



MAHATMA GANDHI UNIVERSITY
of
MEDICAL SCIENCES & TECHNOLOGY
JAIPUR

Syllabus

M.Sc. (Medical) PHARMACOLOGY

(6 SEMESTERS P.G. DEGREE PROGRAM)

2023-24

Recommended by Joint meeting of BOS Non clinical/ 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

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Professor & Head
Department of Pharmacology
Mahatma Gandhi Medical College
& Hospital, Sitapura, Jaipur-302022

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.

M.Sc. (Medical) Pharmacology
(6 SEMESTERS P.G. DEGREE PROGRAM)

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. 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 methodology and self-directed learning for continuous professional development.

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

COURSE OUTCOME (CO) : At the end of the M.Sc. training programme in Pharmacology, the student should acquire competencies in the following areas:

1. The student should be able to explain clearly concepts and principles of Pharmacology and therapeutics.
2. The student should also be able to explain the drug development processes. S/he should be able to explain Drugs and Cosmetics Act, in addition to clinical trial procedures.
3. The student should be able to effectively teach undergraduate students in medicine (MBBS) and allied health science courses (Dentistry and Nursing) so they become competent healthcare professionals and able to contribute to training of postgraduate trainees.
4. The student should be able to carry out a research project (both basic and clinical) from planning to publication and be able to pursue academic interests and continue life-long learning to become more experienced in all the above areas and to eventually be able to guide postgraduates in their thesis work.

2. TITLE OF THE COURSE:

M.Sc. (Medical) Pharmacology

3. DURATION OF THE COURSE:

Duration of the course: 3 Years (6 Semesters)

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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 Pharmacology.
- 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) Pharmacology 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) Pharmacology 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.

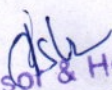
A candidate shall deposit enrolment fees along with tuition fees at the time of his/her admission to the course. Such a candidate who fails to submit, to the college Principal, duly filled enrolment form along with original documents including migration certificate required for enrolment within prescribed 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.


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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.

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.
- (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.

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- 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)

I. Theory

- There shall be five Theory papers in each semester of the study.
- Each Theory paper examination from the Core subject shall be of 3 hours duration and of maximum 70 marks.
- Each Theory paper examination from the Elective shall be of 3 hours duration and of maximum 70 marks.
- 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.
- Continuous Internal assessment (CIA) shall be of 30 for both core and elective subjects.
- 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)

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

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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 presentation on Dissertation and viva voce.

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

- o 02 Internal Faculty
- o 02 External Examiner

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) only at the next examination of the same semester.
3. Candidate who has failed in Practical examination will reappear in practical examination only at the next examination of the same semester.

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.

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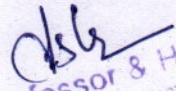
- (b) Continuous assessment marks obtained in main examination in the concerned failed paper(s)/practical shall be carried forward for working out the result of next Theory paper(s) and/or practical examination.
- (c) A failing candidate, if opt for improvement his/her internal assessment marks shall 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.

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

Course/Paper Name	Course/Paper Code	Credits	Theory/ Practical/Viva			
CORE COURSES			EOSE	CA	Total	Pass Marks
Anatomy	MSCM0423S101T	4	70	30	100	50 % aggregate including continuous assessment marks separately in theory and practical.
Physiology	MSCM0423S102T	4	70	30	100	
Biochemistry	MSCM0423S103T	4	70	30	100	
ELECTIVE COURSES (ANY TWO)						
National Health care System	MSCM0423S104T	2	70	30	100	
Basics of Computer	MSCM0423S105T	2	70	30	100	
Basics of Health Care IT	MSCM0423S106T	2	70	30	100	
ABILITY ENHANCEMENT COURSE						
Use of Audio Visual aids of ICT in medical Teaching		1		50		
Practical Classes/ Basic of teaching-learning method		1		50		
TOTAL		20	350	250	600	


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 Department of Pharmacology
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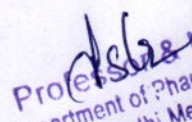
M.Sc. (Medical) Pharmacology Marks Distribution of Semester – II Examination

Course/Paper Name	Course/Paper Code	Credits	Theory/ Practical/Viva			
CORE COURSES			EOSE	C A	Total	Pass Marks
Pathology	MSCM0423S201T	4	70	30	100	50 % aggregate including continuous assessment marks separately in theory and practical.
Microbiology	MSCM0423S202T	4	70	30	100	
Pharmacology	MSCM0423S203T	4	70	30	100	
ELECTIVE COURSES(ANY TWO)						
Pharmacovigilance	MSCM0423S204T	2	70	30	100	
Communication Skills & Academic Writing	MSCM0423S205T	2	70	30	100	
Legal and Medical Issues in Hospitals	MSCM0423S206T	2	70	30	100	
ABILITY ENHANCEMENT COURSE						
Micro teaching and large group teaching		1		50		
Journal Club/Seminar Presentation		1		50		
TOTAL		20	350	250	600	


Professor & Head
Department of Pharmacology
 Mahatma Gandhi Medical College and Hospital
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M.Sc. (Medical) Pharmacology Marks Distribution of Semester – III Examination

Course/Paper Name	Course/Paper Code	Credits	Theory/ Practical/Viva			
CORE COURSES			EOSE	CA	Total	Pass Marks
History & General Pharmacology Principles	MSCM0423S301T	4	70	30	100	50 % aggregate including continuous assessment marks separately in theory and practical.
Clinical Pharmacology & therapeutics	MSCM0423S302T	4	70	30	100	
Biostatistics & Research Methodology	MSCM0423S303T	4	70	30	100	
ELECTIVE COURSES(ANY TWO)						
Organizational Behavior	MSCM0423S304T	2	70	30	100	
Stress Management	MSCM0423S305T	2	70	30	100	
Basic Instrumentation and Lab Practices	MSCM0423S306T	2	70	30	100	
ABILITY ENHANCEMENT COURSE						
Protocol Designing		1		50		
Practical Classes/ Group discussion /Case presentation		1		50		
TOTAL		20	350	250	600	


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 Department of Pharmacology
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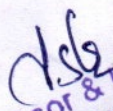
M.Sc. (Medical) Pharmacology Marks Distribution of Semester – IV Examination

Course/Paper Name	Course/Paper Code	Credits	Theory/ Practical/Viva			
CORE COURSES			EOSE	CA	Total	Pass Marks
Systemic Pharmacology I	MSCM0423S401T	4	70	30	100	50 % aggregate including continuous assessment marks separately in theory and practical.
Systemic Pharmacology II	MSCM0423S402T	4	70	30	100	
Systemic Pharmacology III	MSCM0423S403T	4	70	30	100	
ELECTIVE COURSES (ANY TWO)						
Database Management System	MSCM0423S404T	2	70	30	100	
Disaster Management	MSCM0423S405T	2	70	30	100	
Sports Nutrition	MSCM0423S406T	2	70	30	100	
ABILITY ENHANCEMENT COURSE (Any One)						
Journal club/Seminar Presentation		1		50		
Pharmacology Lab Exercises		1		50		
TOTAL		20	350	250	600	

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 Department of Pharmacology
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M.Sc. (Medical) Pharmacology Marks Distribution of Semester – V Examination

Course/Paper Name	Course/Paper Code	Credits	Theory/ Practical/Viva			
CORE COURSES			EOS E	CA	Total	Pass Marks
Experimental Pharmacology I	MSCM0423S501T	4	70	30	100	50 % aggregate including continuous assessment marks separately in theory and practical.
Experimental Pharmacology II	MSCM0423S502T	4	70	30	100	
Biochemical Pharmacology	MSCM0423S503T	4	70	30	100	
ELECTIVE COURSES(ANY TWO)						
Professional Ethics and Human Rights	MSCM0423S504T	2	70	30	100	
Basics of Yoga	MSCM0423S505T	2	70	30	100	
Hospital Equipment Management	MSCM0423S506T	2	70	30	100	
PRACTICAL/ABILITY ENHANCEMENT COURSE						
Seminar /Journal club/Presentation of symposium		1		50		
Pharmacology Lab Exercises		1		50		
TOTAL		20	350	250	600	


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 Department of Pharmacology
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M.Sc. (Medical) Pharmacology Marks Distribution of Semester – VI Examination

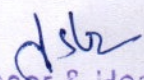
Course/Paper Name	Course/Paper Code	Credits	Theory/ Practical/Viva			
CORE COURSES			EOSE	CA	Total	Pass Marks
Chemotherapy	MSCM0423S601T	4	70	30	100	50 % aggregate including continuous assessment marks separately in theory and practical.
Recent Advances in Pharmacology I	MSCM0423S602T	4	70	30	100	
Recent Advances in Pharmacology II & Clinical trial designing	MSCM0423S603T	4	70	30	100	
ELECTIVE COURSES(ANY TWO)						
Biomedical Waste Management	MSCM0423S604T	2	35	15	50	
Teaching Methodology	MSCM0423S605T	2	35	15	50	
Basic Life Support (BLS)	MSCM0423S606T	2	35	15	50	
PRACTICAL/ABILITY ENHANCEMENT COURSE						
Practical /Viva and Dissertation Viva	MSCM0323S607P	4	70	30	100	
TOTAL		22	350	150	500	

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).


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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

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) Pharmacology: -

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) Pharmacology. A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course.

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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) Pharmacology. 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.

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.

Prof. *Chakradhar*
Department of Physiology
Mahatma Jyoti Baoba College
& Hospital, Bhiwandi, Mumbai-402022

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).

RESPIRATION:

- (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 TRACT:

- (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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SEMESTER I-PAPER III (THEORY)

PAPER CODE-

MSCM0123S103T

MSCM0223S103T

MSCM0323S103T

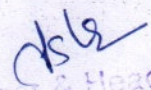
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BIOCHEMISTRY

BASICS OF BIOCHEMISTRY:

- (1) Cell structure and function and transport through the biological membrane.
- (2) Chemistry of Biomolecules – carbohydrate, lipids, amino acids, proteins and nucleic acids.
- (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


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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.

Prof. Dr. H. K. S. Head
Department of Pathology
Mehra Medical College
& Hospital, Sirpur, Jabalpur-482022

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

MSCM0223S202T

MSCM0323S202T

MSCM0423S202T

MSCM0523S202T

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

[Signature]
Professor Dr. H. R. Mehta
Department of Pharmacology
Muller Medical College
& Hospital, Sitapura, Jaipur-302022

- (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-

MSCM0123S203T

MSCM0223S203T

MSCM0323S203T

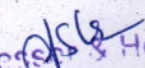
MSCM0423S203T

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 *dynamics*
- (10) Factors Modifying Drug Action
- (11) Drug administered in special situations: Pregnancy, Lactation, Pediatrics & Geriatrics.
- (12) Adverse drug reactions & Pharmacovigilance
- (13) Aspects of Pharmacotherapy & Clinical pharmacology


 Professor & Head
 Department of Pharmacology
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- (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

Professor & Head
Department of Pharmacology
Mahatma Gandhi Medical College
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SEMESTER III-PAPER I (THEORY)

PAPER CODE- MSCM0423S301T

HISTORY & GENERAL PHARMACOLOGY PRINCIPLES

History of pharmacology: (1) Wonder Discoveries in Pharmacology (2) Nobel laureates in Pharmacology and their revolutionary discoveries.

General Pharmacology Principles : (1) Introduction (a) Definition, (b) Nature & sources of drugs & drug information, dosage forms, drug Nomenclature. (2) Routes of drug administration (3) Drug delivery systems (4) Pharmacokinetics (a) Absorption: General Principles for passage of drugs across biological membranes, factors affecting absorption, transport, bioavailability. (b) Distribution: Plasma protein binding, biological barriers (BBB & Placental), volume of distribution, tissue storage. (c) Biotransformation: Principle phases (I & II), sites, types with examples. Factors affecting (Induction, Inhibition, tissue storage). (d) Elimination: Routes, Kinetics Half-Life, Loading dose, Maintenance dose. Methods of prolongation of drug effect, Factors modifying dose of a drug. (5) Pharmacodynamics I (a) Principles of drug action, (b) Mechanism of drug action, (c) Receptors - Agonist, partial agonist, inverse agonist, antagonist (d) Receptors - Transducer mechanism. (e) Dose-response relationship, (f) Drug efficacy & potency, Therapeutic index, LD 50 & ED 50, (g) Synergism and Drug antagonism. (h) Factors modifying drug action (6) Adverse drug reactions

SEMESTER III-PAPER II (THEORY)

PAPER CODE- MSCM0423S302T

CLINICAL PHARMACOLOGY & THERAPEUTICS

- Drug Interactions
- Pharmacogenetics, Pharmacogenomics and Personalized Medicine
- Cell based and Recombinant DNA therapies
- Alternative Medicines: Herbals & Nutraceuticals
- Drugs administered in special situations: Pregnancy, Lactation, Paediatrics & Geriatrics.
- Rational basis of therapeutics (P-drug concept, Essential drugs), Dosage forms and its use, Clinical Pharmacokinetics, Pharmacovigilance, Pharmacoeconomics, Therapeutic drug monitoring, Evidence based Medicine, Essential drug concept, Fixed Dose Combinations
- Hospital formulary development, Functioning of Drug and therapeutic committee , Drug information services, medication error detection and mitigation advice,

antibiotic resistance & Antibiotic stewardship, prescription auditing, Drug counseling

- Pharmacometrics
- Drug development process, Phases of Clinical trial, Drug Regulations: Drug and Cosmetics Act, Drug Price Control order, Application for Investigational New Drug (IND), Application for New drug Discovery (NDD) according to Indian Control Authority & USFDA guidelines. Conducting bio-equivalence studies. Ethical considerations in utilizing human subjects for drug discovery process. Helsinki's declaration. ICH-GCP Guidelines.

SEMESTER III-PAPER III (THEORY)

PAPER CODE-

MSCM0123S303T

MSCM0223S303T

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MSCM0423S303T

MSCM0523S303T

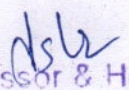
BIostatISTICS & RESEARCH METHODOLOGY

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


Professor & Head
Department of Pharmacology
Mahatma Gandhi Medical College
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SEMESTER VI-PAPER I (THEORY)

PAPER CODE- MSCM0423S401T

SYSTEMIC PHARMACOLOGY I

- Autonomic nervous system
- Peripheral Nervous System
- Autacoids and related drugs
- Central nervous system
- Drug addiction and Drug abuse

SEMESTER VI-PAPER II (THEORY)

PAPER CODE- MSCM0423S402T

SYSTEMIC PHARMACOLOGY II

Systemic Pharmacology

- Drugs affecting kidney function, Cardiovascular, gastrointestinal and respiratory system
- Drugs affecting blood and blood formation

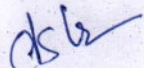
SEMESTER VI-PAPER III (THEORY)

PAPER CODE- MSCM0423S403T

SYSTEMIC PHARMACOLOGY III

Systemic Pharmacology III

- Hormones and Related drugs & Miscellaneous drugs - (a) Vaccines, Antisera & immunoglobulins (b) Vitamins (water soluble and fat-soluble vitamins) (c) Antioxidants. (d) Dermatological pharmacology (e) Ocular pharmacology (f) Toxicology -Heavy metal poisoning and heavy metal antagonists -Management of over dosage with commonly used therapeutic agents. (g) Antiseptics and disinfectants (h) Ectoparasitocides (I) Prescribing in pregnancy and breastfeeding


Professor & Head
Department of Pharmacology
Mahatma Gandhi Institute of College
& Hospital, Sitapura, Jaipur-302022

SEMESTER V-PAPER I (THEORY)

PAPER CODE- MSCM0423S501T

EXPERIMENTAL PHARMACOLOGY I

Experimental methodologies involved in the discovery of drugs (in vivo, in vitro, ex vivo).
Animal handling and animal care.

Ethical guidelines in utilizing animals for experimental purposes.

Methods of anaesthetizing animals and methods of euthanasia.

Restraining and blood collecting methods. Preclinical toxicological studies.

Calculation of LD50 & ED 50.

Acute, subacute and chronic toxicity studies.

Pre-clinical pharmacokinetic and dynamic studies.

High throughput screening (invitro and invivo) for pre-clinical pharmacokinetic and pharmacodynamic studies.

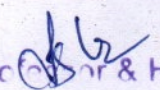
Methods involved in testing teratogenicity, carcinogenicity and organ toxicities in animals.

SEMESTER V-PAPER II (THEORY)

PAPER CODE- MSCM0423S502T

EXPERIMENTAL PHARMACOLOGY II

Drug screening methods involved in the evaluation of anti-ulcer, prokinetic agents, antiemetics, antianginal, antihypertensive, antiarrhythmic, antidiabetic, antifertility agents, anti-platelet, analgesic, antipyretic, anti-inflammatory, antiepileptics, antidepressants, antianxiety, antipsychotics, sedatives-hypnotics, antiparkinsonian local anaesthetics, muscle relaxants, antihyperlipidemic, antiasthmatics, cough suppressants, diuretics & anticancer drugs. Behavioural pharmacology models and evaluation of drugs affecting learning and memory.


Professor & Head
Department of Pharmacology
Maharaja Sayajirao Medical College
& Hospital, Sitapura, Jabalpur-482022

SEMESTER V-PAPER III (THEORY)

PAPER CODE- MSCM0423S503T

BIOCHEMICAL PHARMACOLOGY

Basic principles and applications of simple analytical methods • Principles of quantitative estimation of drugs, endogenous compounds and poisons using Colorimetry, Spectrophotometry, flame photometry, High Performance Liquid Chromatography (HPLC) and enzyme-linked immunosorbent assay (ELISA). Good laboratory practice, Plant extraction methods

SEMESTER VI-PAPER I (THEORY)

PAPER CODE- MSCM0423S601T

CHEMOTHERAPY

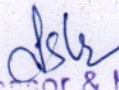
- **Antimicrobial drugs:** Sulfonamides, Cotrimoxazole, Quinolones, Beta-lactam antibiotics, broad spectrum antibiotics, Aminoglycosides, Macrolides, Lincosamides, Glycopeptide and other antibacterial antibiotics, Urinary antiseptics, antitubercular and antileprotic drugs, antifungal, antiviral, antimalarial, antiamoebic and other antiprotozoal drugs, antihelminthic drugs.
- **Antineoplastic drugs:** Cancer chemotherapy & Immunomodulators

SEMESTER VI-PAPER II (THEORY)

PAPER CODE- MSCM0423S602T

RECENT ADVANCES IN PHARMACOLOGY I

Recent advances in General, Autonomic, Peripheral and Central nervous system, Autacoids and related drugs, Renal, Cardiovascular, gastrointestinal and respiratory system


Professor & Head
Department of Pharmacology
Jalpaiguri Medical College
& Hospital, Bhatpara, Jalpaiguri-786022

SEMESTER VI-PAPER III (THEORY)

PAPER CODE- MSCM0423S602T

RECENT ADVANCES IN PHARMACOLOGY II & CLINICAL TRIAL DESIGNING

Recent advances in Pharmacology from time to time-II & Clinical trial designing

- Recent advances in Hormones & Related drugs, Miscellaneous drugs and Chemotherapy
- Clinical trial designing, Clinical trial ethics, Medico-legal aspects of clinical trials, Data archiving and management, Statutory and legal requirements for conduct of clinical trials (including drug schedules), GCP

PRACTICAL / ABILITY ENHANCEMENT

Clinical Pharmacology & Therapeutics

- (1) Prepare a list of P-drugs for a given case
- (3) Clinical Pharmacokinetics
- (4) Pharmacovigilance
- (5) Pharmacoeconomics
- (6) Therapeutic drug monitoring
- (7) Pharmacometrics
- (8) Prepare a list of essential medicines for a healthcare facility

Prescription auditing

Hospital formulary development,

Evaluation of Fixed dose combinations

Drug Counselling -explain to patients, the effects and adverse effects of drugs, including the need for medication adherence

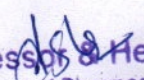
Emergency drug use in crash cart/resuscitation

Drug Information services

Case base discussion & drug interaction exercises

Experimental Pharmacology Exercises:-

- (1) Study of some basic instruments used for isolated tissue experiments.
- (2) Study of some basic animal techniques: Techniques for injection of drugs and collection of blood samples, feeding of animals.


Professor & Head
Department of Pharmacology
Mahatma Gandhi Medical College
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- (3) Different laboratory animals and their application in experimental pharmacology, breeding data, housing and animal feeds.
- (4) Preparation and administration of a drug solution in appropriate strength and volume.
- (5) Bioassay, G LP, Ethical principles of animal use
- (6) Alternatives to animal experiments (cell culture, cell lines)
- (7) Screening for Pharmacological activity with special reference to the following activities: (a) Analgesic-Antipyretic (b) Anticonvulsant (c) Sedative-hypnotics (d) Anti-depressant (e) Anti-parkinsonian (f) Anti-inflammatory (g) Local anesthetic (h) Motor in-coordination (i) Anxiolytic effect (j) Conditioned Avoidance Response (k) Anti-inflammatory effect
- (8) To prepare log dose response curve of a suitable drugs
- (9) Effect of Drugs on guinea pig ileum, frog rectus abdominis, rabbit ileum
- (10) To perform bioassay of a suitable drug on: (a) Guinea pig ileum (b) Frog rectus abdominis
- (11) To study the stimulatory and depressant effects of drugs on rabbit gut.
- (12) To study the effect of coronary vasodilator drug on perfused rabbit heart (Langendroff's technique).
- (13) Determination of pA2 value of acetylcholine on guinea pig ileum.
- (14) To study the effect of unknown drugs using rabbit eye.
- (15) Proficiency in using CAL programs for demonstration of effects of drugs on animals

II. Biochemical Pharmacology Exercises (1) Identification of unknown compounds by using chemical tests. (2) Estimation of drug level using colorimetry, spectrophotometry, fluorimetry, flame photometry, high performance liquid chromatography (HPLC), enzyme linked immunoassay

Antibiotic stewardship
 Prescription auditing
 Evaluation of Fixed dose combinations
 Drug Counselling
 Case base discussion & drug interaction exercises
 Publication ethics
 Poster presentation
 Protocol designing
 Journal Presentation
 Abstract writing

Prof. Dr. J. K. Singh
 Professor & Head
 Department of Pharmacology
 Mahatma Gandhi Medical College
 & Hospital, Sitapura, Jaipur-302022

Microteaching
Thesis presentation

Dissertation

Pedagogy

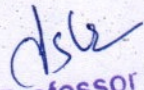
Identifying several situations same and able to dissertation work, writing a proposal and making a presentation to the Dissertation faculty advisory committee. Reporting to the committee on the progress of research work periodically. Making use of a variety of research methods. Defending the inference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

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


Professor & Head
Department of Pharmacology
Mahatma Gandhi Medical College
& Hospital, Sitapura, Jaipur-302022

Paper Code

MSCM0123S101T
MSCM0223S101T
MSCM0323S101T
MSCM0423S101T
MSCM0523S101T

MODEL PAPER
M. Sc. (Medical)
**Physiology/Pharmacology/Microbiology/
Biochemistry/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

Q1. 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.

Q2. 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

Q3. Classify bones with examples and describe blood supply of long bone (10+5)

2. Short Essay (Attempt any two)

2x15=30

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)

20 (5x4)

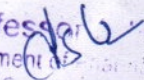
(A) Types of cartilages

(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.

Prof. 
Department of Microbiology
Mahatma Gandhi Medical College
& Hospital, Sitapura, Jaipur-302022

Paper Code

MSCM0123S102T
MSCM0223S102T
MSCM0323S102T
MSCM0423S102T
MSCM0523S102T

MODEL PAPER

M. Sc. (Medical)
**Physiology/Pharmacology/Microbiology/
Biochemistry/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

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

2. Short Answer Questions (Attempt any two):

10X2=20

1. Homeostasis
2. Functions of Cerebellum
3. Oxygen hemoglobin dissociation curve.

3. Short Notes (Any four)

5X4=20

1. Reninangiotensin system.
2. Blood Brain Barrier
3. Actions of parathormone.
4. Accommodation reflex
5. Spermatogenesis

[Signature]
Professor & Head
Department of Pharmacology
Mahatma Gandhi Medical College
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Paper Code

• MSCM0123S103T
MSCM0223S103T
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MSCM0423S103T
MSCM0523S103T

MODEL PAPER

M. Sc. (Medical)
**Physiology/Pharmacology/Microbiology/
Biochemistry/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 Palmitic 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 Homeostasis
- B. Chromatography
- C. Functions of Mitochondria
- D. Structure of DNA
- E. Thyroid Function Test

Professor & Head
Department of Physiology
Mahatma Gandhi Medical College
& Hospital, Sitapura, Jaipur-302022

Paper Code

MSCM0123S201T
MSCM0223S201T
MSCM0323S201T
MSCM0423S201T
MSCM0523S201T

MODEL PAPER

M. Sc. (Medical)
**Physiology/Pharmacology/Microbiology/
Biochemistry/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**

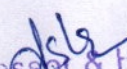
- A. Describe anemia with its classification. Discuss in detail about Sickle cell Anemia.
- B. Describe and Define cell injury along with its Causes. Write in detail about Reversible and irreversible injury.
- C. Define neoplasia along with its nomenclature. Write in brief about carcinogenesis and metastasis.

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 Mellitus


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Department of Pharmacology
Mahatma Gandhi Medical College
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Paper Code

MSCM0123S202T
MSCM0223S202T
MSCM0323S202T
MSCM0423S202T
MSCM0523S202T

MODEL PAPER

M. Sc. (Medical)
**Physiology/Pharmacology/Microbiology/
Biochemistry/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


Professor & Head
Department of Pharmacology
Mahatma Gandhi Medical College
& Hospital, Sitapura, Jaipur-302022

Paper Code

MSCM0123S203T

MSCM0223S203T

MSCM0323S203T

MSCM0423S203T

MSCM0523S203T

MODEL PAPER

M. Sc. (Medical)

Pharmacology

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)

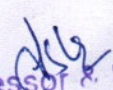
2X10 = 20

- 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


Professor & Head
Department of Pharmacology
Mahatma Gandhi Medical College
& Hospital, Sitapura, Jaipur-302022

MODEL PAPER

**M. Sc. (Medical)
Pharmacology
Semester III**

MSCM0423S301T

Examination (Month/ year)

Paper - I

History & General Pharmacology Principles

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) Clinical implications of enzyme induction and inhibition
- b) Describe various factors modifying drug action using suitable examples.
- c) Enumerate various routes of drug administration. Mention the advantages and disadvantages of intravenous route.

2. Short Essay (Attempt any Two)

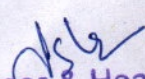
2 X 10 = 20

- a) Receptor mediated drug action
- b) Newer drug delivery systems
- c) Dose response relationship

3. Short notes (Any four)

4 X 5 = 20

- a) James Black
- b) Sources of drug information
- c) Teratogenicity
- d) Alexander Fleming
- e) Drug antagonism


Professor & Head
Department of Pharmacology
Mahatma Gandhi Medical College
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MSCM0423S302T

MODEL PAPER

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

Paper - II

Clinical Pharmacology & therapeutics

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 is Pharmacovigilance? Describe the Pharmacovigilance Program of India (PvPI) in detail.
- b) Describe the various phases of Clinical trial.
- c) Drug-drug interactions

2. Short Essay (Attempt any Two)

2 X 10 = 20

- a) Antibiotic resistance
- b) Nutraceuticals
- c) Computer Assisted Learning in Pharmacology

3. Short notes (Any four)

4 X 5 = 20

- a) Pharmacogenomics
- b) Medication errors
- c) Drugs avoided in children
- d) P-drug
- e) ICH – GCP guidelines


Professor & Head
Department of Pharmacology
Mahatma Gandhi Medical College
& Hospital, Sitapura, Jaipur-302022

Paper Code

MSCM0123S303T
MSCM0223S303T
MSCM0323S303T
MSCM0423S303T
MSCM0523S303T

MODEL PAPER

M. Sc. (Medical)
Pharmacology
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**

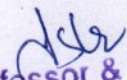
- A. Introduction to research methodology.
- B. Discuss about the biostatistics
- C. Describe Types of variables & scales of measurements.

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.


Professor & Head
Department of Pharmacology
Mahatma Gandhi Medical College
& Hospital, Sitapura, Jaipur-302022

MSCM0423S401T

MODEL PAPER

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

Paper - I

Systemic Pharmacology 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 the mechanism of action, therapeutic uses and adverse effects of Phenytoin.
- b) Write in detail about mechanism of action, uses, precautions and adverse effects of Aspirin.
- c) Describe the mechanism of action of Lignocaine. What are the various techniques of administration of local anaesthetics?

2. Short Essay (Attempt any Two)

2 X 10 = 20

- a) Pharmacotherapy of migraine
- b) Drug induced Parkinsonism
- c) Atypical antipsychotics

3. Short notes (Any four)

4 X 5 = 20

- a) Selective Serotonin Reuptake Inhibitors (SSRIs)
- b) Centrally acting muscle relaxants
- c) Morphine poisoning
- d) Second generation anti-histaminics
- e) Pharmacotherapy of Open Angle Glaucoma

[Signature]
Professor & Head
Department of Pharmacology
Mahatma Gandhi Medical College
& Hospital, Sitapura, Jaipur-302022

MSCM0423S402T

MODEL PAPER

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

Paper - II

Systemic Pharmacology 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 Renin-Angiotensin Aldosterone System (RAAS) and its inhibitors
- b) Write in detail about mechanism of action, uses and adverse effects of heparin
- c) What is Peptic ulcer disease (PUD)? Describe various regimes used for eradication of *Helicobacter pylori*.

2. Short Essay (Attempt any Two)

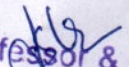
2 X 10 = 20

- a) Pharmacotherapy of migraine
- b) Loop diuretics
- c) Prinzmetal's angina

3. Short notes (Any four)

4 X 5 = 20

- a) Oral rehydration therapy
- b) Pharmacotherapy of constipation
- d) Status asthmaticus
- e) Anti-platelet agents
- f) Mucolytics


Professor & Head
Department of Pharmacology
Mahatma Gandhi Medical College
& Hospital, Sitapura, Jaipur-302022

MSCM0423S403T

MODEL PAPER

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

Paper - III

Systemic Pharmacology III

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 mechanism of action, uses and adverse effects of Metformin.
- b) Describe the mechanism of action, therapeutic uses and adverse effects of Glucocorticoids.
- c) What is hormonal contraception? Describe the various types of contraceptive pills in detail.

2. Short Essay (Attempt any Two)

2 X 10 = 20

- a) Selective estrogen receptor modulators (SERMs)
- b) Thyroid storm
- c) Pharmacotherapy of osteoporosis

3. Short notes (Any four)

4 X 5 = 20

- a) Drugs for psoriasis
- b) Chelating agents
- c) Antiseptics
- d) Fat soluble vitamins
- e) Drugs avoided in pregnancy

Professor & Head
Department of Pharmacology
Mahatma Gandhi Medical College
& Hospital, Sitapura, Jaipur-302022

MSCM0423S501T

MODEL PAPER

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

Paper - I

Experimental Pharmacology 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 in detail significance of preclinical studies.
- B Describe in detail commonly used experimental animals
- C Explain ethical consideration of animal use in indian scenario.

2. Short Essay (Attempt any Two)

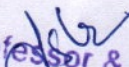
2X10 = 20

- A Write about anesthesia used in experimental animals.
- B Write about techniques of injection of drugs and collection of blood samples from animals.
- C Write about acute, subacute and chronic toxicological studies.

3. Short notes (Any four)

4X5 = 20

- A Comment on transgenic animals in experimental research.
- B Euthanasia methods used in the experimental study.
- C Write on Alternative to animal experimentation.
- D Write about preclinical pharmacokinetic studies.
- E Factors affecting drug response in animals.


Professor & Head
Department of Pharmacology
Mahatma Gandhi Medical College
& Hospital, Sitapura, Jaipur-302022

MSCM0423S502T

MODEL PAPER

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

Paper - II

Experimental Pharmacology 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 methods of evaluation of anti-inflammatory activity of drugs.
- B. Describe methods of evaluation of analgesic activity of drugs.
- C. Describe methods of evaluation of anti-depressant activity of drugs.

2. Short Essay (Attempt any Two)

2X10 = 20

- A. Write about in-vivo methods of evaluation of anti-ulcer activity of drugs.
- B. Write about in-vivo methods of evaluation of anti-anxiety effect of drugs.
- C. Write about in-vivo methods of evaluation of anti-convulsant property of drugs.

3. Short notes (Any four)

4X5 = 20

- A. Evaluate muscle relaxant property of diazepam in mouse using rotarod apparatus.
- B. Write about Straub tail reaction/phenomenon induced by morphine.
- C. Write steps to screen anti-asthmatic activity of drugs using plethysmograph in guinea pig.
- D. Screen the local anesthetic activity of drugs using guinea pig.
- E. Screen the effect of different miotic drugs on Rabbit eye.

Professor & Head
Department of Pharmacology
Mahatma Gandhi Medical College
& Hospital, Sitapura, Jaipur-302022

MSCM0423S503T

MODEL PAPER

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

Paper - III

**Biochemical 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 Describe in details principles of quantitative estimation of drugs using high performance liquid

chromatography.

B Describe in details principles of quantitative estimation of drugs using Immunoassay method.

C Describe in detail methods of extraction of active principles from plants.

2. Short Essay (Attempt any Two)

2X10 = 20

A Explain estimation of drugs using Colorimetry

B Explain estimation of drugs using Spectrophotometry

C Explain estimation of drugs using Flame photometry

3. Short notes (Any four)

4X5 = 20

A Principle of using chromatography

B Principle of using Spectroscopy

C Principle of Good laboratory practice.

D Elemental analysis of plant extract.

E Advantages of structure elucidation of compound isolated from plant extract.

Professor & Head
Department of Pharmacology
Mahatma Gandhi Medical College
& Hospital, Sitapura, Jaipur-302022

MSCM0423S601T

MODEL PAPER

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

Paper - I

Chemotherapy

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 in detail target specific anticancer drugs.
- B. Classify Fluoroquinolones and describe its mechanism of action. Add a note on its indications and contraindications.
- C. Describe in detail immunosuppressive agents.

2. Short Essay (Attempt any Two)

2X10 = 20

- A Chemoprophylaxis in surgical procedures
- B Drug therapy of filariasis and add a note on National Filaria Control Programme.
- C Pharmacotherapy of anaerobic infections

3. Short notes (Any four)

4X5 = 20

- A Topical antifungal agents
- B Treatment guidelines for XDR-TB.
- C Artemisinin combination
- D Therapy of recurrent UTI
- E Calcineurin inhibitors

Professor & Head
Department of Pharmacology
Mahatma Gandhi Medical College
& Hospital, Sirapura, Jaipur-302022

MSCM0423S603T

MODEL PAPER

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

**Paper - III
Recent Advances in Pharmacology II & Clinical trial designing**

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 Recent advances in treatment of type 2 Diabetes Mellitus.
- B Describe in details Antibiotic Stewardship Program.
- C Design a phase II clinical trial protocol for study of safety & efficacy of a new drug molecule in hypertension.

2. Short Essay (Attempt any Two)

2X10 = 20

- A Recent advances in chemotherapy of tuberculosis
- B Good Clinical Practice guidelines in clinical trials
- C Gene therapy in treatment of cancerous conditions

3. Short notes (Any four)

4X5 = 20

- A Darbepoetin
- B Bevacizumab
- C Medical treatment of obesity
- D Therapeutic exploratory trials
- E Role of placebo in clinical trials and its ethical aspects

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Professor & Head
Department of Pharmacology
Mahatma Gandhi Medical College
& Hospital, Sitapura, Jaipur-302022

MSCM0423S602T

MODEL PAPER

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

Paper - II

Recent Advances in Pharmacology 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 Enlist the Novel Oral Anticoagulant Drugs and their mode of action. How are they different from Warfarin? Mention their indications.

B Describe the current concepts in treatment of Hypertension.

C Discuss recent advances in treatment of Bronchial Asthma.

2. Short Essay (Attempt any Two)

2X10 = 20

A Personalized drug therapy and designer drugs

B Novel methods of drug delivery

C Newer drugs in the treatment of peptic ulcer

3. Short notes (Any four)

4X5 = 20

A Dabigatran

B Rescue factor

C .Recombinant DNA Technology

D Nano pharmacology

E Applications of pharmacogenomics

Professor & Head
Department of Pharmacology
Mahatma Gandhi Medical College
& Hospital, Sitapura, Jaipur-302022