SHRI
DHARMASTHALA
MANJUNATHESHWARA
UNIVERSITY

TRUTH LIBERATES

ORDINANCE GOVERNING MBBS DEGREE COURSE PHASE - II [PART - A] CURRICULUM 2024-25

Revised Scheme (RS-1)

|| Om Shree Manjunathaya Namaha ||

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SHRI
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UNIVERSITY

TRUTH LIBERATES

VISION

Shri Dharmasthala Manjunatheshwara University will set the highest standards of teaching and learning, awakening the intelligence of the students and nurturing the creativity hidden in them by creating an environment where the ancient wisdom blends with modern science, to transform them into whole human beings to face the challenges.

MISSION

- To ensure that the journey of education is inspiring, pleasant and enjoyable.
- Attract the best of teachers and students.
- Achieve high principles of trust, love and spirituality in the students.
- Create a collaborative, diverse and exclusive community.
- Transform the student of today to be a leader of tomorrow and a better human being.
- Produce passionate teachers.
- Evolve innovative teaching techniques.
- Create a peaceful environment.
- Prepare the student to face the social challenges.
- Create a University of which the Nation is proud of.
- Be an effective partner in Nation Building.
- Create an Eco-friendly University.
- Create a University based on the principles of beauty, love and justice.

|| Om Shanti! Om Shanti! Om Shanti ||

SHRI
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UNIVERSITY

THE LOGO

Poojya Dr D. Veerendra Heggade, Hon'ble Chancellor of the University, while searching for an appropriate Logo for the University, saw a photograph picked from Temple Architecture showing Wings of a Bird, sculpted in Indian style and wanted it to be incorporated in the logo for the University, as the Wings symbolize 'Spreading of Knowledge beyond Boundaries'. Further it was felt that the Central theme of the logo should be 'Rudra' (The Linga) with wings on each side. In this way, the logo of the University was conceptualized.

Hence:

1. The central part represents Rudra who Demolishes Darkness.
2. The Three horizontal lines on The Linga stand for Samyak Darshan (Right Belief), Samyak Gyan (Right Knowledge) and Samyak Charitra (Right Conduct).
3. The Wings symbolize spreading of Knowledge across the boundaries.
4. Base line “Truth Liberates” highlights the Purpose of Education: to liberate oneself unconditionally. It shows that it is not discipline, nor knowledge nor the efforts to freedom that liberate but Truth is what liberates you from all your conditioning and ignorance.

The overall significance of Shri Dharmasthala Manjunatheshwara University's Logo is:

Darkness of ignorance is destroyed by the flow of knowledge to bring Liberty to everyone, by realizing the truth. And, it should spread globally without the boundaries as hindrance.

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SDMU/ACAD/MED/F-90/Notif-392a/811a/2024

Date: 07-11-2024

NOTIFICATION

Ordinance Governing the Revised Scheme (RS1) of Curriculum for MBBS Phase II

Ref: 1. *Minutes of the 10th Academic Council Meeting held on 23rd October 2024.*
2. *NMC Gazette Notification No. D-11011/500/2024-UGMEB dated 12.09.2024.*

It is hereby notified that Shri Dharmasthala Manjunatheshwara University has framed an ordinance governing the Revised Scheme – I (RS1) of the Curriculum for the Second Phase of the Bachelor of Medicine and Bachelor of Surgery (MBBS) program.

This revision is in accordance with the guidelines stipulated in the National Medical Commission (NMC) Gazette Notification No. D-11011/500/2024-UGMEB, dt 12-09-2024, and the decisions taken by the Academic Council at its 10th meeting held on 23rd October 2024.

The detailed ordinance is available for reference on the University website at https://sdmuniversity.edu.in/academics/curriculum.

The ordinance outlines the detailed course content, assessment methods and other relevant regulations pertaining to the revised curriculum for MBBS Phase II.

All stakeholders are requested to take note of this notification and adhere to the provisions of the ordinance.

By Order,

REGISTRAR
REGISTRAR
Shri Dharmasthala Manjunatheshwara
University, Dharwad

To: The Principal, SDM College of Medical Sciences & Hospital.

Copy for kind information to:
1. Hon'ble Chancellor, Shri Dharmasthala Manjunatheshwara University, Dharwad
2. Vice-Chancellor, Shri Dharmasthala Manjunatheshwara University, Dharwad
3. Pro Vice Chancellor, Shri Dharmasthala Manjunatheshwara University, Dharwad
4. Controller of Examination, Shri Dharmasthala Manjunatheshwara University, Dharwad
5. Chairperson, Board of Studies – Preclinical UG & PG
6. University Records

Shri Dharmasthala Manjunatheshwara University * Dharwad *

DISCLAIMER

This curriculum booklet has been framed as per the guidelines issued by the National Medical Council and is subject to modifications as and when the National Medical Council amends the aforesaid guidelines.

UNIT A
CURRICULUM FOR PARACLINICAL SUBJECTS OF MBBS PHASE-II

PHARMACOLOGY

Subject Goals:

At the end of teaching learning in pharmacology, the student should be able to:

i. Know about essential and commonly used drugs and an understanding of the pharmacologic basis of therapeutics.

ii. Apply pharmacokinetic and pharmacodynamic concept of drugs to drug selection and dosage regimens.

iii. Explain mechanism of action of commonly used drugs.

iv. Select and rationally prescribe drugs based on clinical condition and the pharmacologic properties, efficacy, safety and cost of medicines for common clinical conditions of national importance.

v. Understand generic, branded, over the counter (OTC) and prescription only drugs.

vi. Understand pharmacovigilance and identify adverse drug reactions and drug interactions of commonly used drugs.

vii. Understand essential medicine concept and explore sources of drug information.

viii. Administer drugs through various common routes of administration.

ix. Understand and apply concept of evidence based medicine and rational use of drugs.

x. Communicate well in imparting drug related information to patients.

xi. Knows basics of new drug delivery and industry-doctor relationship.

xii. Critically analyze drug promotional literature and drug formulations. Understand regulatory and ethical aspects of drug discovery and drug use.

PATHOLOGY

Subject Goals:

At the end of the teaching learning in pathology learner should be able to:

i) Demonstrate knowledge of causes, mechanisms, alterations in gross and cellular morphology of organs in disease states.

ii) Explain, interpret and analyse the pathology with clinical condition including diseases which are locally and regionally relevant.

iii) Perform experiments to demonstrate routine pathological investigations on blood and explain principles, interpret investigation results.

iv) Perform experiments to demonstrate routine pathological investigations on the various biological samples and explain principles, interpret investigation results.

v) Demonstrate updated pathological investigations on the various biological samples.

MICROBIOLOGY

Subject goals

At the end of Microbiology teaching-learning activities learner should be able to:

i. Comprehend the immunological mechanisms in health and disease.

ii. Comprehend the of role of microbial agents in health and disease.

iii. Correlate the natural history, mechanisms and clinical manifestations of infectious diseases as they relate to the properties of microbial agents.

iv. Comprehend the principles and application of infection control measures.

v. Comprehend the basis of choice of laboratory diagnostic tests and their interpretation.

vi. Comprehend the principles of antimicrobial therapy and the control and prevention of infectious diseases.

vii. Comprehend the mechanisms of antimicrobial resistance (AMR) and its prevention along with concept and application of the antimicrobial stewardship program.

viii. Demonstrate the knowledge of outbreak investigation and its control.

ix. Describe commensals, opportunistic and pathogenic organisms and explain host parasite relationship.

x. Describe the characteristics (morphology, cultural characteristics, resistance, virulence factors, incubation period, mode of transmission etc.) of different microorganisms.

xi. Explain the various defense mechanisms of the host against the microorganisms which can cause human infection.

xii. Describe the laboratory diagnosis of microorganisms causing human infections and disease.

xiii. Describe the prophylaxis for the particular infecting microorganisms.

xiv. Operate routine and sophisticated instruments in the laboratory.

xv. Demonstrate respect for patient samples, confidentiality pertaining to patient identity in laboratory results and effective communication skills in patient care.

PHARMACOLOGY

1. GOAL

The broad goal of the teaching of undergraduate students in Pharmacology is to inculcate a rational and scientific basis of therapeutics in a medical graduate.

2. OBJECTIVES

2.1 KNOWLEDGE

At the end of the course the student should be able to

i. Understand the general principles of drug action and handling of drugs by the body in all the individuals including children, elderly, lactating and pregnant women and those having a renal and/or hepatic disease and genetic variations.

ii. Prescribe drugs rationally by: a. Understanding the importance of both the non-drug and drug treatment b. Selection of drugs based on suitability, tolerability, efficacy and cost.

iii. Apply pharmacokinetic principles in clinical practice pertaining to the drugs used in commonly encountered conditions, National Health Programmes and emergency medical conditions.

iv. Foresee, prevent and manage adverse drug events and drug interactions.

v. Use antimicrobials judiciously for therapy and prophylaxis.

vi. Understand and implement the concepts of essential medicines, pharmacoeconomics and evidence-based medicine for improving the community health care.

vii. Describe the clinical presentation and management of common poisoning including bites and stings.

viii. Understand the basic concepts of new drug development with emphasis on design and conduct of clinical trials and interpretation of their results.

2.2 SKILLS

At the end of the course the student should be able to:

i. Write a correct, complete and legible prescription for common ailments including those in the National health Programmes and emergency medical conditions.

ii. Calculate the drug dosage using appropriate formulae for an individual patient.

iii. Administer the required dose of different drug formulations using appropriate devices and techniques (.e.g injections, inhalers, transdermal patches etc.).

iv. Advice and interpret the therapeutic monitoring reports of important drugs.

v. Identify, analyze and report adverse drug reactions to appropriate authorities.

vi. Retrieve drug information from appropriate sources including the electronic resources.

vii. Analyse critically drug promotional literature in terms of pharmacological actions of the ingredients, rational/irrational nature of the preparation, economics of the use and claims by the pharmaceutical companies.

viii. Interpret data from in-vitro and in-vivo experiments designed to study the effect of drugs in animals and human beings.

2.3 ATTITUDE AND COMMUNICATION SKILLS

At the end of the course, the learner shall be able to:

i. Communicate with the patient regarding optimal use of drug therapy, devices and storage of medicines.

ii. Follow the drug treatment guidelines laid down for common diseases including those covered under the national Health Programmes and emergency medical conditions and be capable of initiating and monitoring the treatment, recording progress and assessing the outcome.

iii. Motivate patients with chronic diseases to adhere to the line of management as outlined by the health care provider.

iv. Appreciate the relationship between cost of treatment and patient compliance.

v. Exercise caution in prescribing drugs likely to produce dependence and recommend the line of management.

vi. Understand the legal and ethical aspects of prescribing drugs.

vii. Evaluate the ethics, scientific procedures, social and legal implications involved in the development and introduction of new drugs.

2.4 INTEGRATION

From the integrated teaching of other basic sciences, student should be able to comprehend the regulation and integration of the functions of the organs and systems in the body and thus interpret the anatomical basis of disease process.

3. TEACHING HOURS AND COURSE CONTENT

Sl. No	Teaching Learning Method
1	Large group teaching
2	Small group teaching (SGT) Small group discussions- SGD with peer learning techniques like Jigsaw/Seminars/Case based learning sessions/Integrated/ AETCOM teaching sessions Practical sessions
3	Self-directed Learning (SDL)
	TOTAL HOURS AS PER LATEST NMC GUIDELINES

Course Contents

i. THEORY (Large and small group teaching)

Sl No.	GENERAL PHARMACOLOGY (with competency number)
1	Define & describe the principles of pharmacology & pharmacotherapeutics **PH 1.1** (Introduction, definition & sources of drugs)
2	Describe basis of TDM Evidence based medicine (EBM) & Therapeutic drug monitoring (TDM) including clinical trials-phases **PH 1.2, PH 10.10** Describe overview of drug development, phases of clinical trials and Good Clinical Practice **PH 1.2, PH 10.11, PH 10.12**
3	Enumerate & identify drug formulations & drug delivery systems **PH 1.4(SGT)** **(**Solid dosage forms, liquid dosage forms, parenteral dosage forms & drug delivery system)
4	Describe absorption, distribution, metabolism & excretion of drugs PH **1.6**
5	Describe general principles of mechanism of drug action PH **1.7** (Principles & mechanism of drug action, receptor pharmacology, DRC, combined effect of drugs, factors modifying drug action)
6	Describe principles of pharmacovigilance & ADR reporting. Define, identify & describe the management of ADR PH **1.12 & 1.11**
7	Identify & describe management of drug interactions **PH 1.13**
8	Describe nomenclature of drugs i.e., generic, branded drugs **PH 1.3**
9	Describe parts of correct complete legible prescription. Identify errors in prescription & correct appropriately **PH 10.4**
10	Describe various routes of drug administration **PH 1.5**

11	Calculate dosage of drugs using appropriate formulae for individual patients (children, elderly & patients with renal dysfunction) **PH 1.10, PH 10.9** **(**Creatinine clearance, dosage calculation in renal dysfunction and in special cases)

	DRUGS ACTING ON AUTONOMIC NERVOUS SYSTEM
1	Describe mechanism of action, types, doses, side effects, indications, contraindications of adrenergic & anti adrenergic drugs **PH 2.1** **(**Introduction to ANS, Adrenergic neurotransmission & its receptors, Adrenergic drugs, Adrenergic blockers - alpha blockers, beta blockers)
2	Describe mechanism of action, types, doses, side effects, indications, contraindications of cholinergic & anti cholinergic drugs **PH 2.2** **(**Cholinergic drugs & cholinomimetic alkaloids, anticholinesterase agents & treatment of organophosphorus compound poisoning, anti-cholinergic drugs)
3	Describe mechanism of action, types, doses, side effects, indications, contraindications of skeletal muscle relaxants **PH 2.4**
	DRUGS ACTING ON PERIPHERAL NERVOUS SYSTEM
1	Describe the mechanism/s of action, types, doses, side effects, indications & contraindications of local anesthetics. **PH 2.5**
	AUTOCOIDS AND RELATED DRUGS
1	Describe the mechanism/s of action, types, doses, side effects, indications & contraindications of drugs acting by modulating autocoids: (Prostaglandins, serotonin (5HT), histamine modulating drugs- antihistaminics, 5HT modulating drugs with drugs for migraine, ecosonoids, NSAIDS, drugs for gout, anti-rheumatic drugs **PH 2.6, PH 2.7, PH 2.8**
	DRUGS ACTING ON THE CENTRAL NERVOUS SYSTEM
1	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of general anaesthetics, and pre-anesthetic medication. **PH 3.1**

2	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs which act on CNS, (including anxiolytics, sedatives & hypnotics, anti-psychotic, anti-depressant drugs, anti-maniacs, opioid agonists and antagonists, drugs used for neurodegenerative disorders, anti-epileptics drugs) **PH 3.3, PH 3.4, PH3.5, PH 3.6**
3	Explain types, salient pharmacokinetics, pharmacodynamics, therapeutic uses, adverse drug reactions of drugs used for Parkinsonism and other neurodegenerative disorders. Write a prescription to manage a case of drug induced parkinsonism **PH 3.7**
4	Describe the effects of acute and chronic ethanol intake. **PH 3.8**
5	Describe the symptoms and management of methanol and ethanol poisonings **PH 3.8**
6	Describe drugs of abuse (dependence, addiction, stimulants, depressants, psychedelics, drugs used for criminal offences) **PH 3.9**
7	Describe the process and mechanism of drug de-addiction **PH 3.9** (pharmacotherapy for de-addiction)
	DRUGS ACTING ON THE CARDIOVASCULAR SYSTEM
1	Describe the mechanism of action, types, doses, side effects, indications and contraindications of the drugs affecting renal system including diuretics, antidiuretics –vasopressin and analogues **PH 4.5**.
2	Describe mechanisms of actions and contraindications of the drugs modulating the renin angiotensin and aldosterone system. **PH 4.6** (Classification, mechanism of action, indications, side effects, contraindication of Angiotensin converting enzyme inhibitors, angiotensin receptor blockers and direct renin inhibitors)
3	Describe the mechanism of action, types, doses, side effects, indications and contraindications of antihypertensive dugs and drugs used in shock**. PH 4.7**

4	Describe the mechanism of action, types, doses, side effects, indications and contraindications of drugs used in ischemic heart disease (stable, unstable angina and myocardial infarction), peripheral vascular disease (PVD) **PH 4.8** (Classification, mechanism of action, indications, side effects, contraindication of antianginal drugs and drugs for PVD).
5	Describe the mechanism of action, types, doses, side effects, indications and contraindications of drugs used in congestive heart failure **PH 4.9**
6	Describe the mechanism of action, types, doses, side effects, indications and contraindications of the antiarrhythmics **PH 4.10**
	DRUGS AFFECTING BLOOD AND BLOOD FORMATION
1	Describe the mechanism/s action, types, doses, side effects, indications & contraindications of drugs acting on blood, like anticoagulants, antiplatelets, fibrinolytics, plasma expanders **PH 4.1, PH 4.2, PH 4.3, PH 4.4** (Mechanism /s action, types, doses, side effects, indications & contraindications of Coagulants, anticoagulants, antiplatelets, fibrinolytics, plasma expanders, hypolipidaemic drugs)
2	Describe the mechanism/s action, types, doses, side effects, indications & contraindications of drugs used in dyslipidemias. **PH 4.11** (Mechanism/s action, types, doses, side effects, indications & contraindications of hypolipidaemic drugs)
3	Describe the mechanism/s action, types, doses, side effects, indications & contraindications of drugs haematological disorders like, drugs used in anemias and colony stimulating factors **PH 4.1**
	DRUGS ACTING ON THE RESPIRATORY SYSTEM
1	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of drugs used in bronchial asthma and Chronic obstructive pulmonary disease **PH 5.1**
2	Describe the mechanism of action, types, doses, side effects, indications and contraindications of the drugs used in cough (antitussives, expectorants/ mucolytics) **PH 5.2**

	DRUGS ACTING ON THE GASTROINTESTINAL SYSTEM
1.	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs used as below: 1. Acid-peptic disease and GERD 2. Antiemetics and prokinetics 3. Antidiarrhoeals, 4. Laxatives, 5. Inflammatory Bowel Disease, 6. Irritable Bowel Disorders, biliary and pancreatic diseases. **PH 6.1, PH 6.2, PH6.3, PH6.4, PH6.5**
	HORMONES AND RELATED DRUGS
1	Describe the mechanism of action, types, doses, side effects, indications and contraindications of drugs used in endocrine disorders (diabetes mellitus, thyroid disorders and osteoporosis) **PH 7.1, PH7.2, Ph 7.3** **(**Antidiabetic drugs (Insulin and its analogues, oral hypoglycaemic drugs and other newer anti-diabetic drugs, Thyroid and anti- thyroid drugs, drugs affecting calcium metabolism)
2	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used as sex hormones, their analogues and anterior Pituitary hormones **PH 7.4** **(**Introduction to anterior pituitary hormones, androgens and anabolic steroids. Estrogens and anti-estrogens, selective estrogen receptor modulators-SERMs)
3	Describe the mechanism of action, types, doses, side effects, indications and contraindications of corticosteroids **PH7.5**
4	Describe mechanism of action, types, doses, side effects, indications and contraindications the drugs used for contraception **PH7.7**
5	Describe mechanism of action, types, doses, side effects, indications and contraindications of 1. Drugs used in the treatment of infertility and 2. Drugs used in erectile dysfunction 3. Androgens **PH7.6, PH7.9** **Core:** Drugs for ovulation induction including menotropins and erectile dysfunction
6	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of uterine relaxants and stimulants. **PH7.8**

	CHEMOTHERAPY
1.	Describe general principles of chemotherapy: **PH 8.1, PH8.3** **(Anti-microbial agents-**Different basis of classifying, problems with use, drug of choice, combined use of agents, prophylactic use and their failure in therapy. Classification, mechanism of action, pharmacokinetics, interactions, therapeutic and prophylactic uses & adverse effects of i) Broad spectrum antibiotics ii) Beta lactum antibiotics
2	Describe and discuss the rational use of antimicrobials including antibiotic stewardship program: **PH 8.2** (Describe rational use of anti-microbial agents)
3	Describe the first line antitubercular dugs, their mechanisms of action, side effects and doses:**PH 8.5** **Core: (**Classification, mechanism of action, pharmacokinetics, adverse effects and uses of anti TB Drugs. DOTS / short course chemotherapy in treatment of tuberculosis including those of second line drugs. Classification, mechanism of action, pharmacokinetics, interactions, uses & adverse effects, contraindications of macrolides and aminoglycosides)
4	Describe the drugs used in MDR and XDR tuberculosis: **PH 8.5**
5	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of antileprotic drugs: **PH 8.6** **(**Classification, mechanism of action, pharmacokinetics, interactions, uses & adverse effects, multi drug therapy and drugs used in treatment of Leprosy and Lepra reaction)
6	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in malaria, KALA-AZAR, amebiasis and intestinal helminthiasis: **PH 8.7, PH 8.9** **(**Classification, mechanism of action, pharmacokinetics, interactions, uses & adverse effects, contraindications of antimalarial, antiamoebic drugs, drugs used in Kalazar & intestinal helminthiasis)
7.	Explain the types, kinetics, dynamics, adverse effects of drugs used for fungal infections

	PH 8.8
8	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in UTI/ STD and viral diseases including HIV: **PH 8.4 PH 8.10** **(**Classification, mechanism of action, pharmacokinetics, interactions, uses & adverse effects, contraindications of anti-retroviral drugs, HIV treatment guidelines including preferred & alternate anti-HIV regimen, Post exposure prophylaxis of HIV infection and non-retroviral drugs) **(Urinary tract infection (UTI):** Classification, mechanism of action, pharmacokinetics, interactions, uses & adverse effects, contraindications of drugs used in treatment of UTI. Classification mechanism of action and resistance, pharmacokinetics, interactions, uses & adverse effects of cotrimoxazole, sulphonamides, list the rational fixed dose combinations of sulfonamides Classification, mechanism of action and resistance, pharmacokinetics, interactions, uses & adverse effects of fluroquinolones and drugs for influenza and STD)
9	Describe mechanism of action, classes, side effects, indications & contraindications of anticancer drugs **PH 8.11**
	MISCELLANEOUS
1	Describe the Mechanism action, types, doses, side effects, indications & contraindications of immunomodulators& organ transplant rejection **PH 9.1**
2	Describe occupational & environmental pesticides, food adulterants, pollutants & insect repellents **PH 9.2**
3	Describe management of common poisoning, insecticides, common sting & bites **PH9.2**
4	Describe Heavy metal poisoning & Chelating agents **PH 9.3**
5	Describe vaccines & their uses **PH9.4**
6	Describe & discuss the following National Health Programmes including Immunisation, Tuberculosis, Leprosy, Malaria, HIV, Kala Azar, Diarrhoeal diseases, Anaemia & Nutritional disorders, Blindness, Non-communicable diseases, Cancer & Iodine deficiency **PH 9.4**

7	Describe basic aspects of Geriatric & Paediatric pharmacology **PH 1.10**
8	Drugs used in Skin disorders **PH 9.6**
9	Drugs used in Ocular disorders **PH 9.7**
10	Describe & discuss Pharmacogenomics & Pharmacoeconomics **PH 10.7**
11	Describe and discuss antiseptics and disinfectants **PH 9.5**
12	Describe Drug Regulations, acts and other legal aspects **PH 10.11**

ii. PRACTICAL PHARMACOLOGY

	CLINICAL PHARMACY
1	Demonstrate understanding of the use of various dosage forms (oral/local/parenteral; solid/liquid) **PH 1.4**
2	Prepare oral rehydration solution from ORS packet and explain its use **PH 1.4**
3	Demonstrate the appropriate setting up of an intravenous drip in a simulated environment **PH 1.5**
4	Demonstrate the correct method of calculation of drug dosage in patients including those used in special situations **PH 10.9**

	CLINICAL PHARMACOLOGY
5	Write a rational, correct and legible generic prescription for a given condition and communicate the same to the patient **PH 10.4**
6	Perform and interpret a critical appraisal (audit) of a given prescription **PH 10.6**
7	Perform a critical evaluation of the drug promotional literature **PH 10.2**
8	To recognize and report an adverse drug reaction **PH 1.11, PH 1.12**
9	To prepare and explain a list of P-drugs for a given case/condition **PH 10.3**
10	Demonstrate how to optimize interaction with pharmaceutical representative to get authentic information on drugs **PH 10.13**
11	Prepare a list of essential medicines for a healthcare facility **PH 10.8**
12	Communicate effectively with a patient on the proper use of prescribed medication **PH 10.14**
	EXPERIMENTAL PHARMACOLOGY
13	Administer drugs through various routes in a simulated environment using mannequins **PH 1.5**
14	Demonstrate the effects of drugs on blood pressure (vasopressor and vaso-depressors with appropriate blockers) using computer aided learning **PH1.8**
	COMMUNICATION SKILLS IN PHARMACOLOGY
15	Communicate with the patient with empathy and ethics on all aspects of drug use **PH 10.14**
16	Communicate with the patient regarding optimal use of a) drug therapy, b) devices and c) storage of medicines **PH 10.14**
17	Motivate patients with chronic diseases to adhere to the prescribed management by the health care provider **PH 10.15**

18	Explain to the patient the relationship between cost of treatment and patient compliance **PH 10.15**
19	Demonstrate an understanding of the caution in prescribing drugs likely to produce dependence and recommend the line of management **PH 10.16**
20	Demonstrate ability to educate public & patients about various aspects of drug use including drug dependence and OTC drugs **PH 10.17**
21	Demonstrate an understanding of the legal and ethical aspects of prescribing drugs **PH 10.5**

ASSESMENT METHODS <u>(FORMATIVE AND SUMMATIVE)</u>

- *Written (MCQ's/Structured Long Essay Questions/Short essay questions/Short Answer questions/Scenario Based Questions/AETCOM Competencies).*
- *Viva-Voce*

CERTIFICATION OF SKILLS:

Comp. Nos.	Competency description	No. required to certify P
PH 1.4	Identify the common drug formulations and drug delivery systems, demonstrate their use and describe their advantages and disadvantages.	1
PH 1.5	Describe various routes of drug administration, their advantages and disadvantages and demonstrate administration of, e.g., SC, IV, IM, SL, rectal, spinal, sublingual, intranasal sprays and inhalers.	2
PH 1.12	Define Pharmacovigilance its principles and demonstrate ADR reporting	2
PH 1.13	Identify and describe the management of drug interactions	1
PH 10.1	Compare and contrast different sources of drug information and update on latest information on drugs	2
PH 10.2	Perform a critical evaluation of the drug promotional literature and interpret the package insert information contained in the drug package	1
PH 10.3	To prepare and explain a list of P-drugs for a given case/condition	2
PH 10.4	Describe parts of a correct, rational and legible prescription and write rational prescriptions for the provided condition. (examples of conditions to be used are given with other relevant competencies)	5
PH 10.9	Calculate the dosage of drugs for an individual patient, including children, elderly, pregnant and lactating women and patients with renal or hepatic dysfunction.	1
PH 10.13	Demonstrate how to optimize interaction with pharmaceutical representative/media to get/disseminate authentic information on drugs	2
PH 10.15	Describe methods to improve adherence to treatment and motivate patients with chronic diseases to adhere to the prescribed pharmacotherapy	2
Total	**Total number of competencies to be certified - 11**	

4. SCHEME OF EXAMINATION:

A. FORMATIVE ASSESSMENT:

THEORY INTERNAL ASSESSMENT:

- A minimum of **THREE** Internal Assessments (IAs) to be conducted
- Formative assessment marks shall be calculated based on scoring in part continuous assessment tests/ small group teaching participation/ seminars/ assignments and log book assessment of SDL topics and AETCOM modules.

PRACTICAL INTERNAL ASSESSMENT:

- A minimum of **THREE** Practical Internal Assessments (IAs) to be conducted
- Viva/oral examination should assess approach to clinical context in the concepts of basic sciences and included in practical IA marks.

3rd Internal assessment must be conducted similar to the university examination pattern.

The distribution of internal assessment marks shall be as mentioned below:

Theory IA	Maximum Marks	Practical IA	Maximum Marks
Theory written paper/s AETCOM modules (one question in the theory paper)	70	Practical exam and Practical Viva Voce	70
Formative assessment from Continuous Class test (LMS)/ SDL/ Seminar	30	Formative assessment from record book and log book evaluation	30
TOTAL	**100**		**100**

FINAL INTERNAL ASSESSMENT MARKS

Final IA marks will be calculated as average of all three IAs Level of participation in small group teaching, SDL and AETCOM modules shall be assessed using the format given in the log book.

B. SUMMATIVE ASSESSMENT:

MARKS DISTRBUTION FOR UNIVERSITY SUMMATIVE EXAMINATION

THEORY			THEORY TOTAL	PRACTICAL		PRACTICAL TOTAL
	Written paper	MCQ's		Summative exam	Viva	
PAPER I	80	20	**200**	80	20	**100**
PAPER II	80	20				

THEORY SUMMATIVE EXAMINATION:

Written paper: Paper-1: 100 marks + Paper 2: 100 marks = 200 marks
Time: 3 hours for each paper

The pattern of questions in each paper shall be as mentioned below: (to be given by COE Office)

Types of Questions	Number of Questions	Marks per Question	Total Marks
Scenario based Multiple-choice questions (MCQ's)	10	02	20
Structured Long essay question (SLEQ)	01	10	10
Short notes – Applied / Integration modules	04	05	20
Short notes – Recall/ Comprehension	06	05	30
Short notes – AETCOM	01	05	05
Short Answers – Reasoning types	05	03	15
Total Marks			**100**

The question papers shall be based on the blue print of question paper setting.

- Total marks under each type of question from each topic needs to be entered by QP Setter.
- It should be in accordance with Shri Dharmasthala Manjunatheshwara University guidelines.

Blueprint for the theory examinations (For use by the question paper setter)

PAPER 1 TOPICS	Total max marks as per SDMU guidelines	MCQs 2 mark each	SLEQs 10 marks each	SEQs 5 marks each	SEQ Case vignette based 5 marks each	SAQs 3 marks each	Total Marks*
General pharmacology including clinical pharmacology	12						
Drugs acting on ANS	13						
Drugs acting on PNS (LA & Skeletal muscle relaxants)	10						
Drugs acting on CNS	25						
Diuretics, antidiuretics	05						
Drugs acting on CVS	20						
Drugs affecting blood & blood formation	10						
AETCOM (1 SEQ)	05						
TOTAL	100						

PAPER 2 TOPICS	Total max marks as per SDMU guidelines	MCQs 2 mark each	SLEQs 10 marks each	SEQs 5 marks each	SEQ Case vignette based 5 marks each	SAQs 3 marks each	Total Marks*
Chemotherapy including antineoplastic agents	35						
Hormones & related drugs	20						
Drugs acting on GIT	10						
Autacoids and related drugs	12						
Drugs acting on Respiratory System	08						
Miscellaneous (immuno-pharmacology, chelating agents, vitamins, enzymes, antiseptic & disinfectants, drugs acting on skin and mucus membrane)	10						
AETCOM (1 SEQ)	05						
TOTAL	**100**						

*Total marks include MCQs.

The weightage of marks allotted for each topic shall be strictly adhered to while setting a question paper. A MINIMUM OF 10% and up to a MAXIMUM OF 30% marks shall be allocated to assess the higher order thinking of the learner.

The questions framed shall be with appropriate verbs without any ambiguity or overlap.

Chapter wise distribution of marks in Pharmacology paper 1 and 2 for University Exam

PAPER - 1		PAPER - 2	
Topics	**Marks**	**Topics**	**Marks**
General pharmacology including clinical pharmacology	12	Chemotherapy including antineoplastic agents	35
Drugs acting on ANS & PNS (LA & Skeletal muscle relaxants)	23	Hormones & related drugs	20
Drugs acting on CNS	25	Drugs acting on GIT	10
Diuretics, antidiuretics & Drugs acting on CVS	25	Autacoids and related drugs & Drugs acting on Respiratory System	20
Drugs affecting blood & blood formation	10	Miscellaneous (immunopharmacology, chelating agents, vitamins, enzymes, antiseptic & disinfectants, drugs acting on skin and mucus membrane)	10
AETCOM	05	AETCOM	05
	100	**Total**	**100**

Chapter wise distribution of type of Questions and Marks will be as below:

Paper – 1

General pharmacology, Drugs acting on ANS, Drugs acting on CNS, Drugs acting on CVS, Drugs affecting blood & blood formation
General pharmacology including clinical pharmacology, Drugs acting on ANS & PNS (LA & Skeletal muscle relaxants), Drugs acting on CNS, Diuretics, antidiuretics & Drugs acting on CVS, Drugs affecting blood & blood formation
General pharmacology including clinical pharmacology, Drugs acting on ANS & PNS(LA & Skeletal muscle relaxants), Drugs acting on CNS, Diuretics, antidiuretics & Drugs acting on CVS , Drugs affecting blood & blood formation

Paper – 2

Chemotherapy including antineoplastic agents, Hormones & related drugs, Drugs acting on GIT, Autacoids and related drugs
Chemotherapy including antineoplastic agents, Hormones & related drugs, Drugs acting on GIT, Autacoids and related drugs & Drugs acting on Respiratory System, Miscellaneous (immunopharmacology, chelating agents, vitamins, enzymes, antiseptic & disinfectants, drugs acting on skin and mucus membrane)
Chemotherapy including antineoplastic agents, Hormones & related drugs, Drugs acting on GIT, Autacoids and related drugs & Drugs acting on Respiratory System, Miscellaneous (immunopharmacology, chelating agents, vitamins, enzymes, antiseptic & disinfectants, drugs acting on skin and mucus membrane)

Note- *The topics assigned to the different papers are generally evaluated under those sections. However, a strict division of the subject may not be possible and some overlapping of topics is inevitable. Students should be prepared to answer overlapping topics.*

PRACTICAL SUMMATIVE EXAMINTION: TOTAL 100 MARKS
PRACTICAL EXERCISES: 80 MARKS

1. **Ex-1:** dosage forms PH 1.4 and routes of drug administration PH 1.5 including PH 10.9 prescription writing and audit /CCR PH 10.4, 10.6
2. **Ex-2:** (including P drugs 10.3 and communication skills PH 10.14
3. **Ex-3:** drug dose calculation PH 1.4, 10.9 and ADR reporting PH 1.11, 1.12
4. **Ex-4:** Computer assisted learning PH 1.8 and critical evaluation of drug promotional literature PH 10.2

PRACTICAL VIVA VOCE: 20 MARKS

5. <u>SELF DIRECTED LEARNING (SDL)</u>

Topics as given by NMC should be entered in the log book as per the format mentioned in the log book.

6. INTEGRATION: May be conducted in the form of sharing/ nesting/correlation using CBL/PBL/ Case study approach and involving various departments concerned while preparing the specific learning objectives of the integration topics.

Competency list for DOAP / Skill lab topics		
Sl No.	**Comp No.**	**COMPETENCY** **The student should be able to**
1	**PH 1.4**	Identify the common drug formulations and drug delivery systems, demonstrate their use and describe their advantages and disadvantages.
2	**PH 1.5**	Describe various routes of drug administration, their advantages and disadvantages and demonstrate administration of, e.g., SC, IV, IM, SL, rectal, spinal, sublingual, intranasal sprays and inhalers
3	**PH 1.6**	Describe salient features of absorption, distribution, metabolism and excretion of drugs with emphasis on various routes of drug administration
4	**PH 1.12**	Define Pharmacovigilance its principles and demonstrate ADR Reporting
5	**PH 2.2**	Describe types, salient pharmacokinetics, pharmacodynamics, therapeutic uses, adverse drug reactions of cholinergic and anticholinergic drugs and demonstrate OPC poisoning management
6	**PH 2.3**	Explain the rationale and demonstrate the emergency use of various sympathetic and parasympathetic drug

		agonists/antagonists (like Noradrenaline/ Adrenaline / Dopamine /Dobutamine, Atropine) in case-based scenarios
7	**PH 2.5**	Explain types, salient pharmacokinetics, pharmacodynamics, therapeutic uses, adverse drug reactions of local anaesthetics (LA) & demonstrate various methods of administration of LA
8	**PH 3.9**	Describe the drugs that are abused and cause addiction (dependence, addiction, stimulants, depressants, psychedelics, drugs used for criminal offences). Explain the process and steps for management of drug de addiction
9	**PH 4.7**	Explain types, salient pharmacokinetics, pharmacodynamics, therapeutic uses, adverse drug reactions of drugs used for the management of hypertension Devise plan for pharmacologic management of hypertension with Diabetes, Pregnancy induced hypertension and hypertensive emergency and urgency
10	**PH 4.8**	Describe types, salient pharmacokinetics, pharmacodynamics, therapeutic uses, adverse drug reactions of drugs used for the management of ischemic heart disease (stable, unstable angina and myocardial infarction), peripheral vascular disease and devise management plan for a patient of acute myocardial Infarction
11	**PH 4.10**	Explain salient pharmacokinetics, pharmacodynamics, therapeutic uses, adverse drug reactions of drugs used for cardiac arrhythmias. Devise a plan to manage a patient with supraventricular, ventricular arrhythmias, cardiac arrest and fibrillations
12	**PH 9.2**	Describe management of common drug poisonings, insecticides, common stings and bites
13	**PH 10.4**	Describe parts of a correct, rational and legible prescription and write rational prescriptions for the provided condition. (Examples of conditions to be used are given with other relevant competencies)
14	**PH 10.8**	Describe Essential medicines, Fixed dose combination, Over the counter drugs and explain steps to choose essential medicines.

7. RECOMMENDED TEXT BOOKS, REFERENCE BOOKS AND ATLAS

Text Books: (*Note: A single textbook may not cover the entire curriculum. Referring to more than one book is recommended.)*

Recent editions of:

1. K.D. Tripathi, Essentials of Medical Pharmacology, M/s. Jaypee Brothers, Post Box, 7193, G-16, EMCA House, 23/23, Bansari Road, Daryaganj New Delhi.
2. RS Satoskar, Nirmala Rege, SD Bhandarkar. Pharmacology and pharmacotherapeutics, M/S. Popular Prakashan, Elsevier India.
3. Bertram Katzung. Basic and Clinical Pharmacology, Lange Medical Books, McGraw Hill Medical Publishing Division.
4. Bennett PN, Brown MJ, Sharma P. Clinical pharmacology. Edinburgh: Churchill Livingstone
5. Whalen K. Lippincott Illustrated Reviews: Pharmacology. New Delhi: Wolters Kluwer (India)
6. Mukta N. Chowta, Ashok Shenoy, Ashwin Kamath. Manual of Practical Pharmacology For MBBS

Reference books:

1. Goodman & Gillman, The Pharmacological basis of Therapeutics, (International Edition), Toel G, Hardman Lee E. Limbir
2. Ritter JM, flower R, Hnderson G, Loke YK, MacEwan D, Robinson E, Fullerton J. Rang and Dale's Pharmacology. Elsevier Churchill Livingstone
3. Sharma kk and Sharma HL. Principles of Pharmacology, Paras Medical Publisher, Hyderabad India
4. Baryfield A, Cardart C (eds). Martindale: The complete drug reference. Pharmaceutical Press,London

PATHOLOGY

1. GOAL

The goal is to transform a MBBS student into an "Indian Medical Graduate" (IMG) possessing requisite knowledge, skills, attitudes, values and responsiveness, so that she or he may function appropriately and effectively as a Physician of first contact of the community while being globally relevant.

In the field of Pathology, it is to provide the student

1) A comprehensive knowledge of the causes and mechanisms of disease, in order to enable her/him to achieve complete understanding of the natural history and clinical manifestations of disease.
2) To develop skills in doing basic investigations and to understand the rational basis of the investigations, making conclusions on evidences
3) To comprehend the physiological variations, to update disease classifications & advances and to introduce to research
4) Insights into ethical issues

2. OBJECTIVES

At the end of the 1-year course in Pathology the student must be able to explain the pathologic basis for the diseases; various fields in Pathology; anatomic, histologic, physiologic alterations of cells, body fluids, organs, systems and relations between them; issues in transfusion and transplantations; to implement the knowledge of Pathology in medical practice and preventive medicine.

Based on the hands-on training provided during the course on handling the samples and specimens and performing the tests, exposure to scenarios, skill assessment and competencies the student must be able to evaluate patient's condition, enlist & perform appropriate investigations, interpret & make conclusions on investigation results.

2.1 KNOWLEDGE

At the end of the course, the student should be able to:

i. Describe the structure and ultrastructure of an injured cell, mechanisms of cell injury, cell death and repair and to correlate structural and functional alterations.

ii. Explain the pathophysiological processes which govern the maintenance of homeostasis, mechanisms of their disturbance and the morphological and clinical manifestations associated with it.

iii. Describe the mechanisms and patterns of tissue response to injury in order to appreciate the pathophysiology of disease processes and their clinical manifestations.

iv. Correlate normal and altered morphology (gross and microscopic) of different organ systems in common diseases to the extent needed for understanding of disease processes and their clinical significance.

2.2 SKILLS

At the end of the course, the student should be able to:

1. Describe the rationale and principles of the common diagnostic laboratory tests and interpretation of the results;
2. Perform the simple bed-side tests on blood, urine and other biological fluid samples;
3. Formulate a rational scheme of investigations aimed at diagnosing and managing common diseases;
4. Understand biochemical and physiological disturbances that occur as a result of disease with the background of knowledge acquired in preclinical subjects.

2.3 ATTITUDE AND COMMUNICATION SKILLS

During the course all possible attempts will be made to observe and improve students' attitude- to develop curiosity & interest, analytical thinking, attention to detail, professionalism, ethical approach, team spirit, adaptability, discipline, patient-centric outlook, lifelong learner mindset; and to improve communication skills- clarity of expression, active listening, questioning ability, presentation skills, medical terminology use, peer-to-peer communication, record keeping, case discussion participation, non-verbal communication, empathy and respect.

2.4 INTEGRATION

Vertical and horizontal integration of departments are arranged in the teaching schedule to provide deep and wide aspect of a specified topic in short period of time. Student will be able to comprehend different aspects (i.e. basics to management) of a disease by attending the integrated classes.

3 COURSE CONTENT

Sl. No	Teaching Learning Method
1	Large group teaching
2	Small group teaching (SGT) Small group discussions- SGD/Tutorials/Seminars/Case based learning sessions/Integrated/ AETCOM teaching sessions Practical sessions
3	Self-directed Learning (SDL)

3.1 THEORY AND PRACTICALS

Course contents for Teaching & Demonstration for Phase II Pathology Student

CORE TOPICS AND NON-CORE TOPICS (*)
(DOAP- Demonstration -Observation - Assistance – Performance, OSPE- Objective Structured Practical Examination)

Topic (No. of Core topics)	Lecture Topics for Written test/Viva voce	DOAP & Skill Assessment	OSPE+ (No. of Certifications)
1. Introduction to Pathology (3)	PA1.1 Role of Pathologist in diagnosis and management of disease PA1.2 Common definitions and terms used in Pathology PA1.3 Describe proliferation and cell cycle and concept of regenerative medicine along with role of stem cells.		
2. Cell Injury and Adaptation (7)	PA2.1 Causes, mechanisms, types and clinical effects of cell injury PA2.2 Morphology of cell injury PA2.3 Cellular accumulations PA2.4 Cell death-necrosis, apoptosis PA2.5 Gangrene, calcification PA2.6 Cellular adaptations PA2.7 Mechanisms of cellular aging and apoptosis*	PA2.8 Cell injury morphology	
3. Inflammation (4)	PA3.1 Vascular, cellular events PA3.2 Chemical mediators PA3.3 Chronic, specific inflammation	PA3.4 Acute & chronic inflammation	
4. Healing & repair (1)	PA4.1 Process of regeneration and repair of wounds, fracture healing		
5. Hemodynamic disorders (6)	PA5.1 Edema PA5.2 Hyperemia, congestion, hemorrhage PA5.3 Shock PA5.4 Thrombosis PA5.5 Embolism, Infarction	PA5.6 Infarction	

6. Neoplastic disorders (6)	PA6.1 Nomenclature, difference between benign & malignant neoplasm PA6.2 Molecular basis PA6.3 Carcinogens PA6.4 Clinical features, Paraneoplastic syndromes PA6.5 Laboratory diagnosis of cancer PA6.6 Immune response to cancer*	PA6.7 Benign and malignant neoplasms	
7. Basic diagnostic cytology (1)	PA7.1 Cytology & its applications		
8. Immunopathology and AIDS (6)	PA8.1 Normal immunity PA8.2 Hypersensitivity PA8.3 HLA & organ transplantation PA8.4 Autoimmunity PA8.5 Systemic lupus erythematosus PA8.6 Human immunodeficiency virus infection & acquired immunodeficiency syndrome		
9. Amyloidosis (1)	PA9.1 Amyloidosis*	PA9.2 Amyloidosis	
10. Infections and Infestations (4)	PA10.1 Malaria PA10.2 Cysticercosis PA10.3 Leprosy PA10.4 Pathogenesis and pathology of common bacterial, viral, protozoal and helminthic diseases* PA10.5 Pathogenesis, pathology, laboratory findings in COVID		

11. Genetic & pediatric diseases (0)	PA11.1 Down syndrome, Turner syndrome, Klinefelter syndrome* PA11.2 Childhood tumors* PA11.3 Common storage disorders*		
12. Environmental and nutritional diseases (3)	PA12.1 Pathogenesis of disorders caused by air pollution, tobacco, alcohol and noise PA12.2 PEM, vitamin deficiency & starvation PA12.3 Obesity & metabolic syndrome		
13. Introduction to hematology (4)	PA13.1 Hematopoiesis & EMH PA13.2 Anemia classification & investigations in anemia	PA13.2 Anticoagulants PA13.3 Collection of specimens and identify coagulants and anticoagulant bulbs, instruments PA13.4 Hb, RBC count, WBC count and DLC	PA13.4 Hb, RBC count, WBC count and DLC OSPE+ (4)
14. Microcytic anemia (2)	PA14.1 Iron metabolism, microcytic hypochromic anemia & differentials	PA14.3 Microcytic anemia	PA14.3 Microcytic anemia OSPE+ (1)

15. Macrocytic anemia (3)	PA15.1 Metabolism of Vitamin B12 and the etiology and pathogenesis of B12 deficiency and describe laboratory investigations of macrocytic anemia PA15.2 Differences and describe the etiology, laboratory features of megaloblastic anemia and distinguishing features of megaloblastic and non-megaloblastic macrocytic anemia	PA15.3 Macrocytic anemia	PA15.3 Macrocytic anemia OSPE+ (1)
16. Hemolytic anemia (3)	PA16.1 hemolytic anemia classification, pathogenesis, clinical features, indices PA16.2 Sickle cell anemia & thalassemia PA16.3 Acquired hemolytic anemia and different hemolytic anemias		PA16.2 Sickle cell anemia & thalassemia (1)
17. Aplastic anemia (0)	PA 17.1 Aplastic anemia*	PA 17.1 Enumerate the indications and describe the findings in bone marrow aspiration and biopsy*	
18. Leukocyte disorders (2)	PA18.1 Leukocyte counts & leukemoid reaction PA18.2 Leukemias		
19. Lymph node and spleen (6)	PA19.1 Lymphadenopathy PA 19.2 Tubercular lymphadenitis PA19.4 Splenomegaly	PA19.3 Hodgkin disease vs non-Hodgkin lymphoma PA 19.5 TB LN PA19.6 HD	

20. Hemorrhagic disorders (3)	PA21.1 Primary & secondary hemostasis PA20.1 Approach to bleeding disorders, disseminated intravascular coagulation & Vitamin K deficiency PA 20.3 Myeloma		
21. Blood banking and transfusion (6)	PA21.1 Blood group systems PA21.2 Blood components PA21.3 Transfusion transmitted infections PA21.4 Transfusion reaction and its investigation PA21.5 Autologous transfusion	PA21.6 Blood grouping and cross matching	PA21.6 Blood grouping and cross matching OSPE+ (1)
22. Clinical Pathology (5)		PA22.1 Urinalysis PA23.2 Body fluid analysis PA22.3 Semen analysis, Thyroid function tests PA22.4 Liver function tests PA22.5 Renal function tests	PA22.4 LFT (4) PA22.5 RFT (4)
23. GIT (8)	PA23.1 Oral cancer 23.2 Carcinoma esophagus PA23.3 Peptic ulcer disease PA23.4 Carcinoma stomach PA23.5 Tuberculosis of intestine PA23.6 Inflammatory bowel disease PA23.7 Malabsorption* PA23.8 Carcinoma colon	PA23.5 Appendicitis PA23.9 GI ulcers & tumors	

24. Hepatobiliary system (09)	PA24.1 Approach to jaundice PA24.2 Hepatic failure PA24.3 Viral & toxic hepatitis PA24.4 Alcoholic liver disease PA24.5 Cirrhosis & its complications PA24.7 Hepatocellular carcinoma PA24.8 Cholecystitis & Cholelithiasis	PA24.6 Interpret liver function and viral hepatitis serology panel PA24.9 Liver disease and tumors	PA24.6 Interpret liver function and viral hepatitis serology panel (1)
25. Respiratory system (7)	PA25. Pneumonia PA25.2 Lung abscess PA25.3 Chronic obstructive pulmonary diseases-Bronchiectasis PA25.4 Tuberculosis PA25.5 Pneumoconiosis PA25.6 Tumors of lung & pleura	PA25.7 Lung tumors	
26. Cardiovascular system (8)	PA26.1 Atherosclerosis PA26.2 Aneurysms PA26.3 Heart failure PA26.4 Congenital heart disease PA26.5 Rheumatic heart disease PA26.6 Ischemic heart disease PA26.7 Infective endocarditis PA26.9 Cardiomyopathies* PA26.10 CVS tumors*	PA 26.8 Pericarditis & pericardial effusion	
27. Urinary Tract (14)	PA27.1 Histology of kidney PA27.2 Renal failure PA27.3 Acute renal failure PA27.4 Chronic renal failure PA27.5 Glomerulonephritis PA27.6 IgA nephropathy	PA27.17 Kidney diseases and kidney tumors	

	PA27.7 Glomerular manifestations of systemic disease PA27.8 Tubulo-interstitial nephritis PA27.9 Acute tubular necrosis PA27.10 Pyelonephritis and reflux nephropathy PA27.11 Vascular diseases of kidney PA27.12 Cystic diseases of kidney PA27.13 Renal stone & obstructive uropathy PA27.14 Renal tumors* PA 27.15 Thrombotic angiopathies* PA27.16 Urothelial tumors*		
28. Male Genital Tract (5)	PA28.1 Testicular tumors PA28.2 Carcinoma penis PA28.3 BPH PA28.4 Carcinoma prostate PA28.5 Prostatitis*	PA28.6 Tumors of MGT	
29. Female Genital Tract (6)	PA29.1 Carcinoma cervix PA29.2 Carcinoma endometrium PA29.3 Leiomyoma, leiomyosarcoma PA29.4 Ovarian tumors PA29.5 Gestational trophoblastic tumors PA29.6 Cervicitis* PA29.7 Endometriosis* P A29.8 Adenomyosis* PA29.9 Endometrial hyperplasia*	PA29.10 Tumors of FGT	

30. Breast (3)	PA30.1 Benign breast lesions PA30.2 Carcinoma breast PA30.4 Gynecomastia*	PA30.3 Phyllodes tumor* PA30.5 Tumors of Breast	
31. Endocrine system (5)	PA31.1 Iodine dependent thyroid swelling PA31.2 Thyrotoxicosis PA31.3 Thyrotoxicosis & hypothyroidism PA31.4 Thyroid neoplasms PA31.5 Diabetes mellitus* PA31.6 Hyperparathyroidism* PA31.7 Carcinoma pancreas PA31.8 Adrenal insufficiency* PA32.9 Cushing syndrome*	PA32.10 Adrenal neoplasms	
32. Bone and soft tissue (4)	PA32.1 Osteomyelitis PA32.2 Bone tumors PA32.3 Soft tissue tumors PA32.4 Paget's disease* PA32.5 Rheumatoid arthritis* PA 32.6 Osteoarthritis, Gout*	PA32.7 Bone tumors	
33. Skin (2)	PA33.1 Squamous cell carcinoma PA33.2 Basal cell carcinoma PA33.3 Melanoma*	PA33.4 (VI with Dermatology) SCC, BCC, Melanoma*	
34. Central nervous system (3)	PA34.1 Cerebrospinal fluid analysis & Meningitis PA34.2 CNS tumors	PA34.3 CSF in meningitis	PA34.3 CSF in meningitis (1)
35. Eye (0)	PA36.1(VI with Ophthalmology) Retinoblastoma*		

AETCOM (Attitude, Ethics and Communication skill) modules in Pathology

AETCOM Module	
Module 2.4	Working in a health care team
Module 2.7	Bioethics continued: Case studies on autonomy and decision making

NOTE: Teaching hours assigned to different topics will be as per the latest NMC guidelines for that batch.

ASSESSMENT METHODS (FORMATIVE AND SUMMATIVE)

- Written (MCQ's/Structured Long Essay Questions/Short essay questions/Short Answer questions/Clinical vignette Based Questions).
- Viva-Voce, Practical tests (demonstration of skill, identification, performing appropriate tests for given case, Objective Structured Practical Examination (OSPE)

4. CERTIFICATION OF SKILLS

To be evaluated using format provided in the Logbook. Checklist can be prepared by subject experts.

Sl no	Competency number	Competency Description	No required to certify
1	PA13.4	Perform common haematological tests-Hb, RBC count, WBC count & DLC	4
2	PA14.2	Identify and describe the peripheral smear in microcytic Anemia	1
3	PA15.3	Identify and describe the peripheral blood picture of macrocytic Anemia	1
4	PA16.2	Describe the pathogenesis, features, hematologic indices and peripheral blood picture of sickle cell anemia and thalassemia	1
5	PA21.6	Describe the correct technique to perform blood grouping, cross match	1

6	PA 22.4	Describe and interpret the abnormalities in a panel containing liver function tests	4
7	PA 22.5	Describe and interpret the abnormalities in a panel containing, renal function tests	4
8	PA24.6	Interpret liver function and viral hepatitis serology panel. Distinguish obstructive from non-obstructive jaundice based on clinical features and liver function tests	1
9	PA34.3	Identify the etiology of meningitis based on given CSF parameters	1

5. SCHEME OF EXAMINATION:

A. FORMATIVE ASSESSMENT:

THEORY INTERNAL ASSESSMENT:

- A minimum of THREE Internal Assessments (IAs) to be conducted
- Formative assessment marks shall be calculated based on scoring in written tests/ small group teaching participation/ seminars/ assignments and log book assessment of SDL topics and AETCOM modules.

PRACTICAL INTERNAL ASSESSMENT

- A minimum of THREE Practical Internal Assessments (IAs) to be conducted
- Viva/oral examination should assess approach to clinical context in the concepts of basic sciences and included in practical IA marks.
- 3rd Internal assessment must be conducted similar to the university examination pattern.

The distribution of internal assessment marks shall be as mentioned below:

Theory IA	**Maximum Marks**	**Practical IA**	**Maximum Marks**
Theory written paper	70	Practical exam	70
Formative assessment from Continuous class test(LMS)/SDL/ Seminar	30	Formative assessment from Record book/Log book	30
TOTAL	**100**		**100**

FINAL INTERNAL ASSESSMENT MARKS

Final IA marks will be calculated as follows:

Final IA marks out of 100 = Average of all three IAs.
Level of participation in small group teaching, SDL and AETCOM modules shall be assessed using the format given in the log book.

B. SUMMATIVE ASSESSMENT:

Eligibility criteria:

- Learners must secure at least 50% marks of total marks (combined in theory and practical; not less than 40% marks in theory and practical separately) assigned for internal assessment in pathology in order to be eligible for appearing at the final University examination.
- Student should secure a minimum of 75% attendance in Theory and 80 % in Practical classes to be eligible to appear for university examination.
- Learners must have completed the required certifiable competencies for that phase of training and completed the log book appropriate for that phase of training to be eligible for appearing at the final university examination of that subject.

Pass criteria:
Criteria for passing in a subject: A candidate shall obtain a cumulative 50% marks in university conducted examination including theory and practical and not less than 40% separately in Theory and in Practical in order to be declared as passed in that

subject. In subjects that have two papers, the learner must secure a minimum 40% marks in aggregate (both theory papers together).

C. MARKS DISTRIBUTION FOR UNIVERSITY SUMMATIVE EXAMINATION
THEORY SUMMATIVE EXAMINATION:

Time: 3 hours for each paper

Subject	Theory	Practical
Pathology	Paper I- 100 marks	100 marks
	Paper 2 -100 marks	

The pattern of questions in each paper shall be as mentioned below:

Types of Question	Number of Questions	Marks per Question	Total Marks
Scenario based Multiple-choice questions (MCQ's)	10	02	20
Structured Long essay question (SLEQ)	01	10	10
Short notes – Applied / Integration modules	04	05	20
Short notes – Recall/ Comprehension	06	05	30
Short notes – AETCOM	01	05	05
Short Answers – Reasoning types	05	03	15
Total Marks			100

Total marks under each type of question from each topic needs to be entered by QP Setter.

- The question papers shall be based on the blue print of question paper setting.
- It should be in accordance with Shri Dharmasthala Manjunatheshwara University guidelines.

BLUE PRINT FOR THEORY EXAMINATION

S no	Topic	Min. marks	Max. marks	Type of questions
GENERAL PATHOLOGY				
1.	Introduction to Pathology	0	3	SA, MCQ
2.	Cell Injury and Adaptation	2	15	LE, SE, SA, MCQ
3.	Inflammation	2	15	LE, SE, SA, MCQ
4.	Healing and repair	0	10	LE, SE, SA, MCQ
5.	Hemodynamic disorders	2	15	LE, SE, SA, MCQ
6.	Neoplastic disorders	2	15	LE, SE, SA, MCQ
7.	Basic diagnostic cytology	0	5	SE, SA, MCQ
8.	Immunopathology and AIDS	2	10	SE, SA, MCQ
9.	Amyloidosis	0	5	SE, SA, MCQ
10.	Infections and Infestations	0	5	SA, MCQ
11.	Genetic and pediatric diseases	0	5	SE, SA, MCQ
12.	Environmental and nutritional disease	0	5	SE, SA, MCQ
HEMATOLOGY AND CLINICAL PATHOLOGY				
13.	Introduction to hematology	0	5	SE, SA, MCQ
14.	Microcytic anemia	0	15	LE, SE, SA, MCQ
15.	Macrocytic anemia	0	15	LE, SE, SA, MCQ
16.	Hemolytic anemia	2	15	LE, SE, SA, MCQ
17.	Aplastic anemia	0	5	SE, SA, MCQ
18.	Leukocyte disorders	2	15	LE, SE, SA, MCQ
19.	Lymph node and spleen	0	5	SE, SA, MCQ
20.	Hemorrhagic disorders	2	15	LE, SE, SA, MCQ
21.	Blood banking and transfusion	2	5	SE, SA, MCQ
22.	Clinical Pathology	2	5	SE,MCQ,SA

SYSTEMIC PATHOLOGY				
23.	Gastrointestinal tract	3	15	LE,SE,SA,MCQ
24.	Hepatobiliary system	3	15	LE,SE,SA,MCQ
25.	Respiratory system	3	15	LE,SE,SA,MCQ
26.	Cardiovascular system	3	15	LE,SE,SA,MCQ
27.	Urinary Tract	3	15	LE,SE,SA,MCQ
28.	Male Genital Tract	0	6	SE,SA,MCQ
29.	Female Genital Tract	3	15	LE,SE,SA,MCQ
30.	Breast	0	15	LE,SE,SA,MCQ
31.	Endocrine system	2	8	SE,SA,MCQ
32.	Bone and soft tissue	3	15	LE,SE,SA,MCQ
33.	Skin	0	5	SE,SA,MCQ
34.	Central Nervous system	0	5	SE,SA,MCQ
35.	Eye	0	3	SA,MCQ

Note:

1. Distribution of Topics:
   Paper I – General Pathology, Haematology, Clinical Pathology
   Paper II – Systemic Pathology
2. The blue print is to distribute the subject into Paper-I & II for the University assessment only and the division of the systems in each paper is indicative only. Marks allotted to various systems in each paper may vary with that of the blue print. As the curriculum is competency based and the questions are based on case scenarios & applied aspects, strict division of the subject into Paper -I & II is not possible and there is likely to be some overlapping which is inevitable.
3. One SE Question from AETCOM (Paper 1 = module 2.4, Paper 2 = module 2.7)
4. '0' signifies there is an option of not asking any question from that particular topic
5. LE = Long Essay - 10 marks
   SE = Short Essay (Short Notes) - 5 marks each
   SA = Short Answer (Reasoning Questions) - 3 marks each
   MCQ = Multiple Choice Questions - 2 marks each
6. Reference : Revised Competency Based Medical Education Curriculum (CBME) Guidelines , 2024 - National Medical Commission (dated 12/09/2024)

SCHEME OF PRACTICAL & VIVA EXAMINATION (SUMMATIVE ASSESSMENT/ FINAL UNIVERSITY)

Total Marks – 100 (Practicals: 80 + Orals/Viva voice: 20)

S.No	Practical Examination:	80 marks
1	Spotters (Includes Slides, specimens. Instruments and charts)	20 marks
2	Urine Examination	12 marks
3	Hematology-Stained smear given with clinical history for reporting of PS	12 marks
4	Chart: For discussion	12 marks
5	OSPE – PS preparation / Blood Grouping	12 marks
6	Histopathology slide discussion	12 marks

VIVA – VOCE Examination:	20 marks
General Pathology (includes specimens)	
Hematology + Clinical Pathology + Instruments+ Charts	
Systemic Pathology – I (Cardiovascular system, Respiratory system, Gastrointestinal system, Pancreas and Hepatobiliary system)	
Systemic Pathology – II (Urinary system, Bones, Joints and Soft tissues, Male & Female reproductive system, Endocrinology, Skin, Central nervous system, Lymph node & Spleen)	

6. SDL

Suggested topics should be entered in the log book preferably as per the format mentioned in the log book.

7. INTEGRATION

May be conducted in the form of sharing/nesting/correlation using CBL/PBL/Case study approach and involving various departments concerned while preparing the specific learning objectives of the integration topics.

Department involved may be chosen according to the topic and may be conducted as Horizontal/ Vertical form of integration as per the CBME document.

8. RECOMMENDED TEXT BOOKS, REFERENCE BOOKS AND ATLAS

Note: A single textbook may not cover the entire curriculum. Referring to more than one book is recommended.

1. Kumar, Abbas, Fausto, Aster (2020) Robbins & Cotran Pathologic Basis of Disease 10th Edition.
2. Hoffbrand, A. V., Chowdary, P., Collins, G. P., Loke, J. (2024). Hoffbrand's Essential Haematology 9th Edition.
3. Tejinder Singh & K.Uma Chaturvedi (2022) Practical Pathology (with Viva Voce Questions) 5th Edition
4. Edward Klatt and Vinay Kumar (2021) Robbins and Cotran Review of Pathology 5th Edition

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MICROBIOLOGY

1. GOALS

i. The aim of Medical Microbiology course is to introduce basic principles and their relevance in clinical disease for students studying medicine and aspiring to be physicians.

ii. The course is rigorous and includes a large number of etiological agents responsible for infectious diseases globally.

iii. It covers biology of bacteria, viruses and other pathogens related with infectious diseases in humans.

iv. The students should be able to identify common infectious agents and the diseases they cause.

v. The student should be able to evaluate methods used to identify infectious agents in the clinical microbiology laboratory meaning the approach to laboratory diagnosis of infectious diseases.

vi. The student should understand and should be able to recall basics of microbial physiology including metabolism, regulation and replication.

vii. The student should be able to explain general and specific mechanisms the pathogens use to produce disease.

viii. The student should be able to diagnose common infectious diseases from the clinical presentation and knowledge of association of microbes to common clinical conditions.

ix. The student should be able to describe the epidemiology of infectious agents especially the modes of transmission of pathogens.

x. The course will provide opportunities for students to know the approach to laboratory diagnosis of infections.

xi. The students will be trained in a few basic skills in clinical microbiology and their applications and interpretation to diagnose common infectious diseases.

xii. The student should be able to assess treatment strategies including the appropriate use of antimicrobial agents and common mechanisms of antimicrobial action and resistance.

xiii. The student should be able to explain interventions used to prevent transmission of pathogens or the principles of infection control practices including vaccination.

2. OBJECTIVES

2.1 KNOWLEDGE: The students should

i. Know types and structure of various microorganisms.

ii. Be able to differentiate between different types of pathogens like bacteria, viruses, fungi and parasites.

iii. Know commonly encountered and other important pathogens.

iv. Know the basics of microbial genetics.

v. Know the concept of microbial flora and its role in health and disease.

vi. Know the epidemiology of infectious diseases viz. the modes of transmission, population groups concerned, mechanisms related to transmission, attributes of transmission and social implications of infections like outbreaks, epidemics and pandemics.

vii. Know immunological response of the body in the infectious process, immunological memory, immunization, and unwarranted immunological responses contributing to disease.

viii. Know the principles and application of infection control measures, methods of sterilization, disinfection and antisepsis and their applications in patient care.

ix. Know to choose appropriate laboratory tests relevant to the clinical suspicion and interpret the test results.

x. Know the principles of antimicrobial therapy, relation of type of microorganism and antibiotic, bacterial drug resistance etc.

xi. Know methods and rational approach to control and prevent infectious diseases.

xii. Know the pathogenesis of diseases, interventions for effective treatment.

xiii. Know population health, epidemiologic principles and the scientific methods for research relevant public healthcare.

2.2 Skill

At the end of the course, the student shall be able to:

i. Correlate the clinical manifestations with the etiological agent and plan and interpret laboratory investigations for the diagnosis of infectious diseases.

ii. Identify the common pathogenic agents with the help of laboratory procedures and use antimicrobial sensitivity test to select suitable antimicrobial agents.

iii. Perform commonly employed bed-side tests for detection of infections agents such as blood film for malaria, filaria, gram staining, Acid Fast Bacilli (AFB) staining and stool examination for detection of ova, cysts etc.

iv. To articulate a cogent, accurate assessment of the problem and plan or list diagnostic clinical reasoning skills in all the major disciplines

v. The ability to practice effective preventive medicine by identifying, addressing and advocating the strategies to maintain health and well-being, to identify and treat disease early where appropriate and to advice on lifestyle modification practices.

2.3 Attitude and Communication skills

At the end of the course, the student shall be able to**:**

i. Explain general and specific mechanisms of pathogenesis of diseases.

ii. Describe the epidemiology of infectious agents especially the modes of transmission of pathogens

iii. Chose appropriate laboratory investigations and its interpretation

iv. Explain appropriate infection control practices to prevent transmission of infection.

2.4 Integration

The student should understand infection diseases of national importance in relation to the clinical, therapeutic and preventive aspects.

3. TEACHING METHODS:

Sl. No	Teaching Learning Method
1	Large group teaching/Lecture
2	Small group teaching (SGT): Tutorials/Seminars/Case based learning sessions/Integrated teaching sessions/AETCOM teaching sessions Practical sessions
3	Self-directed Learning (SDL)
	TOTAL HOURS AS PER LATEST NMC GUIDELINES

4. COURSE CONTENT:

A. LGT/SGT/DOAP/SDL/Practicals/Case discussion

Number	COMPETENCY The student should be able to	Predominant Domain* K/S/A/C	Level ** K/KH/SH/P	Core (Y/N)	#Suggested Teaching Learning method	##Suggested Assessment method	Number required to certify P
Topic 1: General Microbiology, Ethics & Communication **Number of competencies: (13)** **Number of competencies that require certification: (02)**							
MI 1.1	Discuss notable historical events, scientific developments and contributions of key scientists in the evolution of medical microbiology. Discuss the role of microbes in health and disease	K	K	N	LGT	Written assessment, Viva Voce	-
MI 1.2	Describe basic morphology, physiology / characteristics, classification and common infections /diseases caused by bacteria, viruses, fungi and parasites.	K	KH	Y	LGT	Written assessment, Viva Voce	

MI 1.3	Describe the basic principles of molecular biology and the concept and significance of studying molecular genetics. Discuss molecular techniques applied to disease diagnosis in clinical microbiology.	K	KH	Y	LGT	Written assessment, Viva Voce	
MI 1.4	Describe the laboratory methods used to detect causative agents of infectious diseases.	K	KH	Y	LGT	Written assessment, Viva Voce	
MI 1.5	Discuss the appropriate method of collecting and transporting samples to detect microbial agents, including instructions to be given to patients before sample collection.	K	KH	Y	LGT/ SGT	Written assessment, Viva Voce	
MI 1.6	Demonstrate the appropriate method of collection and transport of samples for the detection of microbial agents including instructions to be given to patients before sample collection.	S	SH	Y	DOAP	Practical exercises /OSPE	3
MI 1.7	Discuss the attitude & behaviors that portray respect & demonstrate respect for patient samples sent to the laboratory for performance of laboratory tests in the detection of microbial agents causing Infectious Diseases	A	SH	Y	SGT	Observation, Viva Voce, Scenario based questions	
MI 1.8	Discuss and demonstrate effective communication skills with patients, relatives and clinicians during sample collection and pre/posttest counseling	C	SH	Y	SGT	OSPE, Observation, Scenario based questions	

MI 1.9	Discuss & demonstrate confidentiality pertaining to patient identity in laboratory Results	A	SH	Y	SGT	Scenario based questions, Viva Voce	
MI 1.10	Perform Gram stain, ZN stain, and routine stool examination to identify the different causative agents of infectious diseases from the clinical specimen	S	P	Y	DOAP	Practical, OSPE	3 for each procedure
MI 1.11	Describe the epidemiological basis of infectious diseases and their application.	K	KH	Y	LGT	Written assessment, Viva Voce	
MI 1.12	Classify and describe the different methods of sterilization and disinfection. Discuss the mechanism of action, application and quality control of different methods in the laboratory and in clinical and surgical practices.	K	KH	Y	LGT SGT	Written assessment, Case discussion exercise, Case based MCQ, Viva Voce	
MI 1.13	Choose the most appropriate method of sterilization and disinfection to be used in specific situations in the laboratory, in clinical and surgical practice.	K	KH	Y	SGT, Case discussion	Written assessment/Viva voce/	
Topic 2 : Basic Immunology & Immunological disorders **Number of competencies: (08)** **Number of competencies that require certification: (NIL)**							
MI 2.1	Explain the role of immunological mechanisms in health and disease (innate and acquired immunity).	K	KH	Y	LGT	Written assessment, Case based MCQ, Viva Voce	
MI 2.2	Describe the structure and functions of immune system and its components (antigens, antibodies and complement systems).	K	KH	Y	LGT SGT	Written assessment, Case based MCQ, Viva Voce	

MI 2.3	Describe the host immune responses in Microbial infections (humoral and cellular immune response).	K	KH	Y	LGT SGT	Written assessment, Case based MCQ, Viva Voce	
MI 2.4	Explain the immune response in different types of infections (bacterial, mycobacterial, viral, fungal and parasitic infections)	K	KH	Y	LGT SGT	Written assessment, Case based MCQ, Viva Voce	
MI 2.5	Discuss the principles and applications of laboratory tests used in diagnostic microbiology based on the host's immune response.	K	KH	Y	LGT SGT	Written assessment, Case based MCQ, Viva Voce	
MI 2.6	Discuss the immunological basis of disease prevention through active and passive immune prophylaxis. Discuss the importance of herd immunity in prevention and control of infectious disease in community.	K	KH	Y	LGT SGT	Written assessment, Case based MCQ, Viva Voce	
MI 2.7	Describe the immunological mechanisms in immunological disorders (hypersensitivity, autoimmune disorders and immunodeficiency states) and discuss the laboratory methods used in their detection.	K	KH	Y	LGT SGT	Written assessment, Case based MCQ, Viva Voce	
MI 2.8	Describe the immunological mechanisms involved in transplantation, tumour immunity and their applications in disease management.	K	KH	N	LGT, SDL`	MCQ, Viva Voce	

Topic 3: CVS and Blood **Number of competencies: (13)** **Number of competencies that require certification: (1)**							
MI 3.1	Describe the etiopathogenesis, clinical features, complications/sequelae and laboratory diagnosis of rheumatic fever.	K	KH	Y	LGT SGT, Case-based discussion	Written/ Viva voce	
MI3.2	Describe the classification etio-pathogenesis, clinical features of Infective endocarditis (IE).	K	KH	Y	LGT, SGT, Case based discussion	Written/ Viva voce	
MI 3.3	Discuss the diagnostic modalities of IE available with special emphasis on concept of sepsis and blood culture collection & processing.	K	KH	Y	LGT, SGT, Case based discussion	Written/ Viva voce	2
MI 3.4	Diagnose a clinically suspected case of rheumatic fever/IE based on the findings of various microscopic, serological and culture investigations.	K	KH	Y	LGT, SGT, Case based discussion	Case based exercise, Case based MCQ, Viva voce	
MI 3.5	Define & describe types of Pyrexia of unknown origin (PUO). Discuss the etiopathogenesis and diagnostic modalities available to rule out infective causes of PUO.	K	KH	Y	LGT, SDL, SGT, Case-based discussion	Written assessment/ Viva voce	
MI 3.6	Classify & describe the enteric fever pathogens. Discuss the evolution of the clinical course, pathogenesis, complications, laboratory diagnosis and prevention of enteric fever.	K	KH	Y	LGT. SGT, Case-based discussion	Case based exercise, Written assessment, Case based MCQ, Viva voce	
MI 3.7	Choose the most appropriate laboratory test in a suspected case of enteric fever based on the duration of illness and in a suspected case of carrier.	K	KH	Y	Interpretational exercises (Practical)	Case based exercise, Case based MCQ, interpretational exercise, Viva Voce	

MI 3.8	Read and interpret the results of various laboratory investigations in a suspected case of enteric fever with special emphasis on serological test results.	K	KH	Y	Interpretational exercises (Practical)	Case discussion exercise, Case based MCQ, interpretation exercise, Viva Voce	
MI 3.9	Enumerate the common infective causes of anaemia and describe the mechanisms involved in causing anaemia by them.	K	KH	Y	LGT	Written assessment	
MI 3.10	Describe the morphology, life cycle, pathogenesis, laboratory diagnosis, prevention and control of the common parasites causing anaemia.	K	KH	Y	LGT	Written assessment, Case based exercise, Case based MCQ, Viva Voce	
I 3.11	Describe the morphology, life cycle, pathogenesis, clinical presentation, laboratory diagnosis and prevention of hemoparasites commonly prevalent in India (e.g. causing kala-azar, malaria, filariasis etc.)	K	KH	Y	LGT, SGT, SDL	Written assessment, Case discussion exercise, Case based MCQ, Viva Voce	
MI 3.12	Differentiate agents of malignant malaria from agents of benign malaria reported in peripheral blood smear examination/ serology and explain its clinical significance.	K,	KH	Y	Case-based discussion with reports (Practical)	Interpretational exercise, Case based exercise, Case based MCQ, Viva Voce	
MI 3.13	Describe the epidemiology the etio pathogenesis evolution complications, opportunistic infections, diagnosis, prevention and the principles of management of HIV	K	KH	Y	LGT, SDL	Written assessment, Case based MCQ, Viva Voce	

Topic 4: Gastrointestinal and Hepatobiliary system **Number of competencies:(09)** **Number of competencies that require certification:(01)**							
MI 4.1	Define and differentiate between diarrhea, dysentery and food poisoning. Enumerate the microbial agents causing them.	K	KH	Y	LGT	Written assessment, Case based MCQ, Viva Voce	
MI 4.2	Describe the epidemiology, morphology, pathogenesis, clinical features and diagnostic modalities of bacterial, viral, parasitic and fungal agents causing diarrhoea.	K	KH	Y	LGT	Written assessment, Case based MCQ, Viva Voce	
MI 4.3	Describe the epidemiology, morphology, pathogenesis, clinical features and diagnostic modalities of bacterial, viral, parasitic and fungal agents causing dysentery	K	KH	Y	LGT with case discussions	Written assessment, Case based MCQ, Viva Voce	
MI 4.4	Identify the common etiologic agents of diarrhoea and dysentery by stool microscopic examination.	S	SH	Y	DOAP (Practical)	Interpretational exercises /practical exercise	
MI 4.5	Enumerate the bacterial, viral, parasitic and fungal agents of food poisoning and discuss their pathogenesis, clinical course and laboratory diagnosis.	K	KH	Y	LGT with case discussion, SGT	Written assessment, Case based MCQ, Viva Voce	
MI 4.6	Describe the infective aetiology, pathogenesis and clinical course of Acid peptic disease (APD) and Discuss the laboratory diagnosis and management of the causative agent of APD.	K	KH	Y	LGT with case discussion, SDL	Written assessment, Case based MCQ, Viva Voce	

MI 4.7	Describe the epidemiology, etiopathogenesis, clinical features and complications of viral hepatitis.	K	KH	Y	LGT with case / clinical report discussion	Written assessment, Case based MCQ, Viva Voce	
MI 4.8	Discuss the modalities in laboratory diagnosis, with special emphasis on viral markers and preventive strategies for viral hepatitis caused by hepatitis viruses.	K	KH	Y	LGT with case / clinical report discussion	Written assessment, Case based MCQ, Viva Voce	
MI 4.9	Suggest the most appropriate laboratory test based on history and clinical presentation in a suspected case of viral hepatitis and interpret the type and progress of viral hepatitis based on the laboratory report of viral markers in a case of infection by hepatitis virus.	K	KH	Y	SDL, SGT with case / clinical report discussion	Written assessment, Case based MCQ, Viva Voce	
Topic 5: Musculoskeletal system, Skin and Soft tissue infections **Number of competencies: (05)** **Number of competencies that require certification: (NIL)**							
MI 5.1	Enumerate the microbial agents causing anaerobic infections. Describe the pathogenesis, clinical course and the laboratory diagnosis of anaerobic infections.	K	KH	Y	LGT with case discussion	Written assessment, Case based MCQ, Viva Voce	
MI 5.2	Explain the etiopathogenesis, clinical course & laboratory diagnosis of bone & joint infections caused by bacterial, fungal, viral and parasitic agents.	K	KH	Y	LGT with case discussion	Written assessment, Case based MCQ, Viva Voce	

MI 5.3	Explain the etiopathogenesis, clinical course and the laboratory diagnosis of skin and soft tissue infections caused by bacterial, fungal, viral and parasitic agents.	K	KH	Y	LGT with case discussion SGT	Written assessment, Case based MCQ, Viva Voce	
MI 5.4	Differentiate between infective and non-infective lesions in the skin. Enlist microbes causing systemic disease with involvement of skin.	K	KH	N	LGT	Written assessment, Viva voce	
MI 5.5	Describe the etiopathogenesis, clinical course, complications and laboratory diagnosis of mycobacterial infections involving skin & soft tissue with special emphasis on sample collection from/of skin	K	KH	Y	LGT, SGT, SDL	Written assessment	
Topic 6 : Central Nervous System infections **Number of competencies: (03)** **Number of competencies that require certification: (NIL)**							
MI 6.1	Enumerate the microbial agents causing meningitis. Explain the pathogenesis, clinical course and laboratory diagnosis of meningitis caused by bacterial, fungal, viral and parasitic agents.	K	KH	Y	LGT with case discussion SGT	Written assessment, Case based MCQ, Viva Voce	
MI 6.2	Enumerate the microbial agents causing encephalitis Explain the pathogenesis, clinical course and laboratory diagnosis of encephalitis caused by bacterial, fungal, viral and parasitic agents.	K	KH	Y	LGT with case discussion SGT, SDL	Written assessment, Case based MCQ, Viva Voce	

MI 6.3	Identify the microbial agents causing meningitis from a Gram stained given smear. Read & Interpret the microscopic findings and culture report of CSF to diagnose a case of bacterial, viral, fungal or parasitic infection in CNS	K	KH	Y	SGT	Written assessment, Case based MCQ, Viva Voce, OSCE	
Topic 7: Respiratory tract infections **Number of competencies: (05)** **Number of competencies/ skills that require certification: (02)**							
MI 7.1	Explain the etiopathogenesis, laboratory diagnosis and prevention of Infections of the upper respiratory tract caused by bacterial, viral, fungal and parasitic agents.	K	KH	Y	LGT with case discussion SGT	Written assessment, Case based MCQ, Viva Voce	
MI 7.2	Explain the etiopathogenesis, laboratory diagnosis and prevention of Infections of the lower respiratory tract caused by bacterial, mycobacterial, viral, fungal and parasitic agents.	K	KH	Y	LGT with case discussion SGT	Written assessment, Case based MCQ, Viva Voce	
MI 7.3	Enlist & identify the etiological agents of lower respiratory infection in specific situations like age, immune status, community-acquired pneumonia, hospital-acquired pneumonia etc	K	KH	Y	LGT with case discussio n, SGT	Written assessment, Case based MCQ, Viva Voce	
MI 7.4	Identify the common etiologic agents of upper respiratory tract infections in a Gram Stain / Albert stained smear of throat swab and correlate with the clinical findings provided.	S	P	Y	DOAP, Practical	OSPE, Clinical case-based exercises	3

MI 7.5	Identify the common etiologic agents of lower respiratory tract infections in a provided Gram Stained & Acid fast stained smear of sputum/BAL/tracheal aspirate and correlate with the clinical findings Provided	S	P	Y	DOAP, Practical	OSPE, Clinical case based exercises	3
Topic:8 Genitourinary and Sexually Transmitted Infections **Number of competencies: (04)** **Number of competencies that require certification: (NIL)**							
MI 8.1	Describe the etiopathogenesis and discuss the laboratory diagnosis of common bacterial, viral, fungal and parasitic infections of the genito- urinary system	K	KH	Y	LGT/ SGT	Written assessment, Viva voce	-
MI 8.2	Enlist common sexually transmitted infections (STI). Explain the pathogenesis, laboratory diagnosis and prevention of common bacterial and viral sexually transmitted infections.	K	KH	Y	LGT/ SGT	Written assessment, Viva Voce	
MI 8.3	Explain the concept and utility of Syndromic management of STI.	K	KH	Y	SDL/ SGT	Written assessment, Viva voce	
MI 8.4	Explain etiopathogenesis, clinical course, and the appropriate method for specimen collection, and discuss the laboratory diagnosis of different clinical and epidemiological types of urinary tract infections.	K	KH	Y	LGT/ SGT	Written assessment, Viva voce	

Topic 9: Zoonotic diseases and Miscellaneous **Number of competencies: (06)** **Number of competencies that require certification: (NIL)**							
MI 9.1	Define and classify Zoonotic infections. Explain etio-pathogenesis, vectors, clinical course, transmission, risk factors, laboratory diagnosis, and preventive & control strategies of different zoonotic infections caused by bacterial, viral, fungal and parasitic agents.	K	KH	Y	LGT/ SGT	Written assessment, Viva voce	
MI 9.2	Describe the etiopathogenesis and laboratory diagnosis of opportunistic infections(OI) along with factors predisposing to the development of OI by bacterial, viral, fungal and parasitic agents.	K	KH	Y	LGT, SGT	Written assessment, Viva voce	
MI 9.3	Choose the most suitable microbiological investigation in a given clinical situation and Interpret the results of the laboratory tests for the diagnosis of the infectious disease	K	SH	Y	Case based exercise, SGT	Cased based exercises, Case based MCQ	
MI 9.4	Describe the etiopathogenesis of infective causes of malignancy and explain the mechanisms used by oncogenic viruses in the development of virus-associated malignancies, along with their preventive measures.	K	KH	Y	LGT SGT	Written assessment, Viva voce	

MI 9.5	Describe the concept of emerging & re-emerging Infectious diseases. Explain the factors responsible for emergence and re-emergence of these disease and strategies for their prevention and control.	K	KH	Y	LGT, SGT, SDL	Written assessment, Viva voce	
MI 9.6	Describe the National Health Programs in the prevention of common infectious diseases and discuss the National reference centres for disease diagnosis and control	K	K	N	LGT	Written assessment, Viva voce	
Topic 10: Healthcare-associated infections (HAI) **Number of competencies: (05)** **Number of competencies that require certification: (01)**							
MI 10.1	Enumerate different causative agents and the types of Healthcare-Associated Infections (HAI). Define HAI and describe the chain of transmission and its role in preventing HAI.	K	K	Y	LGT, SGT	Written assessment, Viva voce	
MI 10.2	Describe the standard & transmission based precautions for infection control and the role of the hospital infection control committee (HICC) in the prevention of HAI.	K	KH	Y	LGT, SGT	MCQ, viva voce	
MI 10.3	Demonstrate hand washing, donning- doffing of PPE and segregation of Biomedical waste	S	SH	Y	DOAP, SGT, Practical	OSPE, Direct Observation with checklist	3 each
MI 10.4	Describe the methods used and significance of assessing the microbial contamination of food, water and air (in hospital surveillance)	K	KH	N	Interactive LGT	Written assessment, MCQ, Viva Voce	

MI 10.5	Describe the commonly detected drug-resistant microbes in HAI. Explain the mechanism of evolution, spread, and control of antimicrobial drug resistance in hospitalized patients.	K	KH	Y	LGT, SGT	Written assessment, MCQ, Viva Voce	
Topic 11: Antimicrobial resistance (AMR) & Antimicrobial Stewardship (AMSP) **Number of competencies: (03)** **Number of competencies that require certification: Nil**							
MI 11.1	Describe the genotypic & phenotypic mechanisms of antimicrobial drug resistance and the methods of antimicrobial susceptibility testing, along with interpretation of the antimicrobial susceptibility testing report	K	KH	Y	LGT, SGT	Written assessment, MCQ, Viva Voce, Interpretational exercise	-
MI 11.2	Explain intrinsic & acquired drug resistance along with the antimicrobial spectrum of important human pathogens and its application in clinical therapy.	K	KH	Y	LGT, SGT	Written assessment, MCQ, Viva Voce	-
MI 11.3	Explain the concept and application of the antimicrobial stewardship program including rational antimicrobial prescription and your role in its implementation.	K	KH	Y	LGT, SGT	Written assessment, MCQ, Viva Voce	-

B. COMPETENCY TOPICS FOR DOAP/SKILL LAB

SL NO	Competency number*	Competency Description	Predominant Domain* K/S/A/C	Level** K/KH/SH/P	Core (Y/N)	#Suggested Teaching Learning method	##Suggested Assessment method	Number required to certify P
1	MI 1.6	Demonstrate the appropriate method of collection and transport of samples for the detection of microbial agents including instructions to be given to patients before sample collection.	S	SH	Y	DOAP	Practical exercises /OSPE	3
2	MI 1.10	Perform Gram stain, ZN stain, and routine stool examination to identify the different causative agents of infectious diseases from the clinical specimen	S	P	Y	DOAP	Practical, OSPE	3 for each procedure
3	MI 3.3	**Discuss the diagnostic modalities of IE available with special emphasis on concept of sepsis and** blood culture collection & processing.	K	KH	Y	LGT, SGT, Case based discussion	Written/ Viva voce	2
4	MI 4.4	**Identify the common etiologic agents of diarrhoea and dysentery by** stool microscopic examination.	S	SH	Y	DOAP (Practical)	Interpretational exercises /practical exercise	3
5	MI 7.4	**Identify the common etiologic agents of upper respiratory tract infections in a** Gram Stain/ Albert stained smear of throat swab **and correlate with the clinical findings provided.**	S	P	Y	DOAP, Practical	OSPE, Clinical case-based exercises	3
7	MI 7.5	**Identify the common etiologic agents of lower respiratory tract infections in a provided** Gram Stained & Acid fast stained smear of sputum/BAL/tracheal aspirate **and correlate with the clinical findings Provided**	S	P	Y	DOAP, Practical	OSPE, Clinical case based exercises	3
8	MI 10.3	**Demonstrate** hand washing, donning- doffing of PPE and segregation of Biomedical waste	S	SH	Y	DOAP, SGT, Practical	OSPE, Direct Observation with checklist	3 each

***Domain: K-** Knowledge, **S–** Skill, **A-** Attitude / professionalism, **C-** Communication.*

***Level: K–** Knows, **KH-** Knows How, **SH-** Shows how, **P-** performs independently.*

***#Suggested Teaching learning Methods: DOAP–** Demonstrate, Observe, Assess, Perform, **LGT-** Large group Teaching, **SGT-** Small group Teaching, **SDL-** Self Directed Learning.*

***##Suggested Assessment method: MCQ-** Multiple Choice Questions, **OSPE-** Objective Structured Practical Examination.*

C. AETCOM Competencies:

1. **Module 2.1:** Demonstrate ability to communicate to patients in a patient, respectful, non-threatening, non-judgemental and empathetic manner.
2. **Module 2.8:** Demonstrate empathy in patient encounter

5. SCHEME OF EXAMINATION:

A. FORMATIVE ASSESSMENT:

THEORY INTERNAL ASSESSMENT:

- A minimum of **THREE** Internal Assessments (IAs) to be conducted
- Formative assessment marks shall be calculated based on scoring in part continuous assessment tests/ small group teaching participation/ seminars/ assignments and log book assessment of SDL topics and AETCOM modules.

PRACTICAL INTERNAL ASSESSMENT:

- A minimum of **THREE** Practical Internal Assessments (IAs) to be conducted
- Viva/oral examination should assess approach to clinical context in the concepts of basic sciences and included in practical IA marks.

3rd Internal assessment must be conducted similar to the university examination pattern.

The distribution of internal assessment marks shall be as mentioned below:

Theory IA	Maximum Marks	Practical IA	Maximum Marks
Theory written paper/s AETCOM modules (one question in the theory paper)	70	Practical exam and Practical Viva Voce	70
Formative assessment from Continuous Class test (LMS)/ SDL/ Seminar	30	Formative assessment from record book and log book evaluation	30
TOTAL	**100**		**100**

FINAL INTERNAL ASSESSMENT MARKS

Final IA marks will be calculated as average of all three IAs

Level of participation in small group teaching, SDL and AETCOM modules shall be assessed using the format given in the log book.

B. SUMMATIVE ASSESSMENT:

Eligibility Criteria for Appearing in the University Examination

Parameter	Requirement
Theory Attendance	75%
Practical Attendance	80%
IA Marks (Min.)	40% individually (Theory/Practical), 50% Combined
Logbook	Certified & Completed Competencies

Note:
1. Students must have appeared for all the scheduled internal assessments conducted by the department.
2. Failure to meet any of these criteria results in the student being barred from appearing in the University Examination for that session.

MARKS DISTRBUTION FOR UNIVERSITY SUMMATIVE EXAMINATION

THEORY			**THEORY TOTAL**	**PRACTICAL**		**PRACTICAL TOTAL**
	Written paper	MCQ's		Summative exam	Viva	
PAPER I	80	20	**200**	80	20	**100**
PAPER II	80	20				

THEORY SUMMATIVE EXAMINATION:

Written paper: Paper-1: 100 marks + Paper 2: 100 marks = 200 marks
Time: 3 hours for each paper

The pattern of questions in each paper shall be as mentioned below: (to be given by COE Office)

Types of Questions	Number of Questions	Marks per Question	Total Marks
Scenario based Multiple-choice questions (MCQ's)	10	02	20
Structured Long essay question (SLEQ)	01	10	10
Short notes – Applied / Integration modules	04	05	20
Short notes – Recall/ Comprehension	06	05	30
Short notes – AETCOM	01	05	05
Short Answers – Reasoning types	05	03	15
Total Marks			**100**

The question papers shall be based on the blue print of question paper setting.

- Total marks under each type of question from each topic needs to be entered by QP Setter. It should be in accordance with Shri Dharmasthala Manjunatheshwara University guidelines.

Blueprint for the theory examinations (For use by the question paper setter)

PAPER 1 TOPICS	Total max marks as per SDMU guidelines
General Microbiology, Ethics & Communication	20
Basic Immunology & Immunological disorders	20
Respiratory tract infections	20
Central Nervous System infections	15
Musculoskeletal system, Skin and Soft tissue infections	20
AETCOM (1 SEQ)	5
TOTAL	**100**

PAPER 2 TOPICS	Total max marks as per SDMU guidelines
CVS and Blood	20
Gastrointestinal and Hepatobiliary system	20
Genitourinary and Sexually Transmitted Infections	20
Zoonotic diseases and Miscellaneous	10
Healthcare-associated infections (HAI)	15
Antimicrobial resistance (AMR) & Antimicrobial Stewardship (AMSP)	10
AETCOM (1 SEQ)	5
TOTAL	**100**

Note- *The topics assigned to the different papers are generally evaluated under those sections. However, a strict division of the subject may not be possible and some overlapping of topics is inevitable. Students should be prepared to answer overlapping topics.*

PRACTICAL SUMMATIVE EXAMINATION: TOTAL 100 MARKS

PRACTICAL EXERCISES: 80 M

S. No	Practical Type	Marks
Exercise 1	Spotters	10
Exercise 2	Gram stain	20
Exercise 3	Acid fast stain	15
Exercise 4	Stool exercise	10
Exercise 5	OSPE - Hand hygiene and Biomedical waste management	5
Exercise 6	Clinical Microbiology applied exercise Based on clinical infective syndromes such as (Infections of blood stream and Cardiovascular system, Gastrointestinal tract and Hepatobiliary system, Skin, Soft tissue and Musculoskeletal system, Central Nervous System, Respiratory System, Genitourinary System)	20
	Total Marks	80

PRACTICAL VIVA VOCE: 20 MARKS

S. No	Topic	Marks
1	General Microbiology and Immunology	5
2	Infections of Blood stream and Cardiovascular System, Gastrointestinal Tract and Hepatobiliary System	5
3	Infections of Skin, Soft tissue and Musculoskeletal system, Central Nervous System	5
4	Infections of Respiratory System, Genitourinary and Sexually Transmitted Infections, Hospital Infection and Control, Miscellaneous Infective Syndromes and Others	5
	Total Marks	**20**

6. SELF DIRECTED LEARNING (SDL)

Topics as given by NMC should be entered in the log book as per the format mentioned in the log book**.**

7. INTEGRATION:

- May be conducted in the form of sharing/ nesting /correlation using CBL/PBL/Case study approach and involving various departments concerned.
- Department involved may be chosen according to the topic and and may be conducted as Horizontal/Vertical form of integration as per the CBME document.

8. RECOMMENDED REFERENCE BOOKS (LATEST EDITIONS)

1. Ananthanarayan and Paniker's Text Book of Microbiology
2. Essentials of Medial Microbiology by Apurba S. Sastry, Sandhya Bhat
3. Parasitology, Protozoology and Helminthology by KD Chatterjee
4. Essentials of Practical Microbiology by Apurba S Sastry and Sandhya Bhat
5. Immunology – RA Godsby, TJ Kindt, BA Osborne, J Kuby
6. Jawetz (Melnick) et al, Medical Microbiology, ed. Z Appleton and Lange, USA.

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