HAMDARD INSTITUTE OF MEDICAL SCIENCES AND RESEARCH

M. Sc. MEDICAL ANATOMY (3 YEARS)

SYLLABUS AND EXAMINATION SYSTEM

Hamdard Institute of Medical Sciences & Research
And Associated HAH Centenary Hospital
JAMIA HAMDARD (HAMDARD UNIVERSITY)
HAMDARD NAGAR, NEW DELHI - 110062

DEPARTMENT OF ANATOMY

Meeting of the Board of Studies

Date: 18.06.2020

Agenda:

Subject: Minutes of the Meeting of Board of Studies to discuss the Curriculum, examination pattern and marks distribution in internal assessment and annual examination of M. Sc. Anatomy (Medical) Course. w.e.f. 2019 Batch.

The meeting of the Board of Studies was conducted in the Department of Anatomy, HIMSR, on 18/06/ 2020 at 02:00 pm and the following members were present:

Members Present:

S. No.	External Members	Designation	Signature
1.	**Prof. Pushpa Dhar**	Professor Of Anatomy AIIMS ,New Delhi	
2.	**Prof. Dinesh Kumar**	Professor, Department of Anatomy, Maulana Azad Medical College, New Delhi	

S. No.	Internal Members	Designation	Signature
1.	**Prof. Shayama Kumari Razdan**	Professor & Head, Anatomy, HIMSR, Jamia Hamdard	Shayama.
2.	**Dr. Shalini Kumar**	Associate Professor, Anatomy, HIMSR, Jamia Hamdard	
3.	**Dr. Arpita Mahajan**	Assistant Professor, Anatomy, HIMSR, Jamia Hamdard	

Shayama.
Dr. Shayama Kumari Razdan
Professor & Head
Department of Anatomy, HIMSR

Professor & HOD
Department of Anatomy
HIMSR-Jamia Hamdard

Hamdard Institute of Medical Sciences & Research
And Associated HAH Centenary Hospital
JAMIA HAMDARD (HAMDARD UNIVERSITY)
HAMDARD NAGAR, NEW DELHI - 110062

DEPARTMENT OF ANATOMY

Date: 18/06/ **2020**

To

The Dean,
HIMSR & HAHC Hospital,
Jamia Hamdard,
New Delhi - 110062.

Subject: Minutes of the Meeting of Board of Studies to discuss the Curriculum, examination pattern and marks distribution in internal assessment and annual examination of M. Sc. Anatomy (Medical) Course. w.e.f. 2019 Batch.

1. The meeting of the Board of Studies was held in the Department of Anatomy on 18/06/ 2020 at 02:00 pm in the office chamber of undersigned and all the following members were present.

Prof. Shayama Kumari Razdan	-	Chairperson
Prof. Pushpa Dhar	-	External Expert
Prof. Dinesh Kumar	-	External Expert
Dr. Shalini Kumar	-	Member
Dr. Arpita Mahajan	-	Member.

2. The Chairperson welcomed the members of the Board of Studies.
3. There was discussion on the Curriculum of **M. Sc. Anatomy (Medical)** among the members.
4. The examination pattern and marks distribution in internal assessment and the annual examination of **M. Sc. Anatomy (Medical)** Course was also discussed.
5. A few minor modifications that were suggested have been incorporated.
6. The meeting ended with a vote of thanks for the chair.

Shayama

Dr. Shayama Kumari Razdan
Professor & Head
Department of Anatomy
Professor & HOD
Department of Anatomy
Hamdard

HAMDARD INSTITUTE OF MEDICAL SCIENCES & RESEARCH

JAMIA HAMDARD, HAMDARD NAGAR, NEW DLEHI

M.Sc. Bye-Laws

1. Programme : M.Sc. Medical Anatomy

M.Sc. at HIMSR, Jamia Hamdard, New Delhi is a full time regular course. During an academic year, a candidate who is enrolled in the M.Sc. Programme, shall not be allowed to enroll for any other full-time programme of study and shall not appear in any other examination of a full time course of this or any other university.

2. Duration: Three Year, Annual System.

Teaching days in each year shall be not less than **180 days**.

Medium of instruction and examinations : English

3. Eligibility for Admission:

All candidates seeking admission in M.Sc. programmes must appear in the Entrance Test and interview conducted by Jamia Hamdard. There should be entry level MCQ examination followed by interview and the marks distribution should be 80% and 20% respectively.The candidates should fulfill the following qualifications for admission as mentioned below:

Selection procedure:

Duration: 3 years (2 years for MBBS degree holders, who will be eligible for direct admission to 2nd year. **Seats**: 5 **Eligibility:** The candidate must have passed Bachelor degree MBBS/BDS/BPT/Allied sciences/Life sciences with at least 50% marks in aggregate, and appeared in Entrance Test and / Interview conducted by Jamia Hamdard. The question paper will comprise of questions on Human anatomy, Genetics, Cell biology taught in MBBS and at B.Sc. level. In the first year, students will attend classes in their respective disciplines with MBBS 1st year students.

4. Course Structure:

a) During 1st year, the M.Sc. students will study the preclinical medical subject, namely, Anatomy, Physiology and Biochemistry. There will be 2 theory papers and one practical. For practical examination one external and one internal examiner will be appointed.

b) During 2nd and 3rd year, the students will remain in the Department of Anatomy and study the theory and carryout the practicals as per the approved syllabus of the Department.

c) A project will be carried out by each M.Sc. student. The topic of the project and the project supervisor will be assigned to the student during the beginning of the 2nd year and student will carry out the project and submit a dissertation six months before the final examination of 3rd year. The dissertation will be evaluated by a panel of internal and external examiners. The student will defend his/her dissertation and face viva-voce examination. The dissertation will not carry any marks, it will be either approved or rejected.

d) A student will be permitted to appear for the final year examination only if his/her dissertation is approved. If the dissertation is not approved, he/she will not be permitted to appear for final examination and will lose a year. In such case, he/she will carry out further research as advised by the examiners and resubmit the revised dissertation next year. He/she will be permitted to appear for final examination only if the revised dissertation is approved.

e) The examination will be annual and all the three annual examinations will be University examinations.

f) Total span period for passing the examination will be 5 years. A maximum of 2 years will be allowed for clearing the 1st year examination and the maximum permissible period for passing the 2nd and 3rd year will be three years.

g) The students who fail in any examination will be permitted to appear in supplementary examination to be held within 2months of declaration of the result.

h) The minimum passing marks will be 50% in each paper.

5. Attendance

a) All Students must attend every lecture and practical class. However, to account for unforeseen contingencies, the attendance requirement for appearing in the annual examinations shall be a minimum of 75% of the classes prescribed for each course.

b) In order to maintain the attendance record of a particular course, a roll call will be taken by the teacher in every scheduled lecture and practical class. For the purpose of attendance, each practical class will count as one attendance unit, irrespective of the number of contact hours. Attendance on account of participation in the prescribed and notified activities such as, NCC, NSS, Inter University sports, educational tours/field work, shall be granted provided the participation of the student is duly verified by the officer-in-charge and is sent to the Head of the Department within two weeks of the function/activity, etc.

c) The teachers shall consolidate the attendance record for the lectures and practicals at the end of each month and submit to the Head of the Department. At the end of the academic session, the teachers shall consolidate the attendance record for the whole session and

submit it to the Head of the Department. The statement of attendance of students shall be displayed by the Head of the Department on the Notice Board. A copy of the same shall be preserved as record. Attendance record displayed on the Notice Board shall deem to be a proper Notification for the students and no individual notice shall be sent to any student.

d) If a student is found to be continuously absent from the classes without any information for a period of 30 days, the concerned teacher shall report the matter to the Head of the Department who will report the matter to the Dean of the Faculty for appropriate action including striking off the name of such student(s) from the rolls. Such a student may, however, apply for re-admission within 7 days from the date of issue of the notice of striking off the name of such student(s) from the rolls. The request for re-admission may be considered by the Dean of the Faculty. Such a student shall not be eligible for re-admission after the prescribed period of 7 days. The re-admission shall be effected only after the payment of prescribed re-admission fee.

e) A student detained on account of shortage of attendance in any semester shall be re-admitted to the same class in the subsequent academic year on payment of prescribed fees applicable in that year to complete the attendance requirement of that course.

6. Internal Assessment:

The Internal Assessment marks will constitute 25% of the total marks allotted to a course.

For the evaluation of lab work, laboratory notebook, practical test/viva voce shall be taken into account. The marks shall be awarded by the respective teachers conducting the practical course. For sessionals and during the examination, no department shall permit discontinuance of classes. Under the compelling circumstance such as sickness of the student or mourning in the family, the candidate may be given another chance. For sickness only a credible medical certificate issued by a hospital shall be considered. In case of causalities a letter from the parents would be required.

7. Annual Examination:

There shall be not less than four theory courses and one lab course in each year. The detailed contents of the courses of studies shall be prescribed by respective Board of Studies and shall be reviewed regularly.

A student who fails in theory papers of examination may be given a chance to appear in supplementary examination to clear those papers.

The annual examination shall be held at the end of each academic year (July) as per schedule given in the Academic Calendar of HIMSR.

Up to a maximum of five days preparatory holidays may be given to the examinees before the start of the annual examinations.

Fifty percent of question paper for annual examinations shall be set by the external examiner and 50% by an internal examiner. The Board of Studies of a department shall draw a panel of

name of examiners, both internal and external, for approval by the Vice-Chancellor. **If the external examiner is unable to send the question paper by the deadline set by the examination branch of the University, the Head of the Department after consultation with the examination branch shall get the paper set internally by a faculty member.** The papers set by the examiners can be moderated by the Head of the department/ course co-ordinator. Teachers appointed on contractual basis with appointment of less than one academic session, and temporary as well as ad-hoc teachers may not ordinarily be appointed as examiners. All such teachers, however, will be expected to assist in the practical examination.

The duration of the annual examination of a theory course shall be Three hours. Practical exams of a lab course shall be of at least four hours duration. The practical examination shall be conducted by an external and an internal examiner and assisted by other teachers.

For projects, **each student shall submit three typed bound copies of his/her dissertation duly certified and signed by the supervisor(s) to the Head of the Department** six months before the final examination. The dissertation shall embody the candidates own work and an up-to-date review of the subject area. The write-up shall detail a critical assessment of the subject area and indicate in what respect the work appears to advance the knowledge of the subject concerned and future course of investigation required. The evaluation of the dissertation will be carried out as outlined in Section 4 (C & D).

8. Promotion :

a) Promotion from 1st year to 2nd year and from 2nd year to 3rd year shall be upon passing in all the theory papers and practical course. However, a student who fails in not more than 1/3rd of theory papers will be promoted to next class. He/she shall carry these papers and will be required to clear these papers next year. The degree will be awarded only after the student passes in all the theory and practical courses.

Award of degree shall be subject to successfully completing all the requirements of the programme of study within five years from admission. Candidates who are unable to appear in the examination because of serious illness at the time of examinations may be given another chance. The request has to be processed through the Head of the Department to the Vice-Chancellor. The Vice-Chancellor may look into the merit of the case and decide accordingly.

9. Classification of Successful Candidates:

The result of successful candidates who fulfill the criteria for the award of M. Sc. degree shall be classified after the final year on the basis of his/her total marks of all the 3 years.

Classification shall be done on the basis of following criteria:

a) He/she will be awarded "Ist Division" if his/her total marks are greater than or equal to 60% in all the examinations in the first attempt.

b) He/she will be awarded "2nd Division" if his/her total marks are greater than or equal to 50% but less than 60% in all the examinations in the first attempt.

c) He/she will be awarded "Pass" if his/her total marks are greater than or equal to 50% in all the examinations in the first attempt. A student who passes the examination in more than one attempt or in supplementary examination will also be awarded "Pass" irrespective of the percentage.

d) He/she will be treated as "fail" if his/her total marks are less than 50% in all the annual examinations taken together.

10. Span Period :

Five years. All requirement of M. Sc. degree within a total period of five years from the date of their first admission.

11. Consolidated Mark-sheet:

On successful completion of the course, a consolidated mark-sheet consisting of marks of all the examinations shall be issued to the students by the Examination Section.

12. Award of Gold Medal:

Gold Medal will be given to the toppers of each course. However, only the overall topper in all the disciplines of any course will be given Gold Medal by the Chief Guest in the Convocation. Criterion for giving the Gold Medals will be the percentage of marks and the students with highest percentage of Marks will be given the Gold Medal in each discipline of a course.

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DEPARTMENT OF ANATOMY

M. Sc. 1st Year

(Common to M. Sc. Students of all disciplines)

The students will study along with MBBS 1st Professional students. The course content for M.Sc. 1st year will be same as for MBBS 1st Professional. After successfully completing the M.Sc. 1st year, the students will study specific discipline courses in their respective subjects.

The marks distribution is as follows:

Paper	**Maximum Marks (Theory + IA**	**Maximum Marks (Practical + IA)**	**Total Marks**
Anatomy (Paper1+2=40+35=75)	75+25	75+25	200
Physiology	75+25	75+25	200
Biochemistry	75+25	75+25	200
		Total Marks	**600**

The Minimum passing marks will be 50% in each paper.

Shayama.

Dr. Shayama Kumari Razdan
Professor & Head,
Department of Anatomy, HIMSR

First Year Medical M.sc:

Syllabus:

Lectures/ demonstrations

General Anatomy

Brief history of anatomy as related to medicine, subdivisions of anatomy; anatomical position descriptive terms, structures met with during dissection; skin, superficial fascia including contents, deep fascia including its modifications; muscles; parts, origin, insertion, tendon, aponeurosis, bursa, synovial sheath; ligament, bone including ossification, joints in general and classification, blood vessels, lymphatic and nervous system in general.

Gross Anatomy

Lectures/ demonstrations in gross anatomy are taken under the general headings of:

Introduction, position, important relations, blood, lymphatic and nerve supply, important applied aspects along with radiological features are emphasized wherever applicable. Emphasis is given on applied aspect of each structure dissected so that the student becomes aware of the clinical aspect of the structures in the body. Gross anatomy is taught regionwise. The regions include:

Upper-Limb

Lower-Limb

Head & Neck

Neuroanatomy Thorax, Abdomen & Pelvis

Embryology: General & Systemic

Histology: General & Systemic

Osteology: The bones of the body are taught in details, which include general features, attachment of muscles and their actions and ossification of bones in demonstration classes.

Syllabus:

Distribution of topics paper wise for second terminal and annual first year M. Sc. Medical university examination:

Paper – I

Head & Neck, Central Nervous System, Upper Limb, General Anatomy, General Histology, Related Histology and Embryology

Paper – II

Thorax, Abdomen, Pelvis, Lower Limb, General Embryology, Principles of Medical Genetics, Related Histology and Embryology.

First Year M.sc Medical

Periodic Part Completion Tests and two terminal examinations will be taken during the first year of M. Sc. (Medical). Second Terminal Examination will be held on the same pattern as that of Annual Examination.

Internal Assessment:

Will be calculated from the two Terminal Examinations to be conducted in the month of December & June.

Total marks of the Internal assessment in Theory=25

Total marks of Internal assessment in Practicals=25

Annual examination: Will be conducted as -

THEORY: CODE: MMAT101

There will be two theory papers

Theory Papers (Two), Paper -1 (40marks) – (3Hr)

Paper - 2 (35 marks) – (3Hr)

Practical Examination : To be held on one day.

PRACTICAL: CODE: MMAP101

Practical- maximum marks - 75

Shayana.

Marks Distribution in Theory and Practical Examination:

Theory Marks (75) + Internal assessment (25)			
Paper – 1 (40 Marks)			
Type of Question	**No. of Questions**	**Marks of each Question**	**Total**
MCQs	5	1	5
Enumerate	5	1	5
long answer questions	3	5	15
short answer questions.	5	3	15
		Total	**40**
Paper – 2 (35 Marks)			
Type of Question	**No. of Questions**	**Marks of each Question**	**Total**
MCQs	5	1	5
Enumerate	5	1	5
long answer questions	2	5	10
Short answer questions.	5	3	15
		Total	**35**

Practical Marks (75)+Int. Assessment(25)	
Paper – 3 (75 Marks)	
Histology - Practical	15
Spotting	20
Hard Part	15
Soft Part	15
Surface Marking	5
Radiology	5

Second Year M.SC

There will be four theory papers & syllabus for each paper is written below. However practical will be held on two days

Paper wise Distribution of Syllabus:

M.Sc. II YEAR

Code	THEORY	TOTAL MARKS (400)	PRACTICAL	TOTAL MARKS (100)
MMA 201	**PAPER I:** General Anatomy, General Histology & General Embryology	75+25 (IA)	**PAPER V (MMA 205)**	PRACTICAL:75+25 (IA)
MMA 202	**PAPER II** Gross Anatomy (Upper and lower limb), Related histology, Embryology Research methodology	75+25 (IA)		
MMA 203	**PAPER III:** Gross Anatomy (Thorax), Related histology, Embryology Cadaver preservation techniques Histological Techniques	75+25(IA)		
MMA 204	**PAPER IV:** Gross Anatomy (Abdomen, Pelvis & Perineum), Related histology, Embryology	75+25(IA)		

Paper wise Distribution Of marks

Total Theory Marks (75 X 4 = 300) + Internal assessment (25 X4 = 100) = 400

Paper – 1 Theory Marks (75) + Internal assessment (25)

Type of Question	No. of Questions	Marks of each Question	Total
Long answer questions	3	10	30
Short answer questions.	5	7	35
Applied	2	5	10
		Total	**75**

Paper – 2 Theory Marks (75) + Internal assessment (25)

Type of Question	No. of Questions	Marks of each Question	Total
Long answer questions	3	10	30
Short answer questions.	5	7	35
Applied	2	5	10
		Total	**75**

Paper – 3 Theory Marks (75) + Internal assessment (25)

Type of Question	No. of Questions	Marks of each Question	Total
Long answer questions	3	10	30
Short answer questions.	5	7	35
Applied	2	5	10
		Total	**75**

Paper – 4 Theory Marks (75) + Internal assessment (25)

Type of Question	No. of Questions	Marks of each Question	Total
Long answer questions	3	10	30
Short answer questions.	5	7	35
Applied	2	5	10
		Total	**75**

Total Practical Marks (75) + Int. Assessment(25) = 100

Paper5	
Histology (Viva)	10
Histological Techniques	10
Window Dissection	20
Hard Part viva	10
Soft Part viva	10
Surface Marking	2.5
Radiology	2.5
Embryology	10

Note: The minimum passing marks will be 50% in each paper

M.Sc. II YEAR

MEDICAL ANATOMY SYLLABUS

THEORY PAPER I:
75+25(IA)

GENERAL ANATOMY

a) Introduction
b) Skin with appendages - functions and applied
c) Fascia- superficial and deep, functions and applied
d) General classification of bones & cartilage including examples, functions and applied;
e) General classification of joints with general features, examples, movements and applied;
f) General classification of muscles - features, function, examples and applied
g) General anatomy of cardiovascular system- arteries, veins, capillaries, end arteries , functions and Applied
h) Lymphatic system – functions and applied
i) Nervous system
j) General principles of radiology

GENERAL HISTOLOGY

a) Cells and organelles including ultrastructure
b) Cell junctions, Cell surface modifications
c) Epithelial tissue-I: Simple -Types. Distribution and functions including ultrastructure .Compound- Types. Distribution and functions including ultrastructure
d) Epithelial tissue-II: Glandular epithelium including ultrastructure & function
e) Classification of connective tissue, distribution and components
f) Connective tissue I: loose areolar, elastic, collagenous and adipose
g) Connective tissue-II: Cartilage - hyaline, elastic, fibro
h) Connective tissue-III: Bone - compact and cancellous
i) Lymphoid-tissue/Immune system-I: classification, cells, histocompatibility
j) Antigens, mononuclear phagocytic system, antigen presenting cells
k) Lymphoid tissue/Immune system-II: Lymphoid tissues and organs classification, origin, functions and clinical aspects
l) Muscular tissue: smooth, striated, cardiac and myoepithelial cells

m) Nervous Tissue: different types of neurons, neuroglia, spinal cord, spinal and sympathetic ganglia, nerve, cerebral cortex, cerebellar cortex.

GENERAL EMBRYOLOGY

a) Introduction: Male and female reproductive system, testis and ovary, migration of primordial germ cells into gonadal ridge, definition of gametes, knowledge of histogenesis and organogenesis of various systems
b) Ovum, oogenesis, growth of ovarian follicles and uterine cycle, ovulation.
c) Sperm, spermatogenesis, spermiogenesis, normal sperm count and abnormal conditions.
d) Principles of family planning and sex determination.

First Two Weeks of Development

a) Fertilization process, *in vitro* fertilization, cleavage, blastocyst formation.
b) Implantation - types, formation of decidua, its subdivisions and abnormal implantation.
c) Formation of Embryoblast and Trophoblast, bilaminar germ disc. Trophoblast development, formation of cytotrophoblast and syncytiotrophoblast.
d) Amniotic membrane, Yolk sac, Extraembryonic mesoderm, Extraembryonic coelom, connecting stalk, chorion, formation of prochordal plate.

Third Week of Development

a) Embryoblast - primitive streak, node, formation of intra - embryonic mesoderm, Trilaminar germ disc, notochord, buccopharyngeal and cloacal membranes, pericardial bar.
b) Trophoblast - secondary yolk sac, intra - embryonic coelom and allantoic diverticulum, intra - embryonic mesoderm, division, derivatives of Ectoderm, endoderm, mesoderm.

Fourth to Eighth Week of Development

Formation of somites, neural tube, cephalo - caudal folding and lateral foldings of embryo, formation of gut and its subdivisions, vitelline duct.

Foetal Membranes, Placenta

a. Formation, functions, features, types, circulation, abnormalities of placenta and placental barrier.
b. Umbilical cord, Amnion, Amniotic fluid its function, chorion leavae, decidua, Amniocentesis.
c. External appearance during second month, crown - rump length, crown head length, estimation of age and growth of foetus.
d. Twins - formation, types, conjoint twins, multiple pregnancies.
e. Causative factors for congenital malformations - Teratogens.

THEORY PAPER II:
75+25 (IA)

UPPER LIMB

a) Introduction to upper limb
b) Pectoral Region, Breast
c) Axilla
d) Scapular Region
e) Arm & Cubital Fossa
f) Forearm & hand
g) Joints of upper limb
h) Nerves, Dermatomes and Nerve Injuries
i) Applied anatomy of each region
j) Sectional Anatomy

LOWER LIMB

a) Introduction to Lower Limb
b) Thigh
c) Gluteal region
d) Popliteal fossa
e) Leg & dorsum of foot
f) Sole
g) Venous drainage & lymphatic drainage of lower limb
h) Joints of lower limb
i) Arches of foot
j) Nerves , dermatomes and nerve injuries
k) Applied anatomy of each region
l) Sectional anatomy

Related histology, Embryology

Research methodology

THEORY PAPER III:
75+25 (IA)

THORAX

a) Introduction to thorax
b) Walls of thorax & Respiratory Movement
c) Thoracic cavity
d) Lung with Pleura
e) Heart with Pericardium
f) Mediastinum- subdivisions, detailed contents and applied
g) Joints of thorax

h) Applied aspects of all regions including bypass surgeries and stents
i) Sectional Anatomy

- **Related Histology and Embryology**
- **Cadaver preservation techniques**
- **Histological Techniques**

THEORY PAPER IV:
75+25 (IA)

ABDOMEN, PELVIS & PERINEUM

a) Introduction of Abdomen and pelvis
b) Abdominal walls including fascia
c) Vessels of Abdomen and pelvis
d) Peritoneal cavity including details of fossae, sub-phrenic spaces, peritoneal bands
e) Viscera of abdominal cavity
f) Diaphragm including details of diaphragmatic hernias
g) Nerves of abdomen and pelvis
h) Female reproductive system
i) Male reproductive system
j) Urinary system
k) Perineum
l) Pelvic diaphragm
m) Joints of abdomen and pelvis
n) Sectional anatomy of abdomen and pelvis
o) Applied anatomy of all regions of abdomen and pelvis
p) Recent advances

- **Related Histology and Embryology**

PRACTICAL PAPER V:
75+25(IA)

a) General Anatomy, General Histology & General Embryology
b) Upper limb, lower limb, Thorax, Abdomen, Pelvis & Perineum
c) Related histology, Embryology
d) Histological Techniques
e) Cadaver preservation techniques
f) Research methodology
g) Radiological anatomy & Surface anatomy

M.Sc. III YEAR

MEDICAL ANATOMY SYLLABUS

There will be four theory papers to be held on four days & syllabus for each paper is written below. However practical will be held on two days

Paper wise Distribution of Syllabus

M.Sc. III YEAR

Code	THEORY	TOTAL MARKS (400)	PRACTICAL	TOTAL MARKS (100)
MMA 301	**PAPER I:** Gross Anatomy (Head & Neck), Related histology, Embryology	75+25(IA)	**PAPER V (MMA 305)**	PRACTICAL: 75+25(IA)
MMA 302	**PAPER II:** Neuroanatomy, Related histology, Embryology	75+25 (IA))		
MMA 303	**PAPER III:** Systemic Embryology, Genetics & Recent Advances,	75+25 (IA)		
MMA 304	**PAPER IV:** Systemic Histology, Museum Technology Electron microscopic	75+25(IA)		

Paper wise Distribution Of marks

Total Theory Marks (75 X 4 = 300) + Internal assessment (25 X4 = 100) = 400

Paper – 1 Theory Marks (75) + Internal assessment (25)

Type of Question	No. of Questions	Marks of each Question	Total
Long answer questions	3	10	30
Short answer questions.	5	7	35
Applied	2	5	10
		Total	**75**

Paper – 2 Theory Marks (75) + Internal assessment (25)

Type of Question	No. of Questions	Marks of each Question	Total
Long answer questions	3	10	30
Short answer questions.	5	7	35
Applied	2	5	10
		Total	**75**

Paper – 3 Theory Marks (75) + Internal assessment (25)

Type of Question	No. of Questions	Marks of each Question	Total
Long answer questions	3	10	30
Short answer questions.	5	7	35
Applied	2	5	10
		Total	**75**

Paper – 4 Theory Marks (75) + Internal assessment (25)

Type of Question	No. of Questions	Marks of each Question	Total
Long answer questions	3	10	30
Short answer questions.	5	7	35
Applied	2	5	10
		Total	**75**

Total Practical Marks (75) + Int. Assessment(25) = 100

Paper-5

Histology (Viva)	10
Window Dissection	20
Hard Part viva	10
Soft Part viva	10
Surface Marking	2.5
Radiology	2.5
Embryology	10
Microteaching	10

Note: The minimum passing marks will be 50% in each paper

M.Sc. III YEAR

MEDICAL ANATOMY SYLLABUS

THEORY PAPER I: 75+25(IA)

HEAD & NECK

a) Scalp & face
b) Cervical fascia
c) General arrangement of triangles of neck with contents
d) Cranial cavity
e) Vertebral canal
f) Orbit
g) Parotid region
h) Submandibular region
i) Temporal & infratemporal fossa
j) Lymph nodes & lymphatic drainage of head & neck
k) Deep structures in neck
l) Nose and paranasal sinuses
m) Tongue
n) Mouth and Pharynx
o) Larynx
p) Ear
q) Eyeball
r) Sympathetic chain and cranial nerves
s) Vessels of head & neck
t) Joints of head and neck
u) Applied anatomy of all regions of head and neck
v) Sectional anatomy of head and neck
w) Recent advances

Related Histology and Embryology

THEORY PAPER II: 75+25 (IA)

NEUROANATOMY

Introduction: evolution - centralization - encephalization - development - tube derivatives - crest derivatives – subdivisions.

a) Cells of the nervous System: - neurons - nerve fibres - neuroglia - functions – synapse.
b) Peripheral nervous System: - spinal nerves - plexus formation, Nerve endings - Receptors – Effectors.
c) Autonomic nervous System: Introduction - Subdivisions - distribution – ganglia – route of supply to all end organs- functions and clinical applications.
d) Central nervous System: Spinal cord - morphology - external - internal - sections - sacral - lumbar - thoracic - cervical - grey matter & cells – white matter & tracts -central canal - covering - blood supply - applied anatomy - lumbar puncture - lesions.
e) Brain Stem: Medulla Oblongata (closed) - external features – internal features - sections - motor decussation - sensory decussation – central canal, blood supply, leisons.
f) Medulla Oblongata (Open): external features - internal features – sections - floor of IV ventricle - nuclei of cranial nerves - inferior cerebellar peduncle - blood supply - lesions.
g) Pons: external features - internal features - floor of IV ventricle - nuclei - middle cerebellar peduncle - blood supply – lesions.
h) Mid brain :external features - internal features - sections - IC level - SC
i) level - aqueduct - nuclei - superior cerebellar peduncle, blood supply, leisons
j) Cerebellum: subdivisions with functional and evolutionary correlations - structure, white matter - submerged nuclear masses – structural organization - blood supply - lesions.
k) Functional columns of nuclei.
l) Thalamic Complex: subdivisions and functions - hypothalamus – meta thalamus - epi thalamus - sub thalamus - blood supply, leisons.

m) Cerebral hemisphere: major subdivisions - functional areas – submerged nuclear masses (basal ganglia) – white matter – structural organization-- blood supply - lesions.

n) Limbic System: parts & functions, clinical applications.

o) Reticular System: parts & functions, clinical applications

p) Ventricular system of brain and clinical applications.

q) Meninges and blood Supply, clinical applications.

r) Cerebrospinal fluid: composition, secretion - circulation - drainage – cisterns-clinical applications.

s) Cranial nerves: Nuclei, course, distribution, lesions.

t) Ascending and descending pathways of CNS.

u) Sectional anatomy.

v) Applied anatomy of all regions with special reference to neurophysiology and neuropharmacology.

Related histology and Embryology

THEORY PAPER III: 75+25(IA)

Systemic Embryology

Systemic Embryology

Development of GIT & Body cavities

- Divisions of gut: foregut, midgut & hepato-pancreatico-biliary system and hindgut
- Body cavities, peritoneal cavity
- Diaphragm, spleen and associated congenital anomalies

Development of respiratory system

- Formation of lung bud, larynx, trachea, bronchi, pleural cavity, maturation of lungs and clinical correlates

Development of genitourinary system:

- Kidney, ureter and urinary bladder
- Testis, ovary, suprarenal gland, descent of gonads
- Genital ducts, their derivatives, external genitalia and associated congenital anomalies

Development of cardiovascular system:

- Establishment of cardiogenic area
- Heart loop and formation of the chambers of the heart
- Intraembryonic vessels
- Major veins and developmental abnormalities
- Foetal circulation and changes after birth

Development of face and pharyngeal arches:

- Pharyngeal arches, pharyngeal pouches, pharyngeal clefts and their derivatives, thyroid and parathyroid gland and common birth defects
- Face, nasal cavity, oral cavity, tongue, soft palate and associated anomalies

Development of nervous system:

- Neural tube: brain vesicles and their derivatives, neural crest and its derivatives, hypophysis cerebri and associated anomalies

Development of organs of special senses

- Eye and ear and their anomalies

Development of skin and its appendages

- Skin and its appendages
- Mammary gland and anomalies

Development of musculoskeletal system

- Skull, vertebral column, limb bones, sternum and common congenital anomalies
- Development of muscles in brief

GENETICS

Genetics

Introduction:

- Definition:
- Terminology
- Allele
- Domonant & Recessive
- Genotype & Phenotype
- Hoozygous & Heterozygous
- Hybrid & Hybridization
- Branches Of Genetics
- Medical genetics
- Cytogenetics
- Clinical genetics

- Methods Of Study

Cell:

- Cell cycle & division
- Interphase Nucleus
- Chromatin Types (Condensed & Extended)
- Sex Chromatin
- Lyon's Hypothesis

Chromosomes:

- Structure & classification
- Karyotyping- methodology

Chromosomal disorders:

- Numerical abnormalities & their causes
- Polyploidy
- Aneuploidy
- Trisomy and monosomy
- Down's syndrome
- Patau's syndrome
- Edwards's syndrome
- Klienfelter's syndrome
- Turner's syndrome
- Mosaicism
- Structural abnormalities
- Deletion, inversion, translocation and ring chromosomes
- Isochromosomes, chromosomal fragile sites, fragile X chromosome

Chromosome at molecular level:

- Structure of DNA, RNA, genetic code, mutation, mutagens

Clinical genetics:

- Pedigree chart
- Inheritance

Diagnosis of Genetic disease:

- Prenatal diagnosis
- Indications
- Chorionic villi biopsy
- Maternal sera

- Amniocentesis

Genetic Counselling:

- Indication & basis of gene therapy

RECENT ADVANCES,

THEORY PAPER IV: 75+25 (IA)

- **SYSTEMIC HISTOLOGY**
- Digestive system:

General plan of GIT: Oesophagus, oral cavity, lip, tongue, salivary glands; parotid (serous), sublingual (mucous) and submandibular (mixed), stomach; body, fundus and pylorus ,small and large intestines; appendix and colon.

Glands:

- Liver, gall bladder & pancreas.

Urinary system:

- Kidney, ureters, urinary bladder and urethra

Male reproductive system:

- Testis, epididymis, vas deferens, prostate and seminal vesicle

Female reproductive system:

- Ovary, fallopian tube, different stages of functional activity of uterus, vagina Mammary gland, placenta and umbilical cord

Integumentary system:

- Skin: hairy, Non hairy

Respiratory system:

- Nose, nasopharynx, larynx, trachea, principal brochi and lung

Endocrine system:

- Pituitary, pineal; review of endocrine tissues in the pancreas, testis and ovary, thyroid, parathyroid and adrenal gland

Special sensory organs:

- Eyeball
- Taste buds
- Olfactory mucosa

Nervous System:

- Spinal cord, cerebrum, cerebellum

- **MUSEUM TECHNOLOGY**
- **ELECTRON MICROSCOPE**

PRACTICAL PAPER V: 75+25(IA)

a) Head & Neck
b) Neuroanatomy
c) Radiological anatomy & Surface anatomy
d) Embryology
e) Genetics & Recent Advances,
f) Museum Technology
g) Microteaching

LIST OF BOOKS & JOURNALS RECOMMENDED

9. a. Recommended Reading Books

1. Richard Snell, Clinical Anatomy by regions, Wolters Kluwer, Lipincott
2. Keith L. Moore, Clinically oriented Anatomy, Wolters Kluwer, Lipincott
3. Susan standring, Gray's Anatomy, Elsevier
4. A.K.Dutta, Essentials of Human Anatomy, CBI
5. John A. Kilman, Barr's The Human Nervous System, an anatomical viewpoint, Wolters Kluwer, Lipincott
6. Victor P. Eroschenko, diFiore's Atlas of Histology with functional Correlation, Wolters Kluwer
7. H.M. Carlton, Carlton's Histological techniques, Oxford University Press, 1980
8. T.W.Sadler, Langman's Medical Embryology, Wolters Kluwer
9. Frank.H. Netter, Atlas of Human Anatomy, Elsevier
10. G.J.Romanes, Cunningham's Manual of Practical Anatomy, Oxford Medical Publications
11. Michael H. Ross- Histology: A Text & Atlas with correlated cell and molecular biology, Wolters Kluwer
12. Halim A, Surface and Radiological Anatomy, CBS
13. Renu Chauhan and Manpreet Gambhir , Surface and Radiological Anatomy, Avichal Publishing Company.
14. Robert. F.Muller, Emery's Elements of Medical Genetics, Churchill Livingstone
15. G.P.Pal , Medical Genetics, AITS Publishers
16. G.P.Pal, Illustrated Textbook of Neuroanatomy ,Wolters Kluwer, Lipincott
17. Keith L.Moore, T.V.Persaud, Mark.G.Torchia, The Developing Human Clinically Oriented Embryology, Elsevier
18. M L Ajmani, Embalming; Principles and Legal Aspects, Jaypee Brothers Medical Publishers

Further reading

1. R.M.H. McMinn Last's Anatomy Regional and Applied, Churchill Livingstone
2. John V Basmajjan, Grant's method of Anatomy: by regions, descriptive and deductive,Baltimore: Williams & Wilkins Company
3. Inderbir Singh, Human Embryology, JP medical Ltd.
4. Richard S. Snell, Clinical Neuroanatomy, Wolters Kluwer, Lipincott.
5. S.D.Gangane, Human Genetics, Elsevier

b. Journals

They should actively participate in Journal Club through their training period, selected published research papers from following journals:

1. Journal of Anatomy
2. Cells Tissues Organs
3. American Journal of Anatomy
4. Brain Research Bulletin
5. Journal of Anatomical Society of India
6. Journal of Anatomical Sciences.
7. Journal of Histo-and-Cytochemistry.
8. Journal of Experimental & Clinical Anatomy.
9. Journal of Surgical and Radiological Anatomy
10. Journal of Clinical Anatomy.