This course will also enable students to demonstrate recording of blood pressure by different methods, discuss mean arterial pressure and its regulation and demonstrate pulse recording using lab tutor. They will also be able to describe different types of pulses and interpret their characters. This course will also enable students to compare the significance of EMG and nerve conduction tests in neurological and muscular disorders.

MPhil Physiology Program Supervisor's Profile

Physiology is the study of normal function within living creatures. From ancient theories to molecular laboratory techniques, physiological research has shaped our understanding of the components of our body, how they communicate, and how they keep us alive.
Department of physiology is an important segment of basic health sciences which occupies a very prominent place in modern age of biosciences and applied biological sciences. It is the core of all medical research for research oriented mind. The level of education is maintained efficiently by implementation of concepts, skills, advance knowledge and teaching method.
One of the current challenges in physiology is integrating information from different body systems into a cohesive picture of the living human body. The concept of integrated function is the underlying principle in translational research, an approach described as 'bench to bedside'.

PROGRAM PROPOSED &
DURATION MPhil..... 2 years

PHD FACULTY

Dr Shazia Shakoor
Professor & HOD
MBBS, MPhil, PhD

Dr. Sheikh Abdul Saeed
Professor
MSc, MPhil, PhD

MUTIDISCIPLINARY RESEARCH LABORATORY (MDRL)

Prof. Dr. Mehreen Lateef
BSc (H), MSc, MPhil, PhD
Principal (BUCAHS)
HOD, Multidisciplinary Lab
BUHSCK

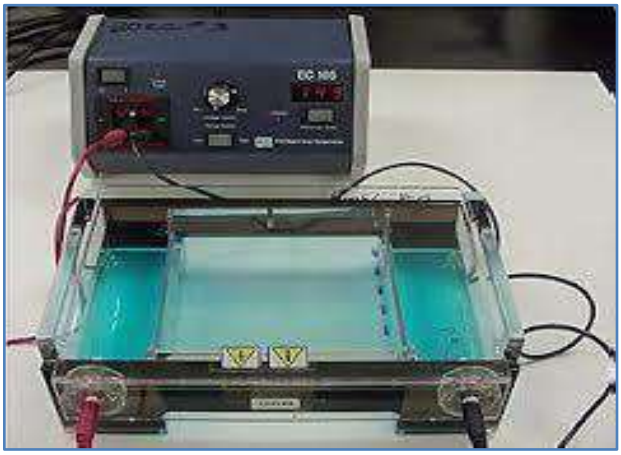
Bahria University Health Sciences Campus, Karachi (BUHSCK) has developed a well-equipped advanced Multidisciplinary laboratory to achieve excellence in health sciences fields by delivering health services through adaptation of advanced techniques. The development of strong research skills and the provision of medical care are inextricably linked. The Multidisciplinary Research Laboratory (MDRL) provides a platform where several academic disciplines or professional specialists combine to conduct or perform innovative research. MDRL is located on second floor of Bahria University Medical College with advanced research instruments. The main objective of MDRL is to strengthen research environment in medical college for faculty, students and researchers (undergraduates and postgraduates) by providing scientific instrumentation and technical expertise under one umbrella. With the help of MDRL, clinicians, medical doctors and scientists will be enabled to explore diagnostic and various treating ways in basic and clinical research and in this way overall health care system can be improved. The name of Bahria University Health Sciences Campus will become more pronounced and so do the ranking of our prestigious institute via research work on advance understanding of biological processes at molecular level from genomics to proteomics.

With respect to the facilities offered, MDRL is divided into different units including Molecular Biology lab, Analytical Centre, Pharmacology and histopathology lab sections. There is cold storage room, PCR machines, UV visible spectrophotometer, ELISA reader, florescence spectrophotometer, cold centrifuge machine, sensitive electronic balances, autoclave machine, deionizer, centrifuge machines, gel electrophoresis. On the other hand Pharmacology and Histopathology labs have also developed with specific equipment for postgraduate advanced research.

Thus MDRL is a highly innovative project at BUHSCK that have research equipment related to basics and clinical, medical and dental health sciences under one roof to facilitate good quality research.

MOLECULAR BIOLOGY LAB

Biosafety Cabinet



Gel Electrophoresis Unit

Autoclave machine

PCR machine

Cold Centrifuge machine

Hot plate Magnetic Stirrer

ANALYTICAL CENTRE

ELISA reader with built in florescence

UV visible Spectrophotometer

ELISA Washer

Centrifuge Machine

pH meter

Electronic balance

SAMPLE STORAGE ROOM

-80° C Freezer

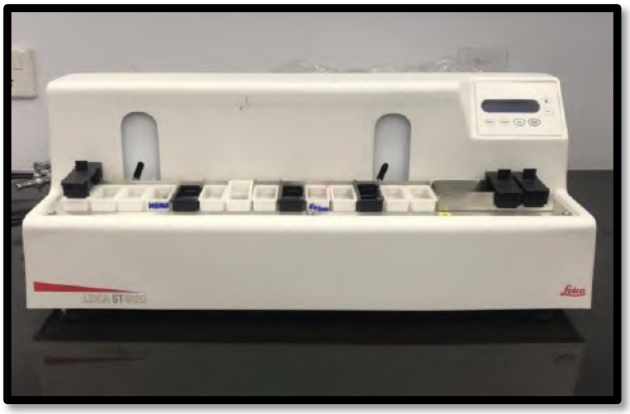
MEDIA PREPARATION ROOM & WASHING AREA

HISTOPATHOLOGY LAB UNIT

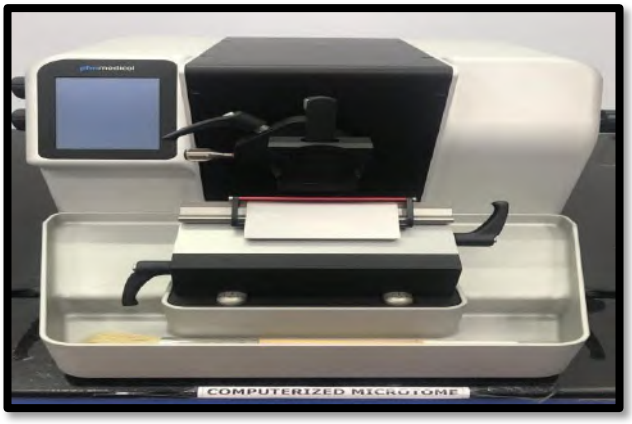
Tissue Processor

Cryotome

Hot Air Oven

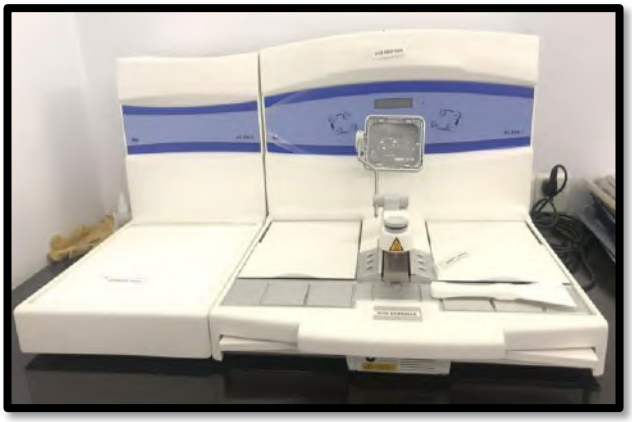


Tissue Stainer



Computerized Microtome

Water bath



Tissue Embedding System

PHARMACOLOGY LAB UNIT

Hematology Analyzer

HPLC

Microscope

Coagulation analyzer

Chemistry Analyzer

Model Apparatus

Rotary Evaporator

ANIMAL HOUSE

Animal House at BUHSCK is a training and research facility with a capacity to keep 500 animals. It has five purpose build rooms, including that of breeding, experimental and dissection room. It is equipped with Auto clave, Water bath, Hot air oven, dissection table, surgical instruments, and chemicals, which can play an important role in the undergraduate teaching and training as well as for novel research projects of the faculty and the postgraduate researchers. The animal facility will provide backup support to all units of MDRL through provision of laboratory animals such as rabbits, mice, rats, guinea pigs etc. as sample.

PHOTOGALLERY BATCH 7 & 3

VICE ADMIRAL (R) ATHER MUKHTAR HI (M)
DIRECTOR GENERAL
BUHSCK

MAJ.GEN. (R) PROF.DR SHEHLA M.BAQAI HI (M)
DEAN HEALTH SCIENCES (BU) & Principal Medical College (BUMC)
BUHSCK

PROF.DR NASIM KARIM
HOD PHARMACOLOGY & Principal BUHS-PGI
BUHSCK

DR.SHUMAILA FAISAL (Pharmacology)

DR.UMBREEN SHAKEEL (Physiology)

DR.AREEBA YOUNUS FAROOQUI (Anatomy)

DR.HIRA FAISAL (Pathology-H)

DR.UZMA ABBAS CHAUDHARY (Pharmacology)

DR SHAHAB SHAFI (Anatomy)

DR.SAIMA CHANDIO (Pharmacology)

DR.KIRAN SALEEM (Pathology-M)

DR.ZAKIA NASEEM SIDDIQUI (Physiology)

DR.MARVI ZIA (Pathology-H)