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MGM INSTITUTE OF HEALTH SCIENCES

(Deemed to be University u/s 3 of UGC Act, 1956)
Grade 'A' Accredited by NAAC
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CHOICE BASED CREDIT SYSTEM

(CBCS)

(with effect from 2019-2020 Batches)

Curriculum for

M.Sc. Medical Anatomy

Amended upto AC-42/2022, Dated 26/04/2022

Amended History

1. Approved as per Resolution No. 3.2.1.6.i, of BOM – 57/2019, dated 26/04/2019.
2. Amended as per Resolution No. 3.1.1.4 of BOM – 59/2019, dated 11/11/2019.
3. Amended as per Resolution No. 3.2.1.5 of BOM-62/2020, dated 16/09/2020.
4. Amended as per Resolution No. 3.2.1.6 of BOM – 62/2020, dated 16/09/2020.
5. Amended as per Resolution No. 2, Resolution 10.4.i of AC-42/2022, dated 26/04/2022 (Incorporated at the end of syllabus).

MGM INSTITUTE OF HEALTH SCIENCES, NAVI MUMBAI

LEARNING OUTCOME BASED CURRICULAM FRAMEWORK

M.Sc. Medical Anatomy Course

Sr. No.		
1	Objectives of PG Education	• At the end of the course, the students shall be able to • **1. Knowledge** 1. Describe gross anatomy of entire body including upper limb, lower limb, thorax, abdomen, pelvis, perineum, head and neck, brain and spinal cord. 2. Explain the normal disposition of gross structure, and their interrelationship in the human body. She/He should be able to analyze the integrated functions of organs systems and locate the site of gross lesions according to deficits encountered. 3. Describe the process of gametogenesis, fertilization, implantation and placenta formation in early human embryonic development along with its variation and applied anatomy. 4. Demonstrate knowledge about the sequential development of organs and systems along with its clinical anatomy, recognize critical stages of development and effects of common teratogens, genetic mutations and environmental hazards. She/He should be able to explain developmental basis of variations and congenital anomalies. 5. Explain the principles of light, transmission and scanning, compound, electron, fluorescent and virtual microscopy. 6. Describe the microscopic structure of various tissues & organs and correlate structure with functions as a prerequisite for understanding the altered state in various disease processes. 7. Describe knowledge about cell and its components, cell cycle, cellular differentiation and proliferation. 8. Describe structure, number, classification, abnormalities and syndromes related to human chromosomes. 9. Describe important procedures in cytogenetics and molecular genetics with its application. 10. Demonstrate knowledge about single gene pattern

		inheritance, intermediate pattern and multiple alleles, mutations, non-mendelian inheritance, mitochondrial inheritance, genome imprinting and parental disomy. 11. Demonstrate knowledge about reproduction genetics, assisted reproduction, prenatal diagnosis, genetic counseling and ethics in genetics. 12. Explain principles of gene therapy and its applied knowledge. 13. Describe immune system and cell types involved in defense mechanisms of the body. Also explain gross features, cytoarchitecture, functions, development and histogenesis of various primary and secondary lymphoid organs in the body. 14. Demonstrate knowledge about common techniques employed in cellular immunology and histo compatibility testing. 15. Demonstrate applications of knowledge of structure & development of tissue organ system to comprehend deviations from normal. 16. Demonstrate knowledge about recent advances in medical sciences which facilitate comprehension of structure function correlations and applications in clinical problem solving. 17. Demonstrate knowledge about surface marking of all regions of the body. 18. Demonstrate knowledge about outline of comparative anatomy of whole body and basic human evolution 19. Demonstrate knowledge about identification of human bones, determination of sex, age, and height for medico legal application of anatomy • **2. Skills** At the end of the course the student should be able to: 1. Identify, locate and demonstrate surface marking of clinically important structures in the cadaver and correlate it with living anatomy. 2. Acquire mastery in dissection skills, embalming, tissue preparation, and staining and museum preparation. 3. Locate and identify clinically relevant structures in dissected cadavers. 4. Locate and identify cells & tissues under the microscope. 5. Identify important structures visualized by imaging techniques, specifically radiographs, computerized tomography (CT) scans, MRI and ultrasonography. 6. Demonstrate various movements at the important joints and actions of various groups of muscles in the human body. 7. Demonstrate anatomical basis of common clinical procedures expected to be performed by a basic medical doctor. 8. Demonstrate different methods of teaching-learning and make presentations of the subject topics and research outputs

Specific practice based competencies:

1. Gross anatomy:

Procurement, Embalming and Preservation of human cadavers
Preparation of tanks for preserving bodies
Dissection of cadaver
Window dissection of important regions
Preparation of specimens for museum with display a) soft parts
b) models c) charts
1.6 Preparation and preservation of human bones / skeleton as assigned by the faculty

2. Histology:

Preparation of common fixatives embalming fluid 10% formalin, Bouin's fluid etc
Making paraffin blocks and section cutting and mounting
Preparation of staining set for H and E staining and stainingparaffin sections with the stain
Making celloidin, araldite, gelatin blocks and their sectioncutting
Processing hard tissues, decalcification of bones, block makingand sectioning, preparation of ground sections of calcified bones.
Frozen section cutting on freezing microtome and cryostat
Honing and Stropping of microtome knives, including sharpening by automatic knife sharpener
Histology file in which LM and EM pictures of all the organs and tissues of the body should be drawn and a small description ofsalient features written

3. Histochemical Methods:

Practical classes for staining of glycogen, mucopolysaccharides, alkaline phosphatase acid phosphatase, and calcium

4. Cytogenetics:

Knowledge about preparation of media, different solutions, stains etc.
Preparation of buccal smear for sex chromatin Human chromosome preparation from peripheral blood and karyotyping.
Banding techniques (G and C)
Making of Pedigree charts for study of patterns of inheritance.
Chromosomal Analysis.

5. Neuroanatomy:

Dissection of brain and spinal cord for teaching and learning

		purpose Preparation of brain and spinal cord macroscopic and microscopic sections and identification of different parts in them. Discussions on clinical problems related to neurological disorders and anatomical explanation for the same.
2	Generic Graduate Attributes	**Scholarly Attitude :** • Acquire competencies in gross and surface anatomy, Neuroanatomy, embryology, genetics, histology, radiological anatomy, applied aspects and recent advances of the above mentioned branches of anatomy to teach medical students. • Acquire mastery in dissection skills, embalming, tissue preparation, staining and museum preparation. • Acquire skills in teaching, research methodology, epidemiology & basic information technology. • Acquire knowledge in the basic aspects of Biostatistics and research methodology. • Has knowledge to plan the protocol of a thesis, carry out review of literature, execution of research project and preparation of report. • Has ability to use computer applications Microsoft office (Microsoft word, excel, power point), Internet, Searching scientific databases (e.g. PubMed, Medline, Cochrane reviews). • Acquire skills in paper & poster preparation, writing research papers and Thesis. **Research Aptitude :** • Making presentations of the subject topics and research outputs. • Demonstrate the ability to identify applied implications of the knowledge of anatomy and discuss information relevant to the problem, using consultation, texts, archival literature and electronic media. • Demonstrate the ability to correlate the clinical conditions to the anatomical/ embryological/hereditary factors. • Demonstrate the ability to evaluate scientific/clinical information and critically analyze conflicting data and

		hypothesis. • Develop honest work ethics and empathetic behavior with students and colleagues. • Acquire capacity of not letting his/her personal beliefs, prejudices, and limitations come in the way of duty. • Acquire attitude and communication skills to interact with colleagues, teachers and students. • Practicing different methods of teaching-learning. **Exemplary Leadership:** • Demonstrate self-awareness and personal development in routine conduct. (Self awareness) • Communicate effectively with peers, students and teachers in various teaching learning activities. (Communication) • Demonstrate a. Due respect in handling human body parts & cadavers during dissection. (Ethics & Professionalism) b. Humane touch while demonstrating living surface marking in subject/patient. (Ethics & Professionalism) • Acquire capacity of not letting his/her personal beliefs, prejudices and limitations come in the way of duty. • Appreciate the issues of equity and social accountability while exposing students to early clinical exposure. (Equity and social accountability).
3	Desired Learning Outcomes of Degree	. **Element of Critical thinking** 1. Demonstrate the ability to identify applied implications of the knowledge of anatomy and discuss information relevant to the problem, using consultation, texts, archival literature and electronic media. 2. Demonstrate the ability to correlate the clinical conditions to the anatomical/ embryological/hereditary factors. 3. Demonstrate the ability to evaluate scientific/clinical information and critically analyze conflicting data and hypothesis. **Dynamic Professionalism**

		1. Develop honest work ethics and empathetic behavior with students and colleagues. 2. Acquire capacity of not letting his/her personal beliefs, prejudices, and limitations come in the way of duty. 3. Acquire attitude and communication skills to interact with colleagues, teachers and students.
4	Proportion of knowledge / Skill / Soft Skill in Curriculum	**Effective Communication Skills** 1. Practicing different methods of teaching-learning. 2. Making presentations of the subject topics and research outputs
5	Curriculum and Employability	**Global Competencies :** 1. Skilled and employed to be a globally competent teacher, researcher and anatomist.

Name of the Degree: M.Sc. Medical Anatomy

AIMS OF THE PROGRAM

Medical Anatomists are in great demand of India and abroad.

Postgraduate qualification in Anatomy can earn to placements in teaching medical institutes, Paramedical courses, medical coding centres and research laboratories run by the government and the corporate sector.

In academics, one can go for higher qualifications like Ph.D. in various field of biology. There is a great demand of this course abroad as most of the foreign countries are looking for expert in this field. After completion of the course, one can work as Tutor in a Medical set up or as a Research Assistant in Research Laboratories.

Duration of Study: The duration of the study for M.Sc. Medical Anatomy will be of six semesters spread over three years.

Program pattern- Commencement of Semester

- First Semester: August
- Second Semester: February
- Third Semester: August
- Fourth Semester: February
- Fifth Semester: August
- Sixth Semester: February

Eligibility Criteria: As a minimum criterion of eligibility, aspiring candidates are needed to have attained a B.Sc. in any discipline of Life Sciences, Biosciences, Bachelor's degree in any of Physics, Biological Sciences, M.B.B.S, BDS, BAMS, BHMS, B.Pharm.,B.Tech (Biotechnology), Bachelor's Degree in Agricultural, Veterinary and Fishery Sciences, or equivalent examination with a minimum aggregate score of 50%.

For any query visit the website: www.mgmuhs.com

I st YEAR

Semester I

	Syllabus Ref. No.	Subject	Credits	Teaching hours	Marks		
	Theory				**Internal Assessment**	**Semester Exam**	**Total**
	MA101T	**Medical Anatomy**	**4**	**4**	**20**	**60**	**80**
	MA102T	**Medical Physiology**	**4**	**4**	**20**	**60**	**80**
	MA103T	**Medical Biochemistry**	**4**	**4**	**20**	**60**	**80**
	MA104T	**Medical Pharmacology**	**4**	**4**	**20**	**60**	**80**
	MA105T	**Medical Microbiology**	**4**	**4**	**20**	**60**	**80**
	Practical						
	MA101P	**Medical Anatomy**	**1**	**2**	**20**	**50**	**70**
	MA102P	**Medical Physiology**	**1**	**2**	**20**	**50**	**70**
	MA103P	**Medical Biochemistry**	**1**	**2**	**20**	**50**	**70**
	MA104P	**Medical Pharmacology**	**1**	**2**	**20**	**50**	**70**
	MA105P	**Medical Microbiology**	**1**	**2**	**20**	**50**	**70**
	Total		**25**	**30**	**200**	**550**	**750**

Semester II							
	Syllabus Ref. No.	Subject	Credits	Teaching hours	Marks		
	Theory				Internal Assessment	Semester Exam	Total
	MA201T	Medical Anatomy	4	4	20	60	80
	MA202T	Medical Physiology	4	4	20	60	80
	MA203T	Medical Biochemistry	4	4	20	60	80
	MA204T	Medical Pharmacology	4	4	20	60	80
	MA205T	Medical Microbiology	4	4	20	60	80
	MA206T	Research Methodology & Biostatistics (Core Course)	4	4	20	60	80
	Practical						
	MA201P	Medical Anatomy	1	2	20	50	70
	MA202P	Medical Physiology	1	2	20	50	70
	MA203P	Medical Biochemistry	1	2	20	50	70
	MA204P	Medical Pharmacology	1	2	20	50	70
	MA205P	Medical Microbiology	1	2	20	50	70
	MA206P	Research Methodology & Biostatistics (Core Course)	1	2	20	50	70
	Total		30	36	240	660	900

2ND YEAR

Semester III							
	Syllabus Ref. No.	**Subject**	**Credits**	**Teaching hours**	**Marks**		
	Theory				**Internal Assessment**	**Semester Exam**	**Total**
	MA301T	**Core Subject :** General Anatomy GeneralHistology General Embryology Upper limb, Thorax	4	4	20	100	120
		Elective course**			Internal Exam 80 Marks*		
	MA302CET	Histo techniques, Museum techniques & Embalming	4	4			
	MA303CET	Radiological Anatomy & Surgical Anatomy	6	18		20*	20
	MA304CET	Departmental posting / Clinical Postings (Radiology, Surgery, Orthopedics, FMT, Genetics)					
	MA305	Dissertation/Project Proposal**	5	10		20*	20
	MA306	Seminar, Microteaching, Journal club presentation	2	2		20*	20
	Practical						
	MA301P	**Core Subject**** General Anatomy, General Histology, General Embryology, Upper limb, Thorax	2	4	20	100	120
		Elective practical	1	2	Internal Exam 50 Marks*		
	MA302CEP	Histo techniques, Museum techniques & Embalming					
	MA303CEP	Radiological Anatomy & Surgical Anatomy					
		Total	24	44	40	260	300

*** Exam to be taken at Departmental Level**

Semester IV							
	Syllabus Ref. No.	**Subject**	**Credits**	**Teaching hours**	**Marks**		
	Theory				**Internal Assessment**	**Semester Exam**	**Total**
	MA401T	**Abdomen and Pelvis, Lower limb with systemic histology and embryology, Genetics**	4	4	20	100	120
		General elective ***	4	4			
	MA402GET	Bioethics, Biosafety, IPR & Technology Transfer	Internal Exam of 80 Marks *				
	MA403GET	Disaster Management and Mitigation Resources					
	MA404GET	Human rights					
	MA405	Clinical Postings (Radiology, Surgery, Orthopedics, FMT, Genetics)	7	21		20*	20
	MA406	Dissertation / Project**	5	10		20*	20
	MA407	Seminar, Microteaching, Journal club presentation	2	2		20*	20
	Practical						
	MA401P	Abdomen and Pelvis, Lower limb with systemic histology and embryology, Genetics	2	4	20	100	120
		Total	24	45	40	260	300

*** Exam to be Taken at Departmental Level**

IIIrd YEAR

Semester V							
	Syllabus Ref. No.	**Subject**	**Credits**	**Teaching hours**	**Marks**		
	Theory				**Internal Assessment**	**Semester Exam**	**Total**
	MA501T	Head, Face and Neck, NeuroAnatomy with Systemic histology and Embryology	4	4	20	100	120
	MA502	Clinical Postings (Radiology, Surgery, Orthopedics, FMT, Genetics)	6	18		20*	20
	MA503	Dissertation / Project**	10	20		20*	20
	MA504	Seminar/Journal Club	2	2		20*	20
	Practical						
	MA501P	Head, Face and Neck, Neuro Anatomy with Systemic histology and Embryology	1	2	20	100	120
		Total	23	46	40	260	300

*** Exam to be Taken at Departmental Level**

Semester VI							
	Syllabus Ref. No.	**Subject**	**Credits**	**Teaching hours**	**Marks**		
	Theory				**Internal Assessment**	**Semester Exam**	**Total**
	MA601T	Gross Anatomy, Histology and Embryology, Neuro anatomy and Genetics	4	4	20	100	120
	MA602	Clinical Postings (Radiology, Surgery, Orthopedics, FMT, Genetics)	5	15		20*	20
	MA603	Seminar/Journal Club	1	1		20*	20
	Practical						
	MA601P	Gross Anatomy, Histology and Embryology, Neuro anatomy and Genetics	2	4	20	50	70
	MA602P	**Dissertation/Project****	12	24		70	70
		Total	24	48	40	260	300

*** Exam to be taken at Departmental Level**

** (a) **Dissertation / Project Course** commences in II nd Semester.

Students should undergo ICMR Online Course of Research Methodology before submitting the protocol for their Dissertation. (Ist / II nd Semester)

Allotment of Guide	II nd Semester (On or Before 30 April)
Submission of Protocol for Scientific and Ethical Committee Approval	III rd Semester (On or Before 14 th Aug)
Scientific and Ethical Approval	III rd Semester (On or Before 14 th October)
Commencement of Research Work	III rd Semester 15th October
Submission of Thesis	VI th Semester 31 st March

*****(Elective): Any one subject is to be chosen from the subjects offered** (Subjects offered may change from time to time depending on the availability of expertise)

Elective courses may or may not have practical and/or field work.

M.Sc. MEDICAL ANATOMY
SEMESTER - 1 SYLLABUS

Hours dedicated for every week: 6 (Theory: 4 Practical: 2)

Course Objective (Teaching Objectives)	• To teach basic Anatomical concepts related to General Anatomy, General histology, General Embryology and Musculoskeletal system
Course Outcomes (learning Objectives)	• To understand the basic anatomical concepts of General Anatomy • To understand the basic anatomical concepts of General Histology • To understand the basic anatomical concepts of General Embryology • To understand the basic anatomical concepts of Muscular System • To understand the basic anatomical concepts of Skeletal System

<table>
<tr><th>Unit no.</th><th>Theory Topics</th><th>Hours allotted No. of--- hrs</th></tr>
<tr><td>1.</td><td>General Anatomy
<table>
<tr><th>Name of the Subunit</th><th>Topics covered under each subunit</th></tr>
<tr><td>1.1 Terminology</td><td>General anatomy includes introduction to anatomy, Terminology related to anatomy, Different anatomical planes and subdivisions</td></tr>
<tr><td>1.2 Bone</td><td>Skeleton system with classification, types of bone, features of long bone, ossification, blood supply</td></tr>
<tr><td>1.3 Joints</td><td>General classification with examples, structure of typical synovial joints, Classification of synovial joint with examples, Fibrous joints, Cartilaginous joints, Nomenclature</td></tr>
<tr><td>1.4 Muscles</td><td>General features of muscles, classification with examples, types of skeletal muscles, Structures associated with muscle, Cardiac muscle and Smooth muscle, Functions, Naming of muscles</td></tr>
<tr><td>1.5 Cardiovascular system</td><td>Types of circulations, Classification of blood vessels, Anastomosis, Collateral circulation, End arteries, Vasa vasorum</td></tr>
<tr><td>1.6 Nervous System</td><td>Subdivisions of nervous system, Spinal cord and spinal segments, nerve fibers and myelination, Autonomic nervous system</td></tr>
<tr><td>1.7 Integumentary System</td><td>Introduction to skin and fascia, Skin components and layers, types of skin, Fascia, Appendages of skin, Functions</td></tr>
</table></td><td>7 hrs</td></tr>
<tr><td>2.</td><td>General Histology
<table>
<tr><th>Name of the Subunit</th><th>Topics covered under each subunit</th></tr>
<tr><td>2.1 Epithelium and glandular tissue</td><td>Classification of epithelia, Simple epithelium and types, Stratified epithelium and types, Goblet cells, Transitional epithelium, Basement membrane, Surface projections and junctions, Classification of glandular tissue with suitable examples</td></tr>
<tr><td>2.2 Connective tissue</td><td>Components of connective tissue, Fibres, Ground substance, Cells of connective tissue, Loose connective tissue, Dense connective tissue, Adipose tissue</td></tr>
<tr><td>2.3 Skeletal system</td><td>Classification of cartilage with examples, Composition of Cartilage and bone, Cells of bone, Bone matrix, Microscopic anatomy of bones</td></tr>
<tr><td>2.4 Muscular system</td><td>Microscopic structure of skeletal muscle, cardiac muscle and smooth muscle, Differences between the muscle structures</td></tr>
</table></td><td>6 hrs</td></tr>
</table>

	2.5 Cardiovascular system and nervous system	Microscopic structure of Medium sized artery, Elastic artery, Vein, Structure of neuron, neuroglia, peripheral nerve, Ganglia	
	2.6 Lymphoid system	Cells of lymphoid system, Lymphatic vessels, Microscopic structure of lymphnode, thymus, spleen and tonsil	
3.	**Unit:3 General Embryology:**		
	Name of the Subunit	**Topics covered under each subunit**	**7 hrs**
	3.1 Introduction to Embryology and cell cycles	Basic terminology, Stages of human development, Cell Cycle, Cell division – Mitosis and Meiosis, related abnormalities	
	3.2 Gametogenesis	Primordial germ cells, Spermatogenesis, Spermiogenesis, Oogenesis	
	3.3 Female reproductive Cycles	Ovarian cycle, Structure of Ovum, Changes in Menstrual cycle, Strata of endometrium	
	3.4 Fertilization	Definition, Stages of fertilization, Effects of fertilization	
	3.5 First week of development	Cleavage division, blastocyst, Implantation, Normal and abnormal sites of implantation and related applied embryology	
	3.6 Second week of development	Formation of 2 germ layers, Yolk sac, Chorion and amnion	
	3.7 Third week of development	Gastrulation, Notochord, Neurulation, Folding of embryo	
	3.8 Placenta	Fetal membranes, Chorionic villi, Placenta formation, functions of placenta, Umbilical cord	
4.	**Unit:4 Muscular system:**		
	Name of the Subunit	**Topics covered under each subunit**	**25 hrs**
	4.1 Muscles of upper limb	Muscles of Pectoral region, muscles of arm, Axilla, spaces of axilla, Cubital fossa , muscles of forearm, intrinsic muscles of palm, flexor and extensor retinacula, carpal tunnel and syndrome, Brachial plexus and related nerves	
	4.2 Muscles of lower limb	Femoral triangle, Front of the thigh, Adductor canal, gluteal region, Hamstrings, Popliteal fossa, Muscles of leg, Arches of foot, Nerve supply to lower limb – Femoral nerve, Obturator nerve and Sciatic nerve, Blood supply to lower limb	
	4.3 Muscles of Abdomen	Muscles of anterior abdominal wall, Inguinal canal and hernia, Diaphargm, Muscles of posterior abdominal wall	
	4.4 Muscles of head and neck	Muscles of scalp and face, Muscles of mastication, Posterior triangle, Anterior triangle, Sternocleidomastoid, Trapezius , Related nerve supply	

	4.5 Muscles of thoracic cage	Intercostal space, Intercostal muscles, respiratory movements	
5.	**Unit:5 Skeletal System:**		**15**
	Name of the Subunit	**Topics covered under each subunit**	
	5.1 Bones of Head and neck	Norma verticalis, Norma Basalis, Norma Occipitalis, Norma Lateralis, Interior of skull, Mandible	
	5.2 Vertebral column	Curvatures of vertebral column, General features of vertebrae, Typical and atypical vertebrae, intervertebral disc	
	5.3 Thoracic bones	Sternum, Classification of ribs, General features of typical rib, 1st, 2nd, 10th, 11th and 12th rib features	
	5.4 Upper limb skeleton	Clavicle, Scapula, Humerus, Shoulder joint, Elbow joint, Radius, Ulna, Radioulnar joints, Wrist joint, Bones of hand	
	5.5 Lower limb skeleton	Hip bone, Femur, Hip joint, Knee joint, Tibia, Fibula, Ankle joint, Bones of foot	
	Total		**60 hrs**

Unit no.	Practical Topics	Hours allotted No. of---hrs
1.	General Anatomy • Bone • Joints	1 hr
2.	**General Histology** • Epithelium • Connective tissue • Cartilage and Bone • Muscular tissue • Vascular tissue • Skin and fascia • Lymphoid Tissue • Nervous tissue	6 hrs
3.	**General Embryology** • Gamets and Gametogenesis • Clevage and blastulation • Implantation and Abnormal sites of Implantation • Formation and derivatives of three germ layers • Notochord formation and Neurulation • Folding of embryo • Placenta	3 hrs
4.	**Muscular system** • Muscles of pectoral region • Muscles of Arm and Cubital fossa • Muscles of forearm • Muscles of palm • Muscles of thigh • Muscles of popliteal fossa and Gluteal region • Muscles of leg • Muscles of foot • Muscles of Thorax • Muscles of abdominal wall • Muscles of head and neck region	10 hrs
5.	**Skeletal System** • Bones of Upper limb • Bones of Lower limb • Joints of upper limb • Joints of lower limb • Vertebral column • Bones of thoracic cage • Skull and Mandible	10 hrs
	Total	30 hrs

Reference Books:

1. B D Chaurasia Vol-1,2 and 3
2. Vishram Singh Vol-1,2,and 3
3. General Anatomy- B.D.Chaurasia
4. General Histology – Krishna Garg
5. General Embryology – Inderbir Singh

M.Sc. MEDICAL ANATOMY
SEMESTER - 2 SYLLABUS

Hours dedicated for every week: 6 (Theory: 4 Practical: 2)

CourseObjective (Teaching Objectives)	• To teach basic Anatomical concepts related to Respiratory system, Cardiovascular system, Gastrointestinal system, Genitourinary system, Endocrine system, Nervous system.
Course Outcomes (learning Objectives)	• To understand the basic anatomical concepts of Respiratory system • To understand the basic anatomical concepts of Cardiovascular system • To understand the basic anatomical concepts of Gastrointestinal system • To understand the basic anatomical concepts of Genitourinary system • To understand the basic anatomical concepts of Endocrine system • To understand the basic anatomical concepts of Nervous system

<table>
<tr><th>Unit no.</th><th>Theory Topics</th><th>Hours allotted No. of--- hrs</th></tr>
<tr><td>1.</td><td>Respiratory System
<table>
<tr><th>Name of the Subunit</th><th>Topics covered under each subunit</th></tr>
<tr><td>1.1 Nose and Nasal Cavities</td><td>General anatomy of Nose, Nasal Septum, Lateral wall of the Nose</td></tr>
<tr><td>1.2 Larynx</td><td>Gross features of larynx, Cartilages of larynx, Muscles of larynx, Blood and Nerve supply of larynx</td></tr>
<tr><td>1.3 Trachea</td><td>Trachea features, Tracheobronchial tree</td></tr>
<tr><td>1.4 Bronchopulmonary Segments</td><td>Features, Segments of Right and Left lung, Blood Supply to segments</td></tr>
<tr><td>1.5 Pleura</td><td>Types of pleura, Pleural cavity, Extensions and relations, Blood and Nerve supply</td></tr>
<tr><td>1.6 Lungs</td><td>Gross features, Lobes and fissures, Surfaces and relations, Blood and nerve supply</td></tr>
<tr><td>1.7 Mediastinum</td><td>Divisions of Mediastinum, Contents of Mediastinum, Thoracic duct, Azygous venous systems.</td></tr>
<tr><td>1.8 Diaphragm</td><td>Gross features, Surfaces and relations, Parts and Openings, Clinical features related to Diaphragm, Blood and nerve supply, Functions and Actions of Diaphragm</td></tr>
</table></td><td>12 hrs</td></tr>
<tr><td>2.</td><td>Cardiovascular System
<table>
<tr><th>Name of the Subunit</th><th>Topics covered under each subunit</th></tr>
<tr><td>2.1 Pericardium</td><td>Parts and divisions of pericardium, Sinuses of pericardium, Blood and nerve supply of pericardium</td></tr>
<tr><td>2.2 Heart</td><td>External features, Internal features of heart with right atrium in detail, Coronary circulation, Nerve supply of heart</td></tr>
<tr><td>2.3 Major vessels related to heart</td><td>Aorta in detail, Superior and Inferior vena cava, Pulmonary vessels</td></tr>
</table></td><td>6hrs</td></tr>
<tr><td>3.</td><td>Unit:3 Gastrointestinal System:
<table>
<tr><th>Name of the Subunit</th><th>Topics covered under each subunit</th></tr>
<tr><td>3.1 Tongue</td><td>Gross features, Divisions, Muscles of tongue, Blood Supply, Nerve Supply in detail.</td></tr>
</table></td><td>16 hrs</td></tr>
</table>

	3.2 Soft Palate	Gross features, Muscles of soft palate, Blood and nerve supply of soft palate	
	3.3 Pharynx	Gross features, Subdivisions, Features of Naso pharynx, Features of Oropharynx, Features of Laryngo Pharynx, Muscles of Pharynx, Blood and Nerve Supply.	
	3.4 Peritoneum	Divisions, Peritoneal reflections, Peritoneal Folds, Lesser Sac	
	3.5 Oesophagus and Stomach	Oesophageal -divisions, Muscles, Constrictions, Blood and nerve supply. Stomach – Gross features, Surfaces and relations, Interior, Blood and Nerve Supply	
	3.6 Small Intestine	Duodenum- Features, divisions, Interior, relations, Blood and nerve supply, General features of Jejunum and Ileum, Differences between each part of small intestine.	
	3.7 Large intestine	Features, divisions, Ceacum in detail, Appendix in detail, Blood supply, Differences between small and large intestine.	
	3.8 Rectum and Anal Canal	Rectum – Features, Interior, Folds, Blood supply and Nerve supply, Anal canal – Features, Muscles, Interior, Clinical Anatomy.	
	3.9 Liver and Extra hepatic biliary apparatus (EHBA)	Liver – gross features, Segments, lobes, Surfaces and relations, Porta hepatis, Blood supply, EHBA – Gall bladder, Cystic duct, Bile ducts	
	3.10 Pancreas	Gross features, Surfaces and relations, Blood supply and Applied anatomy	
	3.11 Spleen	Gross features, Surfaces and relations, Blood supply and Applied anatomy	
	3.12 Abdominal Aorta	Features, Branches and relations	
4.	**Unit:4 Genitourinary system:**		**10 hrs**
	Name of the Subunit	**Topics covered under each subunit**	
	4.1 Kidney	Gross features, Surfaces and relations, Interior, Blood supply, Applied Anatomy	
	4.2 Ureter and Urinary Bladder	Ureter - Gross features, Extensions and divisions, Constricions, Blood supply, Applied Anatomy, Urinary Bladder - Gross features, Surfaces and relations, Interior, Blood supply, Applied Anatomy	
	4.3 Male reproductive system	Testis – Gross features, Surfaces and coverings, Relations, Interior, Blood supply, Applied Anatomy, Epididymis, Vas deferens, Prostrate, and External genetalia of Male.	
	4.4 Female Reproductive System	Uterus – Gross features, Surfaces and relations, Supports of uterus, Interior and Blood supply. Ovaries – Surfaces, relations, Blood supply, Fallopian tubes – parts, relations, blood supply	
	4.5 Urethra	Male And Female urethra – Extension, parts, relations, interior, applied.	

<table>
<tr><td>5.</td><td>Unit:5 Endocrine System:<table><tr><th>Name of the Subunit</th><th>Topics covered under each subunit</th></tr><tr><td>5.1 Thyroid Gland and Parathyroids</td><td>Gross features of thyroid gland, coverings, Surfaces and relations, blood supply, Applied anatomy and Parathyroids</td></tr><tr><td>5.2 Pituitary Gland</td><td>Gross features, Parts and divisions, Relations, Composition, Blood supply and Functions</td></tr><tr><td>5.3 Suprarenal Gland</td><td>Gross features, Coverings, Relations, Blood supply</td></tr></table></td><td>3 hrs</td></tr>
<tr><td>6.</td><td>Unit:6 Nervous System:<table><tr><th>Name of the Subunit</th><th>Topics covered under each subunit</th></tr><tr><td>6.1 Meninges and Dural Venous Sinuses</td><td>Meninges, Dural folds, Dural venous sinuses- Classification, Cavernous sinus in detail</td></tr><tr><td>6.2 Spinal Cord</td><td>External features, Parts and divisions, Section of spinal cord showing ascending and descending tracts, Spinal nerves, Blood supply</td></tr><tr><td>6.3 Brain Stem</td><td>External features of medulla, Pons and Midbrain, Fourth ventricle</td></tr><tr><td>6.4 Cerebellum</td><td>Gross features, Lobes and fissures, surfaces and relations, Blood supply and Applied Anatomy</td></tr><tr><td>6.5 Cerebrum</td><td>Sulci and Gyri, Functional areas of brain, White matter of the brain, Lateral ventricle, Third ventricle, Blood supply of brain</td></tr><tr><td>6.6 Cranial nerves</td><td>Cranial nerves – I-XII, Facial nerve in detail, Hypoglossal nerve in detail, Trigeminal nerve in detail.</td></tr></table></td><td>13 hrs</td></tr>
<tr><td></td><td>Total</td><td>60 hrs</td></tr>
</table>

Unit no.	Practical Topics	Hours allotted No. of---hrs
1.	**Respiratory System** • Sagittal section of HFN • Larynx and Trachea • Lung • Bones of thorax • Structures in Mediastinum • Paranasal Air Sinuses	**5 hrs**
2.	**Cardiovascular System** • Exterior of heart • Interior of heart • Major vessels related to heart	**3 hrs**
3.	**Gastrointestinal System** • Sagittal section of HFN • Stomach • Small Intestine • Large intestine with differences • Liver • Spleen • Pancreas	**6 hrs**
4.	**Genitourinary system** • Kidney • Ureter, Urinary bladder • Prostate and Seminal vesicles • Testis • Uterus • Fallopian tubes and Ovary • Sagittal section of male and female pelvis • Bones- male and female pelvis • Lumbar vertebrae	**8 hrs**
5.	**Endocrine System** • Thyroid gland and relations in neck	**1 hrs**
6.	**Nervous System** • Spinal Cord • Brain stem • Cerebellum • Cerebrum • Ventricles • Sections of brain	**7 hrs**
	Total	**30 hrs**

Reference Books:

1. B D Chaurasia Vol-1,2 and 3
2. Vishram Singh Vol-1,2,and 3
3. NeuroAnatomy- Inderbir Singh

MGM INSTITUTE OF HEALTH SCIENCES M. Sc. Medical Students Syllabus for Research Methodology and Biostatistics		
	No. of Hours	
I. Research Methodology:	Theory	Practical
Scientific Methods of Research : Definition of Research, Assumptions, Operations and Aims of Scientific Research. Research Process, Significance and Criteria of Good Research , Research Methods versus Methodology, Different Steps in Writing Report, Technique of Interpretation, Precaution in interpretation, Significance of Report Writing,Layout of the Research Report	5	—
Research Designs: Prospective, retrospective, Observational Studies: Descriptive, explanatory, and exploratory, Experimental Studies: Pre-test design, post-test design, Follow-up or longitudinal design, Cohort Studies, Case Control Studies, Cross sectional studies, Intervention studies, Panel Studies.	5	—
Sampling Designs : Census and Sample Survey, Implications of a Sample Design, Stepsin Sampling Design Criteria of Selecting a Sampling Procedure, Characteristics of a Good Sample Design, Different Types of Sample Designs (Probability sampling and non probability sampling), How to Select a Random Sample?, Systematic sampling, Stratified sampling, Cluster sampling, Area sampling, Multi-stage sampling, Sampling with probability proportional to size, Sequential sampling.	4	0
Measurement in research: Measurement Scales, Sources of Error in Measurement, Tests of Sound Measurement, Technique of Developing Measurement Tools, Scaling Meaning of Scaling, Scale Classification Bases, Important Scaling Techniques, Scale Construction Techniques, Possible sources of error in measurement, Tests of sound measurement	5	5
Methods of Data Collection: Types of data, Collection of Primary Data, Observation Method, Interview Method, Collection of Primary Data	3	0
Ethics and Ethical practice in research and plagiarism	1	
Sampling Fundamentals : Need and importance for Sampling, Central Limit Theorem, Sampling Theory, Concept of Standard Error, Estimation, Estimating the Population Mean Estimating Population Proportion, Sample Size and its Determination, Determination of Sample Size through the Approach Based on Precision Rate and Confidence Level.	5	2
II. Biostatistics		

Data Presentation : Types of numerical data: Nominal, Ordinal, Ranked, Discrete and continuous. Tables: Frequency distributions, Relative frequency, Graph: Bar charts, Histograms, Frequency polygons, one way scatter plots, Box plots, two way scatter plots, line graphs	3	3
Measures of Central Tendency and Dispersion : Mean, Median, Mode Range, Inter quartile range, variance and Standard Deviation, Coefficient of variation, grouped mean and grouped standard deviation (including merits and demerits).	3	3
Testing of Hypotheses: Definition, Basic Concepts, Procedure for Hypothesis Testing, Normal distribution, data transformationImportant Parametric Tests, Hypothesis Testing of Means, Hypothesis Testing for Differences between Means, Hypothesis Testing for Comparing Two Related Samples, Hypothesis Testing of Proportions, Hypothesis Testing for Difference between Proportions, Testing the Equality of Variances of Two Normal Populations.	6	6
Chi-square Test: Chi-square as a Non-parametric Test, Conditions for the Application Chi-square test, Steps Involved in Applying Chi-square Test, Alternative Formula, Yates' Correction, and Coefficient by Contingency.	2	2
Measures of Relationship: Need and meaning, Correlation and Simple Regression Analysis	2	2
Analysis of Variance and Covariance: Analysis of Variance (ANOVA):Concept and technique of ANOVA, One-way ANOVA, Two-way ANOVA, ANOVA in Latin-Square Design Analysis of Co-variance (ANOCOVA), ANOCOVA Technique.	4	4
Nonparametric or Distribution-free Tests: Important Nonparametric or Distribution-free Test Sign test, Wilcoxon signed-Rank Test, Wilcoxon Rank Sum Test: Mann-Whitney U test Kruskal Walli's test, Friedman's test, and Spearman Correlation test.	3	3
Vital Health Statistics: Measurement of Population: rate, crude rate, specific rate, *Measurement of fertility***:** specific fertility rate, Total fertility rate, *Reproduction rate*, Gross Reproduction Rate, Net Reproduction Rate, Measures related to mortality: Crude Death Rate (CDR) , Age-specific death Rate, Infant and child mortality rate, Measures related to morbidity.	4	3
Computer Application Use of Computer in data analysis and research, Use of Software and Statistical package.	0	2
Total hours	55	35

1. LETTER GRADES AND GRADE POINTS:

MGMIHS has adopted the UGC recommended system of awarding grades and CGPA under Choice Based Credit Semester System for MSc Medical courses.

1. MGMIHS would be following the absolute grading system, where the marks are compounded to grades based on pre-determined class intervals.
2. The UGC recommended 10-point grading system with the following letter grades will be followed:

Table 1: Grades and Grade Points

Letter Grade	**Grade Point**
O (Outstanding)	10
A+ (Excellent)	9
A (Very Good)	8
B (Good)	7
C (Above Average)	6
F (Fail)/ RA (Reappear)	0
Ab (Absent)	0
Not Completed (NC)	0
RC (<50% in attendance or in Internal Assessment)	

a. A student obtaining Grade RA shall be considered failed and will be required to reappear in the examination.

b. Candidates with NC grading are those detained in a course (s); while RC indicate student not fulfilling the minimum criteria for academic progress or less than 50%in attendance or less than 50% in internal assessments (IA). Registrations of such students for the respective courses shall be treated as cancelled. If the course is a core course, the candidate has to re-register and repeat the course when it is offered next time.

c. CBCS Grading System - Marks Equivalence Table

Table 2: Grades and Grade Points

Letter Grade	**Grade Point**	**% of Marks**
O (Outstanding)	10	86-100
A+ (Excellent)	9	70-85
A (Very Good)	8	60 -69
B (Good)	7	55 -59
C (Above Average) – **Pass both for UG and PGs**	6	50- 54
F (Fail))/ RA (Reappear)	0	Less than 50
Ab (Absent)	0	-
NC- not completed	0	-
RC- Repeat the Course	0	0

Table 3: Cumulative Grades and Grade Points

Letter Grade	**Grade Point**	**CGPA**
O (Outstanding)	10	9.01 - 10.00
A+ (Excellent)	9	8.01 – 9.00
A (Very Good)	8	7.01 – 8.00
B (Good)	7	6.00 - 7.00
C (Above Average)	6	5.01 - 6.00

d. Assessment of a Course: Evaluation for a course shall be done on a continuous basis. Uniform procedure will be adopted under the CBCS to conduct continuous internal assessments (IA), followed by one end-semester university examination (ES) for each course.

e. Courses in programs wherein Theory and Lab are assessed jointly, the minimum passing head has to be 50% Grade each for theory and practical's separately. RA grade in any one of the components will amount to reappearing in both components. i.e. theory and practical.

2. Eligibility to appear for the end-semester examinations for a course includes:

Candidates having ≥ 75% attendance and obtaining the minimum 35% in internal assessments in eachcourse to qualify for appearing in the end-semester university examinations.

The students desirous of appearing for university examination shall submit the application form dulyfilled along with the prescribed examination fee.

Incomplete application forms or application forms submitted without prescribed fee or application formsubmitted after due date will be rejected and student shall not be allowed to appear for examination.

3. Passing Heads

The minimum passing head shall be 50% in both Theory and practicals separately including the internal assessment.
Elective subjects – the minimum prescribed marks for a pass in elective subject should be 50%. The marks obtained in an elective subjects should be communicated to the university before the commencement of the university examination. (From IIIrdSem Onwards)

4 Detention:

A student not meeting any of the above criteria may be detained (NC) in that particular course for the semester. In the subsequent semester, such a candidate improve in all, including attendance and/or IA minimum to become eligible for the next end-semester examination.

5 The maximum duration for completing the course will be 6 years (minimum duration of course x 2) i.e. (3x2) =6 years for PG Courses, failing which his/her registration will be cancelled. Full fees of entire course of three years may be liable to be paid by the students.

6 Carry over benefit:

A candidate who fails in any two main subjects of previous semester shall be permitted to carry overthose subjects to the next semester.

A candidate shall not be allowed to appear in the final semester examination unless the candidate hascleared all the previous semester examinations.

7 Grace Marks for PG Courses:

No grace marks will be awarded for PG Exams.

8. University End-Semester Examination

There will be one final university examination at the end of every semester.

A candidate must have minimum 75% attendance (Irrespective of the type of absence) in theory and practical in each subject to be eligible for appearing the University examination.

The Dean shall send to the university a certificate of completion of required attendance and other requirements of the applicant as prescribed by the university, two weeks before the date of commencement of the written examination.

A candidate shall be eligible to sit for the examination only, if she / he has secured minimum 35% in internal assessment of that subject. The internal examinations will be conducted at college/ department level.

Notwithstanding – anything in any examination, a deficiency of attendance at lectures or practical maximum to the extent of 10% - may be condoned by the Dean.

If a candidate fails either in theory or in practical, he/ she have to re-appear for both.

There shall be no provision of re- evaluation of answer sheets. Candidates may apply

to the university following due procedure for recounting of theory marks in the

Presence of the subject experts.

Internal assessments shall be submitted by the Head of the Department to the university

through the Dean MGMMC at least two weeks before commencement of University theory examination.

Supplementary examination: There shall be no supplementary examination

Re-Verification -There shall be provision of retotaling of the answer sheets, candidate shall be permitted to apply for recounting/retotaling of theory papers within 8 days from the date of declaration of results.

Scheme of University Exam Theory PG Program: General structure / patterns for setting up question papers for Theory / Practical courses, their evaluation weightages for PG programs are given in the following tables.

Theory Question Paper Pattern for Core Subjects in University Examinations

Under CBCS - 60Marks (for 1st & 2nd Semester)

Question Type	No. of Questions	Questions to be Answered	Questions X Marks	Total Marks
Brief Answer Questions	7	6	1X 10	60

General Instructions (Theory):

A. Time duration of each Theory Paper will be of Three (3) Hrs .
B. Total Marks of each Theory Paper will be 60 Marks

8. 13 Practical Question Paper Pattern For University Examinations Under CBCS - 50 Marks

Exercise	Description	Marks
Q No 1	Practical exercise – 1	1 x15=15 M
Q No 2	Station exercise	5x5M=25 M
Q No 3	VIVA	10 M
		Total = 50 M

General Instructions (Practical):

A. All the students have to remain present at the examination center 15 minutes before the scheduled time for examination.

B. Students have to carry with them certified journal, I-card or examination receipt, and other necessary requirements for examination.

C. Candidate should not leave the practical hall without the permission of examiner.

D. Use of calculator is allowed but the use of mobile phones is strictly prohibited.

E. The candidate has to leave the laboratory only after the submission of all the answer sheets of the exercises performed.

Internal examination pattern (Theory) : 30marks

Questiontype	No. of questions	Questions to be answered	Question X marks	Total marks
Brief Answer Questions	4	3	1X10	30

Breakup of theory IA calculation for 20 marks

Internal exam (Department -30 Marks)	15 marks
Seminar	5 marks
	Total = 20 M

Internal Examination Pattern (Practical): 30 Marks

Practical Exercise	10marks
Station Exercise	10 marks
Viva	10 marks
Total practical	30 Marks

Breakup of practical IA calculation:

Internal exam (Department -30 Marks)	15 marks
Journal	5 marks
	Total = 20 M

Internal Assessment marks should be submitted to the university by respective departments at least 15 days prior to onset of university examination.

9. Submission of Protocol of Dissertation: Students should undergo Online Course of Research Methodology (MCI- PG) before submitting the protocol for their Dissertation.

MGM Institute of Health Sciences, Navi Mumbai

MGM MEDICAL COLLEGE

Academic Year 2019 – 2020

Academic Calendar For M.Sc. (3 Years) Medical Courses

(Anatomy, Physiology, Biochemistry, Pharmacology, Microbiology)

SCHEDULE OF ACTIVITY	DATES
Commencement of First Semester	01.08.2019
Receipt of completed Eligibility forms at MGMIHS from Respective college without late fees Receipt of completed Eligibility forms at MGMIHS from Respective college with late fees (Only for new admission)	On or before 30.10.2019 On or before 30.11.2019
Commencement of Internal Exam	3rd Week of November 2019
Winter Vacation for Staff	16.10.2019 to 15.11.2019
Notification of First Semester University Examination	As per MGMIHS
Commencement of First Semester University Examination	1 Week of January 2020
Conclusion of respective semesters	Last week of January 2020
Declaration of final Result	As per MGMIHS
Commencement of Second Semester	1st Week of February 2020
Commencement of Internal Examination	3rd Week of April 2010
Allotment of Guide for Dissertation	On or Before 30 th April 2020
Notification of Second Semester University Examination	As per MGMIHS
Summer Vacation for staff	01.05.2020 to 10.06.2020
Commencement of Second Semester University Examination	1 Week of July 2020
Conclusion of Second Semester	15 July 2020
Declaration of final Result	As per MGMIHS
Commencement of Next Academic Session	16.07.2020

MGM Institute of Health Sciences, Navi Mumbai

MGM MEDICAL COLLEGE

Academic Year 2019 – 2020

Academic Calendar For M.Sc. (3 Years) Medical Courses

(Anatomy, Physiology, Biochemistry, Pharmacology, Microbiology

SCHEDULE OF ACTIVITY	DATES
Commencement of Third Semester	16.07.2020
Submission of Protocol for Scientific and Ethical Approval	14.08.2020
Commencement of Internal Exam	3rd Week of November 2020
Winter Vacation for Staff	16.10.2020 to 15.11.2020
Notification of First and Third Semester University Examination	As per MGMIHS
Commencement of Third Semester University Examination	1 Week of January 2021
Conclusion of respective semesters	15 January 2021
Declaration of final Result	As per MGMIHS
Commencement of Fourth Semester	3rd week of January 2021
Commencement of Internal Examination	2nd Week of April 2021
Notification of Fourth Semester University Examination	As per MGMIHS
Summer Vacation for staff	01.05.2021 to 10.06.2021
Commencement of Fourth Semester University Examination	3rd Week of June 2021
Conclusion of Respective Semesters	30 June 2021
Declaration of final Result	As per MGMIHS
Commencement of Next Academic Section	1.07.2021

MGM Institute of Health Sciences, Navi Mumbai

MGM MEDICAL COLLEGE

Academic Year 2019 – 2020

Academic Calendar For M.Sc. (3 Years) Medical Courses

(Anatomy, Physiology, Biochemistry, Pharmacology, Microbiology

SCHEDULE OF ACTIVITY	DATES
Commencement of Fifth Semester	1.07.2021
Commencement of Internal Exam	3rd Week of November 2021
Winter Vacation for Staff	16.10.2021 to 15.11.2021
Notification of First, Third and Fifth Semester University Examination	As per MGMIHS
Commencement of Fifth Semester University Examination	First Week of December 2021
Conclusion of Fifth semester	Second Week of December 2021
Declaration of final Result	As per MGMIHS
Commencement of Sixth Semester	16 December 2021
Submission of Dissertation	31 March 2022
Commencement of Internal Examination	2nd Week of April 2022
Notification of Fourth Semester University Examination	As per MGMIHS
Summer Vacation for staff	01.05.2022 to 10.06.2022
Commencement of Sixth Semester University Examination	1st June 2022
Conclusion of Respective Semesters	30 June 2022
Declaration of final Result	As per MGMIHS

DEPARTMENT OF ANATOMY
MGM MEDICAL COLLEGE, KAMOTHE, NAVI MUMBAI
SYLLABUS

Name of the course - M.SC Medical Anatomy

Semester – 3

Unit no.	Topic	Sub Topics		Hours T + P
1	General Anatomy	1.1	Terminology	7+2
		1.2	Bone	
		1.3	Joints	
		1.4	Muscles	
		1.5	Cardiovascular system	
		1.6	Nervous System	
		1.7	Integumentary System	
2	General Histology	2.1	Epithelium and glandular tissue	7+14
		2.2	Connective tissue	
		2.3	Skeletal system	
		2.4	Muscular system	
		2.5	Cardiovascular system and nervous system	
		2.6	Lymphoid system	
		2.7	Integumentary system	
3	General Embryology	3.1	Introduction to Embryology and cell cycles	7+4
		3.2	Gametogenesis	
		3.3	Female reproductive Cycles	
		3.4	Fertilization	
		3.5	First week of development	
		3.6	Second week of development	
		3.7	Third week of development	
		3.8	Placenta	
4	Upper Limb:	4.1	Bones of Upper Limb	19+20
		4.2	Mammary Gland	
		4.3	Venous drainage of Upper limb	
		4.4	Pectoral Region	
		4.5	Axilla	
		4.6	Arm and Cubital Region	
		4.7	Back and Scapular regions	
		4.8	Forearm	
		4.9	Palm	
		4.10	Joints of Upper limb	
		4.11	Brachial plexus and Nerves of Upper limb	

Unit no.	Topic	Sub Topics		Hours T + P
5	Thorax	5.1	Bones – Ribs, sternum, Thoracic vertebrae	20+20
		5.2	Joints of Thorax - type, articular surfaces & movements of manubriosternal, costovertebral, costotransverse and xiphisternal joints	
		5.3	Thoracic cage – Inlet, cavity, outlet	
		5.4	intercostal spaces - types, boundaries, contents with vessels, nerves with its clinical importance,	
		5.5	mechanism of respiration - types, movements, muscles, applied anatomy	
		5.6	Pericardium - subdivisions, sinuses, blood supply, nerve supply and applied aspect	
		5.7	5.7 heart - features, blood supply, fibrous skeleton, conducting system, applied anatomy	
		5.8	Mediastinum – Divisions, boundaries and contents	
		5.9	Oesophagus - features, relations, blood supply, nerve supply,lymphatic drainage and applied anatomy	
		5.10	Thoracic duct - extent, relations, tributaries, applied anatomy	
		5.11	Superior vena cava, azygos venous system - origin, course, relations, tributaries, termination and applied anatomy	
		5.12	Aorta - extent, branches, relations and applied anatomy	
		5.13	Thoracic sympathetic chain	
		5.14	Pleura - extent, recesses, blood supply, lymphatic drainage, nerve supply, applied anatomy	
		5.15	Lung - features, relations, Bronchopulmonary segments, blood supply, lymphatic drainage, nerve supply, applied anatomy	
		5.16	Phrenic nerve - formation & distribution	
		5.17	Diaphragm	
		5.18	Systemic Histology of Respiratory system & Cardiovascular system	

DEPARTMENT OF ANATOMY

MGM MEDICAL COLLEGE, KAMOTHE, NAVI MUMBAISYLLABUS

Name of the course - M.SC Medical Anatomy - 3rd Semester –Elective subject - 1

Elective subject - (1) Histo techniques, Museum techniques & Embalming

Sr. no.	Topic	Sub Topics	Hours T + P
1	**Histo techniques**	An Introduction to Histology	25 + 15
		Different types of Microscopes	
		Procurement and fixation of biological specimens	
		Decalcification	
		Dehydration and clearing	
		Impregnation and embedding	
		Paraffin waxes and paraffin - block making	
		Microtomes and microtome knives	
		Technique of section cutting	
		Stains and staining	
		Special staining methods	
		Mounting, covering and labeling of sections	
2	**Embalming**	Various embalming solutions & techniques	10 + 5
3	**Museum techniques**	Various Museum techniques	25 + 10
		Plastination	
		Casting	

DEPARTMENT OF ANATOMY
MGM MEDICAL COLLEGE, KAMOTHE, NAVI MUMBAI
SYLLABUS
Name of the course - M.SC Medical Anatomy - 3rd Semester – Elective subject -2

Elective subject - (1) Radiological Anatomy & Surgical Anatomy

Sr. no.	Topic	Lecture (Hr)	Practical (Hr)
	RADIOLOGICAL ANATOMY		
1	Modes of investigations	1	1
2	History and principle of X-Rays and digital X Ray	2	0
3	History and principle of Ultrasonography, colour Doppler and types	2	1
4	History and principle of CAT scan	3	0
5	History and principle of MRI and MRI angiography	2	1
6	PET scan and Nuclear imaging	2	0
7	Thoracic imaging from conventional to HRCT and Echocardiography Indications Mode of conducting investigation specially for X ray chest Algorithm of observing Chest X Ray Choosing mode of investigation and advantages and disadvantages	4	2
8	Limb imaging and vascular imaging	4	1
9	Abdominal imaging GIT Indications Mode of conducting investigation specially for X ray KUB Barium studies and endoscopy Algorithm of observing Choosing mode of investigation and advantages and disadvantages	4	2
10	Abdominal imaging GUT Indications Mode of conducting investigation specially for X ray KUB Algorithm of observing IVP, HSG Choosing mode of investigation and advantages and disadvantages	4	2
11	HNF and Brain imaging Indications Mode of conducting investigation specially for X ray Algorithm of observing skull, paranasal sinouses. CT and MRI at various sections Choosing mode of investigation and advantages and disadvantages	5	2
12	Ultrasonography for fetal anatomy and colordopplar	4	3
13	Role of PET and nuclear medicine in investigation	3	0

	SURGICAL ANATOMY		
14	Surgical anatomy of Paranasal sinus with clinical correlation	1	1
15	Surgical anatomy of laryngopharyngeal complex and surgical approach	1	1
16	Anatomy of orbit and extraocular muscles	1	1
17	Laparoscopic anatomy of abdomen and pelvis and clinical significance	2	2
18	Endoscopic landmarks in upper GI tract and anatomical correlation in clinical practice	2	2
19	Upper limb neurovascular anatomy for nerve block and colour Doppler	1	1
20	Lower limb neurovascular anatomy for nerve block and colour Doppler	1	1
21	Surgical anatomy of anterior abdominal wall	2	1
22	Anatomy of inguinal canal	1	1
23	Development of heart: ASD, VSD and transposition of great vessels	3	2
24	Portal circulation and Portal hypertension and anastomosis	1	0
25	Spinal cord lesions and clinical localization	2	1
26	Peripheral nerves: Radial, Median, Ulnar and sciatic	2	1
	Total	60	30

DEPARTMENT OF ANATOMY
MGM MEDICAL COLLEGE, KAMOTHE, NAVI MUMBAI
SYLLABUS

Name of the course - M.SC Medical Anatomy

Semester - 4

Unit no.	Topic	Sub Topics		Hours T + P
1	**Abdomen and Pelvis**	**1.1**	Bone	32+30
			lumbar vertebrae, sacrum - features, articulations & attachments
			Pelvis: Types of pelvis, inlet, cavity, outlet of pelvis and pelvimetry and sex differences
		1.2	**Anterior & Posterior abdominal wall**
			Anterior abdominal wall – planes,quadrants, regions, layers, Muscles, nerve & blood supply, applied aspect
			Rectus sheath and inguinal canal - site, boundaries, contents, applied aspect
			Posterior abdominal wall: muscles, fascia, nerves - lumbar plexus
		1.3	**Male reproductive system**
			Testis - coverings, structure, blood & nerve supply, lymphatic drainage & applied anatomy, Epididymis, Spermatic cord, scrotum, Penis - parts, components, blood supply and lymphatic drainage
			Histology & Embryology of male reproductive system
		1.4	**Abdominal cavity**
			Peritoneum – Greater sac, lesser sac, Epiploic foramen, peritoneal folds, pouches, recesses and applied anatomy
			Viscera - Position, features, relations, blood & nerve supply, lymphatic drainage and applied aspects - Stomach, Duodenum, Small and large intestine, Appendix, Liver, Pancreas, spleen, kidney, suprarenal glands, ureter
			extrahepatic biliary apparatus - Position, parts, features, relations, blood & nerve supply, lymphatic drainage and applied aspects
			Vessels - formation, course, relations and Branches/ tributaries and applied aspects of Abdominal aorta, Coeliac trunk, Superior mesenteric, Inferior mesenteric, Common iliac artery & Portal vein, Inferior vena cava & Renal vein,
			thoracoabdominal diaphragm - attachments, openings, nerve supply, actions and applied anatomy
			Histology & Embryology of gastrointestinal system & urinary system

Unit no.	Topic	Sub Topics		Hours T + P
1	**Abdomen and Pelvis**	**1.5**	**Pelvic wall and viscera**	
			Pelvic diaphragm - layers, attachments, openings, nerve supply, actions and applied anatomy	
			Viscera - Position, features, relations, blood & nerve supply, lymphatic drainage and applied aspects - urinary bladder, Rectum and anal canal, vas deference, prostate, urethra, ovary, Uterus, fallopian tubes, vagina	
			Histology & Embryology of female reproductive system	
			Vessels - formation, course, relations and Branches and applied aspects of internal iliac arteries	
			Nerves - Lumbosacral plexus	
		1.6	**Perineum**	
			Perineal pouches, ischioanal fossa - site, boundaries, contents, applied aspect	
			Urogenital diaphragm - layers, attachments, openings, actions and applied anatomy with Perineal body	
		1.7	**Vertebral column**	
			curvatures,Intervertebral joints - type, articular ends, ligaments and movements, applied aspect	
			Contents of the vertebral canal,	
		1.8	**Sectional Anatomy**	
			Cross-section at the level of T8, T10 and L1	
			Midsagittal section of male and female pelvis	

Unit no.	Topic	Sub Topics		Hours T + P
2	Lower Limb	2.1	**Bones**	20+25
			Hip bone, Femur, Tibia, Fibula, Patella, articulated foot, (esp. talus and calcaneum) importance of ossification of lower end of femur & upper end of tibia, blood supply of head of femur	
		2.2	**Front & medial side of thigh**	
			Muscles – Attachments, nerve supply and actions of muscles of front & medial side of thigh (esp. quadriceps femoris, sartorius, adductor longus, magnus)	
			Nerves - Femoral nerve, Obturator nerve, Vessels – Femoral artery	
			Boundaries, contents, applied anatomy of - femoral triangle with femoral sheath & adductor canal	
		2.3	**Gluteal region, back of thigh,**	
			Muscles – Attachments, nerve supply and actions of muscles of Gluteal region (Glutei), back of thigh with anatomical basis of sciatic nerve injury during gluteal intramuscular injections and Trendelenburg sign	
			Nerves – Sciatic nerve, vessels - cruciate and trochanteric anastomosis, popliteal artery	
			Boundaries, contents, applied anatomy of - popliteal fossa	
		2.4	**Anterolateral compartment of leg & dorsum of foot**	
			Muscles – Attachments, nerve supply and actions of Anterolateral compartment of leg (esp. tibialis anterior)	
			Nerve - common peroneal nerve with anatomical basis of foot drop, vessels - anterior tibial and dorsalis pedis artery	

Unit no.	Topic	Sub Topics		Hours T + P
2	Lower Limb	2.5	**Back of Leg & Sole**	
			Muscles – Attachments, nerve supply and actions of muscles of Back of Leg (esp. triceps surae with concept of Peripheral heart, tibialis posterior) & Sole, layers (names of muscles)	
			Nerve - tibial nerve, vessels - posterior tibial, and medial and lateral plantar nerves and vessels	
		2.6	**General Features**	
			Fascia lata, Retinacula & Dermatomes of lower limb	
			Venous drainage of lower limb with applied anatomy (esp. anatomical basis of varicose veins and deep vein thrombosis)	
			Lymphatic drainage,	
		2.7	**Joints**	
			Hip joint, knee joint, tibiofibular, ankle joint - type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements, muscles involved, blood supply, nerve supply and applied anatomy (esp. Trendelenburg sign,)	
			arches of foot - formation, functions, maintaining factors and applied anatomy	
		2.8	**Bones**	
			Various bones in the articulated foot with individual muscle attachment	
		2.9	**Applied**	
			Anatomical basis of Psoas abscess & Femoral hernia, complications of fracture neck of femur, dislocation of hip joint and surgical hip replacement, knee joint injuries, Osteoarthritis, rupture of calcaneal tendon, Flat foot & Club foot, Metatarsalgia & Plantar fasciitis, enlarged inguinal lymph nodes	
		2.1	**Joints**	
			Subtalar and transverse tarsal joints - type, articular surfaces, ligaments, movements, muscles involved, nerve supply and applied anatomy	
Unit no.	Topic	Sub Topics		Hours T + P

3	**Genetics**	**3.1**	Introduction, Mendel's Laws	8+5
			Chromosomes	
			Chromosome - structure & classification, Karyotyping - process & application , Barr body, Lyon's hypothesis	
			Structural and numerical chromosomal aberrations	
		3.2	**Patterns of Inheritance**	
			Various modes of inheritance with examples, Pedigree charts, multifactorial inheritance	
		3.3	**Variation**	
			Genetic basis of: polymorphism and mutation	
		3.4	**Genetic Counseling**	
			Principles	
		3.5	**Diseases & syndromes**	
			Genetic basis & clinical features of Achondroplasia, Cystic Fibrosis, Vitamin D resistant rickets, Haemophilia, Duchene's muscular dystrophy & Sickle cell anaemia, Prader Willi syndrome, Edward syndrome & Patau syndrome	
		3.6	**Cell lines**	
			Mosaicism and chimerism with example	

Name of the Programme	**M. SC MEDICAL Anatomy**
Name of the Course	**BIOETHICS, BIOSAFETY, IPR & TECHNOLOGY TRANSFER**

Course objective	The students will gain structural knowledge on: 1. To list the routes of exposure for a pathogen to a human being . 2. To demonstrate and assess the proper use of PPE, best practices,biological containment, and be prepared to safely conduct research 3. To identify the role of the Biosafety Professional inBiomedical Research Laboratories 4. To appreciate the importance of assertion in interpersonal communication and beintroduced to some key assertion strategies 5. To understand the interpersonal nature of giving feedback, receiving criticism and resolving conflicts. 6. To establish attentive listening as an assertion strategy
Course outcomes	Students will learn to: 1. Effectively manage the health and safety aspects of a biological laboratory. 2. Give reliable, professional and informed advice and information to colleagues and managers. 3. Help to ensure that their institution complies with relevant legislation, liaise effectively with enforcing authorities and be aware of the penalties for failing to comply. 4. Build a context of understanding through communication. 5. Mediate between other conflicting parties. 6. Exhibit de-escalatory behaviors in situations of conflict. 7. Demonstrate acknowledgment and validation of the feelings, opinions, andcontributions of others.

Unit no.	Topics	Hours allotted 60hrs
1	**Ethics***:* Benefits of Ethics, ELSI of Bioscience, recombinant therapeutic products for human health care, genetic modifications and food consumption, release of genetically engineered organisms, applications of human genetic rDNA research, human embryonic stem cell research.	**15 hrs**
2	**Patenting:** Patent and Trademark, Bioscience products and processes, Intellectual property rights, Plant breeders rights, trademarks, industrial designs, copyright biotechnology in developing countries. Biosafety and its implementation, Quality *control in* Biotechnology.	**15 hrs**
	Introduction to quality assurance, accreditation & SOP writing : Concept of ISO standards and certification , National regulatory body for accreditation, Quality parameters, GMP & GLP, Standard operating procedures, Application of QA in field of genetics, Data management of clinical and testing laboratory	**15 hrs**
3	**Funding of biotech business** (Financing alternatives, funding, funding for Bioscience/ Medical Health Sector in India, Exit strategy, licensing strategies, valuation), support mechanisms for entrepreneurship (Bio-entrepreneurship efforts in India, difficulties in India experienced, organizations supporting growth, areas of scope, funding agencies in India, policy initiatives), Role of knowledge centers and R&D (knowledge centers like universities and research institutions, role of technology and up gradation)	**15 hrs**

Reference Books:

1. www.pdfdrive.net
2. www.khanacademy.org
3. www.acadeicearths.org
4. www.edx.org
5. www.open2study.com
6. www.academicjournals.org

Name of the Programme	**M. SC MEDICAL Anatomy**
Name of the Course	**DISASTER MANAGEMENT AND MITIGATION RESOURCES**

Course objective	The course will uplift about: 1. Understand and appreciate the specific contributions of the Red Cross/Red Crescent movement to the practice and conceptual understanding of disaster management and humanitarian response and their significance in the current context. 2. Recognize issues, debates and challenges arising from the nexus between paradigm of development and disasters. 3. Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives. 4. Respond to disaster risk reduction initiatives and disasters in an effective, humane and sustainable manner.
Course outcomes	At the successful completion of course the student will gain: 1. knowledge and understanding of the disaster phenomenon, its different contextual aspects, impacts and public health consequences. 2. Knowledge and understanding of the International Strategy for Disaster Reduction (UN-ISDR) and to increase skills and abilities for implementing the Disaster Risk Reduction (DRR) Strategy. 3. Ensure skills and abilities to analyse potential effects of disasters and of the strategies and methods to deliver public health response to avert these effects.

Unit no.	Topics	Hours allotted 60hrs
1	**Introduction:** Definition of Disaster, hazard, global and Indian scenario, general perspective, importance of study in human life, Direct and indirect effects of disasters, long term effects of disasters. Introduction to global warming and climate change.	**08 hrs**
2	**Natural Disaster and Manmade disasters:**Natural Disaster: Meaning and nature of natural disaster, Flood, Flash flood, drought, cloud burst, Earthquake, Landslides, Avalanches, Volcanic eruptions, Mudflow, Cyclone, Storm, Storm Surge, climate change, global warming, sea level rise, ozone depletion Manmade Disasters: Chemical, Industrial, Nuclear and Fire Hazards. Role of growing population and subsequent industrialization, urbanization and changing lifestyle of human beings in frequent occurrences of manmade disasters.	**15 hrs**
3	**Disaster Management, Policy and Administration:**Disaster management: meaning, concept, importance, objective of disaster management policy, disaster risks in India, Paradigm shift in disaster management. Policy and administration: Importance and principles of disaster management policies, command and co-ordination of in disaster management, rescue operations-how to start with and how to proceed in due course of time, study of flowchart showing the entire process.	**12 hrs**
4	**Financing Relief Measures:**Ways to raise finance for relief expenditure, role of government agencies and NGO's in this process, Legal aspects related to finance raising as well as overall management of disasters. Various NGO's and the works they have carried out in the past on the occurrence of various disasters, Ways to approach these teams. International relief aid agencies and their role in extreme events.	**13 hrs**
5	**Preventive and Mitigation Measures:**Pre-disaster, during disaster and post-disaster measures in some events in general structural mapping: Risk mapping, assessment and analysis, sea walls and embankments, Bio shield, shelters, early warning and communication Non Structural Mitigation: Community based disaster preparedness, risk transfer and risk financing, capacity development and training, awareness and education, contingency plans. Do's and don'ts in case of disasters and effective implementation of relief aids.	**12 hrs**

Reference Books:

1. ShailendraK.Singh : Safety & Risk Management, Mittal Publishers
2. J.H.Diwan : Safety, Security & Risk Management,APH
3. Stephen Ayers &Garmvik: Text Book of Critical Care, Holbook and Shoemaker
4. www.pdfdrive.net
5. www.khanacademy.org
6. www.acadeicearths.org
7. www.edx.org
8. www.open2study.com
9. www.academicjournals.org

Name of the Programme	**M. SC MEDICAL Anatomy**
Name of the Course	**HUMAN RIGHTS**

Course objective	Students will comprehend on: 1. A branch of public international law, and relevant juridical mechanisms at global as well as regional levels, 2. Human rights as an object of study in history, philosophy and the social sciences, as well as a practical reality in national and international politics. 3. Different forms of promoting and implementing human rights, domestically as well as on the international level. 4. The role of human rights in contemporary issues relating to terrorism, religion, ethnicity, gender and development. 5. Cholarly values such as transparency, impartiality, clarity, reliance and the importance of sound reasoning and empirical inference.
Course outcomes	Student will be able to virtue: 1. identify, contextualise and use information about the human rights situation in a given country 2. critically appraise source material, including cases from human rights committees and tribunals and reports and summary records from treaty bodies 3. analyse a country's situation or an international situation in terms of human rights and formulate human rights-based initiatives and policies 4. Promote human rights through legal as well as non-legal means. 5. Participate in legal, political and other debates involving human rights in a knowledgeable and constructive way

Unit no.	Topics	Hours allotted 60hrs
1	*Background*: Introduction, Meaning, Nature and Scope, Development of Human Rights, Theories of Rights, Types of Rights	**08 hrs**
2	*Human rights at various level* : Human Rights at Global Level UNO, Human Rights – UDHR 1948 – UN Conventions on Human Rights: International Covenant on civil and Political Rights 1966, International Convent on Economic, Social and Cultural Right, Racial Discrimination -1966 International, Instruments: U.N. Commission for Human Rights, European Convention on Human Rights.	**15 hrs**
3	*Human rights in India* : Development of Human Rights in India, Human Rights and the Constitution of India, Protection of Human Rights Act 1993- National Human Rights Commission, State Human Rights Commission, Composition Powers and Functions, National Commission for Minorities, SC/ST and Woman	**12 hrs**
4	*Human Rights Violations*: Human Rights Violations against Women, Human Rights Violations against Children, 35 Human Rights Violations against Minorities SC/ST and Trans-genders, Preventive Measures.	**13 hrs**
5	*Political issues*: Political Economic and Health Issues, Poverty, Unemployment, Corruption and Human Rights, Terrorism and Human Rights, Environment and Human Rights, Health and Human Rights	**12 hrs**

Reference Books:

1. JagannathMohanty Teaching of Human sRights New Trends and Innovations Deep & Deep Publications Pvt. Ltd. New Delhi2009
2. Ram Ahuja: Violence Against Women Rawat Publications JewaharNager Jaipur.1998.
3. SivagamiParmasivam Human Rights Salem 2008
4. Hingorani R.C.: Human Rights in India: Oxford and IBA New Delhi.

Evaluation Pattern- MSc Medical Anatomy (Admission Batch 2019 Onwards)

Evaluation Pattern for III rd and IV th Semester Exam <u>(Core Subject)</u>

Final Theory Marks will be 120 Marks (100 Marks University Theory Exam + 20 Marks Internal Assessment)

Theory Marks 100 (Time 3 Hours)

Question Type	Marks Per Question	No. of Questions	Questions to be Answered	Questions X Marks	Total Marks
Brief Answer Questions	10	11	10	10 X 10	100

- **<u>Semester III</u>**

  Practical Exam Pattern- Marks 100 –

Exercise	Description	Marks	Total marks
Q No 1	Practical exercise	Upper limb – 15m	50
		Thorax – 15m	
		Histology – 10m	
		Embryology – 10m	
Q No 2	Station exercise	Spots	25
Q No 3	VIVA	25 M	25
	Total		100

- **<u>Semester IV</u>-**

  Practical Exam Pattern- Marks 100

Exercise	Description	Marks	Total marks
Q No 1	Practical exercise	Lower limb – 10m	50
		Abdomen & pelvis – 15m	
		Histology – 10m	
		Embryology – 10m	
		Genetics – 5m	
Q No 2	Station exercise	Spots	25
Q No 3	VIVA	25 M	25
	Total		100

Internal Examination (Mid-Semester Exam)

Theory Marks 50 (Time 1 1/2 Hours)

Question Type	Marks Per Question	No. of Questions	Questions to be Answered	Questions X Marks	Total Marks
Brief Answer Questions	10	6	5	5 X 10	50

Practical Marks 50

Exercise	Description	Marks
Q No 1	**Practical exercise – 1**	1 x25=25 M
Q No 2	**Station exercise**	5x2M=10 M
Q No 3	**VIVA**	15 M
		Total = 50 M

For Calculation of Internal Assessment

The Marks obtained in Internal Examination out of 50 will be converted to out of 20 for Theory and Practical Internal Assessment.

Evaluation Pattern for III rd and IV th Semester Exam

(Elective Subjects & PG Activity)

Elective Subjects

- III rd Semester students have a choice to select one Core Elective Subject out of the two as mentioned above; for which there will be Internal Evaluation exam for Theory and Practical.

- IV th Semester students have a choice to select one General Elective Subject out of the three mentioned above; for which there will be Internal Evaluation exam for Theory.

Evaluation Pattern for Elective Subject (Theory)- Time 3 Hrs

Section	Question	Marks Distribution	Marks Alloted per section	Marks
Section A	MCQ	10 X 1 M=10	10	10
Section B	SAQ LAQ	3/4 X 5 M= 15 2/3 X10 M= 20	15 20	35
Section C	SAQ LAQ	3/4 X 5 M= 15 2/3 X10 M= 20	15 20	35
				Total 80

Practical Exam Pattern

Excercise	Discription	Marks
Q 1	**Practical Excercise**	1 X 20 = 20 M
Q 2	**Station Excercise**	2 X 5 = 10 M
Q 3	**Viva**	10 M
	Journal	10 M
		Total = 50 M

PG Activities

- The record of Clinical Postings, Dissertation/ Project/ Seminars will be maintained in Logbook. Each of the activity will be evaluated as per the evaluation format given in the Logbook and will be signedby the Departmental Co-ordinator before Semester end Examination.

Allotment of Marks for PG Activities

PG Activity	Marks Alloted
Clinical & Sectional Postings	20
Seminars/ Journal Clubs	20
Dissertation/ Project Work	20

The Marks obtained in the Internal Assessment, Elective Subjects and PG Activities to be sent toMGMIHS before the Semester End Examination as per the date announced by the university.

~~Annexure – L 1~~**Annexure-33A of BOM-63/2021 dt 17.02.2021**

ACADEMIC SYLLABUS FOR SEMESTER V

Name of the course - M.SC Medical Anatomy

Semester – 5

Core subjects - Head, face & neck& Neuroanatomy with systemic Histology & Embryology& applied aspect

Unit no.	Topic	Sub Topics		Theory Hours	Practical Hours
1	Head, face & neck	1.1	Bone	0	2
		1.2	Scalp	1	1
		1.3	Face & parotid region	4	2
		1.4	Neck	7	4
		1.5	Cranial cavity, Orbit	7	2
		1.6	Temporal, Infra-temporal & sub-mandibular regions	8	6
		1.7	Mouth, Pharynx & Palate	4	2
		1.8	Nose & Larynx	3	1
		1.9	Ear & Eye	3	1
		1.10	Back	1	1
		1.11	Joints	1	1
2	Neuroanatomy	2.1	Meninges & CSF	1	0
		2.2	Spinal cord	1	1
		2.3	Brain stem	3	1
		2.4	Cerebellum	1	
		2.5	Cerebrum	9	3
		2.6	Ventricular System	2	1
		2.7	ANS	1	0
		2.8	Histology of Nervous System	1	1
		2.9	Development of Nervous System	1	1
Total Hours				**60**	**30**

Name of the course - M.SC Medical Anatomy Semester – 5

List of the topics covered in sub-topics

Unit no.	Topic	Sub Topics		Hours T + P
1	**Head, face & neck**	**1.1**	**Bone**	40+22
			Skull – parts, bones, Normas-verticalis, occipitalis, Frontalis, lateralis, basalis, interior of skull, Mandible,Cervicalvertebrae,Fetal skull
		1.2	**Scalp**
			layers, blood supply, nerve supply and surgical importance
		1.3	**Face & parotid region**
			Muscles of facial expression with nerve supply
			Facial vessels - course, branches with applied aspect
			Nerve supply of face - sensory, motor - with course and distribution, applied anatomy of VII nerve
			lymphatic drainage of HFN - cervical lymph nodes with applied anatomy
			parotid gland - features, relations, nerve supply, duct and surgical importance
		1.4	**Neck**
			Anterior & posterior triangles of neck – Boundaries, subdivisions, contents, applied aspect, Midline structure of neck,
			Muscle Attachments, Nerve Supply, actions of Sternocleidomastoid, digastric, omohyoid, stylohyoid, mylohyoid
			deep cervical fascia - parts, extent, attachments, modifications, spaces, applied anatomy
			thyroid gland - location, parts, borders, surfaces, relations, blood supply and applied anatomy
			Vessels - origin, course, relations, branches/ tributaries and termination of Carotid arteries, subclavian artery, internal, external jugular, brachiocephalic veins
			Nerves - course and distribution of IX, X, XI & XII nerves, cervical sympathetic chain
			Histology of salivary glands Development of Pharangealapparatus,face

Unit no.	Topic	Sub Topics		Hours T + P
1	Head, face & neck	1.5	**Cranial cavity, Orbit**	
			dural folds - attachments and contents, dural venous sinuses - classification, location, communications, tributaries and applied of sagittal, cavernous sinuses	
			Extraocular - Muscles Attachments, Nerve Supply, actions, applied anatomy	
			Vessels - origin, branches/ tributaries and termination of ophthalmic vessels	
			Nerves - course and distribution of III,IV,VI nerves &ciliary ganglion - roots, branches	
			Pituitary gland - location, parts, relations, blood supply and applied anatomy	
			Lacrimal apparatus	
			Histology of Endocrine glands Development of Thyroid &Pitutory gland	
		1.6	**Temporal, Infra-temporal & sub-mandibular regions**	
			Temporal and infratemporal fossae - extent, boundaries and contents	
			Muscles of mastication - Attachments, Nerve Supply, actions, applied anatomy	
			Temporo-mandibular joint - type, articular surfaces, ligaments, relations, movements, muscles involved, blood supply, nerve supply and applied anatomy	
			Nerves - course and distribution, applied anatomy of V3 nerve with otic, submandibular &Pteriogopalatine ganglia - roots, branches, applied anatomy	
			Vessels - origin, branches/ tributaries and termination and applied anatomy of maxillary artery, pterygoid venous plexus	
			morphology, relations, nerve supply & applied anatomy of submandibular salivary gland	
		1.7	**Mouth, Pharynx & Palate**	
			Parts if any, morphology, relations, blood supply and applied anatomy of - pharynx, palatine tonsil, palate	
			Tongue - morphology, muscles, nerve & blood supply, lymphatic drainage, applied anatomy	
			Histology & Development of tongue	
		1.8	**Nose & Larynx**	
			nasal septum, lateral wall of nose - features, blood supply, nerve supply and applied anatomy	
			paranasal sinuses - number, features, relations, blood supply, nerve supply and applied anatomy	
			Larynx - external & internal features, muscles, nerve supply, blood supply, lymphatic drainage, applied anatomy	

Unit no.	Topic	Sub Topics		Hours T + P
		1.9	**Ear & Eye**	
			External ear - parts, blood supply and nerve supply	
			Middle ear and auditory tube - boundaries, contents, relations and functional anatomy	
			Parts and layers of eyeball	
			Histology of special sences	
			Development	
		1.10	**Back**	
			Boundaries and contents of Suboccipital triangle	
		1.11	**Joints**	
			Craniovertebral joints - type, articular surfaces, ligaments, movements, muscles involved and applied anatomy	
2	**Neuro anatomy**	**2.1**	**Meninges & CSF**	20+8
			Meninges - layers, extent, Spaces, modifications and applied anatomy	
			CSF - circulation & applied anatomy	
		2.2	**Spinal cord**	
			Features, Cross section - mid-cervical & mid-thoracic level, tracts, Blood supply & clinical anatomy,	
		2.3	**Brain stem**	
			Medulla oblongata, Pons, Midbrain - Features, Blood Supply, cranial nerve nuclei & syndromes	
			Sections of Medulla oblongata, Pons, Midbrain - sensory & pyramidal decussation,olivary levels, upper & lower levels of pons, Superior & inferior collicular levels	
			Cranial nerve nuclei with its functional components	
		2.4	**Cerebellum**	
			Features, Classification, connections - Superior, middle and inferior cerebellar peduncles, deep cerebellar nuclei, , functions, Blood supply and clinical anatomy	

Unit no.	Topic	Sub Topics		Hours T + P
2	Neuroanatomy	2.5	**Cerebrum**	
			Features, sulci and gyri, functional areas & applied anatomy,	
			White matter – Classification, & corpus callosum, internal capsule –parts, blood supply & applied anatomy,	
			Blood Supply of Brain, Blood brain barrier, Circle of Willis, applied aspects	
			Diencephalon - Parts, relations, Gross connections, major nuclei - Thalamus, hypothalamus, epi, meta &subthalamus, applied aspects	
			Basal ganglia - parts, connections, applied aspects	
			Limbic system - parts, connections, applied aspects	
		2.6	**Ventricular System**	
			Overview ventricular system and its communication, CSF circulation,	
			Lateral &IIIrd, IVth ventricle - parts, boundaries, features & applied anatomy	
		2.7	**ANS**	
			Autonomic nervous system - Parts, connections, functions, applied aspect	
		2.8	**Development of nervous system**	
		2.9	Histology of nervous system	

Evaluation Pattern for Year (Vth&VIthSem) M.Sc. Medical Anatomy (Batch 2019-20 onwards)

Skeleton – IIIrd Year MSc medical Anatomy

Evaluation Pattern

EVALUATION PATTERN FOR VTHSEMESTER EXAM

V sem Syllabus - Head, face &neck & Neuroanatomy with systemic Histology & Embrylogy & applied aspect

A. Evaluation Pattern for Vth Semester Exam

1. **THEORY-**

Final Theory Marks will be 120 Marks
(100 Marks University Theory Exam + 20 Marks Internal Assessment)

Theory Marks 100 (Time 3 Hours)

Question Type	Marks Per Question	No. of Questions	Questions to be Answered	Questions X Marks	Total Marks
Brief Answer Questions	10	11	10	10 X 10	100

2. **PRACTICAL-**

Final Practical Marks will be 120 Marks
(100 Marks University Practical Exam+ 20 Marks Internal Assessment)

Practical Exam Pattern- Marks 100

Exercise	Description	Marks	Total marks
Q No 1	Practical exercise	HFN – 15m	50
		Neuroanatomy – 15m	
		Histology – 10m	
		Embryology – 10m	
Q No 2	Station exercise	Spots	25
Q No 3	VIVA	25 M	25
	Total		100

B. Evaluation Pattern for Vth Semester Exam (Internal)

1. THEORY-

Theory Marks 50 (Time 1 Hour30 Mins)

Question Type	Marks Per Question	No. of Questions	Questions to be Answered	Questions X Marks	Total Marks
Brief Answer Questions	10	6	5	5 X 10	50

2. PRACTICAL-

Practical Exam Pattern- Marks 50

Exercise	Description	Total marks
Q No 1	**Exercise -1**	25
Q No 2	**Exercise-2**	15
Q No 3	VIVA	10
	50	

C. For Calculation of Internal Assessment

The Marks obtained in Internal Examination out of 50 will be converted to out of 20 for Theory and Practical Internal Assessment.

	Internal Exam Marks	Internal Assessment Marks
Theory	**50**	**20**
Practical	**50**	**20**

D. Assessment of PG Activities

- The record of Clinical Postings, Dissertation/ Project/ Seminars will be maintained in Logbook. Each of the activity will be evaluated as per the evaluation format given in the Logbook and will be signed by the Departmental Co-ordinator before Semester end Examination.

Allotment of Marks for PG Activities:

PG Activity	Marks Alloted
Clinical & Sectional Postings	20
Seminars/ Journal Clubs	20
Dissertation/ Project Work	20

Note: The Marks obtained in the Internal Assessment and PG Activities to be sent to MGMIHS before the Semester End Examination as per the date announced by the university.

M.SC SEMESTER 6thSYLLABUS

Name of the course - M.SC Medical Anatomy

Hours dedicated for every week: 6 (Theory: 4 Practical: 2)

Course Objective (Teaching Objectives)	• To teach basic Anatomical concepts related to General Anatomy, General histology, General Embryology and Musculoskeletal system
Course Outcomes (learning Objectives)	• To understand the basic anatomical concepts of General Anatomy • To understand the basic anatomical concepts of General Histology • To understand the basic anatomical concepts of General Embryology • To understand the basic anatomical concepts of Muscular System • To understand the basic anatomical concepts of Skeletal System

DEPARTMENT OF ANATOMY
MGM MEDICAL COLLEGE
SYLLABUS

Name of the course - M.SC Medical Anatomy
Semester – 6

Theory (Gross anatomy, Histology embryology, neuroanatomy and genetics)

Unit no.	Topic	Sub Topics		Duration
1	Superior Extremity	1.1	Pectoral girdle or shoulder girdle	4 hrs
		1.2	Brachial blocks	
		1.3	Claw hand	
		1.4	Evolutional aspects of development of upper extremity and its role	
2	Inferior Extremity	2.1	Babinki's sign	3 hrs
		2.2	Sciatica	
		2.3	X ray hip joint and test for hip joint integrity.	
3	Thorax	3.1	Intercostal space and mechanism of respiration.	6 hrs
		3.2	Angiography and angioplasty and bypass surgery	
		3.3	X- ray chest interpretation, indications	
		3.4	Fallot's tetralogy anatomical basis	
		3.5	Mediastinum	
		3.6	Respiratory epithelium	
4	Abdomen and pelvis	4.1	Histology of liver and cirrhosis of liver with concept of liver segments	10 hrs
		4.2	Development of kidney and anomalies.	
		4.3	Development of gonad and its anomalies	
		4.4	Development of pancreas and annular pancreas	
		4.5	Implantation and ectopic pregnancy	
		4.6	Development of paramesonephric duct and anomalies	
		4.7	Posterior abdominal wall and vascular structures	
		4.8	Histological General plan of GIT	
		4.9	Development and histology of suprarenal gland	
		5.0	Histology of pituitary gland	

Unit	Topic	Sub Topics	Duration

no.				
5	HNF	5.1	Extraocular muscle and strabismus	8 hrs
		5.2	Facial nerve and bell's palsy	
		5.3	TM joint and trismus	
		5.4	Tongue histology and carcinoma of tongue	
		5.5	Pharynx and deglutination	
		5.6	Larynx and stridor and carcinoma of larynx	
		5.6	Cavernous sinus and thrombosis	
		5.7	Development of face and anomalies	
6	CNS	6.1	Lower end of spinal cord and clinical applications such as regional block, tabesdorsalis with conusmedullaris syndrome	15 hrs
		6.2	Cranial nerve nuclei and functional correlation	
		6.3	Medullary syndrome	
		6.4	Blood supply of brain and cerebrovascular accidents	
		6.5	Meninges and CSF with hydrocephalus	
		6.6	Parkison's disease and basal ganglion	
		6.7	Hypothalamus and functional correlation	
		6.8	Cerebellar circuitry and cerebellar lesions	
		6.9	Cerebral functional areas and functional correlation	
		7.0	Limbic system and emotion and memory	
		7.1	Internal capsule and white matter of cerebrum	
		7.2	Histology of spinal cord and gray matter	
		7.3	Developmental anomalies of CNS	
		7.4	Development of eye ball	
		7.5	Development of ear	
		7.6	Development of pituitary	

7	Imaging Advances and principles	7.1	Principles of Ultrasonography and its uses in medical profession	5 hrs
		7.2	Use of color Doppler and its principle	
		7.3	Principle of MRI and its uses in clinical practice	
		7.4	Principle of CT scan and its uses	
		7.5	Principle nuclear imaging and PET scan	
		7.6	Laparoscopy principle and pelvic anatomy	
8	Gen Histology and Embryology	8.1	Connective tissue and collagen fibers	5 hrs
		8.2	Correlation of histological structure and follicular development	
		8.3	Primitive streak and molecular regulation and fetal axis	
		8.4	Teratology	
		8.5	Cleavage and twining	
9	**Genetics**	**9.1**	Various branches of genetics and it's applications	6 hrs
			Chromosomes	
			Clinical application of meiosis in process of gametogenesis	
			Structural and numerical chromosomal aberrations	
		9.2	**Patterns of Inheritance**	
			Multifactorial inheritance	
		9.3	**Variation**	
			Genetic basis of: polymorphism and mutation	
		9.4	**Genetic Counseling**	
			Genetic screening and Ethics of counseling	

DEPARTMENT OF ANATOMY
MGM MEDICAL COLLEGE, Aurangabad
SYLLABUS

Name of the course - M.SC Medical Anatomy
Semester – 6
Practical (Gross anatomy, Histology embryology, neuroanatomy and genetics)

Unit no.	Topic	Sub Topics		Duration
1	Superior Extremity	1.1	Demonstrate axilla and its contents	2 hrs
		1.2	Supraclavicular brachial plexus	
2	Inferior Extremity	2.1	Demonstrate gluteal region	2 hrs
		2.2	X ray hip joint and test for hip joint integrity	
3	Thorax	3.1	X- ray chest interpretation, indications	3 hrs
		3.3	Mediastinum	
		3.5	Respiratory epithelium	
4	Abdomen and pelvis	4.1	Histology of liver and cirrhosis of liver with concept of liver segments	3 hrs
		4.2	Development of kidney and anomalies.	
		4.3	Development of gonad and its anomalies	
		4.4	Development of pancreas and annular pancreas	
		4.9	Development and histology of suprarenal gland	
		5.0	Histology of pituitary gland	
5	HNF	5.1	Extraocular muscle and strabismus	5 hrs
		5.2	Facial nerve and bell's palsy	
		5.4	Tongue histology and carcinoma of tongue	
		5.5	Pharynx and deglutination	
		5.6	Larynx and stridor and carcinoma of larynx	
		5.7	Development of face and anomalies	

6	CNS	6.1	Lower end of spinal cord and clinical applications such as regional block, tabesdorsalis with conusmedullaris syndrome	3 hrs
			Internal capsule and white matter of cerebrum	
		7.2	Histology of spinal cord and gray matter	
		7.4	Development of eye ball	
		7.5	Development of ear	
		7.6	Development of pituitary	
7	Imaging Advances and principles	7.1	Principles of Ultrasonography and its uses in medical profession	4 hrs
		7.2	Use of color Doppler and its principle	
		7.3	Principle of MRI and its uses in clinical practice	
		7.4	Principle of CT scan and its uses	
		7.5	Principle nuclear imaging and PET scan	
		7.6	Laparoscopy principle and pelvic anatomy	
8	Gen Histology and Embryology	8.1	Connective tissue and collagen fibers	2 hrs
		8.2	Correlation of histological structure and follicular development	
9	Genetics	9.1	Pedigree charts	6 hrs
		9.2	Clinical application of meiosis in process of gametogenesis	
		9.3	Variation	
		9.4	Genetic Counseling	
			Able to analyze charts and its counselling	

EVALUATION PATTERN FOR VITH SEM MSC MEDICAL COURSES

(From Batch 2019-20 Onwards)

VI sem Syllabus - Gross Anatomy with clinical anatomy & Radiology, Neuroanatomy, Histology, Embryology, Genetics, Recent advances

A. Evaluation Pattern for VIth Semester Exam

1. THEORY-

Final Theory Marks will be 120 Marks
(100 Marks University Theory Exam + 20 Marks Internal Assessment)

Theory- Marks 100 (Time 3 Hours)

Question Type	Marks Per Question	No. of Questions	Questions to be Answered	Questions X Marks	Total Marks
Brief Answer Questions	10	11	10	10 X 10	100

2. PRACTICAL-

a. Practical Marks will be 70 Marks (50 Marks University Practical + 20 Marks Internal Assessment)

Exercise	Description		Marks
Q No 1	Exercise 1	Gross anatoy, Neuroanatomy- 15m	25
		Radiology, Genetics- 5m	
		Histology & Embryology – 5m	
Q No 2	Exercise 2	Spots	15
Q No 3	VIVA		10
			Total = 50 M

b. Thesis Evaluation – Marks 70

	Subject Knowledge	Objectives, Concept and Methodology	Result, Discussion and Outcome	External ExaminerViva	Internal ExaminerViva	Total Marks
Marks Alloted	**10**	**10**	**10**	**20**	**20**	**70**

B. Internal Examination (Mid-Semester Exam)

1. **THEORY-**

Theory Marks 50 (Time 1 1/2 Hours)

Question Type	Marks Per Question	No. of Questions	Questions to be Answered	Questions X Marks	Total Marks
Brief Answer Questions	10	6	5	5 X 10	50

2. **PRACTICAL-**

Practical Marks 50

Exercise	Description	Marks
Q No 1	Excercise 1-table exercise/spots	15
Q No 2	Exercise 2-Thesis Defense/ Stations	25
Q No 3	VIVA	10
		Total = 50 M

C. For Calculation of Internal Assessment

The Marks obtained in Internal Examination out of 50 will be converted to out of 20 for Theory and Practical Internal Assessment**.**

	Internal Exam Marks	Internal Assessment Marks
Theory	50	20
Practical	50	20

D. Evaluation of PG Activities:

- The record of Clinical Postings, Dissertation/ Project/ Seminars will be maintained in Logbook. Each of the activity will be evaluated as per the evaluation format given in the Logbook and will be signed by the Departmental Co-ordinator before Semester end Examination.

Allotment of Marks for PG Activities

PG Activity	Marks Alloted
Clinical & Sectional Postings	20
Seminars/ Journal Clubs	20

The Marks obtained in the Internal Assessment and PG Activities to be sent to MGMIHS before the Semester End Examination as per the date announced by the university.

Resolution No. 2 of Academic Council (AC-42/2022): Resolved to approve the Action Taken Report (ATR) **[ANNEXURE-2]** on the decisions taken in the meeting of Academic Council with the following observations/discussion/decision:

i) Resolved to amend Resolution No. 3.5 of AC-41/2021 dt. 27/08/2021 by including five (05) M.Sc. Medical courses. The amended Resolution is as mentioned below -

Amended Resolution No. 3.5 of AC-41/2021 dt. 27/08/2021 : Resolved to incorporate the changes as per the decisions of the CBCS committee in UG (B.Sc. Medical Dialysis Technology, B.Sc. Medical Laboratory Technology, B.Sc. Medical Radiology & Imaging Technology, B. Optometry, B.Sc. Cardiac Care Technology, B.Sc. Operation Theatre &Anaesthesia Technology, B.Sc. Perfusion Technology) ; PG (M.Sc. Medical Biotechnology, M.Sc. Medical Genetics, M.Sc. Clinical Embryology, M.Sc. Molecular Biology, Master of Public Health, Master in Hospital Administration, M.Sc. Cardiac Care Technology, M.Sc. Biostatistics, M.Sc. Medical Radiology & Imaging Technology, M. Optometry, M.Sc. Clinical Nutrition) and M.Sc. Medical (Anatomy, Physiology, Biochemistry, Microbiology, Pharmacology) courses with effect from the batch admitted in 2020-21 onwards.

Resolution No. 10.4 of Academic Council (AC-42/2022):

i) Resolved to accept "50% eligibility in internal assessment" pattern for all the CBCS programs (UG & PG) running under the constituent units of MGMIHS.(MGM School of Biomedical Sciences, MGM School of Physiotherapy, MGM Medical College (M.Sc. Medical 3 year courses)

MGM INSTITUTE OF HEALTH SCIENCES

(Deemed to be University u/s 3 of UGC Act, 1956)

Grade 'A' Accredited by NAAC

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