Syllabus and Examination pattern for Under Graduate Medical Course Part II

(A) NOTIFICATION

Ref. :

(1) Medical Council of India Regulation on Graduate Medical Education, 1997.
(2) Amendment of the regulations on graduate medical education notified by Government of India from time to time :
   a. Gazette Notification dated 29.05.1999.

In exercise of the powers, conferred under section 26 of Krishna Institute of Medical Sciences Deemed University, in its meeting of the Board of Management held on 27th June, 2006, has been pleased to approve the Bye-law pertaining to MBBS course as given in schedule here to Annexed.

The Bye-law as above shall be effective for the students admitted to MBBS course Phase II from the academic year 2006-07 onwards.

By Order
Registrar

(B)

PHARMACOLOGY AND PHARMACOTHERAPEUTICS

Goal
The broad goal of teaching pharmacology to undergraduate students is to inculcate in them a rational and scientific basis of therapeutics.

Objectives
At the end of the course, the student shall be able to -
1) Describe the pharmacokinetics and pharmacodynamics of essential and commonly used drugs.
2) List the indications, contraindications, interactions and adverse reactions of essential and commonly used drugs.
3) Indicate the use of appropriate drug/drugs in a particular disease with consideration of its/their cost, efficacy and safety for -
   - Individual needs, and
   - Mass therapy under national health programmes.
4) Describe the pharmacokinetic basis, clinical presentation, diagnosis and management of common poisonings.
5) List the drugs of addiction and recommend the management.
6) Classify environmental and occupational pollutants and state the management issues.
7) Explain pharmacological basis of prescribing drugs in special medical situations such as pregnancy, lactation, infancy and old age.
8) Explain the concept of rational drug therapy in clinical pharmacology
9) State the principles underlying the concept of 'Essential Drugs'
10) Evaluate the ethics and modalities involved in the development and introduction of new drugs

Skills
At the end of the course, the student shall be able to -
1) Prescribe drugs for common ailments.
2) Identify adverse reactions and interactions of commonly used drugs.
3) Interpret the data of experiments designed for the study of effects of drugs and bioassays, which are observed during the study.
4) Scan information on common pharmaceutical preparations and critically evaluate drug formulations.
5) Be well conversant with the principles of pharmacy and dispense the medications giving proper instructions.

Integration
Practical knowledge of rational use of drugs in clinical practice will be acquired through integrated teaching vertically with pre-clinical and clinical subjects and horizontally with other para-clinical subjects.

**COURSE CONTENTS**

**THEORY**

**General Pharmacology**

*Must Know*


**Autonomic Nervous System & Skeletal Muscle Relaxants**

*Must Know*


**Endocrines**

*Must Know*

Anterior Pituitary Hormones, Thyroid hormone & Antithyroid drugs, Insulin, Oral Antidiabetics & Glucagon, Corticosteroids, Male Sex Hormones, Female Sex Hormones, Hormonal Contraceptives, Drugs affecting Calcium Balance, Drugs acting on Uterus.

**Autacoids and Related Drugs**

*Must Know*

Prostaglandins & Leukotrienes, Histamine & H 1 blockers, 5-HT agonists & antagonists.

**Respiratory System**

*Must Know*

Drug therapy of Bronchial Asthma, Drug therapy of Cough.

**Gastrointestinal System**

*Must Know*

Haemopoietic System

Must Know

Chemotherapy

Must Know
General considerations, Sulfonamides & Cotrimoxazole, Quinolones, Penicillins & Cephalosporins, Tetracyclines, Chloramphenicol, Aminoglycoside antibiotics, Macrolides, Chemotherapy of Urinary Tract Infections, Chemotherapy of Sexually transmitted Diseases, Chemotherapy of tuberculosis, Chemotherapy of Leprosy, Antiviral drugs (including antiretroviral drugs), Antifungal drugs, Antimalarial drugs & Chemotherapy of malaria, Antiamoebic drugs & Chemotherapy of amoebiasis & Other Protozoal diseases, Anthelmintics, Chemotherapy of Malignancy, Antiseptics & Disinfectants.

Immunopharmacology

Must Know
Immunosuppressants, immunostimulants, Vaccines, Toxoids, Antisera.

Cardiovascular System

Must Know

Diuretics & Antidiuretics

Must Know

Central Nervous System

Must Know
General Anesthetics, Ethyl & Methyl alcohol, Sedatives & Hypnotics - Barbiturates, Benzodiazepines & other anxiolytics, Antiepileptic drugs, Drugs used in Mental Illness, General considerations & Classification of Psychotropic drugs, Antipsychotic drugs, Antidepressant drugs, Antimanic drugs, Anti-Parkinsonian drugs & treatment of other Neurodegenerative disorders, Opioid analgesics & antagonists, Analgesics & NSAIDS, Drug therapy of Rheumatoid arthritis.

Miscellaneous Topics

Must Know
Local anesthetics, Drug therapy of gout, Drug use at extremes of age, in Pregnancy & in organ 2 dysfunction, Heavy metal antagonists, Drugs acting on skin & Ectoparasiticides, Nitric oxide, Vitamins, antioxidants, Hyperbaric oxygen, Enzyme therapy & Diagnostic agents, Environmental & Occupational Pollutants & Insecticides, Ocular Pharmacology.
Practicals and demonstrations

1) Introduction to Practical Pharmacology, Prescription writing, Pharmacokinetics I, Routes of Administration: Oral, Routes of Administration: Topical, Routes of Administration: Parenteral, Pharmacokinetics II: Applications in Therapeutics, Revision of Spots.

2) Pharmacodynamics I (Effect of drugs on isolated tissue preparations e.g. Frog’s rectus abdominis and rabbit’s small intestine - Demonstrations), Pharmacodynamics II (Dog BP and Respiration - Demonstration), Screening Techniques for New drugs (Evaluation of Analgesics & Antiepileptic drugs - Demonstrations), Adverse Drug Reactions, Rational Pharmacotherapy I, Rational Pharmacotherapy II, Sources of Drug Information including scrutiny of Promotional Literature, Case Study 1, Case Study 2, Revision Practicals on Spots, Prescriptions and Dosage Forms.

3) Revision Practicals on Prescriptions, Prescription Criticism Exercises, Fixed Dose Drug Combination Preparations, Dosage Forms and Spots.

Books recommended
- Pharmacology and Pharmacotherapeutics - Satoskar RS, Bhandarkar SD, Rege NN (Eds), Popular Prakashan Pvt. Ltd., Mumbai.

Reference books

Teaching Methods and Hours

1. Total No. of Hours
   - Theory didactic lectures: 150 hrs.
   - Non-lecture teaching: 56 hrs.
   - Practical/Demonstration: 66 hrs.
   - Internal Assessment: 28 hrs.
   - Total: 300 hrs.

2. Topic wise/System wise distribution of teaching hours:

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Topic / System</th>
<th>No. of hours</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>General Pharmacology</td>
<td>18 hrs.</td>
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<tr>
<td>3.</td>
<td>Endocrines</td>
<td>15 hrs.</td>
</tr>
<tr>
<td>4.</td>
<td>Autacoids &amp; Related Drugs</td>
<td>03 hrs.</td>
</tr>
<tr>
<td>5.</td>
<td>Respiratory System</td>
<td>03 hrs.</td>
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<tr>
<td>6.</td>
<td>Gastrointestinal System</td>
<td>05 hrs.</td>
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<tr>
<td>7.</td>
<td>Haemopoietic System</td>
<td>08 hrs.</td>
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</table>
9. Immunopharmacology 04 hrs.
10. Cardiovascular System 15 hrs.
11. Diuretics & Antidiuretics 07 hrs.
13. Miscellaneous topics 12 hrs.

Scheme Of Examination

Internal Assessment Examination Scheme

<table>
<thead>
<tr>
<th>1st Term Ending</th>
<th>2nd Term Ending</th>
<th>Preliminary Examination</th>
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<tbody>
<tr>
<td>Theory (A)</td>
<td>Theory (C)</td>
<td>Theory (E)</td>
</tr>
<tr>
<td>Practicals (B)</td>
<td>Practicals (D)</td>
<td>Practicals (F)</td>
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<tr>
<td>50</td>
<td>50</td>
<td>80</td>
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1) Theory marks to be sent to the University out of 15 =

\[
\frac{(A) + (C) + (E)}{12} = \frac{50 + 50 + 80}{12} = \frac{180}{12} = 15
\]

2) Practical marks to be sent to the University out of 15 =

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\frac{(B) + (D) + (F)}{8} = \frac{40 + 40 + 40}{8} = \frac{120}{8} = 15
\]

University Examination - Distribution of Marks

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<thead>
<tr>
<th>Pattern Of Examination</th>
<th>Pharmacology</th>
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<tr>
<td>1. Written Paper</td>
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<td>No. of Papers</td>
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<td>Maximum Marks for each Paper</td>
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<tr>
<td>2. Viva-Voce</td>
<td>14</td>
</tr>
<tr>
<td>3. Internal Assessment (Theory)</td>
<td>15</td>
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<td>A. Total Theory</td>
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<tr>
<td>1. Practicals</td>
<td>26</td>
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<tr>
<td>2. Internal Assessment (Practical)</td>
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<td>B. Total Practicals</td>
<td>41</td>
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<tr>
<td>Grand Total A + B</td>
<td>150</td>
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</table>

Nature Of Question Paper

<table>
<thead>
<tr>
<th>Paper</th>
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<tr>
<td>Paper I</td>
<td>40 marks</td>
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<tr>
<td>Paper II</td>
<td>40 marks</td>
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</tbody>
</table>
Section - A  Q. No. 1  Multiple Choice Questions (28 - MCQs) - 14 marks

Section - B  Q. No. 2  Short Answer Questions (SAQs)  
Write in brief (Any Six out of Seven) - 12 marks

Section - C  Q. No. 3  Long Answer Questions (LAQs).  
(Any Two out of Three) - 14 marks

Pattern Of Viva Voce And Practical Examination

(i) Viva examination (Orals) : Total - 14 marks

(ii) Practical examination : Total - 26 marks
PATHOLOGY

Goal
The goal of teaching pathology is to provide undergraduate students comprehensive knowledge of the causes and mechanisms of disease, in order to enable them to achieve complete understanding of the natural history and clinical manifestations of the disease.

Objectives
At the end of one and half years, the student shall be able to -

1) Describe the structure and ultrastructure of a sick cell, the mechanisms of the cell degradation, cell death and repair.

2) Correlate structural and functional alterations in the sick cell.

3) Explain the Patho physiological processes, which governs the maintenance of homeostasis, mechanism of their disturbances and the morphological and clinical manifestations associated with it.

4) Describe the mechanisms and patterns of tissue response to injury to appreciate the Pathophysiology of disease processes and their clinical manifestations.

5) Correlate the gross and microscopic alterations of different organ systems in common diseases to the extent needed to understand disease processes and their clinical significance.

6) Develop an understanding of neoplastic change in the body in order to appreciate need for early diagnosis and further management of neoplasia.

7) Understand mechanisms of common haematological disorders and develop a logical approach in their diagnosis and management.

Skills
At the end of one and half years, the student shall be able to -

1) Describe the rationale and principles of technical procedures of diagnostic laboratory tests.

2) Interpret diagnostic laboratory tests and correlate with clinical and morphological features of diseases.

3) Perform simple bedside tests on blood, urine and other biological fluid samples.

4) Draw a rational scheme of investigations aimed at diagnosing and managing common disorders.

5) Recognize morbid anatomical & histopathological changes for the diagnosis of common disorders.

Integration
At the end of one and half years, the student shall be able to integrate the causes and mechanisms of disease most prevalent in India with their natural history for the understanding of their clinical course and management.

COURSE CONTENTS
THEORY

Definitions and causes of diseases
Must know
Able to recall common definitions in Pathology and causes of cell injury.
Modes of cell injury
Must know
Able to appreciate mechanisms of cell injury & relate them to the morphological changes.

Necrosis & gangrene, apoptosis
Must know
Able to recognize types of necrosis and gangrene at gross and microscopic levels. Apoptosis and its relevance.

Intracellular accumulations, Hyaline & mucoid change
Must know
Able to list the types of intracellular accumulations & alterations in reversible cell injury along with alterations in cell organelles and cytoskeleton.

Acute inflammation
Must know
Define and describe changes occurring in acute inflammation and integrate the changes with morphological patterns of injury.

Chemical mediators of Inflammation:
Must know
Definition, Classification, description of each type, role of acute, chronic inflammation.

Chronic inflammation (including granulomatous)
Must know
Differentiate it from acute inflammation, describe aetiology, patterns and systemic effects of granulomas.

Regeneration and repair (general & specialized tissues)
Must know
Define & describe regeneration and repair and understand the mechanisms and list factors modifying repair. and the complications.

Oedema
Must know
Define oedema, classify and describe pathogenesis & correlate morphology with clinical significance with emphasis on transudate and exudate.

Shock
Must know
Define, classify and understand pathogenesis, recognize the role of mediators and stages of shock.

Thrombosis
Must know
Describe etio-pathogenesis, fate, morphology and effects of thrombosis.

Embolism & Hyperemia & Haemorrhage.
Must know
Enumerate types of embolism, recognize morphological changes and correlate clinical significance. Definitions, morphology of acute and chronic congestions, clinical significance of haemorrhage.
Ischemia & Infarction.

Must know
- Types of infarction, morphological changes & correlate clinical significance.

Disturbances of pigment metabolism & calcification

Must know
- State the type of pigment disturbances and describe the changes associated with common disturbances like lipofuscin, melanin, Hemosiderin and Bilirubin. Describe the types and morphological changes of calcification.

Genetic disorders

Must know

Desirable to know
- Lysosomal storage disorders, glycogen storage diseases, methods of disease diagnosis.

Hypersensitivity reactions:

Must know
- Classify, differentiate between different types of Hypersensitivity reactions.

Desirable to know
- Transplant rejections.

Autoimmune diseases

Must know
- Understand mechanisms of autoimmunity and diagnose common autoimmune diseases; overview of SLE.

Amyloidosis

Must know
- Definition, physical characters, chemical characters, classification, pathogenesis, morphology, clinical correlation and lab diagnosis.

AIDS

Must know
- Understand the natural history of the disease and recommend relevant investigations in the management.

Deficiency disorders

Must know
- Essential nutrients, pathogenesis obesity, starvation, protein energy Malnutrition & disorders of vitamins trace elements.

Tuberculosis

Must know
- Appreciate the importance of tuberculosis in the present day Context, its Pathogenesis & basic histopathology. List and describe the various pulmonary lesions of tuberculosis. Describe changes in various organs in TB and understand their functional correlation, sequelae, lab diagnosis and TB in AIDS.

Leprosy

Must know
- Classify, differentiate between different types of leprosy and describe the diagnostic histologic features and sequelae.
Cellular Adaptations/ Growth disturbances

Must know
Define the various growth disturbances and appreciate the clinical significance of each.

Neoplasia - Nomenclature and classification

Must know
Define important terms, classify and differentiate benign from malignant neoplasms: Precancerous conditions

Neoplasia - Carcinogenesis

Must know
Understand molecular and physical carcinogenesis and analyse the mechanism of genetic changes in carcinogenesis.

Neoplasia - Carcinogenesis

Must know
Understand chemical & biological carcinogenesis.

Neoplasia - Biology and Lab diagnosis

Must know
Understand the tumour host interactions in neoplasia and recommend the diagnostic workup for detection of cancer.

Neoplasia - Spread, grading and staging

Must know
Biology of tumour growth, metastases, types, mechanisms, clinical correlations, grading of cancer and staging of cancer.

Atherosclerosis

Must know
Definition, etiopathogenesis, gross and microscopic description, complications and clinical correlation.

Vasculitis & aneurysm

Must know
Develop an index of suspicion for vasculitides and aneurysms.

Ischaemic heart disease

Must know
Incidence, risk factors, Pathogenesis, morphological changes, clinical course, complications and investigations.

Rheumatic heart disease & CHD

Must know
Incidence, etiopathogenesis, morbid anatomy, histopathology, lesions in the organs, clinical course and sequelae.

Endocardial and pericardial diseases

Must know
Infective endocarditis - Pathogenesis, morphology, differential diagnosis of cardiac vegetations, aetiology and basic morphology of different forms of pericarditis.
Pneumonias
Must know
Aetiology, classification, gross, histopathological description in different forms and complications.

Lung Abscess and Bronchiectasis
Must know
Etiopathogenesis, morphological appearances and complications.

Chronic Bronchitis and Emphysema
Must know
Pathogenesis, types of emphysema, definition of chronic bronchitis, morbid anatomy and cardiac sequelae.

Environmental pathology & Occupational lung diseases
Must know
Types, etiopathogenesis, gross anatomical differences between different forms and sequelae.

Tumours of lung and pleura
Must know
Classification, aetiology, gross appearances, histological description of important forms, natural history, pattern of spread, Para neoplastic syndromes and secondary Pathology.

Lesions of oral cavity and salivary glands
Must know
Differential diagnosis of swelling of salivary glands, oral cancer - etiopathogenesis, gross and histopathological descriptions.

Gastritis and Peptic Ulcer
Must know
Definition of peptic ulcer, etiological factors, gross and microscopic appearances and sequelae.
Desirable to know
Overview of aetiology and types of gastritis.

Ulcers of Intestines appendicitis, haemorrhoids
Must know
Etiological classifications, Morphological appearances of typhoid, tubercular, amoebic ulcers and bacillary dysentery. Differential diagnosis of different forms of ulcers.types of appendicitis, pathology of haemorrhoides.

Idiopathic Inflammatory Bowel disease
Must know
Enumerate similarities and differences between the two component disorders viz., Crohn's disease and ulcerative colitis.

Tumours of upper GIT
Must know
Etiopathogenesis, morphological features of carcinoma oesophagus, classification and morbid anatomy & histopathology of gastric carcinomas.
Tumours of lower GIT  
Must know  
Pathology of carcinoma colon. Intestinal polyps, GI stromal tumours, carcinoid tumors.

Viral Hepatitis  
Must know  
Aetiology, clinical source and enzymology, salient histological features and sequelae.

Alcoholic liver disease & cirrhosis  
Must know  
Pathogenesis, morphological manifestations and correlation with clinical features of a .l .d & cirrhosis, in addition classification & d /d of cirrhosis.

Tumors of liver. Diseases & tumors of Pancreas  
Must know  
Pathology of Hepatocellular carcinoma, pancreatitis &. Pathology of tumors of Pancreas.

Cholecystitis, gall stones & tumors of gall bladder  
Must Know  

Diabetes mellitus  
Must know  
Classification, pathogenesis of system involvement, sequelae, complications & lab diagnosis.

Acute nephritis, rapidly progressive GN & end stage kidney  
Must know  
Understand and integrate clinical and pathologic features of these syndromes with aetiopathogenesis.

Nephrotic syndrome  
Must know  
Integrate clinical and pathological features of this disorder & remaining types of GMN.

Renal failure  
Must know  
Definitions, criteria, aetiology, systemic manifestations and investigations.

Pyelonephritis and renal calculi, obstructive uropathy  
Must know  

Tumours of kidney, Pelvis, Ureter, bladder  
Must know  
Classification, Morphological features, clinical course including Para neoplastic syndromes of common tumours.

Tumours of testis and Prostate  
Must know  
Classification, salient morphological features of most common tumours and clinical course.
Diseases & tumors of Cervix

Must know
Etiopathogenesis, salient morphological features, dysplasia and role of cytological screening.

Diseases & tumors of uterus

Must know
Aetiopathogenesis, morphological types.

Desirable to know
Classification and morphological description of important types.

Non-neoplastic and Neoplastic lesions of the breast

Must know
Classification, morphological features and grading of carcinoma breast and differential diagnosis of breast swellings.

Non-neoplastic lesions of lymph nodes and Spleen

Must know
Aetiology, differential diagnosis, morphological features of common causes of lymphadenopathy, common causes and appearances of splenomegaly.

Hodgkin's Lymphoma

Must know
Definition, classification, salient diagnostic features and clinical course.

Non-Hodgkin's Lymphoma

Must know
Definition, classification, salient diagnostic features and clinical correlation

Desirable to know
Extra nodal lymphomas.

Tumours of skin - pigmented & Non-pigmented

Must know
Classification, morphological features of most common types and natural history, Naevi & malignant melanoma.

Soft tissue tumours

Must know
Classification, morphological features of lipomatous, fibrous and blood vessel tumours. Morphological features of neural, muscle and fibro histiocytic tumours.

Non-neoplastic lesions of bone and joints

Must know
Etiopathogenesis and morphological changes of common arthritis and osteomyelitis.

Tumours of bone, cartilage and joints

Must know
Classification, radiological and pathological features of important bone tumours (Osteosarcoma, Osteochondroma, GCT and Ewing's sarcoma).

Inflammatory conditions of CNS

Must know
Morphological features and differential diagnosis of meningitis.
Neoplasms of CNS

**Must know**
Classification, morphological features of important CNS tumours, clinical course and sequelae (Meningioma and Gliomas).

Lesions of Thyroid

**Must know**
Differential diagnosis of thyroid nodule.

Myopathies, neurogenic atrophy

**Desirable to know**
Differential diagnosis of common muscle disorders.

Introduction to haematology and hemopoiesis: classification & general features of anemia

**Must know**
Understand the importance of haematology in clinical practice and enumerate the stages of hemopoiesis. Classify anaemia by various methods, clinical features and lab approach to anaemias.

Iron deficiency anaemia & megaloblastic anemia

**Must know**
Definition, causes, haematological features, morbid anatomical features, laboratory diagnosis and differential diagnosis.

Haemolytic anaemia

**Must know**
Definition, classification, Pathogenesis and haematological features.

Haemoglobinopathies

**Must know**
Definition, classification, Lab diagnosis of Thalassaemia and Sickle cell anaemia.

Haemorrhagic disorders

**Must know**
Classify haemorrhagic disorders, describe clinical distinction between Purpuras and Coagulation disorders and laboratory screening tests for haemorrhagic disorders. Normal coagulation and fibrinolytic mechanism. Describe etio-pathogenesis, clinical significance and lab diagnosis of haemophilia and DIC. Describe etio-pathogenesis, morphological features (haematological and morbid anatomical) clinical significance and lab diagnosis of ITP.

MDS & Acute Leukaemias

**Must know**
Classify and differentiate different types of acute Leukaemias.

Chronic Leukaemias, Leukemoid reaction & MPD

**Must know**
Definition, general features, classification, aetiology, haematological change, morbid anatomy, clinical course and lab. Investigations. Introduce leukemoid reaction & MPD.
Paraproteinemia
Must know
Understand the relevance of paraproteinemia’s and integrate the various diagnostic modalities with the diagnosis.

Blood groups, Blood transfusion & blood components
Must know

Differential diagnosis of Jaundice & LFTS
Must know
The differential diagnosis and laboratory investigations in Jaundice.

Recent diagnostic techniques in pathology
Must know
PCR, flow cytometry, Immunofluorescence, Electron microscopy, gene microarray Molecular biology & hybridization techniques.

Cytology
Must know
Exfoliative cytology, PAP Smear. FNAC of common organs. Guided FNAC Tutorials.

General Pathology
Cell injury and cell death, Cellular accumulations, Inflammation and repair, Circulatory disturbances, Immunological disorders, Infections, Neoplasia, Amyloidosis, Aids, Tuberculosis

Haematology
Anaemias, Leukaemias, Interpretation of haematological case charts, Haemorrhagic disorders, Blood group & transfusion, Identification of instruments

Systemic Pathology
Diseases of b.v. & Heart, Pneumonia & tumors of lungs, Oral cancer, Peptic ulcer & intestinal ulcers, Tumors of G.I.tract, Diseases of liver & D/D of jaundice, Glomerulonephritis, Carcinoma breast, Carcinoma Cervix, Bone tumors, Museum specimens, Museum specimens

Clinical Pathology
Glucose Tolerance Test, Renal Function Tests, Differential Diagnosis of Meningitis, Identification of needles and instruments used in clinical pathology

Autopsy
Tuberculosis, Myocardial infarction, Carcinoma/sarcoma, Hypertension by students.

PRACTICALS
General Pathology
Microscopy and tissue processing, Identify the common types of cells by light microscopy, Intracellular accumulation, Necrosis & gangrene, Acute inflammation, Chronic inflammation and Repair, Thrombosis, embolism, Infarction, Oedema and congestion, Disturbances of pigment metabolism, Tuberculosis, Leprosy, Amyloidosis, Disturbances of growth (Atrophy, hypertrophy, hyperplasia, metaplasia, Dysplasia, hypoplasia), Epithelial tumors, Soft tissue tumors.
Haematology

Systemic Pathology
Diseases of blood vessels (Atherosclerosis, syphilitic aortitis), Diseases of Heart (IHD & RHD), Pneumonias, Tumors of lung, Diseases of kidney, Gross and Microscopic features of peptic ulcer and duodenal ulcer, Gross and Microscopic features of other intestinal ulcers, Tumours of GIT, Diseases of Liver, Lymphomas, Diseases of male genital system, Female genital system, Tumours of breast, Tumours of skin (Pigmented&non-pigmented), Tumours of bone, Diseases of thyroid, Diseases of CNS

Clinical Pathology
Urine RE - Carryout a bedside routine urine examination and interpret the results, Pregnancy test and Semen Analysis - (Practical demonstration), Common cytological preparations & serous fluid examination, CSF examination.

Autopsy
To study and describe five autopsy reports.

Books Recommended
- Text book of Pathology - Robbins
- Text book of General Pathology Part I & II - Bhende and Deodhare
- Clinical Pathology - Talib
- Text book of Pathology - Harsh Mohan
- Text book of Pathology - Muir
- Haematology - De Gruchi

Reference Books
- Text book of Pathology Vol I II& III - Sternbergs
- Haematology - Wintrobes
- Pathologic basis of Disease - Robbins

Teaching Methods and Hours
1. Total No. of Hours 300 hrs.
   - Theory didactic lectures 99 hrs.
   - Non-lecture teaching (Tutorials) 35 hrs.
   - Practical/Demonstration 100 hrs.
   - Internal Assessment 35 hrs.
   - Revision 31 hrs.

2. Topic wise/System wise distribution of teaching hours:

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<tbody>
<tr>
<td>1.</td>
<td>General Pathology</td>
<td>91</td>
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<tr>
<td>2.</td>
<td>Systemic Pathology</td>
<td>115</td>
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<tr>
<td>3.</td>
<td>Hematology</td>
<td>57</td>
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<td>4.</td>
<td>Clinical Pathology</td>
<td>25</td>
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<td>5.</td>
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<td>50</td>
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<tr>
<td>Practicals (B)</td>
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</tr>
<tr>
<td>40</td>
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University Examination - Distribution of Marks

<table>
<thead>
<tr>
<th>Pattern Of Examination</th>
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<tbody>
<tr>
<td>1. THEORY</td>
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<tr>
<td>PRACTICAL</td>
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<td>1. Practicals</td>
<td>26</td>
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<td>2. Internal Assessment (Practical)</td>
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<td>B. Total Practicals</td>
<td>41</td>
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<td>Grand Total A + B</td>
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Nature Of Question Paper

Paper I 40 marks

Paper II 40 marks

Section - A Q. No. 1. Multiple Choice Questions (28 - MCQs) - 14 marks

Section - B Q. No. 2 Short Answer Questions (SAQs) - 12 marks
  Write in brief (Any Six out of Seven)

Section - C Q. No. 3 Long Answer Questions (LAQs). - 14 marks
  (Any Two out of Three)

PATTERN OF VIVA VOCE AND PRACTICAL EXAMINATION

I. Viva examination (Orals) : Total - 14 marks

II. Practical examination : Total - 26 marks
MICROBIOLOGY

Goal
The goal of teaching Microbiology is to provide understanding of the natural history of infectious diseases in order to deal with the etiology, pathogenesis, pathogenicity, laboratory diagnosis, treatment, control and prevention of these infections and infectious diseases.

Objectives
The student of the end of one and half years should be able to:
1) State the etiology, pathogenesis and methods of laboratory diagnosis and apply that knowledge in the diagnosis, treatment, prevention and control of communicable diseases caused by microorganisms.
2) Understand commensally, opportunistic and pathogenic organisms of human body and describe host parasite relationship.
3) Know and describe the pathogenesis of diseases caused by microorganisms.
4) State the sources and modes of transmission of pathogenic & opportunistic microorganisms including knowledge of insect vectors & their role in transmission of infectious diseases.
5) Choose appropriate laboratory investigations required for clinical diagnosis.

Skills
1) Plan and interpret laboratory investigations for diagnosis of infectious diseases and correlate the clinical manifestations with the etiological agent.
2) Identify common infectious agents with the help of laboratory procedure acquire knowledge of antimicrobial agents, use of antimicrobial sensitivity tests to select suitable antimicrobial agents for treatment.
3) Perform simple laboratory tests, which help to arrive at rapid diagnosis.
4) Be conversant with proper methods, of collection, storage & transport of clinical material for microbiological investigations.
5) Understand the principles of immunology and its application in the diagnosis and prevention of infectious diseases including immunization schedule, acquire knowledge of the scope of immunotherapy and different vaccines available for the prevention of communicable diseases.
6) Understand methods of disinfections and sterilization and their application to control and prevent hospital and community acquired infections including universal biosafety precautions and waste disposal.
7) Recommend laboratory investigations regarding bactriological examination of food, water, milk and air.
8) The student should be well equipped with the knowledge of prevalent communicable diseases of national importance and of the newer emerging pathogens.

COURSE CONTENT

THEORY

The areas of study in Microbiology will include General Microbiology, Systemic Microbiology including Bacteriology, Immunology, Mycology, Virology, Rickettsia, Chlamydia, Parasitology and Applied microbiology in relation to infections and diseases of various systems of body.

General Microbiology

Introduction and Historical background

Must know
Definitions, Medical Microbiology, pathogen, commensal symbiont etc. To cover Antony van Leeuwenhoek Pasteur, Lister, Koch, Flemming etc. in History Scope to
cover the importance of Med Microbiology on diagnosis and prevention of infections diseases.

Desirable to know
Micro-organisms as models in Molecular Biology and Genetic engineering

Morphology of bacteria and Classification
Must know
Bacterial cell and its organelles, morphological classification, methods of studying bacteria, staining methods & their principles, Gram & Zel Neelson staining, their importance in presumptive diagnosis, negative staining, dark ground illumination, Phase contrast and fluorescent microscopy, briefly about electron microscopy, Principles and applications of all microscopes.

Physiology of bacteria including growth requirements & metabolism
Must know
Nutrition, respiration (anaerobic & aerobic) and growth of bacteria, growth curve, physical factors influencing growth. Culture media: Definition, classification and application.

Desirable to know
Important constituents of culture media.

Sterilization.
Must know
Definition of sterilization, disinfection asepsis, antiseptics. Ubiquity of bacteria, modes of killing microbes and preventing them, Factors determining selection of the mode, factors adversely affecting sterilization. Enumeration of physical methods of sterilization including principle & their application.

Desirable to know
Working and efficacy testing of autoclave, inspissator and hot air oven, Central Sterile supply. Department (CSSD) - concept only.

Disinfectants.
Must know
Asepsis and antisepsis, mode of action of chemical agents on microbes. Phenols, Halogens, Aldehydes, Acids, Alcohol. Heavy metals. Oxidizing agents etc. Universal biosafety precautions

Desirable to know
Dyes, soaps and detergents. Concentration and contact time.

Waste disposal
Must know
Definition of waste, Classification, Segregation. Transport and disposal.

Bacterial genetics and drug resistance to antimicrobial agents.
Must know
Introduction- codon, lac operon, mutation, transformation, transduction & conjugation. R factor. mode of action of antimicrobials on bacteria, mechanism of drug resistance and antimicrobial susceptibility tests, steps taken to minimize emergence of resistant strains (Antibiotic policy, formulation)

Host parasite relationship and bacterial infections
Must know
Commensal. Pathogenic and opportunistic organisms. Their pathogenic factors and modes of transmission, Microbial factors spores, Capsule, toxins, enzymes, intracellular parasitism, Antigentic variation & extrinsic
factors etc. leading to establishment of infection. Types of infection: primary, Secondary, General, Local, natural, nosocomial, introgenic, zoonotic.

Normal flora
  Must know
  Introduction - various sites, types and role.

Methods of identification of bacteria. Diagnosis of infectious diseases (direct and indirect)
  Must know
  Desirable to know
  PCR, RIA., DNA Probes.

IMMUNOLOGY
Introduction
  Must know
  Definition of immunity, types of immunity, factors responsible, Mechanism of innate immunity, active and passive immunity, local immunity.
  Desirable to know
  Herd immunity

Antigens, HLA
  Must know
  Definition, Types, Antigen determinants, Properties of antigen. MHC - concept, Class-I,II &III functions, Indication of typing, MHC restriction.
  Desirable to know
  Nature of determinants e.g. of haptens. e.g. of cross/reactive antigen

Antibodies.
  Must know
  Definition, nature, structure of immunoglobulins, papain digestion, understrand isotypic, allotypic and idiotypic markers, immunoglobulin classes, physical and biological properties of immunoglobins.
  Desirable to know
  Pepsin digestion, Amino acid sequence, immunoglobin domain, abnormal immunoglobins.

Serological reactions.
  Must know
  Desirable to know

Immune response
  Must know
  Types, Development, Role of - thymus, bone marrow, lymph nodes & spleen, Cells of lymphoreticular system, Morphology and role of T subsets, NK cells, B cells, Plasma cells and macrophages, B & T cell activation,antigen processing and presentation, primary and secondary immune response, principle and uses of
monoclonal antibodies, factors affecting antibody production, CMI- definition, types, role of T cell and macrophages, Definition of immune tolerance and mechanism of tolerance.

**Desirable to know**
Lymphokines and their role, Clonal selection, mechanism of immunonegulation. Theories of antibodies formation, techniques of monoclonal antibody formation. detection of CMI, types of immunotolerance.

**Complement**

**Must know**
Definition, Synthesis, Pathways, activation, role & biological functions, components, measurement.

**Desirable to know**
Regulation of complement activation, complement deficiency.

**Hypersensitivity**

**Must know**
Definition, Classification, difference between immediate and delayed reaction, mechanism of anaphylaxis, Types of anaphylaxis, atopy, e.g. of anaphylactic reaction. Tests for anaphylaxis mechanism and e.g. of type II & type III reactions. Mechanism & types of delayed hypersensitivity.

**Desirable to know**
Desensitization in anaphylaxis, type V reaction. ADCC, Shwartzman phenomenon.

**Autoimmunity**

**Must know**
Definition, Mechanism, classification, pathogenesis.

**Transplantation & tumour immunology**

**Must know**
Type of transplants. Mechanism of transplant rejection, Prevention of graft rejection, GVH reaction, IR to tumours. Tumour antigens, mechanism of IR to tumours.

**Desirable to know**
Type of tumour antigens. Immune surveillance.

**Immuno- Deficiency**

**Must know**
Classification, examples, laboratory tests for detection, Manifestations.

**SYSTEMIC BACTERIOLOGY**

**Pathogenesis includes:**

**Must know**
Infectious agent, Habitat, Source /reservoir, Mode, Infective dose, Multiplication, spread, Clinical features, pathology, Complications, Virulence factors

**Desirable to know**
Immunological response

**Laboratory diagnosis:**
Specimen selection, Collection, Transport, Primary smear, hanging drop, Selection of media, Pathogenicity testing, Anti microbial drug susceptibility testing, Serological interpretation
<table>
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<tr>
<th>Sr No</th>
<th>Topic/hr</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
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<td>K</td>
<td>DK</td>
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<td>K</td>
<td>BA-MK</td>
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<td>K</td>
<td>LJ.Growth Time MK</td>
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<td>Atypical Mycobacteria (1 hour)</td>
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<td>M. leprae (1 hour)</td>
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<td>Isolation MK</td>
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<td>K</td>
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<td>Bacillus Methods of Anaerobiosis &amp; Classification Non sporing anaerobes (1 hour)</td>
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<td>K</td>
<td>MK</td>
<td>D</td>
<td>K</td>
<td>M</td>
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<td>Clostridium welchi, tetani, botulinum (2 hrs.)</td>
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<td>K</td>
<td>D</td>
<td>MK</td>
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<td>Enterobacteriaeae (2 hours)</td>
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<td>Salmonella typhi (2 hours)</td>
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<td>Pseudomonas (1 hour)</td>
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<td>Brucella (1 hour)</td>
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<td>Haemophilus (1 hour)</td>
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<td>DK</td>
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<td>Bordetella &amp; Pasteurella (1 hour)</td>
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<td>D</td>
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<tr>
<td>18</td>
<td>Spirochetes (2 hrs)</td>
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<td>K</td>
<td>DK</td>
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<td>K</td>
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<tr>
<td>19</td>
<td>Actinomycosis &amp; Nocardia(1hour)</td>
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<td>K</td>
<td>MK</td>
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<td>20</td>
<td>Rickettsia (1 hour)</td>
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<td>K</td>
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<td>M</td>
<td>K</td>
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<tr>
<td>21</td>
<td>Chlamydia &amp; Mycoplasma (2 hours)</td>
<td>M</td>
<td>K</td>
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<td>22</td>
<td>Bacteriology of air water, milk and food (1 hour)</td>
<td>-</td>
<td>-</td>
<td>MK</td>
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</table>
MYCOLOGY

Introduction to Mycology
   Must know
      Nature of fungus (definition, differences with bacteria). Characteristics of fungi,
      Common terminologies, brief account of types of sporulation and morphological
      classification of fungi, Methods of identification. Infections produced. Lab
      Diagnosis. Processing of skin, hair and nail.

   Desirable to know
      Growth requirements, ecological, medical and industrial importance of fungi
      (brief account)

Agents of Superficial mycosis
   Must know
      Enumerate, predisposing factors, morphological features, Lab. Diagnosis

   Desirable to know
      Colony characteristics of dermatophytes.

Subcutaneous mycosis
   Must know
      Enumerate, predisposing factors, Mycetoma, Rhinospondiosis, Pathog-enesis,
      Lab Diagnosis.

Systemic mycosis
   Must know
      Classification, predisposing factors, morphology, Pathogenesis lab Diagnosis

   Desirable to know
      Cultural characteristics

Opportunistic fungal infections
   Must know
      Classification, Predisposing factors, Mucor, Aspergillus, Pneumocystis carinii,
      Candida, cryptrococcus.

   Desirable to know
      Cultural characteristics

VIROLOGY

   Must know
      Morphology, pathogenesis, laboratory diagnosis, prevention and control for all
      viruses

General Virology
   Must know
      Size, Shape, symmetry, structure, resistance, multiplication, properties and
      classification of viruses, pathogenesis, bacteriophages, concept of virons.

Laboratory diagnosis of viral infections
   Must know
      Collection of samples, transport, cultivation and methods of diagnosis.

Viral immunity
   Must know
      Viral immunity, interferon, viral vaccines.

Pox viruses
   Must know
      Smallpox and Molluscum.
DNA viruses
   Must know
   Papova, Adeno, Herpes viruses (herpes simplex, Varicella zoster, CMV, EBV)

Respiratory viruses
   Must know
   Orthomyxo and Paramyxoviruses, Ag shift and drift.
   Desirable to know
   Rhinoviruses

Picornaviruses
   Must know
   Polio, Coxsackie, Enteroviruses, Viruses causing diarrhoea - Rotaviruses,
   Immunity (polio).

Hepatitis viruses
   Must know
   Hepatitis viruses immunity and laboratory diagnosis.

Arboviruses.
   Must know
   Dengue, KFD, Japanese encephalitis, definition, Classification, enumeration in
   India. Pathogenesis, laboratory diagnosis and control.

Rhabdoviruses
   Must know
   Rabies

Slow and Oncogenic viruses, Newer viruses (SARS)
   Must know
   Characteristics of slow virus infections. Pathogenesis and laboratory diagnosis
   and viruses associated with it.

Retroviruses.
   Must know
   HIV/AIDS, Immunity. USP

PARASITOLOGY
   Must know
   Geographical distribution, Habitat, Morphology (different stages) found in human
   beings, Life cycle, Pathogenesis, Laboratory diagnosis, Treatment, Control,
   Immunoprophylaxis

Introduction to Medical Parasitology
   Must know
   Parasites, their nature, classification and explanation of terminologies,
   epidemiology, emerging parasitic infection, pathogenicity and laboratory
   diagnosis.

E. Histolytica
   Must know
   Amoebic infections

Free-living amoebae and Flagellates
   Must know
   Free living amoebae. PAME, Giardia & Trichomonas.
Hemoflagellates

Must know
L. donovani, life cycle, morphology, pathogenicity and Lab. diagnosis.

Desirable in know
Brief account of Trypanosomes.

Malaria

Must know
Malarial parasites: life cycle, morphology, Pathogenicity, laboratory diagnosis etc.

Misc. Pathogenic protozoa

Must know
Toxoplasma

Desirable in know
Cryptosporidium, Isospora, B coli

Cestodes

Must know
Taenia saginata & solium. Echinococcus granulosus- life cycle, morphology, pathogenicity and laboratory diagnosis.

Desirable in know
Brief mention of other cestodes.

Trematodes

Must know
Schistosomiasis; life cycle, morphology, pathogenicity & lab diagnosis.

Desirable in know
Brief account of Fasciola hepatica.

Intestinal Nematodes

Must know
A duodenale, A lumbricoides, E. vermicularis. T. trichura (Life cycle, Morphology, laboratory diagnosis).

Desirable in know
Brief mention of S. stercoralis.

Tissue Nematodes

Must know
W. bancrofti, D. medinensis, in brief T. spiralis.

Tutorials

Must know
- Micro-organisms causing diseases & pathological lesions
- Methods of collection & transportation of specimens
- Methods of laboratory diagnosis
- Serological response produced by organisms.
- Interpretation of laboratory report.

Topic of Tutorial:
- Gastrointestinal infections (diarrhoea and dysentery) and their laboratory diagnosis.
- Upper respiratory tract infection (patch sore throat) and their laboratory diagnosis.
- Lower respiratory tract infection (pneumonia, bronchitis, bronchiolitis etc.) and their Laboratory diagnosis.
- Urinary tract infection and their laboratory diagnosis.
• Infections of the central nervous system (meningitis, encephalitis, brain abscess) and their laboratory diagnosis.
• Wound infections and pyogenic infections.
• Septicemia and PUO and laboratory diagnosis.
• Eye infections and their laboratory diagnosis.
• Sexually transmitted disease (STD) and their laboratory diagnosis (genital ulcerative disease.)
• Role of laboratory in cross infection. Nosocomial infections/outbreak/epidemic.
• Vehicles and vectors of communicable disease & zoonosis.
• Preventive inoculations immunomodulation and immunotherapy.

Integrated teaching
• Tuberculosis and Leporosy Note Each topic may be allotted 3 hrs.
• Pyrexia of Unknown Origin (PUO) these topics may be covered in 2nd and 3rd term of 2nd MBBS
• Sexually Transmitted Diseases
• Hepatitis
• HIV/AIDS
• Malaria
• Diarrhoea and Dysentery

Practicals
• Introduction to Microbiology, Microscopy and Micrometry.
• Morphology and physiology of bacteria and methods staining
• Growth requirements of bacteria (media) and identification of bacteria (biochemical reactions.)
• Scheme for laboratory diagnosis of infectious diseases; collection, storage and transport of microbiological specimens (and laboratory animals).
• Sterilization- the physical agents. Sterilization- the chemical agents and method of waste disposal.
• Serological tests for diagnosis of microbial infections
• Staphylococci and other gram-positive cocci.
• Streptococci and Pneumococci
• Gram negative cocci
• C. diphtheriae and other gram positive non sporing bacilli.
• Mycobacteria
• Spore bearing aerobic and anaerobic bacilli.
• Enteric gram-negative bacilli - lactose fermenters - E coli etc.
• Non lactose fermenters - Salmonella and Shigella.
• V. cholerae and other Vibrio like organisms.
• Pseudomonas, Proteus and hospital acquired infection.
• Spirochetes.
• Actinomycetes, Nocardia and Fungi.
• Rickettsia, Chlamydia, Mycoplasma and Viruses.
• Introduction to parasitology and Protozoal infections.
• Haemoflagellates.
• Plasmodia and toxoplasma.
• Cestodes and trematodes.
• Intestinal nematodes.
• Extra - intestinal nematodes.

Books recommended:
1. Textbook of Microbiology - R Ananthanarayan, C K Jayaram Panikar
2. A textbook of Microbiology - P. Chakraborty
3. Textbook of Medical Microbiology - Rajesh Bhatia & Itchpujani
4. Textbook of Medical Microbiology - Arora and Arora
5. Textbook of Medical Parasitology - C. K. Jayaram Panikar  
8. Microbiology in clinical practice - D. C. Shanson  

**Books Reference**
1. Mackie McCartney practical Medical Microbiology - Colle. JG. Fraser AG  
2. Principles of Bacteriology, Virology & Immunology Vol. 1,2,3,4,5 - Topley- Wilsons  
3. Medical Mycology (Emmons) - Kwon Chung  
4. Review of Medical Microbiology (Lange) - Jawetz  
5. Immunology - Weir DM  
6. Medical Microbiology - David Greenwood, Richard Stack, John Pentherer  
7. Parasitology - KD Chatterjee  
8. Medical Virology - Timbury MC  
9. Mackie McCartney medical Microbiology vol 1 - Duguid JP,  
10. Microbial infection - Marmion BP. Swain RHA  
11. Manson- Barr,- Manson Tropical Diseases - ELBS  

**Teaching Methods and Hours**
1. **Total No. of Hours** 250 hrs.  
   - Theory didactic lectures 82 hrs.  
   - Non-lecture teaching 35 hrs.  
   - Practical/Demonstration 100 hrs.  
   - Internal Assessment 33 hrs.  

2. **Topic wise/System wise distribution of teaching hours:**

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<tr>
<th>Sr. No</th>
<th>Topic / System</th>
<th>No. of hours</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>General Microbiology</td>
<td>12</td>
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<tr>
<td>2.</td>
<td>Immunology</td>
<td>12</td>
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<tr>
<td>3.</td>
<td>Systemic Bacteriology</td>
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<td>4.</td>
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<td>Parasitology</td>
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**Scheme Of Examination**

**Internal Assessment Examination Scheme**

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<th>1st Term Ending</th>
<th>2nd Term Ending</th>
<th>Preliminary Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory</td>
<td>(A)</td>
<td>Theory (C)</td>
<td>Theory (E)</td>
</tr>
<tr>
<td></td>
<td>(B)</td>
<td>Pricals (D)</td>
<td>Pricals (F)</td>
</tr>
<tr>
<td>50</td>
<td>40</td>
<td>50</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td></td>
<td>40</td>
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</tbody>
</table>

1) Theory marks to be sent to the University out of 15 =

\[
(A) + (C) + (E) = 50 + 50 + 80 = 180
\]

\[
\frac{12}{12} = \frac{12}{12} = 15
\]

**KRISHNA INSTITUTE OF MEDICAL SCIENCES DEEMED UNIVERSITY, KARAD.**
2) Practical marks to be sent to the University out of 15 =

\[
\frac{(B) + (D) + (F)}{8} + \frac{40 + 40 + 40}{8} = \frac{120}{8} = 15
\]

University Examination - Distribution of Marks

<table>
<thead>
<tr>
<th>Pattern of Examination</th>
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</tr>
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<tbody>
<tr>
<td>1. THEORY</td>
<td>2</td>
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<tr>
<td>No. of Papers</td>
<td>2</td>
</tr>
<tr>
<td>Maximum Marks for each Paper - 40 marks</td>
<td>80</td>
</tr>
<tr>
<td>2. Viva-Voce</td>
<td>14</td>
</tr>
<tr>
<td>3 Internal Assessment (Theory)</td>
<td>15</td>
</tr>
<tr>
<td>A. Total Theory</td>
<td>109</td>
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<tr>
<td>PRACTICAL</td>
<td></td>
</tr>
<tr>
<td>1. Practicals</td>
<td>26</td>
</tr>
<tr>
<td>2. Internal Assessment (Practical)</td>
<td>15</td>
</tr>
<tr>
<td>B. Total Practicals</td>
<td>41</td>
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<tr>
<td>Grand Total A + B</td>
<td>150</td>
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</table>

Nature Of Question Paper

<table>
<thead>
<tr>
<th>Paper</th>
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<tbody>
<tr>
<td>Paper I</td>
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</tr>
<tr>
<td>Paper II</td>
<td>40 marks</td>
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</table>

Section - A Q. No. 1. Multiple Choice Questions (28 - MCQs) - 14 marks

Section - B Q. No. 2 Short Answer Questions (SAQs) Write in brief (Any Six out of Seven) - 12 marks

Section - C Q. No. 3 Long Answer Questions (LAQs). (Any Two out of Three) - 14 marks

Pattern Of Viva Voce And Practical Examination

(i) Viva examination (Orals) : Total - 14 marks

(ii) Practical examination : Total - 26 marks
FORENSIC MEDICINE AND MEDICAL JURISPRUDENCE INCLUDING TOXICOLOGY

Goal
The broad goal of teaching undergraduate students of Forensic Medicine is to produce a physician who is well informed about Medico-legal responsibility during his/her practice of Medicine. He/She will also be capable of marking observations and inferring conclusions by logical deductions to set enquiries on the right track in criminal matters and associated medico-legal problems. He/she acquires knowledge of law in relation to Medical practice, Medical negligence and codes of Medical Ethics.

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

1) Identify the basic Medico-legal aspects of hospital and general practice.
2) Define the Medico-legal responsibilities of general physician while rendering community service either in a rural primary health center or an urban health center.
3) Appreciate the physician’s responsibilities in criminal matters and respect for the codes of Medical ethics.
4) Diagnose, manage and identify also legal aspect of common acute and chronic poisonings.
5) Describe the Medico-legal aspects and findings of post-mortem examination in cases of death due to common unnatural conditions and poisonings.
6) Detect occupational and environmental poisoning, prevention and epidemiology of common poisoning and their legal aspects particularly pertaining to workmen’s compensation Act.
7) Describe the general principles of analytical toxicology.
8) Understand clinical Forensic Medicine.
9) Understand issues in Organ Harvesting.

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

1) Make observations and logical inferences in order to initiate enquiries in criminal matters and Medico-legal problems.
2) To be able to carry on proper Medico-legal examination and documentation/Reporting of injury and Age.
3) To be able to conduct examination for sexual offences and intoxication.
4) To be able to preserve relevant ancillary materials for medico legal examination.
5) To be able to identify important post-mortem findings in common unnatural deaths and be able to distinguish between Natural and Un-natural deaths.
6) To observe the principles of medical ethics in the practice of his profession.
Integration
Department shall provide an integrated approach towards allied disciplines like Pathology, Radiology, Forensic Sciences, Hospital Administration etc. to impart training regarding Medico-legal responsibilities of physicians at all levels of healthcare. Integration with relevant disciplines will provide scientific basis of clinical toxicology e.g. Medicine, Pharmacology etc.

COURSE CONTENT
THEORY

Forensic Medicine
Introduction
Definition Scope Relevant To Subject, History of Forensic Medicine, Need, scope, Importance and probative value of Medical evidence in Crime Investigation

Forensic Identity
Must Know
Introduction, definition, types, corpus delicti, Data useful for identification of Living and dead, Age estimation and it’s medico-legal importance, Sex determination and it’s medico-legal importance, Other methods of establishing identity : Tattoo marks, Deformities, Seers, Identification of decomposed, Mutilated bodies and skeletal remains, Medico-legal aspect of DNA fingerprinting—a brief introduction, Various trace materials having value for evidence in crime.

Thanatology
Must Know
Brainstem Death in relation to Organ Transplantation, Moment of death, Modes of death, Causes of sudden Natural deaths, Changes after death, Cooling, Hypostasis, Changes in eye, Muscle changes, Putrefaction, Adipocere, Mummification, Estimation of time since death, Presumption of death and survivorship, disposal and preservation of dead.

Medico-Legal Autopsy
Must Know
Autopsy: Objectives, Facilities, Rules and Basic techniques, Proforma for reporting Medico-legal autopsy, Exhumation, examination of mutilated remains, Obscure and negative autopsies and post-mortem artifacts.

Trauma
Must Know
Definition and classification of injuries, Blunt force Trauma: Abrasions, Contusions and Lacerations, Sharp force Trauma : Incised, Stab and Chop wounds, Basics of Firearms injuries and Explosive injuries, 1) PM examination of Firearm injury deaths, 2)Removal and collection of Bullets, Pellets, cloths etc., Complications and causes of death due to injury, Medico-legal aspects of Trauma in General and reporting of cases of Hurts and relevant IPCs, Regional injuries : Head injury, mechanism, Injury to Scalp, Skull, Brain, Intracranial Haemorrhages, cut throat injuries and spinal injuries, Road Traffic Accidents injuries, Fabricated and Defence injuries, Physical methods of Torture and their identification, Thermal injuries: Injuries due to heat and cold, Frostbite, Burns, Scalds and Bride burning (Dowry death), Injuries due to Electricity, Lightening, Non-Accidental Domestic Violence, Starvation deaths.

Medico-Legal Aspects of Sex, Marriage And Infant Death
Explanation and ML Importance of Terminologies Impotence, Sterility, Virginity Pregnancy, Delivery, Paternity, Legitimacy, Assisted Reproductive Technique Medico-legal Aspect and PNDT Act, Sexual Offences and Sexual perversions,
Examination of Rape and Sodomy cases, Abortions, Medical Termination of pregnancy Act, Criminal abortions and relevant IPC sections.

Infant deaths: Explanation of Terminologies Viability, Live Births, Deadborn, Stillborn, Determination of age of Focus and Infant with special reference to 3,5,6 & 9 months of I.U. Age, Infanticides Autopsy to confirm Livebirth, period of survival, causes of deaths, Battered Baby Syndrome and sudden Infant Death Syndrome.

Asphyxial Death
Must Know
Introduction, Pathophysiology, General Signs-Symptoms of Asphyxia, Hanging: Definition, Types and Causes of death, PM Finding, ALI, Strangulation, Suffocation and Traumatic Asphyxia, Definition, Types and Causes of death, PM finding and MLI, Drowning:Definition, Types, mechanisms and Causes of death, PM Finding, Test & MLI.

Forensic Psychiatry
Must Know
Basic concepts of Forensic Psychiatry in respect of Viv il and Criminal responsibility, Examination, Certification, restraint and admission to psychiatric hospital and nursing homes, Mental Health Act 1987: Principles and Objectives.

Toxicology
General Principles
Introduction to Toxicology, Epidemiology of poisoning, General consideration and Laws in relation to poisons/Narcotic drugs and Psychotropic substances ACT, duties and Responsibilities of attending Physician, Basic of Environmental and Industrial Toxicology in relation to Health & Ecology, Common poisons and their classification. Identification of common poisons Rules of Administration. Actions of poison and factors modifying them, Diagnosis of poisoning (Clinical and Confirmatory), Treatment/Management of cases of acute and chronic poisoning, Analytical Toxicology (Principles Bedside & Common Lab. Tests), Collection, Preservation and Dispatch of Viscera to FSL, Regulation Toxicology for prevention of Hazards to Health and Ecology.

Corrosive And Irritant Poisons
Must Know

Neurotoxic
Must Know
Inebriant-Ethyl Alcohol, Methyl Alcohol, Benzo-diazepine, Somniferons and Sedative Hypnotics-Opium and Derivatives Barbiturates Chlortal Dhatura Cannabis Cocaine, Insecticides/Pesticides/Agrochemical-organo-phosphorus compounds Organo-chlorides, Carbamates, Pyrethroids, Aluminium phosphide.

Other Poisons
Must Know
Cardiac Poisons-Oleanders, Aconite, Tabacco, Spinal Poisons-Strychnine, Asphyxiants (Gases) Carbon monoxide, Carbon Dioxide, Cyanogen gas and Cyanides, Domestic/Household Poisons-Kerosene, Detergents, Disinfectants, Cosmetics, Rodenticide mothballs etc., Therapeutic Drug Toxicity/poisoning by

Medical Jurisprudence
Legal And Ethical Aspects of Practice of Medicine

Must Know

The Indian Medical Council and State Medical Council Formation, Functions, Rights, Privileges and Duties of Registered Medical Practitioners, Infamous conduct, Professional secrecy and privileged communications, Medical Ethics and prohibition of Torture & care of Torture Victims, Animal Ethics, Consent-Its relevance in Medical Practice, Medical Negligence and contributory negligence. Precautionary measures and defences for Medical Practitioners against legal actions, Medical/Doctors indemnity insurance, Consumer Protection Act relevant to medical practice, Euthanasia-Current views and dilemmas, Different code of Medical Ethics and Ethics in Research, Common medico-legal problems in Hospital practice, Biomedical waste, disposal.

Legal Procedures in Medico - Legal cases

Must Know

Medico-legal investigations of death in suspicious circumstances, different Inquests type of offences, Types of Criminal courts and their powers, punishments prescribed by law, kinds of witnesses, Evidence, Documentary Medical evidence, Dying, declaration and Dying deposition, The Trial criminal cases, Rules and Conventions to be followed by Medical Witness at Medical evidence, subpoena, conduct money Relevant Sections from the Indian Evidence Act, Indian Penal code and criminal Procedure code.

Practicals

Forensic Medicine

Report on: Estimation/Certification of Age, Recording of fingerprints, Examination/Certifications of the Injured - (Prescribed Forms), Examination of the Causative Agents in cases of Injuries - (e.g. Weapons, Instruments), Hard and blunt weapons, Sharp cutting, sharp pointed and Sharp Heavy cutting weapons, Firearm weapons, Sexual offences - Examination/Certification of Victim, Examination/Certification of Accused, Examination of Focust to opine about age with reference to 3,5,6,7 months LU period, Examination of Bones for Medico-legal purpose to determine age, sex, stature, cause of death, time since death - a) Skull and Mandible, b) Pelvis, c) Femur, Humerus.

Study of

Medical certification of cause of Death as per Birth and Death registration Act (Prescribed Forms), Studies of Skiagrams for estimation of age, bony injury, foreignbody and pregnancy, Photograph of different events of Medico-legal importance and post-mortem c changes, Study of Various slides of medico-legal significanc, Demonstration of Instruments - a) Used in treatment of acute poisoning cases, b) Used for causing abortions, c) Used for carrying out autopsy

Forensic Toxicology

Examination/Certification of Alcoholic (Prescribed Forms ‘A’ & ‘B’), Study of Common poisons - (Sulphuric Acid, Nitric Acid, Hydrochloric Acid, Carboic Acid and Oxalic Acid, Phosphorous, Lead, Arsenic, Mercury, Copper, Glass powder, Castor, Croton, Calatropis, Abrus Precatorious (Ratti), Dhatura, Cannabis Indica, Opium, Aconile, Yellow Oleander Stryehmine, Snakes, Scorpon, Alcohol, Methyl Alcohol, Kerosen, Organo-phosphorus compounds, Organo Chloro compounds, Carbamates (Carbary I) and other commonly used poisons antidotes and preservatives.
Medical Jurisprudence

Study of Medical Certificates (Prescribed Forms)

a) Sickness Certificate
b) Fitness Certificate
c) Certificate of Physical fitness

Legal procedures in medico-legal cases

Orientation of various formats of specified forms: Consent to surgery, Anaesthesia and other Medical services, Request for sterilization, consent to access for hospital records, Authorization for Autopsy, Dead body Challan used for sending Dead body for post-mortem examination, Request for the second inquest by Magistrate on the Dead body. Advance post-mortem certificate, Post-mortem form, Pictorial Post-mortem form. Form for the Final cause of death, Form for dispatch of exhibits other than the viscera to chemical analyzer. Forms for dispatch of Viscera for Histopathological Examination, Form for Dispatch of viscera to chemical analyzer, Forensic Science Laboratory report form, Summons to Witness.

Books Recommended

- Text book of Medical Jurisprudence and Toxicology - Modi Ed. 23:2005
- The Essentials of forensic medicine & Toxicology - K.S.Narayan Reddy
- Text Book of Forensic Medicine - J.B.Mukher Vol.1, 2
- Principles of Forensic Medicine - A. Nand
- Legal Medicine - Dr. A.C. Mohanty’s
- Medical Jurisprudence and Toxicology - Bernard Knight et al.: Cox’s
- Medical Jurisprudence and Toxicology - Krishna Handboook et al: Cox’s
- Modern Medical Toxicology - V.V. Pillay
- Text Book of Medical Jurisprudence and Toxicology - Parikh
- Forensic Medicine & Toxicology Oral, Practical and MCQ - R.N. Karmakar.

Reference Books

- Forensic Pathology - Russell S. Fisher & Charles S. Petty
- Forensic Medicine - Keith Simpson
- Current Methods of autopsy practice - Jurgen Ludwig
- Legal Medicine - Gradwohl

Teaching Methods and Hours

1. Total No. of Hours 100 hrs.
   Theory didactic lectures 40 hrs.
   Non-lecture teaching 20 hrs.
   Practical/Demonstration 40 hrs.

2. Topic wise/System wise distribution of teaching hours:

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<thead>
<tr>
<th>Sr. No</th>
<th>Topic / System</th>
<th>No. of hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Forensic Medicine</td>
<td>15</td>
</tr>
<tr>
<td>2.</td>
<td>Toxicology</td>
<td>15</td>
</tr>
<tr>
<td>3.</td>
<td>Medical Jurisprudence</td>
<td>06</td>
</tr>
<tr>
<td>4.</td>
<td>Legal procedure in Medico-legal cases</td>
<td>04</td>
</tr>
<tr>
<td>5.</td>
<td>Court Attendance</td>
<td>04</td>
</tr>
<tr>
<td>6.</td>
<td>Integrated Approach Towards allied disciplines</td>
<td>06</td>
</tr>
<tr>
<td>7.</td>
<td>Tutorials and Seminars</td>
<td>10</td>
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Scheme Of Examination

Internal Assessment Examination Scheme

<table>
<thead>
<tr>
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<th>1st Term Ending</th>
<th>2nd Term Ending</th>
<th>Preliminary Examination</th>
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<tbody>
<tr>
<td>Theory (A)</td>
<td>20</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>Practicals (B)</td>
<td>20</td>
<td>20</td>
<td>40</td>
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1) Theory marks to be sent to the University out of 10 =

\[
\frac{(A) + (C) + (E)}{08} = \frac{20 + 20 + 40}{08} = \frac{80}{08} = 10
\]

2) Practical marks to be sent to the University out of 10 =

\[
\frac{(B) + (D) + (F)}{08} = \frac{20 + 20 + 40}{08} = \frac{80}{08} = 10
\]

University Examination - Distribution of Marks

<table>
<thead>
<tr>
<th>Pattern Of Examination</th>
<th>F.M.T.</th>
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<tbody>
<tr>
<td>THEORY</td>
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<tr>
<td>Written Paper</td>
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</tr>
<tr>
<td>No. of Papers</td>
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</tr>
<tr>
<td>Maximum Marks for each Paper - 40 marks</td>
<td>1</td>
</tr>
<tr>
<td>Viva-Voce</td>
<td>10</td>
</tr>
<tr>
<td>Internal Assessment (Theory)</td>
<td>10</td>
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<tr>
<td>A. Total Theory</td>
<td>60</td>
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<td>PRACTICAL</td>
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<td>Practicals</td>
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<tr>
<td>Internal Assessment (Practical)</td>
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<tr>
<td>B. Total Practicals</td>
<td>40</td>
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<td>Grand Total A + B</td>
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Nature Of Question Paper

One Paper 40 marks

Section - A Q. No. 1. Multiple Choice Questions (28 - MCQs) - 14 marks

Section - B Q. No. 2 Short Answer Questions (SAQs)
Write in brief (Any Six out of Seven) - 12 marks

Section - C Q. No. 3 Long Answer Questions (LAQs)
(Any Two out of Three) - 14 marks

PATTERN OF VIVA VOCE AND PRACTICAL EXAMINATION

(i) Viva examination (Orals) : Total - 10 marks

(ii) Practical examination : Total - 30 marks

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