MAHATMA GANDHI UNIVERSITY
of
MEDICAL SCIENCES & TECHNOLOGY
JAIPUR

# Syllabus

## M.Sc. (Medical)ANATOMY

**(6 SEMESTERS P.G. DEGREE PROGRAM)**

Professor & Head
Dept. of Anatomy
Mahatma Gandhi Medical College & Hospital
Sitapura, Jaipur-302022

**2023-24**

**Recommended by Joint meeting of BOS Nonclinical/ Para clinical / Clinical at its meeting held on 03/03/2023 and approved by Academic Council at its meeting held on 28/04/2023.**
**Revised by Faculty of Medicine & Surgery on 29/04/2025 & approved by Academic Council at its meeting held on 01/05/2025**

# NOTICE

1. **The university reserves the right to make changes in the syllabus /books/ guidelines, fee-structure or any other information at any time without prior notice the decision of the university shall be binding on all.**

2. **The jurisdiction of all court cases shall be Jaipur Bench of Hon'ble Rajasthan High Court only.**

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# M.Sc. (Medical) ANATOMY

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### 1. Introduction:

The Master of Science in Medical field provides the candidate with knowledge, general competence, and analytical skills on an advanced level, needed in consultancy, education, research.

**Programme specific outcome: M.SC. MEDICAL**

**POS 1. POS 1.** The PG student should acquire basic skills in teaching medical/ para-medical students

**POS 2.** A post graduate student after undergoing the required training should be able to deal with the allied departments and render services in advanced laboratory investigations.

**POS 3.** The student should have knowledge about the principles of research methodologyand self-directed learning for continuous professional development.

**POS 4.** The student should be able to carry out a research project from planning topublication and be able to pursue academic interests.

**COURSE OUTCOME (CO) :**After completing the six semester course in M.Sc. Anatomy the student shall have achieved competence in the following:

1. Acquire competencies in gross and surface anatomy, neuroanatomy, embryology, genetics, histology, radiological anatomy, applied aspects and recentadvances of the above mentioned branches of anatomy to clinical practice. Theseare given in detail in subsequent sections.
2. Acquire mastery in dissection skills, embalming, tissue preparation, staining and museum preparation.
3. Acquire skills in teaching, research methodology, epidemiology & basicinformation technology.
4. 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.
5. Has ability to use computer applications Microsoft office (Microsoft word, excel, power point), Internet, Searching scientific databases. Acquire skills in paper & poster preparation, writing researchpapers and Thesis.
6. Develop honest work ethics and empathetic behavior with students andcolleagues.
7. 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.
8. Practicing different methods of teaching-learning. Making presentations of the subject topics and research outputs.
9. Demonstrate the ability to identify applied implications of the knowledge of anatomy

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and discuss information relevant to the problem, using

10. 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.

**2. TITLE OF THE COURSE:**

M.Sc. (Medical) ANATOMY

**3. DURATION OF THE COURSE:**

Duration of the course: 3 Years (6 Semesters)

**4. MEDIUM OF INSTRUCTION:**

English shall be the medium of instruction for all the subjects of study and for examination of the course.

**5. ELIGIBILITY FOR ADMISSION:**

MBBS/BDS/ B.Sc.& A.H./ BHMS/BAMS/ BUMS/ BPT/ BOT/B.Sc. Nursing/B. Pharmacy /B.Sc. Biotech/ B.Sc. in Life Sciences (Zoology, Botany, Biochemistry/ Chemistry) with at least 50% marks in the aggregate.

• B.Sc. with at least 50% marks in the aggregate and with Physics and Chemistry subjects are eligible for M.Sc. Medical Anatomy.

• B.Sc. (MLT) with at least 50% marks in aggregate are eligible for M.Sc. (Medical) Biochemistry and Microbiology courses only.

**6. PROCESS OF ADMISSION:**

Admission to M.Sc. (Medical) Anatomy Program shall be made on the basis of written entrance examination conducted for the purpose.

**7. RESERVATION POLICY:**

Reservation in admissions shall be applicable as per policy of the State Government.

**8. ENROLLMENT:**

Every candidate who is admitted to M.Sc.(Medical) Anatomy Degree Program in Mahatma Gandhi medical college shall be required to get himself/herself enrolled with the Mahatma Gandhi University of Medical Sciences & Technology (MGUMST) after paying the prescribed eligibility and enrolment fees.

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A candidate shall deposit enrolment fees along with tuition fees at the time of his/her admission to the course. Such a candidate who fails to submit, to the college Principal, duly filled enrolment form along with original documents including migration certificate required for enrolment within prescribed period then after he/she shall pay late fee applicable at that time. No student will be allowed to appear in the university examination without his/her enrollment.

**9. ATTENDANCE:**

Minimum 75 % attendance is required in each semester, both for theory and practical classes separately; student with deficient attendance will not be permitted to appear in university examination in that subject.

**.10. WORKING DAYS:**

Each semester shall consist of not less than 120 working days including examination.

**11. CONDUCTION OF THE UNIVERSITY EXAMINATION:**

University semester examination shall be conducted twice in a year with an interval of six months. Even Semester examination shall be conducted after 6 months of odd semester examination

**12. ELIGIBILITY TO APPEAR FOR UNIVERSITY EXAMINATION**

Student is required to have minimum 75% attendance (in theory and practical separately) /to make him/her eligible to appear in University Examination in individual subject.

Candidates failing in one or more, subject in a semester will be required to appear in their failing subject in the next examination of the same semester next year.

The scheme of "Carry forward" (for the subjects in which the student has failed/ abstained) will be allowed for the current academic year in the universities and every student will be promoted to next semester/year. However, such students may clear the examination for the course in which he/ she has failed/ remained absent, whenever the examination is held next. Student will be allowed to appear in the end semester exam of final semester exams only if he/she has cleared all pervious semester and internal exams.

A candidate will have to clear all the subjects of First to Fifth semester before appearing at sixth semester university examination.

**13.DISSERTATION**

(i) Every student will be required to write a dissertation involving primary research in his/her area of interest. The dissertation includes a critical review of literature pertaining to the specific area of interest, data collection and analysis of the selected problem.

(ii) One faculty member will be assigned as Guide to each student.

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(iii) Synopsis/protocol of the Dissertation shall be submitted by the student during the third semester to Institutional Ethics Committee (IEC).

(iv) Dissertation duly completed and signed by Guide shall be submitted to Principal, MGMCH, at least three months before the Sixth semester Exam.

(v) Dissertation will be examined during Practical Examination by all the examiners. Marks will be awarded as per the assessment done by these examiners.

(vi) A student will be considered fit for award of degree only if the Dissertation is evaluated by the examiners.

## 14. APPOINTMENT OF EXAMINER & PAPER SETTER

- All the examiners - Paper setters, Theory examination answer books evaluators, External and internal Examiners for Practical examinations shall be appointed by the president of the University from the panel submitted by HOD/Convener of the respective BOS/COC through concerned dean of faculty.
- Paper setters for core subjects shall be external. He shall also evaluate answers sheets of his paper.
- For Elective courses paper setter and Evaluator shall be from the MGUMST itself.
- External Examiner will be invited from other recognized University/ Institution in the state of Rajasthan or outside the state of Rajasthan
- Practical examiner can be appointed to evaluate answers sheets.
- Professor/ Assoc. Professor /Assistant Professor/ having PG qualification (MD) and 5 years' teaching experience after PG in respective field OR M.Sc. with PhD having 3 years Teaching experience after PG in respective field is eligible to act as Internal/External examiner of theory/practical examination.

## 15. SCHEME OF EXAMINATION

The University examination for the Course shall be conducted semester wise at the end of every semester.

### Continuous Assessment

Internal assessments will be conducted in the form of mid-term Examinations. Internal assessments will consist of departmental examinations, assignments, departmental posting, and evaluations.

Ability Enhancement courses (AEC)

**The AEC from Semester I to V will be conducted and Evaluated by the respective departments. The marks will be sent to the principal's office by them after evaluation .**

### End of Semester Examination (EOSE)

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**Theory**

(a) There shall be five Theory papers in each semester of the study.

(b) Each Theory paper examination from the Core subject shall be of 3 hours duration and of maximum 70 marks.

(c) Each Theory paper examination from the Elective shall be of 3 hours duration and of maximum 70 marks.

(d) If a student fails in any paper in University Semester Examination, she/he will be allowed to write the exam whenever the next semester exam is conducted by the University till N+3 criteria is valid. For any subsequent attempt her/his Internal Assessment (IA) marks secured will be carried forward.

(e) Continuous Internal assessment (CIA) shall be of 30 for both core and elective subjects.

(f) The Paper Setter shall set the questions within the prescribed course of study of the concerned paper. There will be a set pattern of question papers duly approved by Academic Council.

Pattern of question papers (Annexure 1)

(g) Passing Marks: A candidate will have to obtain at least 50% marks including internal assessment in each theory paper to pass.

**II. Practical and Viva-Voce Examination**

At the end of semester VI there shall be practical and viva-voce examination of 140 marks. It shall be conducted after the Theory examination is over. A candidate will have to obtain at least 50% marks in practical and viva-voce examination

| Semester | Practical /Dissertation Marks | | | | | Practical Examiners |
|---|---|---|---|---|---|---|
| | End of Semester Examination (EOSE) | | | Total Marks | Min. Pass Marks | |
| | Practical | viva-voce | CIA | | | |
| VI | 100 | 40 | 60 | 200 | 100 | Two Internal & Two External Examiner |

(i) The practical examination will consist of skill test (long case), presentation on Dissertation and viva voce.

(ii) Board of Examiners for University Practical and Viva Voce Examination will be as under:

- 02 Internal Faculty
- 02 External Examiner

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**PRACTICAL, DISSERTATION AND GRAND VIVA AT THE END OF SIXTH SEMESTER OF 4 CREDITS OF 100 MARKS**

**III Result**

1. A candidate will have to obtain at least 50% marks separately in each Theory paper including internal assessment and a minimum of 50% marks in the practical examination including viva-voce for him to be declared pass.
2. A Candidate who has failed in a subject(s) will reappear in respective paper(s) in next examination of the same semester next year.
3. Candidate who has failed in Practical examination will reappear in practical examination only.

**IV. Supplementary/Remanded Examination**

(a) There shall be a supplementary examination of VI semester only within two months of the declaration of the result of the main examination of VI Semester.

(b) Continuous assessment marks obtained in main examination in the concerned failed paper(s)/practical shall be carried forward for working out the result of next Theory paper(s) and/or practical examination.

(c) A failing candidate, if opt for improvement his/her internal assessment marks shall be allow to do so. In case he does appear for improvement or gets lesser marks in internal assessment, his earlier marks will be considered for working out the result of the failing subject.

**V. Promotion to Next Semester**

1. A candidate who has passed or failed in one or more subjects shall be promoted to respective next semester.
2. A candidate will be allowed to appear for the VI semester examination only when the backlog of all papers (theory papers and practical) of I semester to V semester exams including elective papers (if any) is cleared.
3. The student is required to clear all the University examination within 6 years from the joining of the course .

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**M.Sc. (Medical) Anatomy Marks Distribution of Semester – I Examination**

| Course/Paper Name | Course/Paper Code | Credits | Theory/ Practical/Viva | | | |
|---|---|---|---|---|---|---|
| **CORE COURSES** | | | EOSE | CA | Total | Pass Marks |
| Anatomy | MSCM0123S101T | 4 | 70 | 30 | 100 | 50 % aggregate including continuous assessment marks separately in theory and practical. |
| Physiology | MSCM0123S102T | 4 | 70 | 30 | 100 | |
| Biochemistry | MSCM0123S103T | 4 | 70 | 30 | 100 | |
| **ELECTIVE COURSES (ANY TWO)** | | | | | | |
| National Health care System | MSCM0123S104T | 2 | 70 | 30 | 100 | |
| Basics of Computer | MSCM0123S105T | 2 | 70 | 30 | 100 | |
| Basics of Health Care IT | MSCM0123S106T | 2 | 70 | 30 | 100 | |
| ABILITY ENHANCEMENT COURSE | | | | | | |
| Journal Club Presentation | | 1 | | 50 | | |
| Practical Classes/ Lab Posting | | 1 | | 50 | | |
| **TOTAL** | | **20** | 350 | 250 | 600 | |

**M.Sc. (Medical) Anatomy Marks Distribution of Semester – II Examination**

| Course/Paper Name | Course/Paper Code | Credits | Theory/ Practical/Viva | | | |
|---|---|---|---|---|---|---|
| **CORE COURSES** | | | EOSE | CA | Total | Pass Marks |
| Pathology | MSCM0123S201T | 4 | 70 | 30 | 100 | 50 % aggregate including continuous assessment marks separately in theory and practical. |
| Microbiology | MSCM0123S202T | 4 | 70 | 30 | 100 | |
| Pharmacology | MSCM0123S203T | 4 | 70 | 30 | 100 | |
| **ELECTIVE COURSES(ANY TWO)** | | | | | | |
| Pharmacovigilance | MSCM0123S204T | 2 | 70 | 30 | 100 | |
| Communication Skills & Academic Writing | MSCM0123S205T | 2 | 70 | 30 | 100 | |
| Legal and Medical Issues in Hospitals | MSCM0123S206T | 2 | 70 | 30 | 100 | |
| ABILITY ENHANCEMENT COURSE | | | | | | |
| Journal Club Presentation | | 1 | | 50 | | |
| Practical Classes/ Lab Posting | | 1 | | 50 | | |
| **TOTAL** | | **20** | 350 | 250 | 600 | |

## M.Sc. (Medical) Physiology Marks Distribution of Semester – III Examination

| Course/Paper Name | Course/Paper Code | Credits | Theory/ Practical/Viva | | | |
|---|---|---|---|---|---|---|
| **CORE COURSES** | | | EOSE | CA | Total | Pass Marks |
| Cell Physiology, Muscle Nerve Physiology AND Environmental Physiology | MSCM0523S301T | 4 | 70 | 30 | 100 | 50 % aggregate including continuous assessment marks separately in theory and practical. |
| Blood & it's components | MSCM0523S302T | 4 | 70 | 30 | 100 | |
| Biostatistics & Research Methodology | MSCM0523S303T | 4 | 70 | 30 | 100 | |
| **ELECTIVE COURSES(ANY TWO)** | | | | | | |
| Organizational Behavior | MSCM0523S304T | 2 | 70 | 30 | 100 | |
| Stress Management | MSCM0523S305T | 2 | 70 | 30 | 100 | |
| Basic Instrumentation and Lab Practices | MSCM0523S306T | 2 | 70 | 30 | 100 | |
| ABILITY ENHANCEMENT COURSE | | | | | | |
| Plan presentation | | 1 | | 50 | | |
| Practical Classes/ Lab Posting | | 1 | | 50 | | |
| **TOTAL** | | **20** | 350 | 250 | 600 | |

## M.Sc. (Medical) Physiology Marks Distribution of Semester – IV Examination

| Course/Paper Name | Course/Paper Code | Credits | Theory/ Practical/Viva | | | |
|---|---|---|---|---|---|---|
| **CORE COURSES** | | | EOSE | CA | Total | Pass Marks |
| Cardiovascular System | MSCM0523S401T | 4 | 70 | 30 | 100 | 50 % aggregate including continuous assessment marks separately in theory and practical. |
| Respiratory System | MSCM0523S402T | 4 | 70 | 30 | 100 | |
| Digestive System | MSCM0523S403T | 4 | 70 | 30 | 100 | |
| **ELECTIVE COURSES (ANY TWO)** | | | | | | |
| Database Management System | MSCM0323S404T | 2 | 70 | 30 | 100 | |
| Disaster Management | MSCM0323S405T | 2 | 70 | 30 | 100 | |
| Sports Nutrition | MSCM0323S406T | 2 | 70 | 30 | 100 | |
| **ABILITY ENHANCEMENT COURSE** | | | | | | |
| Seminar Presentation | | 1 | | 50 | | |
| Practical Classes/ Lab Posting | | 1 | | 50 | | |
| **TOTAL** | | **20** | 350 | 250 | 600 | |

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## M.Sc. (Medical) Anatomy Marks Distribution of Semester – V Examination

| Course/Paper Name | Course/Paper Code | Credits | Theory/ Practical/Viva | | | |
|---|---|---|---|---|---|---|
| **CORE COURSES** | | | EOSE | CA | Total | Pass Marks |
| Radiological and Sectional Anatomy | MSCM0123S501T | 4 | 70 | 30 | 100 | 50 % aggregate including continuous assessment marks separately in theory and practical. |
| Neuroanatomy | MSCM0123S502T | 4 | 70 | 30 | 100 | |
| Systemic Embryology | MSCM0123S503T | 4 | 70 | 30 | 100 | |
| **ELECTIVE COURSES(ANY TWO)** | | | | | | |
| Professional Ethics and Human Rights | MSCM0123S504T | 2 | 70 | 30 | 100 | |
| Basics of Yoga | MSCM0123S505T | 2 | 70 | 30 | 100 | |
| Hospital Equipment Management | MSCM0123S506T | 2 | 70 | 30 | 100 | |
| **PRACTICAL/ABILITY ENHANCEMENT COURSE** | | | | | | |
| Seminar Presentation | | 1 | | 50 | | |
| Practical Classes/ Lab Posting | | 1 | | 50 | | |
| **TOTAL** | | **20** | 350 | 250 | 600 | |

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**M.Sc. (Medical) Anatomy Marks Distribution of Semester – VI Examination**

| Course/Paper Name | Course/Paper Code | Credits | Theory/ Practical/Viva | | | |
|---|---|---|---|---|---|---|
| **CORE COURSES** | | | EOSE | CA | Total | Pass Marks |
| Genetics | MSCM0123S601T | 4 | 70 | 30 | 100 | 50 % aggregate including continuous assessment marks separately in theory and practical. |
| Museum Techniques | MSCM0123S602T | 4 | 70 | 30 | 100 | |
| Recent advances and Applied ANATOMY | MSCM0123S603T | 4 | 70 | 30 | 100 | |
| **ELECTIVE COURSES(ANY TWO)** | | | | | | |
| Biomedical Waste Management | MSCM0123S604T | 2 | 70 | 30 | 100 | |
| Teaching Methodology | MSCM0123S605T | 2 | 70 | 30 | 100 | |
| Basic Life Support (BLS) | MSCM0123S606P | 2 | 70 | 30 | 100 | |
| **PRACTICAL/ABILITY ENHANCEMENT COURSE** | | | | | | |
| Practical /Viva and Dissertation Viva | MSCM0323S607P | 4 | 160 | 40 | 200 | |
| **TOTAL** | | **22** | 510 | **190** | **700** | |

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## 16. REVALUATION / SCRUTINY:

Revaluation of answer book(s) and security of the marks shall be permissible as per the policy of the university.

## 17. AWARD OF DEGREE:

The degree shall be awarded by the University only after receipt of Course completion certificate and NO dues from the Head of Institution. (Principal of the college) .

## 18. LETTER GRADES AND GRADE POINTS

| LETTER GRADE | GRADE | PERCENTAGE OF MARKS |
|---|---|---|
| O (Outstanding) | 10 | 100 % |
| A+(Excellent) | 9 | 90-99.99 % |
| A(Very Good) | 8 | 80-89.99 % |
| B+(Good) | 7 | 70-79.99 % |
| B(Above Average) | 6 | 60-69.99 % |
| C(Average) | 5 | 50-59.99 % |
| F(Fail) | 0 | 0 Less than 50 % |
| Ab (Absent) | 0 | 0 Absent |

## 19. Grades Qualifying for Pass:

Theory and Practical Examination

**1. Minimum 5 Grade** in the university examination and **5 Grade** in internal assessment evaluated by the department are required to pass **who fails to obtain 5 Grade shall be declared failed.**

2. A student obtaining **Grade F** shall be considered **failed** and will be required to reappear in the examination.

3. Letter Grade **Ab (Absent)** will be showing the absent of the candidate in examination and will be required to reappear in the examination.

## 20. Credit Weightage Distribution

| Item | Credit Weight (30) |
|---|---|
| **1.Internal Assessment (30.00%)** | |
| Mid-term Exam | 20 |
| Class participation/presentation, Attendance | 5 |
| Departmental Postings, Assignment, quizzes | 5 |
| **2.University Exam (70.00%)** | |
| **Total** | **100** |

## 21. Authority to issue transcript

The Controller of Examination of the University shall be the authority for issuing transcript after receiving the described fee from the candidate.

## 22. Working Hours/Days

| Duration | 3 Years(6 Semesters) |
|---|---|
| Working Days | 6 Days in A Week |
| Working Hours | 36 Hours in A Week |

## 23. Distribution of Courses Semester-Wise

| Semester | Core Course Component (CCC) | Elective Course Component(ECC) | Practical / Ability Enhance Component | Total No. Of Courses/Papers |
|---|---|---|---|---|
| **Semester I** | **3** | **2** | **2** | **5** |
| **Semester II** | **3** | **2** | **2** | **5** |
| **Semester III** | **3** | **2** | **2** | **5** |
| **Semester IV** | **3** | **2** | **2** | **5** |
| **Semester V** | **3** | **2** | **2** | **5** |
| **Semester VI** | **3** | **2** | **1** | **5** |
| **Total** | **18** | **12** | **11** | **30** |

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**24. Distribution of Courses in Each Semester**

| Sr. No. | Type of Course | Numbers |
|---|---|---|
| 1 | Core Course | 3 |
| 2 | Elective Course | 2 |
| Total | | 05 (Five) |

**25. Types of Courses in M.Sc. (Medical) Anatomy: -**

1. **Core Course**-course designed under this category aim to cover the basics that a student is expected to imbibe in the discipline of M.Sc. (Medical) **Anatomy**. A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course.

2. **Elective Course**-it is a course which can be chosen from a pool of courses it is specific or specialized or advanced or supportive to the discipline of M.Sc. (Medical) **Anatomy**. Students have to **CHOOSE ANY TWO COURSE IN EACH SEMSTER** from the pool of course given to that semester.

3. **Practical/ Ability Enhancement Courses (AEC:** The Ability Enhancement (AE) Courses or practical are the courses based upon the content that leads to Knowledge enhancement. They are skill-based and are aimed at providing hands-on-training, competencies, skills, etc.

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## SEMESTER I-PAPER I (THEORY)

**PAPER CODE-**
MSCM0123S101T
MSCM0223S101T
MSCM0323S101T
MSCM0423S101T
MSCM0523S101T

## ANATOMY

(1) Anatomical terminology, Anatomical planes, Anatomical positions, Clinical positions,Terms related to movements
(2) Musculoskeletal system:
(a) Bones & their classification, Morphology, ossification, blood supply
(b) Muscles: Morphology, classification, blood supply, innervations, functions
(3) Integumentary system: Thick Skin, Thin skin, layers of dermis & epidermis, Skin appendages, blood supply, innervations, functions
(4) Cardiovascular system: Morphology of blood vessels, classification of blood vessels, blood capillaries, blood circulation, functions
(5) Nervous system: Central Nervous system & Peripheral Nervous system, Gross basic Anatomy, Cranial nerves, Spinal nerves, Functions of nerves, Autonomic nervous system
(6) Lymphatic system: Formation of lymph, Lymphatic ducts, Thoracic duct, Lymph circulation, functions
(7) Digestive system: Parts of digestive system, gross anatomy and functions
(8) Excretory system: Parts of excretory system, gross anatomy of kidney, ureter, urinary bladder, and their functions
(9) Reproductive system: Male reproduction system- gross anatomy of penis, testis, epididymis, vas-deferens, seminal vesicles and prostate. Female reproductive system- gross anatomy of ovaries, uterine tube, uterus, vagina, menstruation cycle.
(10) Endocrine.
(11) Respiratory.

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## SEMESTER I-PAPER II (THEORY)

**PAPER CODE-**
MSCM0123S102T
MSCM0223S102T
MSCM0323S102T
MSCM0423S102T
MSCM0523S102T

## PHYSIOLOGY

### CELL PHYSIOLOGY:

(1) Membrane transport, Bio-membrane potentials, Nernst equation,
(2) Composition of ECF and ICF, Goldmann equation.

### NERVE-MUSCLE:

(1) Neuron (structure, functions and classification) and neuroglia,
(2) Action potential, neuromuscular junction,
(3) Skeletal muscle (structure, mechanism of contraction).
(4) Smooth muscle (structure, mechanism of contraction).

### BLOOD:

(1) Function and composition,
(2) Erythrocytes,
(3) Hemoglobin,
(4) Blood groups,
(5) Leucocytes,
(6) Thrombocytes,
(7) Immunity (basics).

### CARDIOVASCULAR SYSTEM:

(1) Cardiac muscle,
(2) Physiological Anatomy of heart and conduction system,
(3) Normal ECG, cardiac cycle, heart sounds,
(4) Cardiac output and blood pressure,
(5) Coronary circulation,
(6) Common symptoms of cardiovascular illness (basics only).

### RESPIRATORY SYSTEM:

(1) Functional Anatomy of the respiratory system,
(2) Mechanism of breathing, dead space, surfactant, dynamic and static lung volumes and capacities,
(3) Transport of oxygen and carbon dioxide,
(4) Regulation of respiration: neural and chemical
(5) Cyanosis,
(6) Hypoxia,
(7) Oxygen therapy,
(8) Artificial respiration.



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## GASTROINTESTINAL SYSTEM:

(1) Functional Anatomy,
(2) salivary glands (secretion and functions of saliva, deglutition),
(3) Stomach (composition, regulation of secretion and functions of the gastric juice),
(4) Liver and its functions.
(5) Pancreas (secretion and function),
(6) Intestinal secretion (composition and functions), movement of intestines,
(7) Hormones of GIT (Basic only).

## EXCRETORY SYSTEM:

(1) Functions of kidney,
(2) Juxta glomerular apparatus,
(3) Formation of urine, counter current mechanism,
(4) Role of kidney in maintenance of acid base balance,
(5) Renal function tests

## AUTONOMIC NERVOUS SYSTEM:

(1) Organization of the ANS,
(2) Neurotransmitters,
(3) Effect of Sympathetic and Parasympathetic stimulation on different organ systems.

## ENDOCRINE SYSTEM

**(1)** Introduction
**(2)** Enumerate the endocrine glands and their functions

## REPRODUCTIVE SYSTEM

(1) Introduction
(2) Menstrual cycle, male/female sex hormones
(3) Methods of contraceptions.

## CENTRAL NERVOUS SYSTEM

(1) General organization of CNS & PNS,
(2) Sensory system (general sensations, receptors, sensory pathways, sensory areas of brain)
(3) Motor system: (Spinal reflexes, reflex arc, corticospinal and extra pyramidal tracts
(4) Special senses

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Mahatma Gandhi Medical College & Hospital
Sitapura, Jaipur-302022

## SEMESTER I-PAPER III (THEORY)

**PAPER CODE-**
MSCM0123S103T
MSCM0223S103T
MSCM0323S103T
MSCM0423S103T
MSCM0523S103T

## BIOCHEMISTRY

**BASICS OF BIOCHEMISTRY**:

(1) Cell structure and function and transport through the biological membrane.

(2) Chemistry of Biomolecules – carbohydrate, lipids, amino acids, proteins and nucleicacids.

(3) Chemistry of Blood & Haemoglobin.

(4) Enzymes – Nature and classification, concepts, Kinetic, mechanism of action.

(5) Bioenergetics and Biological oxidation.

(6) Metabolism of Carbohydrates, Proteins, Lipids.

(8) Nutrition, Vitamins & Minerals.

(10) Molecular Biology.

(11) Organ function tests (Renal Function Tests, Liver function tests, Thyroid Function tests &pancreatic Function tests).

(12) Immunology – General outline

(14) Principles, working & applications of Basic Biochemical techniques: a) Colorimetry b) Spectrophotometry c) Chromatography d) Electrophoresis e) ELISA

## SEMESTER II-PAPER I (THEORY)

**PAPER CODE-**
MSCM0123S201T
MSCM0223S201T
MSCM0323S201T
MSCM0423S201T
MSCM0523S201T

## PATHOLOGY

INTRODUCTION TO PATHOLOGY:

(1) Definition
(2) Cause of cell injury
(3) Reversible and irreversible injury
(4) Pathologic calcification
(5) Cellular adaptations in brief.

INFLAMMATION AND REPAIR:

(1) Acute and Chronic inflammation
(2) Chemical mediators of inflammation

HEALING:

(1) By primary and secondary intention
(2) Factors affecting wound healing

HEMODYNAMIC DISORDERS:

(1) Edema
(2) Shock

NEOPLASIA:

Definition, Nomenclature

(1) Characteristic of benign and malignant neoplasm
(2) Metastasis in brief
(3) Carcinogenesis in brief.

HAEMOPOIETIC SYSTEM:

(1) Anemia
(2) IDA, Megaloblastic, Thalassemia, SCA, G6PD, deficiency, Hemophilia, Leukemia
(3) Lab investigation of hemorrhagic disorders.

LIVER:

(1) Liver function test, Jaundice, Hepatitis-B

KIDNEY:

(1) Stones, Nephrotic Syndrome, Renal Function Test
(2) ARF, CRF
(3) Glomerular nephritis in brief.

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THYROID:

(1) Goiter, Thyroiditis
(2) Hypo and Hyperthyroidism

BONE:

(1) Osteomyelitis, TB
(2) Common Tumors

GALL BLADDER:

(1) Gall stones, Cholecystitis

BLOOD GROUPS AND COAGULATION

**PANCREAS**: Diabetes Mellitus, Pancreatic Function Test

## SEMESTER II-PAPER II (THEORY)

**PAPER CODE-**
MSCM0123S202T
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## MICROBIOLOGY

(1) Cell Structure
(a) Microscopy, staining,
(b) Detailed structure in comparison to Eukaryotic cell, Morphological change during growth.
(2) Microscopy
(a) Various optical methods available for viewing microorganism and their applications.
(3) Overview of Microbial Worlds
(a) Basic principles and Purpose of Classification systems
(4) Growth Survival of Micro-organism
(a) Growth
(b) Growth parameters
(c) Definition and measurement of bacterial growth
(d) Survival of micro-organisms in natural environment
(e) Role of antimicrobial agents.
(5) Cultivation of micro-organisms
(a) Growth requirements
(b) Sources of metabolic energy
(c) Nutrition
(d) Environmental and other factors affecting growth

(e) Methods of cultivation
(6) Microbial Metabolism
(a) Metabolism of biosynthesis and growth
(b) Biosynthesis pathways
(c) Energy Yielding metabolism
(d) Regulation of metabolic pathways
(7) Bacterial Genetics
(a) Structure and replication of bacterial DNA plasmids
(b) Variation:
i. Mutation
ii. Transfer of genetic material
(c) Recombine DNA technology
(8) Control of micro-organism
(a) Sterilization & Disinfection
(b) Antimicrobial agents & bacterial resistance
(9) General Principles in clinical microbiology
(a) Collection and handling of various samples
(b) Laboratory safety
(c) Quality control
(d) Antimicrobial susceptibility and assay
(e) Laboratory animals-handling and care

## SEMESTER II-PAPER III (THEORY)

**PAPER CODE-**
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MSCM0523S203T

## PHARMACOLOGY

GENERAL PHARMACOLOGY:
(1) Introduction to Pharmacology
(2) Nature and Sources of Drugs & Drug Information
(3) Dosage forms & Drug Nomenclature
(4) Routes of drug administration,
(5) Drug delivery systems
(6) Pharmacokinetics (Absorption, Distribution, Metabolism and Excretion of drugs)
(7) Therapeutic drug Monitoring
(8) Pharmacogenomics and Pharmacogenetics
(9) Drug receptors and Pharmacogenetics
(10) Factors Modifying Drug Action
(11) Drug administered in special situations: Pregnancy, Lactation, Pediatrics & Geriatrics.
(12) Adverse drug reactions & Pharmacovigilance



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(13) Aspects of Pharmacotherapy & Clinical pharmacology
(14) Drug Interactions
(15) Drug development process and Regulations
(16) Rational Drug concept
(17) Essential drug concept
(18) Fixed Drug Combinations
(19) Evidence based Medicine

**II Classification and pharmacological actions of drugs acting on various systems: -**

1. Autonomic nervous system

2. Peripheral Nervous System

3. Central nervous system

4. Renal system

5.Cardiovascular System

6. Gastrointestinal system

7.Respiratory system

8.Uterine motility

**III. Classification and pharmacological actions of**

1. Autacoids and related drugs

2. Chemotherapy of microbial diseases

3. Antineoplastic agents

4. Immunomodulators

5. Drugs affecting blood

6. Hormones and Related drugs

7. Vitamins

**RECOMMENDED TEXTBOOKS**

- Goodman & Gilman's The Pharmacological Basis of Therapeutics, ed. Laurence Brunton, Bruce A. Chabner, Bjorn Knollman.
- Essentials of Medical Pharmacology, by KD Tripathi
- Basic and Clinical Pharmacology, by Bertram G. Katzung and Anthony J. Trevor

## SEMESTER III-PAPER I (THEORY)

**PAPER CODE-**
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### Gross Anatomy-I

(a) Superior Extremity

Pectoral region, Axilla, Brachial plexus, Muscles of the back, Mammary glands, shoulder joint, Arm, Forearm, elbow joint, wrist joint, Hand, Blood supply , Lymphatic drainage, Nerves and Nerve injuries, development and dermatomes of Upper Limb.

Inferior Extremity

Thigh, Femoral triangle, Gluteal Region, Hip Joint, Knee Joint, Popliteal fossa, Leg, Ankle joint, Foot, Blood supply Lymphatic drainage, Nerves and Nerve injuries, development and dermatomes of Lower Limb.

(b) Thorax

Thoracic wall,Pleura, lungs, Mediastinum, Pericardium, Heart, **Superior Vena cava ,Arch of** aorta ,descending thoracic aorta , Pulmonary Trunk, diaphragm, Oesophagus thoracic duct and Thymus

## SEMESTER III-PAPER II (THEORY)

**PAPER CODE-**
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### GENERAL HISTOLOGY & GENERAL EMBRYOLOGY

**General Histology**

(a) Cell Biology: Cytoplasm– Cytoplasmic matrix, cell organelles , cytoskeleton, cell inclusions, cilia and flagella.

(b) Nucleus-nuclear envelope, nuclear matrix, DNA and other components of chromatin, protein synthesis, nucleolus, nuclear indicating cell death.

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(c) Cell cycle, mitosis, meiosis, cell renewal, Cellular differentiation and proliferation.

(d) Tissues of Body: Light and electron microscopic details and structural basis of function, regeneration and degeneration.

(e) Introduction to histology parts of microscope, epithelium

(f) Epithelium-2

(g) Glands

(h) Connective tissue

(i) Cartilage

(j) Bone

(k) Muscle tissue

(l) Circulatory system

(m) Nervous tissue

(n) Lymphatic system

**General Embryology**

a. Terms- phylogeny, ontogeny, trimester, viability, Stages of Human life
b. Menstrual and Ovarian cycle
c. spermatogenesis and oogenesis, contraception
d. Teratogenic influences: fertility and sterility, surrogate motherhood, social significance of "sex- ratio"
e. Fertilization
f. First and second week of development
**g.** Third week of development
**h.** Third to Eighth week of development
i. Placenta
j. Foldings of embryo
k. Foetal circulation
l. Foetal membranes
m. Twins, chimera
n. Pre- Natal diagnostic techniques.
o. Congenital anomalies related to all topics described above.

## SEMESTER III-PAPER III (THEORY)

**PAPER CODE-**
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## BIOSTATISTICS & RESEARCH METHODOLOGY

**i. Biostatistics: -** Use of calculators and electronic spread sheets for understanding of: (1) Elements of data collection and presentation of data (2) Measures of central tendency and dispersion (3) Nonparametric tests (4) Parametric tests (including ANOVA) (5) Correlation and regression (6) Sampling techniques, randomization, sample size estimation. (7) Scales of measurement, data display, and measures of central tendency (mean, median, mode). (8) Dispersion of data (variance, standard deviation). (9) Selection of tests (of significance) and their applicability. (10) Correlation and regression analysis. (11) Statistical software.

**ii. Research Methodology: -**

1. Literature search and bibliography.
2. Data management and presentation.

Formulation of research topic, study design, blinding procedures and protocol

## SEMESTER IV-PAPER I (THEORY)

**PAPER CODE-** MSCM0123S401T

GROSS ANATOMY II

(a) Abdomen: Gross anatomy of Anterior and Posterior abdominal wall, rectus sheath, Inguinal canal, inguinal hernia, Peritoneum, stomach, esophagus, liver ,pancreas ,spleen, kidney ,small and large intestine, external genitalia, gonads with their blood supply, nerve supply and clinical aspects.

(b) Pelvis: Gross anatomy of urinary bladder, ureter, Urethra, uterus, vagina, rectum and anal canal, pelvic nerves and vessels, perineum, ischiorectal fossa, pelvic diaphragm.

(c) Head, Neck & Face Region Gross anatomy of scalp, face, parotid, triangles of neck, pharynx, larynx, thyroid gland, vessels and lymphatics of face and neck, Temporo mandibular joint, cranial cavity, Ear and Eye.

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## SEMESTER IV-PAPER II (THEORY)

**PAPER CODE-** MSCM0123S402T

## HISTOLOGY TECHNIQUES, SURFACE ANATOMY AND EMBALMING

### Histology Techniques

a. Preparation of tissue blocks, section cutting and routine H & E staining of the tissues,
b. Special staining of the tissues
c. Identification of normal and abnormal organs in light and electronic microscopy, artifact identification
d. Three dimensional reconstructions from serial sections and its interpretation.

### Surface Marking

Surface projections of visceras, blood vessels, nerves and glands of upper limb, lower limb, head and neck, thorax, abdomen and pelvis.

### Embalming

Principles and uses of embalming, composition of embalming fluids, common embalming techniques.

## SEMESTER IV-PAPER II (THEORY)

**PAPER CODE-** MSCM0123S403T

## SYSTEMIC HISTOLOGY

(a) Systemic Histology: Cellular organization, light and electronic microscopic features, structure and functional correlation of all the systems and organs of the body.

i. Circulatory system
ii. Nervous syatem
iii. Lymphatic system
iv. Gastrointestinal tract
v. Respiratory system
vi. Urinary system
vii. Male reproductive system
viii. Female reproductive system
ix. Endocrine glands
x. Central nervous system
xi. Sense Organs

## SEMESTER V-PAPER I (THEORY)

**PAPER CODE-** MSCM0123S501T

## RADIOLOGICAL AND SECTIONAL ANATOMY

Radiological and Sectional Anatomy

Principles of radiography for normal and special radiographs

Radiographs of anteroposterior and lateral views of upper limb, lower limb, thorax, head and neck, abdomen and pelvis.

Principles of CT, MRI and PET SCAN.

Identification and relations of body structures in Cross sections at various levels of Upper and Lower Limbs, Thorax, Abdomen, sagittal and cross sections of Pelvis, sagittal and coronal sections of Brain.

## SEMESTER V-PAPER II (THEORY)

**PAPER CODE-** MSCM0123S502T

## NEUROANATOMY

Brain, Development of the nervous system, Olfactory and optic pathways, Cochlear-vestibular and gustatory pathways, Motor pathways, Sensory pathways, Central autonomic pathways, Hypothalamo-hypophyseal system:

i. Study of spinal cord, medulla oblongata,pons, midbrain, cerebellum, thalamus, hypothalamus, limbic lobe and their functions
ii. Cerebral hemispheres, gyri, sulci, motor and sensory area, white matter, basal ganglia
iii. Cranial nerves and functional components.
iv. Ventricles and Circulation of C.S.F.
v. Blood supply of brain & spinal cord

## SEMESTER V-PAPER III (THEORY)

**PAPER CODE-** MSCM0123S503T

## SYSTEMIC EMBRYOLOGY

Development of GIT, components of nervous system, cardiovascular system, urinary system, male and female reproductive system, body cavities and diaphragm, head and neck, skeletal system and congenital anomalies associated with them.

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## SEMESTER VI-PAPER I (THEORY)

**PAPER CODE-** MSCM0123S601T

## GENETICS

Cell cycle and Cell division
Modes of inheritance.
Pedigree chart.
Autosomal and sex linked inheritance and clinical conditions.
Genes and Chromoosome
methods of chromosomal analysis.
Karyotyping- Procedure and clinical application
Barr body.
Lyon's hypothesis.
Chromosomal numerical abnormalities.
Chromosomal structural abnormalities
Down syndrome-Chromosome abnormality and clinical features
Turner syndrome-Chromosome abnormality and clinical features.
Klinefelter syndrome-Chromosome abnormality and clinical features.
Genetic counselling
Different modes of prenatal diagnosis.

## SEMESTER VI-PAPER II (THEORY)

**PAPER CODE-** MSCM0123S602T

## MUSEUM TECHNIQUE

**Museum Techniques**

Common techniques for the Preparation of specimens for museum with display

a) Soft parts

b) Models

c) Charts

## SEMESTER VI-PAPER III (THEORY)

**PAPER CODE-** MSCM0123S603T

## RECENT ADVANCES AND & APPLIED ANATOMY

### Recent advances

Recent advances and clinical application of anatomical knowledge in medical sciences which facilitate comprehension of structure, function, correlations and application in clinical problem solving.

Collection, maintenance and application of stem cells, cryobanking and principles of organ donation from recently obtained dead bodies.

### PRACTICAL / ABILITY ENHANCEMENT

Dissection of Human cadavers
Histology slides: Histological features of tissues and organs in the body and their functional correlation.
Surface making of all organs on a cadaver.
Embryology models- Development of major system of Human Body.
Osteology
Embalming techniques
Histology Techniques- (Tissue processing and cutting
Slide preparation, Mounting and
Staining techniques)
Radiology
Anatomical cross sections of Limb, Thorax, Abdomen and Pelvis, Thorax and Head and Neck
Coronal and Sagittal Section of Brain.

### Dissertation

### Pedagogy

Identifying several situations same and able to dissertation work, writing a proposal and making a presentation to the Dissertation faculty advisory committee. Reporting to the committee on the progress of research work periodically. Making use of a variety of research methods. Defending the inference before the Examining Committee.

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**Contents**

Every student will do a detailed study on the topic selected for the dissertation, and is expected to prepare a two or three proposals which he intends to take up for the Dissertation. Faculty will examine this and decide on the topic of dissertation.

The Process involves:

1. Formulation of objectives and hypothesis
2. Review of literature
3. Designing the tool for data collection
4. Data collection
5. Coding, classifying and analysis of data
6. Inferences, conclusions and recommendations
7. Preparing a bibliography
8. Writing the dissertation and submission

**Paper Code**
MSCM0123S101T
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MSCM0523S101T

# MODEL PAPER

**M. Sc. (Medical)**
**Anatomy**
**Semester I**
**Examination (Month/ year)**

**Paper - I**

**Anatomy**

**Time: Three Hours**

**Maximum Marks: 70**

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)** **2X15 = 30**

A. Describe Synovial joints under following headings: (2.5+10+2.5)
(i) Components and Structure of joint
(ii) Classification of synovial joint
(iii) Factors providing stability to joint.

B. Describe central nervous system under the following headings: (10+2.5+2.5)
(i) Parts and their functions
(ii) Cells present in CNS
(iii) Functions of cerebellum

C. Classify bones with examples and describe blood supply of long bone (10+5)

**2. Short Essay(Attempt any two)** **2x10=20**

A. Describe Compact and cancellous bones with examples
B. Components of respiratory system with functions.
C. Parts of female reproductive system with functions.

**3. Write short notes on: ( Any Four)** **5x4=20**

A. Types of cartilages
B. Compare functions of sympathetic and Parasympathetic nervous system
C. Contribution of A. Vesalius in study of anatomy
D. Types of anastomosis between blood vessels
E. Types of muscles with examples.

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**Paper Code**
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**MODEL PAPER**

**M. Sc. (Medical)**
**Anatomy**
**Semester I**
**Examination (Month/ year)**

**Paper - II**

**Physiology**

**Time: Three Hours**

**Maximum Marks: 70**

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)** **2X15=30**

A. Describe Classification of Reflexes & Describe in detail Stretch Reflex
B. Define erythropoiesis. List the different stages of erythropoiesis. Describe factors necessary for erythropoiesis
C. Define cardiac output, how is it regulated? Give one method of measurement of cardiac output.

**2. Short Answer Questions (Attempt any two):** **10X2=20**

A. Homeostasis
B. Functions of Cerebellum
C. Oxygen hemoglobin dissociation curve.

**3. Short Notes (Any four )** **5X4=20**

A. Renin-angiotensin system.
B. Blood Brain Barrier
C. Actions of parathormone.
D. Acommodation reflex
**E.** Spermatogenesis

**Paper Code**
MSCM0123S103T
MSCM0223S103T
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**MODEL PAPER**

**M. Sc. (Medical)**
**Anatomy**
**Semester I**
**Examination (Month/ year)**

**Paper - III**

**Biochemistry**

**Time: Three Hours**

**Maximum Marks: 70**

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)** **2X15=30**

A. With the help of flow chart describe in detail about Glycolysis. Write its energetics
B. Explain all the reactions of Urea Cycle. Add a note on Ammonia toxicity
**C.** Enumerate Beta-oxidation with the help of flow chart. Also write the energetics of Palmatic acid.

**2. Short Essay (Attempt any 2)** **2x10=20**

A. Classification of Carbohydrate
B. Write the biochemical function, RDA and deficiency disorders of Vitamin A
C. Factors affecting enzyme activity

**3. Short notes (Attempt any 4)** **4x5=20**

A. Calcium Homeostatis
B. Chromatography
C. Functions of Mitochondria
D. Structure of DNA
E. Thyroid Function Test

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**Paper Code**
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**MODEL PAPER**

**M. Sc. (Medical)**
**Anatomy**
**Semester II**
**Examination (Month/ year)**

**Paper - I**

**Pathology**

**Time: Three Hours**

**Maximum Marks: 70**

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)** **2X15=30**

A. Describe anemia with its classification. Discuss in detail about Sickle cell Anemia.

B. Describe and Define cell injury along with its Causes. Write in detail about Reversible and irreversible injury.

C. Define neoplasia along with its nomenclature. Write in brief about carcinogenesis and metastasis.

2. **Short Essay (Attempt any two)** **2x10=20**

A. Factors affecting wound healing

B. Difference between Acute and Chronic inflammation

C. Difference between benign and malignant neoplasm

**3. Short notes (Any four)** **4x5=20**

A. Renal Function Test

B. Liver Function Test

C. Pancreatic Function Test

D. Lab investigation of haemorrhagic disorders

E. Discuss Diabetes Mallitus

**Paper Code**
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# MODEL PAPER

**M. Sc. (Medical)**
**Anatomy**
**Semester II**
**Examination (Month/ year)**

**Paper - II**

**Microbiology**

**Time: Three Hours**

**Maximum Marks: 70**

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)** **2X15=30**

A. Define Sterilization. How does it differ from disinfection? Classify the various agents used in sterilization. Add a note on the principle and functioning of autoclave.

B.Explain the structural components of bacterial cell with well labelled diagram. Write a note on bacterial growth curve.

C. Describe the method of collection and processing of blood specimen for bacterial culture and sensitivity.

**2.Short Essay (Attempt any 2)** **2x10=20**

A. Kirby-Bauer Disc Diffusion method

B. Anaerobic culture methods

C. Biological safety cabinet

3.**Short notes (Attempt any 4)** **4x5=20**

A. Polymerase chain reaction

B. Dark ground microscope

C. Structure of Transposon

D. Methods of Cultivation

**E.** Recombinant DNA Technology

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**Paper Code**
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**MODEL PAPER**

**M. Sc. (Medical)**
**Anatomy**
**Semester II**
**Examination (Month/ year)**

**Paper - III**

**Pharmacology**

**Time: Three Hours**

**Maximum Marks: 70**

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)** **2X15=30**

A.What are the possible targets of drug action? Describe the G proteins as targets of action for different drugs.

B Define Adverse drug reactions and classify them. Describe the roles and responsibilities of Pharmacovigilance program of India.

C Classify diuretics. Explain the pharmacological action of loop diuretics.

**2. Short Essay (Attempt any Two)** **2X10 = 20**

A . Explain Essential drug concept.

B Describe Factors Modifying Drug Action.

C Explain pharmacological actions of Adrenaline.

**3. Short notes (Any four)** **4X5 = 20**

A Newer drug delivery systems

B Therapeutic drug monitoring

C Clinical significance of Pharmacogenomics.

D Parenteral routes of drug administration

E Pharmacological actions of antidepressants

**Paper Code**
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# MODEL PAPER

**M. Sc. (Medical)**
**Anatomy**
**Semester III**
**Examination (Month/ year)**

**Paper - I**

**Gross Anatomy I**
**Time: Three Hours**

**Maximum Marks: 70**

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)** **2X15=30**

A. Describe brachial plexus under following headings.. (5+5+5)
(i) Formation (ii) Branches (iii) Applied aspect.

B. Describe femoral triangle under the following headings: (5+5+5)
(i) Boundaries (ii) Contents (iii) Femoral sheath and femoral hernia

C. Describe boundaries and contents of middle mediastinum (15 )

**2. Short Essay (Attempt any two)** **2x10=20**

A. Describe coronary circulation.
B. Describe palmer spaces of hand.
C. Venous drainage of lower limb.

**3.Write short notes on: ( Any Four)** **5x4=20**

A. Popliteal fossa
B. Course and distribution of median nerve
C. Thoracic duct.
D. Movements of shoulder joint.
E. Locking and unlocking of knee joint.

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**Paper Code**
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**MODEL PAPER**

**M. Sc. (Medical)**
**Anatomy**
**Semester III**
**Examination (Month/ year)**

**Paper - II**

**General Embryology and General Histology**

**Time: Three Hours**

**Maximum Marks: 70**

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)** **2X15=30**

A. Compare Histological features of Compact Bone and Hyaline cartilage.

B. Describe third week of development. Describe derivatives of germ layers.

C. Define epithelium. Describe its types with example.

2. **SHORT ESSAY (ATTEMPT ANY TWO)** **2x10=20**

A. Describe histological features of Salivary Gland.

B. Compare histological features of Compact Bone and Hyaline cartilage.

C. Placenta, its structure, functions and placental abnormalities.

3. **WRITE SHORT NOTES ON (ANY FOUR)** **4x5=20**

A. Define Primitive streak and Sacrococcygeal teratoma.

B. Foetal circulation

C. Ectopic pregnancy

D. Menstrual cycle and Oogenesis.

E. Microscopic anatomy of Large Artery.

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**MODEL PAPER**

**M. Sc. (Medical)**
**Anatomy**
**Semester III**
**Examination (Month/ year)**

**Paper - III**

**Biostatistics & Research Methodology**

**Time: Three Hours**

**Maximum Marks: 70**

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

**Q.** 1. **Long Answer (Attempt any two)** **2X15=30**

A. Introduction to research methodology.
B. Discuss about the biostatistics
C. Describe Types of variables & scales of measurements.

**Q. 2 Short Essay (Attempt any Two)** **2X10 = 20**

A. Concept of probability distribution
B. Basics of Testing of Hypothesis
C. Describe Correlation & Regression

**Q. 3 Short notes (Any four)** **4X5 = 20**

A. Cluster randomization.
B. Sampling & Non sampling errors
C. Incidence & Prevalence
D. Random & non- random sampling
E. Methods of minimizing errors.

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**MODEL PAPER**

**MSCM0123S401T**

**M. Sc. (Medical)**
**Anatomy**
**Semester IV**
**Examination (Month/ year)**

**Paper - I**

**Gross Anatomy II**

**Time: Three Hours**

**Maximum Marks: 70**

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)** **2X15=30**

A. Describe Stomach under following headings: (2.5+10+2.5)
(i) Position and Gross features (ii) Blood Supply and Lymphatic drainage (iii) Clinical Anatomy

B. Describe kidney under the following headings: ( 10+2.5+2.5)
(i) Anterior and posterior relations (ii) Blood supply (iii) Applied Aspect

C. Enumerate cranial dural venous sinuses. Describe location, relations, tributaries and applied anatomy of Cavernous sinus. (10+5)

**2. Short Essay (Attempt any two)** **2x10=20**

A. Describe Portal vein and its tributaries.
B. Describe structure, parts, relations, blood supply and nerve supply of Thyroid Gland.
C. Describe position, relations, ligaments and clinical anatomy of ovary

**3.Write short notes on: ( Any Four)** **5x4=20**

A. Lateral wall of nose
B. Posterior Triangle.
C. Supports of Uterus
D. Cavernous sinus
E. Nerve supply of Tongue

**MODEL PAPER**

**MSCM0123S402T**

**M. Sc. (Medical)**
**Anatomy**
**Semester IV**
**Examination (Month/ year)**

**Paper - II**

**Histology Techniques, Surface Anatomy and Embalming**

**Time: Three Hours**

**Maximum Marks: 70**

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)** **2X15=30**

a) Describe the composition of Formalin based Embalming fluid. What are the functions of different constitutents.

b) Describe the principle and steps of Haematoxylin and Eosin staining of tissues.

c) Define tissue processing. Describe steps of tissue processing.

**2. SHORT ESSAY (ATTEMPT ANY TWO)** **2x10=20**

a) Define Staining. Describe common special staining techniques

b) Describe surface anatomy of lung with pleural reflections

c) Define Embalming, its purpose , types and methods of Embalming.

**3.WRITE SHORT NOTES ON (ANY FOUR)** **4x5=20**

a) SUDAN staining

b) Surface anatomy of Kidney

c) Function of Thymol and Glycerine in Embalming fluid

d) Surface anatomy of parotid gland and duct.

e) Microtome

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**MODEL PAPER**

**MSCM0123S403T**

**M. Sc. (Medical)**
**Anatomy**
**Semester IV**
**Examination (Month/ year)**

**Paper - III**

**Systemic Histology**

**Time: Three Hours**

**Maximum Marks: 70**

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)** **2X15=30**

Q1. Describe microanatomy of Liver and Gall bladder with functional correlation.

Q2. Differentiate microanatomical structure of spleen, lymph nodes and Tonsil.

Q3. Compare the microscopic anatomy of Renal Cortex and Renal Medulla.

**2. Short Essay (Attempt any two)** **2x10=20**

A. Structure of cartilages present in epiglottis and trachea
B. Microanatomy of thyroid gland and parotid gland
C. Histological features of small and large intestine

**3. Write short notes on: ( Any Four)** **5x4=20**

(A) **Microanatomy of bone and Haversian system**
(B) Structure and Function of Goblet cells.
(C) Difference between serous and mucus acini.
(D) Histological feature of Suprarenal gland
(E) Hassal's Corpuscles.

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**MODEL PAPER**

**MSCM0123S501T**

**M. Sc. (Medical)**
**Anatomy**
**Semester V**
**Examination (Month/ year)**

**Paper - I**

**Radiological and Sectional Anatomy**

**Time: Three Hours**

**Maximum Marks: 70**

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)** **2X15=30**

A. Describe sagittal section of male and female pelvis . Give an account of peritoneal relations of pelvic visceras.
B. Describe Principles of radiography for anteroposterior and lateral views
C. Describe common imaging techniques with their priciples.

**2. Short Essay (Attempt any two)** **2x10=20**

A. Describe Radiological features of x-ray KUB and barium enema
B. Principles of CT and MRI imaging techniques.
C. Coronary angiography

**3.Write short notes on: ( Any Four)** **5x4=20**

A. Tranverse section at T4 level.
B. Structures present at Transpyloric level
C. X-Ray chest Poster-anterior (PA view)
D. Coronal section of brain at level of Mammillary bodies and correlate with CT.
E. Sagittal section of Peritoneum in males

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**MODEL PAPER**

**MSCM0123S502T**

**M. Sc. (Medical)**
**Anatomy**
**Semester V**
**Examination (Month/ year)**

**Paper - II**

**Neuroanatomy**
**Time: Three Hours**

**Maximum Marks: 70**

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)** **2X15=30**

   A. Describe ascending and descending tracts of Spinal Cord.

   B. Ventricular system of brain with applied anatomy.

   C. Describe the gross anatomy of cerebellum along with its connections.

2. **SHORT ESSAY (ATTEMPT ANY TWO)** **2x10=20**

   A. Duramater and its folds.

   B. Neural tube defects

   C. Autonomic nervous system.

3. **WRITE SHORT NOTES ON (ANY FOUR)** **4x5=20**

   A. Thalamic nuclei.

   B. Brodmann's area of Cerebrum

   C. Functions of hypothalamus.

   D. Circle of Willis.

   E. Facial nerve

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MSCM0123S503T

# MODEL PAPER

**M. Sc. (Medical)**
**Anatomy**
**Semester V**
**Examination (Month/ year)**

**Paper - III**

**Systemic Embryology**

**Time: Three Hours**

**Maximum Marks: 70**

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)** **2X15=30**

   A. Define pharyngeal arch, pharyngeal pouch and pharyngeal cleft.

   B. Write about the development of face.

   C. Describe the development of tongue.

2. **SHORT ESSAY (ATTEMPT ANY TWO)** **2x10=20**

   A. Describe congenital heart defects

   B. Describe midgut rotation and anomalies

   C. Describe embryological basis for Cryptorchidism.

3. **WRITE SHORT NOTES ON (ANY FOUR)** **4x5=20**

   A. Bifid Uterus.

   B. Meckel's diverticulum.

   C. Tracheoesophageal fistula.

   D. Annular pancreas.

   E. Epispadias and Hypospadias.

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**MODEL PAPER**

**MSCM0123S601T**

**M. Sc. (Medical)**
**Anatomy**
**Semester VI**
**Examination (Month/ year)**

**Paper - I**

**Genetics**

**Time: Three Hours**

**Maximum Marks: 70**

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)** **2X15=30**

A. Enumerate Modes of Inheritance. Explain Sex-linked inheritance and any two clinical Syndromes associated with sex linked chromosomal aberrations.
B. Describe Karyotyping. Classify human chromosomes in different groups as seen in Karyotyping.
C. Describe common indications for prenatal diagnosis. Enumerate invasive and noninvasive methods. Describe any one Invasive method in detail

**2. Short Essay (Attempt any two)** **2x10=20**

A. Describe the numerical chromosomal aberrations giving examples.
B. Describe Pedigree chart. Draw a chart for Autosomal recessive inheritance.
**C.** Describe phases in a Cell cycle. Describe stages of Meiosis.

**3.Write short notes on: ( Any Four)** **5x4=20**

A. Lyons Hypothesis.
B. Genetic Counselling.
C. Southern Blot Technique.
D. Structure of chromosome.
E. Mosaic and Chimeras

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**MODEL PAPER**

**MSCM0123S602T**

**M. Sc. (Medical)**
**Anatomy**
**Semester VI**
**Examination (Month/ year)**

**Paper - II**

**Museum Technique**

**Time: Three Hours**

**Maximum Marks: 70**

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)** **2X15=30**

   A. Enumerate the steps of preparation of museum specimen. Describe mounting of specimen in detail.

   B. Describe special techniques of museum specimen preparation.

   C. Describe the factors affecting Fixation Process

**2. Short Essay (Attempt any two)** **2x10=20**

   A. Colour restoration
   B. Kaiserling I, II and III solution
   C. Principles of Fixation

**3. Write short notes on: ( Any Four)** **5x4=20**

   A. Preservation of brain
   B. Mounting of hollow viscera
   C. Embedding and Impregnation
   D. Preparation of museum catalogue
   E. Lugol's iodine

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**MODEL PAPER**

**MSCM0123S603T**

**M. Sc. (Medical)**
**Anatomy**
**Semester VI**
**Examination (Month/ year)**

**Paper - III**
**Recent advances and Applied Anatomy**

**Time: Three Hours**

**Maximum Marks: 70**

Attempt all Questions

All the parts of one question should be answered at one place.

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1. **Long Answer (Attempt any two)** **2X15=30**

**A.** Describe the surgical anatomy of fascial spaces of hand and wrist

**B.** Describe the principles of Plastination

C. Describe the clinical anatomy of Bronchopulmonary segments

**2. Short Essay (Attempt any two)** **2x10=20**

**A.** Describe the anatomical basis of Lumbar sympathectomy

B. Describe techniques of invitro fertilization

C. Describe surgical anatomy of extra hepatic biliary apparatus.

**3. Write short notes on: ( Any Four)** **5x4=20**

A. Cisternal Puncture
B. Organ Transplantation
C. Translational Research in anatomy
D. Uses of virtual table in teaching anatomy
E. Structures compressed in Thoracic inlet syndrome