

POST GRADUATE PROGRAM

M. Phil ANATOMY



King Edward Medical University

Lahore

2007

Prologue

by

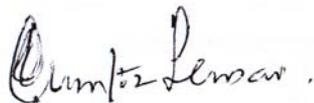
The Honorable Vice Chancellor KEMU

The Program Faculty Committee Members of all M. Phil Programs are guided and assisted in order to enable them to meet the minimum requirements and Standards to be achieved. Only principle areas are addressed giving freedom for the students to raise questions and arguments and for the teachers to include most recent and best guidance literature curriculum contents. It is clear that beyond the main framework there are greater challenges in the areas of selecting modern knowledge, translating information into skills, selecting best pedagogy, and teaching in the light of different knowledge levels as determined by Blooms Taxonomy, effective communication, making use of best teaching aids, evaluations, counseling and role modeling. Moreover teachers of Postgraduate M. Phil programs have additional responsibilities of keeping into view the community heeds in terms of health care problems in their respective fields. The students in this modern curriculum have more responsibilities to improve their knowledge beyond textbooks and visit libraries and World Wide Web as frequently as possible. Their logical arguments will serve as the backbone of learning process.

The whole curriculum is divided into semesters to facilitate, knowledge delivery and absorption, more effective. Each semester is further subdivided into modules. This will further make the education process smooth.

I remain confident that both faculty and students would enjoy during this program.

I congratulate Chairman Diploma Coordination Committee, Professor Dr. -----
----- and his dedicated team members / Program Directors, who have put in lot of hard work to bring these framework guidelines in its present shape.



Prof. Mumtaz Hassan (S.I.)

MBBS (Pb.) B.Sc. (Pb.) MRCP (UK), DTM&H (Edin)
FCPS (Pak.), FRCP (Lond.), FRCP (Edin), FRCP (Glasg.),
FRCP (Ireland), DM (USA), FACP (USA), FACIP (USA),
FCCP (USA), FAFCA (USA)

Vice Chancellor

King Edward Medical University,
Lahore

Prologue

by

The Honorable Pro-Vice-Chancellor KEMU

M.Phil Programs in Basic Medical and Dental Sciences were introduced in Pakistan to create Scientist and Teachers. In absence of PhD programs these programs were equivalent to major qualifications of the Universities. These programs before 2001 were spread over four years, two (2) years of experience of teaching in same subject in recognized medical teaching institution, one (1) year of course work and one (1) year of lab work and research. In 2001 curriculum were revised and all four (4) years were included into the body of the program.

Now PhD programs are promoted, supported, encouraged and funded by Higher Education Commission, largely as M.Phil leading to PhD programs, the M.Phil programs are made equivalent to M.Phil in Engineering, Hard Sciences, Biological Sciences and Social Sciences.

The M.Phil programs based on this framework will have duration of two (2) years at postgraduate level (Level 7 according to the European Education Levels) and will be credit based, modularized, Semesterized during first year and research work during second year. The qualification of M.Phil will be "Medium Qualification" according to "PMDC Criteria" and "Masters (M) qualification according to QAA-UK criteria.



Prof. Dr. Syed Muhammad Awais
(*Sitara-e-Imtiaz*)

M.B.B.S.(Pb), M.C.P.S.(Surg), M.Sc. Bio-eng. (Dun.),
M.S. (Orth)

**Pro-Vice Chancellor &
Prof. Orthopaedic Surgery
King Edward Medical University &
Mayo Hospital & University, Lahore**

Prologue

By

The Chairperson M. Phil Program

Committee KEMU

M.Phil programs at KEMU not only provide students with an outstanding education but also encourage them to self-directed, theoretical and practical learning. These above mentioned attributes are at the forefront of knowledge in every specialized field that provides a basis for originality in developing and/or applying ideas, often within a research context. The aim of this exercise is to develop conceptual understanding that enables the student; to evaluate critically current research and advanced scholarship in the discipline; and to evaluate methodologies and develop critiques of them and, where appropriate, and to propose new hypotheses.

M.Phil programs at KEMU also recognize and reinforce the ability of students to integrate knowledge and formulate judgments. Students are also directed to take account of social and ethical issues and responsibilities and also reflect experience of managing change in a complex environment. The learning process at this level is associated with independent working with other people at the same level or higher. All feasible efforts will be made by the departments to provide students an opportunity to develop the work or learning according to student's scholastic interest.

During the course of M.Phil training, students will be presented with unfamiliar learning situations and will be required to solve problems that involve many obscure and interacting factors. Many such factors are typically variable, making the learning context complex and unpredictable. The overall impact of these exercises is to; ensure a highly specialized education and its application in problem solving to ensure access to employment requiring decision-making in complex and unpredictable situations and Nurture independent learning ability required for continuing professional development Career progression within the respective field.

Prof. Dr. Atiya Mubarak Khalid
MBBS, BSc. (Eng), M. Phil
Chairperson Anatomy & Histology Deptt.
King Edward Medical University, Lahore.

FOREWORD

Anatomy is still and will remain the Gateway in Medicine, queen of surgery, sine qua non entry into basic sciences, and mother of all medical sciences.

Human anatomy is a part, not merely of, medical sciences, of biological knowledge, and beyond that also a part of the totality of Mankind understanding of this Universe. Structures must be viewed in light of their development, evolution and kinetics and at all levels, down to cytological, even molecular detail, if one is to understand them.

How much it is fascinating to try to know about our interior. Human Anatomy has been studied for centuries dating back to early Greeks and Egyptians. This subject has considerable applied applications, serving as a basis for understanding the form and function of the body in health and disease. Of all modern day advancement and achievements in investigations and management of disease, knowledge of Anatomy constitutes core of information in Radiology, Autoradiography, Computerized Tomography, Magnetic Resonance Imaging, Ultrasound and many other medical fields. To develop the curriculum thus turns to be a formidable task. We focus our attention hard to achieve this goal.

Table of Contents

Sr. No.	Section Title	Page No.
1	Introduction	1
2	Faculty of Anatomy M. Phil Program	2
3	Program Outline	3
5	Curriculum Outline and Learning Schedule	4
6	Year 1 Semester 1 Class Schedule	5-6
7	Course Contents, Semester 1	7-18
8	Year 1 Semester 2 Class Schedule	19-20
9	Course Contents Semester 2	21-26

INTRODUCTION

M. Phil (Anatomy) program was introduced in Pakistan to create Scientists and Teachers in this field. In the absence of PhD program this program was equivalent to major qualifications of the Universities. The program before 2001 was spread over four years, two (2) years of experience of teaching in the same subject in recognized medical teaching institution, one (1) year of course work and one (1) year of lab work and research. In 2001 the curriculum was revised and all four (4) years were included into the body of the program.

Now PhD programs are being promoted , supported, encouraged and funded by Higher Education Commission, largely as M. Phil leading to PhD programs, the M. Phil (Anatomy) Program is made equivalent to M. Phil in Engineering, Hard Sciences, Biological Sciences and Social Sciences.

The M. Phil (Anatomy) program based on this framework will have duration of two (2) years at postgraduate level (level 7 according to the European Education Levels) and will be credit based, modularized, semesterized during first year and research work during second year. The qualification of M. Phil (Anatomy) will be “Medium Qualification” according to “PMDC criteria” and “Masters (M) qualification according to QAA-UK criteria.

**Faculty of Anatomy M. Phil Program
King Edward Medical University, Lahore**

Prof. Dr. Atiya Mubarak Khalid
Chairperson of Anatomy & Histology Department
Director M. Phil Program

Dr. Tauqir Ahmad
Associate Professor

Dr. Raafia Tafweez
Associate Professor

Dr. Nadia Tazeen
Assistant Professor

VISITING FACULTY

Prof. Dr. Muhammad Nawab Khan

Prof. Dr. Nawaz Anjum

Program Outline

Duration of the Program:	02 Years (Full Time)
Entry Qualifications:	MBBS/BDS/BS.c Hons/MS.c (minimum 16 years of education).
Entry Procedure;	GRE Type Entry Test (MCQ Based) Written Test at Faculty of Basic Sciences Level Interview at Department of the Program Level

Phase of Studies in Basic Curriculum:

Entry
↓

Year 1	Semester 1 (18 weeks)	Semester 2 (18 weeks)
	Semester Evaluation (02 weeks)	Semester Evaluation (02 weeks)
	Comprehensive Evaluation (02 weeks)	
Year 2	Research & Dissertation (Lab. Work) 48 weeks	
	Project Synopsis Writing (4 weeks)	
	Research Project (42 weeks)	
	Dissertation Defense (02 weeks)	

Exit ↘

Year 1 is semesterized into two Semesters of twenty (20) weeks each whereas year two (2) is annual of forty eight (48) weeks. Each module and the whole program is made credit based according to the following criteria.

CURRICULUM OUT LINE**FIRST YEAR****1ST SEMESTER JANUARY 15TH - MAY 28TH**

- TEACHING 18 Weeks
- REVIEW AND EVALUATION 02 Weeks

Total 20 Weeks

SUMMER RECESS MAY 29TH - JULY 30TH**SECOND SEMESTER AUGUST 1ST - DECEMBER 28th**

- TEACHING 18 Weeks
- REVIEW AND EVALUATION 02 Weeks

Total 20 Weeks

WINTER RECESS DECEMBER 29TH - JANUARY 14TH**SECOND YEAR****JANUARY 15TH - DECEMBER 20TH**

- SYNOPSIS WRITING 04 Weeks
- TEACHING / LAB WORK 42 Weeks
- DESIRTATION DEFENCE 02 Weeks

Total 48 Weeks

YEAR 1 SEMESTER 1**Class Schedule**

	701	702	703	704	705	706
Duration	2 weeks	2 weeks	2 weeks	2 weeks	6 weeks	4 weeks
Title of Module	Introduction and Principles of Anatomy	Research Methods & Biostatistics	Molecular Biology & Genetics	Basic Science	Limbs & Thorax	Developmental & Microscopic basis of human body
Module Coordinator	Prof. Dr. Atiya Khalid	Prof. Syed Muhammad Awais	Prof. Fridoon		Prof. Dr. Atiya Khalid	Prof. Dr. Atiya Khalid
Place of Learning	Anatomy	Patiala Block	Patiala Block	Department Lecture Room	Anatomy dept.	Anatomy dept.

YEAR 1 SEMESTER 1

Weekly Schedule

<i>Days</i>	8am-9am	9am-10am	10am-11am	11am-12pm	Noon-1pm	1pm-4pm
<i>Monday</i>					LUNCH	
<i>Tuesday</i>						
<i>Wednesday</i>						
<i>Thursday</i>						
<i>Friday</i>						
<i>Saturday</i>				Self Directed Learning/ Guided Library Hours	LUNCH	

Total No of hours in semester **720**

Theory Lectures hours/week 18

Laboratory hours/week 12

Seminars and Assignments/week 06

Self learning hours/weeks 04

Total hours/Week **40**

Theory 70%

Practical 30%

Module No. 701**Module Title: Introduction to Principles of Anatomy****Duration:** 2Weeks**Credit Hours:** 3 hrs

Learning Objectives: After taking this course the student are expected to grasp the general features of structure of human body and its preservation. They will be able to apply this knowledge to understand the systemic and radiological Anatomy.

Course Content:

- Introduction to General Anatomy, History of Anatomy, Anatomical nomenclature and important definitions.
 - Skin with its appendages and fascia.
 - Bones and cartilages
 - Joints
- Muscles
- Circulatory System
- Somatic Nervous System
- Autonomic Nervous System

Practical Work

- Preservation of dead bodies
- Preparation of Embalming solution
- Use of audio visual aid
- Anatomy museum technology
 - Preparation of Preservative fluids
 - Preparation, storage and exhibition of specimen.
- Management of mortuary & dissection hall in the Anatomy department.

Seminar Topic

- Pattern of skin creases in mentally retarded children
- Referred pain

Self Study

- Review of Literature
- Group Discussion

Recommended Books

- R. J. Last Anatomy
- Principals of General Anatomy by Prof. Dr. Ghulam Ahmad

Module No. 702**Module Title: Introduction to Molecular Cell Biology****Duration:** 2Weeks**Credit Hours:** 3 hrs

Learning Objectives: This course is the first in the series of two courses designed to introduce both classical and contemporary topics in biology to the students. After taking this course students will be expected to have a basic understanding of molecular organization of the cell and the biological role of the molecular machinery of the cell.

Course Contents:

- An Evolutionary Framework for Biology
- Life and Chemistry: Small Molecules
- Life and Chemistry: Large Molecules
- Cells: The Basic Units of Life
- Cellular Membranes
- Energy, Enzymes, and Metabolism
- Cellular Pathways That Harvest Chemical Energy
- Photosynthesis: Energy from the Sun
- Chromosomes, the Cell Cycle, and Cell Division
- Genetics: Mendel and Beyond
- DNA and Its Role in Heredity
- From DNA to Protein: Genotype to Phenotype
- The Genetics of Viruses and Prokaryotes
- The Eukaryotic Genome and Its Expression

Seminar Topics:

- Chromosomes and Inheritance
- Recombinant Biotechnology
- Stem cell Therapeutics
- Transport Channels
- Biotechnology in Medicine

Book Recommended:

Life, 'The Science of Biology' by Craig Heller

Module No. 703**Module Title:** **Research Methods & Biostatistics****Duration:** 2Weeks**Credit Hours:** 3 hrs

Learning Objectives: To help participants to formulate ideas that can be tested in a scientific manner. To give participants a basic understanding of epidemiological methods and biostatistics. To develop the critical faculties of participants for evaluation of their own and other people's work. To give practical experience of development of study protocols and applications for research funding. To give practical experience of use of computers for word processing, database manipulation, use of spreadsheets, statistical analysis, preparation of slides and overheads, internet communication and video conferencing and report writing.

Course Contents:**Research Methods**

- Philosophy, language, types and structure of Research
- Conceptualizing research, problem formulation, research objectives
- Review of literature, sources of knowledge
- The Planning-Evaluation Cycle
- Sampling terminology, Probability sampling, Non-probability sampling, Bias and Error
- Time in Research, Types of Relationships
- Variables, Hypotheses, Types of Data
- Introduction to Design, Types of Designs
- Experimental Design
- Survey Research, Types of Surveys
- Qualitative research, Qualitative Data
- Introduction to Design, Types of Designs, Experimental Design
- Questionnaires

Biostatistics

- Data display and summary, mean and standard deviation
- Populations and samples
- Statements of probability and confidence intervals
- Differences between means: type I and type II errors and power
- Differences between percentages and paired alternatives
- The t tests and the chi-squared tests
- Correlation and regression
- Study design and choosing a statistical test

Epidemiology

- What is epidemiology?
- Quantifying disease in populations
- Comparing disease rates
- Measurement error and bias
- Planning and conducting a survey
- Ecological studies, Longitudinal studies, Case-control, cross sectional studies and experimental studies

Technical Writing

- Synopsis writing
- Grant proposal writing
- Research paper writing
- Thesis outline
- Thesis writing

Module 704

Module Title: **Basic Medical Sciences**

Duration: 2Weeks

Credit Hours: 3 hrs

Learning Objectives: This is a multidisciplinary course that in two weeks gives students basic knowledge of the five pillars of basic medical sciences i.e. Anatomy Physiology Pathology Biochemistry And Course Pharmacology. Student taking this course will be able to understand

Course Contents:

Anatomy

Embryology

- Fertilization, Zygote, Morula, Blastula, Gastrula, Embryonic period Derivatives of germ layers
- Brief account of Amnion, Chorion, Placenta
- Out line of development of Heart and its Anomalies
- Brief account of development of Urogenital, Digestive systems

Histology

- Cell,
- Tissue (Epithelial tissue, Muscular tissue, Connective tissue and Nervous tissue)
- General plan of microscopic structure of CVS
- Systems (Respiratory, Urogenital, Digestive systems)

➤ **General Anatomy**

- Classification of bones, their blood supply and ossification
- Classification of Joints Nerve Supply and Blood supply
- Types and Nerve supply of Muscles
- Definition of Neuron and Peripheral and Central nervous system
- Surface marking of Heart, Lungs, Abdominal viscera

➤ **Thorax**

- Thoracic cage movements
- Heart and its External and Internal features and Blood supply
- Lungs, Pleura, Mediastinum (Name of contents)

➤ **Abdomen**

- Disposition of Abdominal and Pelvic viscera
- Outline of Blood supply
- Nerve supply and Lymphatic drainage and Peritoneal relation of viscera

➤ **Head & Neck**

- Bones, Foramina of skull
- Names of Cranial nerves, Brief outline of 5th & 7th Cranial nerves
- Dural venous sinuses, Blood supply and Nerve supply (brief account)

- Nose, Pharynx and Larynx. (Blood supply and Nerve supply)

Physiology

- Functional organization of the human body and control of the internal environment
- Extra cellular fluid
- Homeostasis
- Dehydration and Rehydration and K⁺ Homeostasis
- Anemia, Polycythemia
- Resistance of body to infection-the leukocytes, tissue macrophage system and inflammation
- Immunity and allergy
- Hemostasis and blood coagulation
- Cardiovascular system properties of cardiac output CCF test cardiac function & Hypertension Normal ECG Acid Base Balance urine formation
- Respiration Spirometry Regulation Real Electrocardiogram.
- Body fluids & kidneys; regulation of acid-base balance
- Pulmonary blood flow
- The nervous system and special senses
- The gastrointestinal tract
- Metabolism and temperature regulation
- Endocrinology and reproduction
- Sports Physiology
- Ovarian and testicular function tests
- Thyroid Parathyroid Adrenal pancreas endocrine hypothalamus

Pathology

- Structure and functions of normal human cell inflammatory reaction, chemical mediators primary and secondary wound healing. Factors affecting the process of healing. Healing in fractured long bone.
- Gram + Ve organisms and lesions produced by them. Gram- Ve organisms and lesions produced by them. Mycobacterial infections, lesions and laboratory diagnosis. Viral infections like Hepatitis, AIDS, Polio, Hepes, Measels etc. Fungal infections-superficial deep seated and opportunistic. Parasites of medial importance and their lab. Diagnosis such as protozoa, tape worms and round worms
- Etiology and pathogenesis of thrombosis, complications and diagnosis thrombosis, type, mechanisms of change of various emboli, infarction and its diagnosis.
- Nomenclature etiology of tumors, benign and malignant tumour, route of spread of malignant Tumour, effects of tumors, oncogens, Tumour suppress genes, tumour markers, and their diagnostic significance, some prototype specific Tumour.
- Pathologic calcifications. Its types and lesions, various exogenous and endogenous pigments and lesions. Deficiency diseases and lesions.
- Physical irritants and lesions produced by them. Ionizing Radiations and lesions produced by them. Chemical agents as a cause of tissue injury.
- Rheumatic, ischemic and congenital Heart disease, Endocarditis. Antheroma-its etiology, lesions and complications.
- Glomerulonephritis, pyelonephritis, stones renal tumours diabetic Nephropathy.

- Bronchiectasis, emphysema, pneumonias, tumours, tuberculosis pneumoconiosis.
- Oesophageal lesions, peptic ulcer, gastritis, tumours of stomach, inflammatory bowel diseases, tuberculosis of intestine, tumours of intestine.
- Tumours of bones, inflammation of bones and joints, muscle dystrophy important skin lesions and their diagnosis, inflammations and tumours in oral cavity including teeth and jaws.
- Tumours of C.N.S inflammations of meninges and their lab diagnosis demyelinating diseases.
- Tumours of lymph nodes and leukemias, multiple myeloma- lesions and lab diagnosis.

Biochemistry

- Fluid & Electrolyte & Acid Base Balance in Human Body with select Clinical Scenarios.
 - Constitution of Extra & Intracellular Fluids.
 - Extracellular Fluid Compartments; Select Dehydration & Oedema Development & Management.
 - Intracellular Fluid Compartments; Select Dehydration & Oedema Development & Management.
- Metabolic Cross Talk in Glycomics. Health & Disease Scenarios.
 - Site, Pathway Dynamics, Key & Regulatory Enzymes, Nutritional & Endocrine Command, Outcome & Clinical Complications in Glycolysis, Hexose Shunt Pathway, Glycogenesis & Glycogenolysis, Krebs's Pathway & Glucuronic Acid Pathway.
- Metabolic Cross Talk in Lipomics. Health & Disease Scenarios.
 - Site, pathway Dynamics, Key & Regulatory Enzymes, Nutritional & Endocrine Command, Outcome & clinical Complications in Fatty Acid Oxidation & Biosynthesis, Ketosis, Cholesterol synthesis & Lipoproteins.
- Metabolic Cross Talk in Proteomics. Health & Disease Scenarios.
 - Site, pathway Dynamics, Key & Regulatory Enzymes, Nutritional & Endocrine Command, Outcome & clinical Complications in Urea Cycle, Protein Biosynthesis & Select Amino acid Metabolism with Genetic Disorders.
- The Liver & Biliary System.
 - Liver Functions & Liver Function Tests, Biliary Stasis, Cholecystitis & Pancreatitis, Jaundice.
- Nutrition & Endocrines Modalities.
 - Basic Nutritional Principles & Calorific Requirements. Diet in health & Disease.
 - Biosynthesis, Storage, Mechanism of Release, Transport, Binding to Receptor, Mode of Activity, Biochemical Functions & Abnormalities in Vitamin A, D, K, C & B Complex.
 - Biosynthesis, Storage, Mechanism of Release, Transport, Binding to Receptor, Mode of Activity, Biochemical Functions & Abnormalities in Insulin, Glucagon, Thyroid Hormones, Para thyroid Hormones, Calcitonin, Growth Hormone, Aldosterone, Cortisol & Catecholamines.

Course Pharmacology

- Basic principles: Drug receptors and pharmacodynamics, pharmacokinetics, drug biotransformation
- Autonomic drugs

- Cardiovascular drugs
- Renal drugs
- Drugs with action on smooth muscles
- Drugs that act in the central nervous system
- Drugs used to treat diseases of blood, inflammation and gout
- Endocrine drugs
- Chemotherapeutic drugs
- Special aspects of perinatal, pediatric and geriatric pharmacology
- Drugs used in gastrointestinal diseases
- Therapeutic and toxic potential of over the counter drugs. Local acting Drugs.

Module No. 705**Module Title: Limbs and Thorax****Duration: 6 Weeks****Credit Hours: 9**

Learning Objectives: After taking this course the students must be able to grasp the appendicular and axial skeleton, soft tissue i.e. fasciae, muscles, nerves and vessels of upper & lower limbs and thoracic region of the body. They should be able to apply this knowledge to understand the clinical, systemic and radiological Anatomy.

Course Contents:**Unit – I (Upper Limb) 2 Weeks**

- Bones of upper limb
- Superficial structures of upper limb
- Pectoral & Scapular region
- Axilla
- Arm & cubital fossa
- Forearm & wrist
- Hand
- Joints of upper limb
- Related surface Anatomy
- Radiological Anatomy of Upper Limb

Practical Work

- Specimen Study and Preparation
- Dissection of Upper limb

Assignment

1. Teaching / Demonstration of
 - Pectoral girdle
 - Spaces of forearm and hand
2. Presentation
 - Metastasis of CA Breast
 - Brachial Plexus Injuries

Self Study

- Internet/Library

Unit – II (Lower Limb) 2 Weeks**Course Contents**

- Bones of lower limb
- Superficial structures of lower limb
- Gluteal region
- Thigh and popliteal fossa
- Leg
- Foot
- Joints of lower limb
- Related Surface Anatomy
- Radiological Anatomy of Lower Limb

Practical Work

- Specimen Study and Preparation
- Dissection of Lower Limb

Assignment

1. Teaching / Demonstration of
 - Femoral sheath with hernias
 - Knee Joint
2. Presentation on
 - Anatomical and clinical aspects of veins of lower limb
 - Superficial Inguinal Lymphadenopathy

Self Study

- Group Discussion
- Review of literature

Unit – III (Thorax)

2Weeks

Course Contents

- Thoracic wall & Diaphragm
- Mediastinum
- Pleura, Lungs
- Pericardium and Heart
- Vertebral Column
- Muscles of Back
- Radiological and surface Anatomy of Thorax

Practical Work

- Specimen study / preparation
- Dissection of Thorax

Assignment

1. Teaching / Demonstration of
 - Respiratory movements
 - Vertebral venous plexus and role in spread of cancer
2. Presentation on
 - Diaphragmatic hernias
 - Blood supply of Heart

Self Study

- Review of Literature
- Group Discussion

Recommended Books

- R. J. Last Anatomy
- Gray's Anatomy student edition
- Clinical Anatomy by Snell
- Clinically Oriented Anatomy by Keith L. Moore.
- For osteology students will be directed to consult the osteology section of
 - Gray's Anatomy
 - Fraser's Anatomy of human skeleton

▪ **Module No. 706**

Module Title: **Developmental & Microscopic Basis of Human Body**

Duration: 4 Weeks

Credit Hours: 6

Learning Objectives: This course is designed to give a comprehensive knowledge of basic structure of human body at microscopic level and development of embryo and its anomalies. After taking this module the students must have a clear concept of the human life span and developing human with knowledge of growth and differentiation. They should comprehend the terms like Gametogenesis, Fertilization, Cleavage, Implantation, Germinal layers of embryo and fetal membranes e.g. placenta, Amnion, Chorionic sac, yolk sac, Allantois, Umbilical Cord, Multiple pregnancies, Twinning and related clinically oriented problems.

Besides this, students should be able to know the microscopic and ultramicroscopic details of basic body tissues i.e. epithelium, connective tissue, muscles and nervous tissues and techniques used for their study.

Unit - I (Developmental Basis of Human Body) 2 Weeks

Course Contents

- Introduction, terminologies & historical review of development Anatomy
- Gametogenesis and spermatogenesis
- Ovulation, fertilization
- Cleavage, Blastocyst formation, implantation & formation of bilaminar germ disc.
- Gastrulation & formation of trilaminar germ disc & their derivatives.
- Placenta
- Amniotic fluid, fetal membranes, umbilical cord
- Multiple Pregnancies.

Practical Work

- Semen Analysis – procedure & examination of prepared slides
- Visit antenatal clinics & observe/ study evaluation of male & female infertility
- To Study the cases of ployhydramnios oligohydramnios & multiple pregnancies.

Assignment

- Invitro techniques
- Ectopic Pregnancy

Self Study

- Review of Literature
- Group Discussion

Unit – III(Microscopic Basis of Human Body)

2Weeks

Course Contents

- Epithelium
- Supporting Tissue
 - Ordinary supporting tissue
 - specialized supporting tissue
- Muscle Tissue
- Nervous Tissue
- Circulatory System
- Lymphoid Tissue

Practical Work

- Section cutting and Processing
- Staining procedure with H& E
- Microscopic examination of tissue.
- Drawing & labeling of diagrams of tissues studied.
- Special Stains used for connective and nervous tissue.
- Immuno histochemistry

Assignment

- Growth of long bone
- Thymus
- Intercellular junctions
- Myelination

Self Study

- Review of Literature
- Group Discussion

Evaluation

Recommended Books

- The Developing Human (Clinically oriented embryology) 6th edition
- Wheater's Functional Histology.
- Basic Histology by Janquiera 11th edition

YEAR 1 SEMESTER 2

Weekly Schedule

<i>Days</i>	8am-9am	9am-10am	10am-11am	11am-12pm	Noon-1pm	1pm-4pm
<i>Monday</i>					LUNCH	
<i>Tuesday</i>						
<i>Wednesday</i>						
<i>Thursday</i>						
<i>Friday</i>						
<i>Saturday</i>				Self Directed Learning/ Guided Library Hours	LUNCH	

Total No of hours in semester	720
Theory Lectures hours/week	18
Laboratory hours/weeks	12
Seminars and Assignments/week	06
Self learning hours/week	04
Total hours/Week	40
Theory	70%
Practical	30%

Module No. 707**Module Title: Abdomen****Duration:** 2weeks**Credit Hours:** 3

Learning Objectives: After taking this course the students must have the clear cut concept of gross features of abdomen. It includes anterolateral and posterior abdominal walls (i.e. fasciae, muscles, blood vessels and nerves), intermuscular spaces, peritoneal cavity and abdominal viscera. They should be able to apply this knowledge to understand the clinical, systemic and radiological Anatomy which includes all forms of Radiograph, Ulterasonography, CT scan, M.R.I and Angiography

Course Contents

- Anterolateral Abdominal wall and Inguinal region
- Peritoneum
- Fore gut, Mid gut and Hind gut
- Spleen, pancreas and hepatobiliary system
- Vessels and Nerves of Abdomen
- Posterior abdominal wall
- Kidney, Suprarenal gland and Ureter
- Related Surface Anatomy
- Medical Imaging of Abdomen

Practical Work

- Ultrasonography
- Specimen study / Preparation
- Dissection of region

Assignment

- Peritoneal Recesses
- Porto systemic Anatamosis
- Extra Hepatic biliary apparatus variation.
- Radiological Anatomy of Abdomen

Self Study

- Group discussion
- Review of Literature

Recommended Books

- R. J. Last Anatomy
- Clinically Oriented Anatomy by Keith L. Moore.

Module No. 708**Module Title: Pelvis and Perineum****Duration:** 2weeks**Credit Hours:** 3

Learning Objectives: After taking this course the students must have the concept of bony pelvis with its joints , ligaments, Muscles, fasciae, nerves, blood vessels and viscera of pelvis. They should be able to apply this knowledge to understand the clinical, systemic and radiological Anatomy

Course Contents:

- Bony pelvis, pelvic joints and ligaments.
- Pelvic wall, pelvic peritoneum and vessels
- Somatic and autonomic nerve plexuses
- Pelvic part of gut
- Urogenital region
- Perineum
- Radiological Anatomy of Pelvis

Practical Work

- Specimen study / preparation
- Dissection of Pelvis

Assignment

- Pelvimetry
- Nerve supply of urinary bladder with applied aspects

Self Study

- Library

Recommended Books

- R. J. Last Anatomy
- Clinically Oriented Anatomy by Keith L. Moore.
- For osteology students will be directed to consult the osteology section of
 - Gray's Anatomy
 - Fraser's Anatomy of human skeleton

Module No. 709**Module Title: Head & Neck****Duration:** 5weeks**Credit Hours:** 7.5

Learning Objectives: After taking this course the students must have the concept of surface and gross anatomy of bones and joints of head and neck region. They must have detailed knowledge of muscles, fasciae, blood vessels, nerves, glands, organs of special senses i.e. eye, ear, nose etc. They should be able to apply this knowledge to understand the clinical, systemic and radiological Anatomy which includes all forms of Radiograph, Ultrasonography, CT scan, M.R.I and Angiography.

Course Contents

- Skull
- Face and Scalp
- Orbit, eye and ocular adnexa
- Nose, Nasal cavity and Para nasal air sinuses
- Oral cavity
- Temporal and Infratemporal fossa
- Ear
- Fascia, muscles, Triangles of Neck and Blood vessels of neck
- Bones and joints of neck
- Thyroid and Parathyroid glands
- Larynx and Trachea
- Pharynx and Esophagus
- Cranial Nerves
- Lymphatic Drainage of Head and Neck
- Surface Anatomy & Radiological Anatomy of Head & Neck

Practical Work:

- Dissection of the region
- Preparation of Specimen of Larynx & Ear
- Specimen Study

Seminar topics

- Facial nerve and its lesions
- Thyroid and parathyroid glands
- Facial nerve and its lesions
- Oculomotor Nuclear complex

Self Study

- Group discussion
- Library

Recommended Books

- R. J. Last Anatomy
- Clinically Oriented Anatomy by Keith L. Moore.
- For osteology students will be directed to consult the osteology section of
 - Gray's Anatomy
 - Fraser's Anatomy of human skeleton

Module No. 710**Module Title: Systemic Development****Duration:** 3weeks**Credit Hours:** 4.5

Learning Objectives: After taking this course the students must have the concept of organogenesis i.e. development of various organ systems of body with special emphasis on its germ layer origin, its primordium, morphogenesis, histogenesis and brief outline of all important congenital abnormalities stressing their embryological basis

Course Contents

- Central & peripheral Nervous system
- Digestive system including body cavities and diaphragm
- Respiratory system
- Urinary system
- Male reproductive system
- Female reproductive system
- Head and neck including teeth, eye and ears
- Musculoskeletal system and limbs
- Cardiovascular systems
- Integumentary System
- Teratogenesis

Practical Work.

- Slides study of serial sections of human/pig/chick embryo
- Study of specimen / model

Assignment

- Visit to Paediatric and Neonatology wards to observe and study the cases of congenital abnormalities

Seminar topic

- Abnormalities of cardiovascular system
- Respiratory distress syndrome

Module No. 711**Module Title: Microscopic Study of Organ System****Duration:** 3weeks**Credit Hours:** 4.5**Learning Objectives:** After taking this course the students must have the concept of detailed micro and ultra microscopic features of the organ system of the body including endocrine glands and special senses.**Course Contents**

- Gastrointestinal tract & associated glands
- Respiratory system
- Urinary system
- Male Reproductive system
- Female Reproductive system
- Endocrine glands
- Integumentary system
- Nervous system
- organs of Special senses

Practical Work

preparation of slides of rabbit tissues

Practical Note Book – Drawing and labeling of tissues studied with brief description

Seminar topic

- Gut associated lymphoid tissue
- Retinal detachment

Self Study

- Review of Literature
- Group discussion

Module No. 7 12**Module Title: Neuro Anatomy****Duration:** 3weeks**Credit Hours:** 4.5

Learning Objectives: After taking this course the students must have the concept of gross features of brain and spinal cord and peripheral nervous system. Internal structures and connections (tracts) of spinal cord, hind brain, midbrain and forebrain. Distribution of cranial nerves nuclei in brainstem.

Course Contents

Spinal cord
 Ascending and descending Tracts
 Brain Stem
 Cerebellum.
 Thalamus
 Hypothalamus
 Structural and functional localization of cerebral cortex
 Reticular formation & limbic system
 Basal nuclei
 Meninges and dural venous sinuses
 Ventricles of brain , CSF- Formation, circulation & drainage.
 Blood supply of brain & spinal cord
 ➤ Autonomic nervous system

Practical Work

- Demonstration on circulation of CSF
- Draw & label sections of brain stem
- Dissection of brain
- Prepared slides of thick sections of spinal cord, brain stem & cerebellum.

Seminar topic

- Facial nerve lesion
- Parkinson's Disease

Self Study

- Library
- Review of literature