Curricula for M.B.B.S. Second Professional Examination

PATHOLOGY

1. 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.

2. Educational objectives

(a) Knowledge

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

i. describe the structure and ultrastructure of a sick cell, the mechanisms of the cell degradation, cell death and repair.

ii. Correlate structural and functional alterations in the sick cell.

iii. Explain the Pathophysiological processes which governs the maintenance of homeostasis, mechanism of their disturbances and the morphological and associated clinical manifestation

iv. describe the mechanisms and patterns of tissue response to injury to appreciate the Pathophysiology of disease processes and their clinical manifestations.

v. 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.

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

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

(b) Skills

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

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

ii. Interpret diagnostic laboratory tests and correlate with clinical and morphological features of diseases.
iii. Perform simple bedside tests on blood, urine and other biological fluid samples.

iv. Draw a rational scheme of investigations for diagnosing and managing common disorders.

v. Recognise morbid anatomical and histopathological changes for the diagnosis of common disorder.

(c) 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.

3. Total duration of teaching

3 Semesters (III, IV and V)

Minimum 315 working days.

Total number of teaching hours allotted to the discipline

300 hrs

Distribution of teaching hours

A) Theory (lectures & ..... tutorials) ..... Total ..... 101 58 159

B) Practicals ..... 110

C) Revision & Evaluation (Internal) ..... 31

4. Syllabus

a. Learning methods

Distribution of teaching hours

Divisions

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<tr>
<th></th>
<th>a) lectures (1 hr)</th>
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b. & c. **Sequential organization of course contents**

The Broad area of study shall be:-
General Pathology (including general neoplasia) Systemic Pathology (including systemic neoplasia)
Haematology, Clinical Pathology

A) **GENERAL PATHOLOGY: (n=35)**

1. Definitions and causes of diseases:-
   Must know:- Able to recall common definitions in Pathology and causes of cell injury.

2. Modes of cell injury:-
   Must know:- Able to appreciate mechanisms of cell injury & relate them to the morphological changes.

3. Necrosis & gangrene:-
   Must know:- Able to recognize types of necrosis and gangrene at gross and microscopic levels.
   Desirable to know:- Apoptosis and its relevance.

4. Intracellular accumulations and alterations:-
   Must know:- Able to list the types of intracellular accumulations & alterations in reversible cell injury along with alterations in cell organelles and cytoskeleton.

5. Cellular Adaptations/ Growth disturbances:-
   Must know:- Define the various growth disturbances and appreciate the clinical significance of each.

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

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

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

9. Regeneration and repair (general):-
Must know:- Define & describe regeneration and repair and understand the mechanisms and list factors modifying repair.

10. Repair in specialized tissues:-
Must know:- Describe repair in fractures and parenchymal organs and list modifying factors and complications.

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

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

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

14. Embolism and Infarction:-
Must know:- Enumerate types of embolism and infarction, recognize morphological changes and correlate clinical significance.

15. Hyperaemia and Haemorrhage:-
Must know:- Definitions, morphology of acute and chronic congestions, clinical significance of haemorrhage.

16. Disturbances of pigment metabolism:-
Must know:- State the type of pigment disturbances and describe the changes associated with common disturbances like lipofuscin, melanin, Hemosiderin and Bilirubin.

17. Disturbances of Mineral metabolism:-
Must know:- Describe the types and morphological changes of calcification. Desirable to know:- Disturbances of other minerals like zinc etc.

18. Genetic disorders:-
Must know:- Normal karyotype, classification of genetic disorders, types of genetic change, Down's syndrome, Klinefelter's syndrome, Turner's syndrome Desirable to know:- Lysosomal storage disorders, glycogen storage diseases, methods of disease diagnosis.

19. Hypersensitivity reactions:-
Must know:- Classify, differentiate between different types of Hypersensitivity reactions.
Desirable to know:- Be conversant with transplant rejections.
20. Autoimmune diseases:
   Must know: Understand mechanisms of autoimmunity and diagnose common autoimmune diseases; overview of SLE.
21. Amyloidosis:
   Must know: Definition, physical characters, chemical characters, classification, pathogenesis morphology, clinical correlation and lab diagnosis.
22. AIDS:
   Must know: Understand the natural history of the disease and recommend relevant investigations in the management.
23. Typhoid fever:
   Must know: Correlate Pathogenesis with morphology and clinical features of the disease.
24. Syphilis:
   Must know: Classify and describe lesions in various stages of syphilis.
25,26,27 (3 lectures) 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.
28. Leprosy:
   Must know: Classify, differentiate between different types of leprosy and describe the diagnostic histologic features and sequelae.
29. Fungal diseases:
   Desirable to know: Classification and be conversant with relevance of fungal diseases in the world with emphasis on opportunistic fungal infections.
30. Malaria:
   Must know: Identify, morphological features in vivax and falciparum malaria and recommend lab investigations in the management.
31 & 32. Neoplasia - Nomenclature and classification:
   Must know: Define important terms, classify and differentiate benign from malignant neoplasms.
   Desirable to know: Precancerous conditions
33. Neoplasia - Carcinogenesis:-
   Must know:- Understand carcinogenesis and analyse the mechanism of genetic changes in carcinogenesis.

34. Neoplasia - Biology and Lab diagnosis:-
   Must know:- Understand the tumour host interactions in neoplasia and recommend the diagnostic workup for detection of cancer.

35. Neoplasia - Spread, grading and staging:-
   Must know:- Biology of tumour growth, metastases, types, mechanisms, clinical correlations, grading of cancer and staging of cancer.

B) HAEMATOLOGY : (n=15)
1. Introduction to haematology and hemopoiesis:-
   Must know:- Understand the importance of haematology in clinical practice and enumerate the stages of hemopoiesis.

2. Anaemias (general):-
   Must know:- Definition, classify anaemia by various methods, clinical features and lab approach to anaemias.

3. Iron deficiency anaemia:-
   Must know:- Definition, causes, haematological features, morbid anatomical features, laboratory diagnosis and differential diagnosis.

4. Megaloblastic anaemia:-
   Must know:- Definition, causes, haematological features, morbid anatomical features, laboratory diagnosis and differential diagnosis.

5. Haemolytic anaemia:-
   Must know:- Definition, classification, Pathogenesis and haematological features.

6. Haemoglobinopathies:-
   Must know:- Definition, classification, Lab diagnosis of Thalassaemia and Sickle cell anaemia.

7&8. 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 etiopathogenesis, morphological features (haematological and morbid anatomical) clinical significance and lab diagnosis of ITP.

9. Leukocytic disorders:
   - Must know: Leukocytosis, Leukopenia and Leukemoid reactions.

10. Acute Leukaemias:
    - Must know: Classify and differentiate different types of acute Leukaemias.

11. Chronic Leukaemias:
    - Must know: Definition, general features, classification, aetiology, haematological change, morbid anatomy, clinical course and lab. investigations.

12. Paraproteinemia:
    - Desirable to know: Understand the relevance of paraproteinemia’s and integrate the various diagnostic modalities with the diagnosis.

13. Aplastic Anaemias:
    - Desirable to know: Aplastic anaemias and Agranulocytosis.

14. Blood groups:
    - Must know: Appreciate the relevance of blood groups in haematology and transfusion medicine. Erythroblastosis foetalis

15. Blood Transfusion:
    - Must know: Indications, selection of blood donors, autologous transfusions, complications of blood transfusions, investigation of suspected transfusion reactions.

C) SYSTEMIC PATHOLOGY: (n=46)

1. Atherosclerosis:
   - Must know: Definition, etiopathogenesis, gross and microscopic description, complications and clinical correlation.

2. Hypertension:
   - Must know: Relate the mechanisms of the disease to the clinical course and sequelae.

3. Other diseases of blood vessels:
   - Must know: Develop an index of suspicion for vasculitides and aneurysms.

4. Ischaemic heart disease:
   - Must know: Incidence, risk factors, Pathogenesis, morphological changes, clinical course, complications and investigations.
5. Congenital heart disease:-
   Desirable to know:- Correlate the anatomical malformations of disorders to the clinical consequences of the disease.

6. Rheumatic heart disease:-
   Must know:- Incidence, etiopathogenesis, morbid anatomy, histopathology, lesions in the organs, clinical course and sequelae.

7. Endocardial and pericardial diseases:-
   Must know:- Infective endocarditis - Pathogenesis, morphology, differential diagnosis of cardiac vegetations, aetiology and basic morphology of different forms of pericarditis.

8. Cardiomyopathies:-
   Desirable to know:- Recognize the disorders as part of differential diagnosis in primary myocardial diseases.

9. Pneumonias:-
   Must know:- Aetiology, classification, gross, histopathological description in different forms and complications.

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

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

12. Occupational lung diseases:-
    Must know:- Types, etiopathogenesis, gross anatomical differences between different forms and sequelae.

13. 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.

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

15. 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.

16. Ulcers of Intestines:-
   Must know:- Etiological classifications, Morphological appearances of typhoid, tubercular, amoebic ulcers and bacillary dysentery. Differential diagnosis of different forms of ulcers.

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

18. Tumours of upper GIT:-
   Must know:- Etiopathogenesis, morphological features of carcinoma oesophagus, classification and morbid anatomy and histopathology of gastric carcinomas.
   Desirable to know:- Overview of carcinoid tumours of GIT.

19. Tumours of lower GIT:-
   Must know:- Pathology of carcinoma colon.
   Desirable to know:- Intestinal polyps & GI stromal tumours.

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

21. Alcoholic liver disease:-
   Must know:- Pathogenesis, morphological manifestations and correlation with clinical features.

22. Cirrhosis:-
   Must know:- Etiopathogenesis, classification, important histological features and differential diagnosis.

23. Tumours of liver, Pancreas and gall bladder:-
   Must know:- Pathology of Hepatocellular carcinoma.
   Desirable to know:- Pathology of tumours of Pancreas and gall bladder.

24. Diabetes mellitus:-
   Must know:- Classification, pathogenesis of system involvement, sequelae and complications.

25. Acute nephritis and rapidly progressive GN:-
   Must know:- Understand and integrate clinical and pathologic features of these syndromes.
26. Nephrotic syndrome:
   Must know: Integrate clinical and pathological features of this disorder.

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

28. Pyelonephritis and interstitial Nephritis:
   Must know: Aetiology, Pathogenesis of Pyelonephritis acute and chronic morphological features and clinical correlation.

29. Tumours of kidney and Pelvis:
   Must know: Classification, Morphological features, clinical course including Para neoplastic syndromes of common tumours.

30. Tumours of testis and Prostate:
   Must know: Classification, salient morphological features of most common tumours and clinical course.

31. Tumours of Cervix and Uterus:
   Must know: Etiopathogenesis, salient morphological features, dysplasia and role of cytological screening.

32. Tumours of Ovary and trophoblastic tissue:
   Desirable to know: Classification and morphological description of important types.

33. Non-neoplastic and Neoplastic lesions of the breast:
   Must know: Classification, morphological features and grading of carcinoma breast and differential diagnosis of breast swellings.

34. 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.

35. Hodgkin's Lymphoma:
   Must know: Definition, classification, salient diagnostic features and clinical course.

36. Non-Hodgkin's Lymphoma:
   Must know: Definition, classification, salient diagnostic features and clinical Correlation.
   Desirable to know: Extra nodal lymphomas.

37. Tumours of skin - Non-pigmented:
   Must know: Classification, morphological features of most common types and natural history.
38. Tumours of skin - Pigmented:-
   Must know: Classification, morphological features of common naevi, natural history of malignant melanoma.

39 & 40. Soft tissue tumours :
   Must know: Classification, morphological features of lipomatous, fibrous and blood vessel tumours. Morphological features of neural, muscle and fibro histiocytic tumours.

41. Non-neoplastic lesions of bone and joints:-
   Must know: Etiopathogenesis and morphological changes of common arthritis and osteomyelitis.

42 & 43. Tumours of bone, cartilage and joints:-
   Must know: Classification, radiological and pathological features of important bone tumours (Osteosarcoma, Osteochondroma, GCT and Ewing's sarcoma).

44. Inflammatory and neoplastic conditions of CNS:-
   Must know: Morphological features and differential diagnosis of meningitis. Desirable to know: Classification, morphological features of important CNS tumours, clinical course and sequelae (Meningioma and Gliomas).

45. Lesions of Thyroid:-
   Must know: Differential diagnosis of thyroid nodule.

46. Myopathies:- Desirable to know: Differential diagnosis of common muscle disorders.

**D) CLINICAL PATHOLOGY : (n=3)**

1. Differential diagnosis of Jaundice:-
   Must know: The differential diagnosis and laboratory investigations in jaundice

2. Renal function tests:-
   Must know: Laboratory approach to a case of renal dysfunction

3. Diabetes mellitus:-
   Must know: Laboratory diagnosis of Diabetes mellitus

**E) AUTOPSY : (n=1)**

Must know: Indications and techniques of medical autopsies
Tutorials

GENERAL PATHOLOGY:
1. Cell injury and cell death
2. Cellular accumulations
3. Inflammation and repair
4. Circulatory disturbances
5. Immunological disorders
6. Infections
7. Neoplasia

HAEMATOLOGY:
1. Anaemias
2. Leukaemias
3. Interpretation of haematological case charts and identification of instruments
4. Haemorrhagic disorders

SYSTEMIC PATHOLOGY:
1. Atherosclerosis and IHD
2. Rheumatic heart disease
3. Pneumonias
4. Tumours of lung
5. Oral cancer
6. Peptic Ulcer
7. Cirrhosis
8. Glomerulonephritis
9. Carcinoma Breast
10. Carcinoma Cervix
11. Bone Tumours
12. Museum specimens
13. Museum specimens

CLINICAL PATHOLOGY:
1. Glucose Tolerance Test
2. Renal Function Tests
3. Differential Diagnosis of Meningitis
4. Identification of needles and instruments used in clinical pathology

AUTOPSY:
4. Hypertension by students (2 or 3)
**d. Term-wise distribution**

1st term: 1. General Pathology  2. General Neoplasia  3. Haematology & Transfusion Medicine  
3rd term: Tutorials & Revision.

**e. Practical’s: Total hours, number & contents**

Total hours : 110 Number : 44

Contents :  
**A) GENERAL PATHOLOGY: (n=12)**

1. Microscopy and tissue processing
2. Identify the common types of cells by light microscopy
3. Intracellular accumulation
4. Acute inflammation
5. Chronic inflammation and Repair
6. Thrombosis, embolism, infarction and gangrene
7. Oedema and congestion
8. Disturbances of pigment metabolism
9. Tuberculosis
10. Leprosy
11. Amyloidosis
12. Disturbances of growth (Atrophy, hypertrophy, hyperplasia, metaplasia, Dysplasia, hypoplasia)

**B) HAEMATOLOGY: (n=7)**

1. Collection of specimen, anticoagulants and common haematological tests (Hb)
2. Common Haematological Counts (TLC, DLC) & Interpretation of ESR
3. Haemopoiesis
4. Investigations in Anaemia
5. Investigations in Leukaemia
6. Investigations in haemorrhagic disorders
7. Blood Banking
C) SYSTEMIC PATHOLOGY: (n=18)
1. Diseases of blood vessels (Atherosclerosis, syphilitic aortitis)
2. Diseases of Heart (IHD & RHD)
3. Pneumonias
4. Tumours of lung
5. Diseases of kidney
6. Gross and Microscopic features of peptic ulcer and duodenal ulcer
7. Gross and Microscopic features of other intestinal ulcers
8. Tumours of GIT
9. Diseases of Liver
10. Lymphomas
11. Diseases of male and female genital system
12 & 13. Tumours of breast
14. Tumours of skin (Pigmented)
15. Tumours of skin (non-pigmented)
16. Soft tissue tumours
17. Tumours of bone
18. Diseases of thyroid

D) CLINICAL PATHOLOGY: (n=5)
1. Urine RE - Carryout a bedside routine urine examination and interpret the results.
2. Pregnancy test and Semen Analysis - (Practical demonstration).
3. Common cytological preparations (lecture demonstration).
4. CSF examination.
5. Serous effusion examination.

E) AUTOPSY: (n=2)
1 & 2) To study and describe five autopsy reports.

List of Slides and Specimens that should be shown during the Pathology Practical Classes
These are grouped under two headings: The students
1) Must see (M)
2) Desirable to see (D)
**DRAWING SLIDES:**

**HISTOPATHOLOGY:**

1. Kidney cloudy change (M)
2. Fatty change liver (M)
3. Uterus - leiomyoma with hyaline change (M)
4. Kidney - amyloid (M)
5. Lymph node - caseous necrosis (M)
6. Kidney - infarct (Coagulation necrosis) (M)
7. Acute ulcerative appendicitis (M)
8. Pyogenic meningitis (M)
9. Lepromatous leprosy - skin (M)
10. Tuberculoid leprosy - skin (M)
11. Actinomycosis (M)
12. Granulation tissue (M)
13. Ileum - typhoid ulcer (M)
14. Tuberculous lymphadenitis (M)
15. Amoebic colitis (M)
16. Lung - haemosiderin pigment or CPC (M)
17. Liver - CPC (M)
18. Artery - recent / organised thrombus (M)
19. Hashimoto's thyroiditis (D)
20. Skin - papilloma (M)
21. Squamous cell carcinoma (M)
22. Adenocarcinoma - Colon (M)
23. Lymph node - metastasis (M)
24. Skin - capillary haemangioma (M)
25. Cavernous haemangioma (M)
26. Benign cystic teratoma (Dermoid cyst) (M)
27. Stomach - chronic peptic ulcer (M)
28. Liver - Viral hepatitis (Massive/ sub-massive necrosis) (D)
29. Liver - portal and biliary cirrhosis (M)
30. Lung - lobar and broncho pneumonia (M)
31. Lung - fibrocaseous tuberculosis (M)
32. Heart - rheumatic myocarditis (D)
33. Heart - healed infarct (M)
34. Aorta - atherosclerosis (M)
35. Kidney - crescentic glomerulonephritis (M)
36. Kidney - chronic glomerulonephritis (M)
37. Kidney - chronic pyelonephritis (M)
38. Kidney - RCC (D)
39. Benign prostatic hyperplasia (M)
40. Testis - seminoma (M)
41. Uterus - leiomyoma (M)
42. Products of conception (M)
43. Hodgkin's lymphoma (M)
44. Brain - tuberculous meningitis (M)
45. Brain - menigioma (D)
46. Bone - osteogenic sarcoma (M)
47. Bone - chondroma (M)
48. Bone - osteoclastoma (M)
49. Skin - melanoma and nevus (M)
50. Breast - fibroadenoma (M)
51. Breast - carcinoma (M)
52. Thyroid - colloid goitre (D)
53. Thyroid - papillary carcinoma (D)
54. Skin - basal cell carcinoma (M)

**HAEMATOLOGY:**
1. Acute blast cell leukaemia (M)
2. Chronic myeloid leukaemia (M)
3. Eosinophilia (M)
4. Iron deficiency anaemia (M)
5. Haemolytic anaemia (M)
6. Macrocytic anaemia (M)
7. Leucocytosis (M)
8. Various biochemical charts - LFT, GTT, CSF, etc (M)
LIST OF SPECIMEN:

1. Cell injury and adaptation (Degeneration)
   a) Liver - fatty change (M)
   b) Kidney - cloudy change (M)
   c) Aorta - atheroma (M)
   d) Atheroma with calcification (D)
   e) Kidney stones (M)

2. Amyloidosis
   a) Kidney - amyloidosis (M)
   b) Spleen - amyloidosis (M)

3. Necrosis and Gangrene
   a) Kidney - infarct (M)
   b) Spleen - infarct (M)
   c) Intestine - gangrene (M)
   d) Foot - gangrene (M)
   e) Lymph node - caseation (M)

4. Acute inflammation
   a) Lobar pneumonia (M)
   b) Kidney - abscess (D)
   c) Liver - abscess (D)
   d) Mycetoma - foot (D)
   e) Acute appendicitis (M)
   f) Purulent meningitis (M)
   g) Fibrinous pericarditis (M)

5. Chronic inflammation
   a) Syphilitic aortitis (D)

6. Repair
   a) Heart - healed infarct (M)

7. Specific inflammation
   a) Ileum - typhoid (M)
   b) Amoebic colitis (M)
   c) Amoebic liver abscess (M)

8. Chronic specific granulomatous inflammation
   a) Intestine - TB ulcer (M)
   b) Brain - TB meningitis (M)
   c) Lymph node - TB (M)
   d) Lung - miliary TB (M)
   e) Fibrocaseous TB (M)

9. Pigment disorders
   a) Liver and spleen - Prussian blue reaction (D)
   b) Liver and spleen - malaria (M)
c). Skin - melanoma (any site) (M)
10. Disorders of vascular flow and shock
   a). Liver - CPC (M)
   b). Lung - CPC (M)

11. Thrombosis embolism and infarction
   a) Thrombus - artery / vein (M)
   b) Infarction - kidney / spleen / brain (M)
   c) Intestine gangrene (M)

12. Immunopathology
   a) Heart - Rheumatic carditis (M)
   b) Kidney - acute glomerulo nephritis (M)
   c) Thyroid - Hashimoto's thyroiditis (D)

13. Growth disorders
   a) Heart - LVH (M)
   b) Kidney - atrophy and compensatory hypertrophy (M)
   c) Kidney - Hydronephrosis (M)

14. Neoplasm
   a) Papilloma skin (M)
   b) Adenomatous polyp (M)
   c) Fibroadenoma - breast (M)
   d) Squamous cell carcinoma - skin (M)
   e) Adenocarcinoma - colon (M)
   f) Metastasis - lung (M)
   g) Leiomyoma - uterus (M)
   h) Soft tissue - lipoma (M)
   j) Haemangioma - any site / type (M)
   k) Melanoma (M)
   l) Dermoid cyst (M)
   m) Teratoma (M)

15. Alimentary System
   a) Oesophagus carcinoma (M)
   b) Stomach - chronic peptic ulcer (M)
   c) Perforated peptic ulcer (M)
   d) Stomach - carcinoma (linitis plastica) (M)
   e) Intestine - TB ulcer (M)
   f) Colon - Amoebic colitis / bacillary colitis / carcinoma ulcerative / carcinoma
polypoidal growth (M)

16. Liver
   a) Acute diffuse necrosis (D)
   b) Amoebic abscess (M)
   c) Micronodular / macronodular / mixed cirrhosis (M)
   d) Hepatoma (M)
   e) Metastasis (M)

17. Respiratory system
   a) Lung - lobar / bronchopneumonia (M)
   b) Bronchogenic carcinoma (M)
   c) Lung - abscess (D)
   d) Fibrocaseous TB (M)

18. Cardiovascular System
   a) Rheumatic endocarditis (D)
   b) Fibrinous pericarditis (M)
   c) Mitral stenosis (M)
   d) Aortic stenosis (M)
   e) Bacterial endocarditis (M)
   f) Recent myocardial infarct (D) g) Healed myocardial infarct (M) h) Atheroma aorta (M)
   j) Atheroma with complications (M)

19. Urinary System
   a) Flea bitten kidney (M)
   b) Large white kidney (M)
   c) Shrunken granular kidney (M)
   d) Acute pyelonephritis (M)
   e) RCC (D)
   f) Wilm's tumour (D)
   g) Papillary carcinoma - Urinary bladder (D)

20. Male Reproductive System
   a) SCC - penis (M)
   b) Seminoma - testis (M)
   c) Teratoma - testis (M)
   d) Benign prostatic hyperplasia (M)

21. Female Reproductive System
   a) Uterus - leiomyoma (M)
b) Carcinoma cervix (D)
c) Ovary - cyst adenocarcinoma (D)
d) Ovary - dermoid cyst (D)

21. Lymphoreticular System
a) Lymph node - TB Lymphadenitis (M)
b) Lymph node - lymphoma (M)
c) Spleen - infarct (M)

22. Central Nervous System
a) Brain - purulent meningitis (M)
b) Brain - tuberculous meningitis (M)
c) Tuberculoma (D) d) Meningioma (D) e) Glioma (D)
f) Haemorrhage - CVA (D)

23. Bone lesions
a) Chronic osteomyelitis (D)
b) Osteoclastoma (M)
c) Osteogenic sarcoma (M)
d) Multiple myeloma (D)

24. Skin lesions
a) Squamous cell carcinoma (M)
b) Basal cell carcinoma (D)
c) Melanoma - skin (any site) (M)

25. Diseases of Endocrine organs
a) Breast - fibroadenoma (M)
b) Breast - carcinoma (M)
c) Thyroid - multinodular goitre (M)
d) Thyroid - solitary nodule / adenoma (M)

f. Books recommended:
a) Text book of Pathology by Robbins
b) Text book of General Pathology Part I & II by Bhende and Deodhare
c) Clinical Pathology by Talib
d) Text book of Pathology by Harsh Mohan
e) Text book of Pathology by Muir
f) Haematology De Gruchi
g) IAPM text book of Pathology

Reference books:
a) Anderson's text book of Pathology Vol I & II
c) Pathology by Rubin and Farber
d) Pathologic basis of Disease Robbins
5. Evaluation

Methods: Theory, Practical’s and Viva

<table>
<thead>
<tr>
<th>No.</th>
<th>Question Description</th>
<th>Division of Marks</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Theory (2 papers – 40 marks each)</td>
<td>16 X ½</td>
<td>08</td>
</tr>
<tr>
<td>2</td>
<td>Oral (Viva)</td>
<td>2 X 5</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>Practical</td>
<td>4 X 3</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>Internal assessment (theory – 15, practicals – 15)</td>
<td>10X 1</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td></td>
<td>150</td>
</tr>
</tbody>
</table>

Passing: A candidate must obtain 50% in aggregate with a minimum of 50% in Theory including oral and minimum of 50% in practical’s

Pattern of Theory Examination including Distribution of Marks, Questions, Time.

Nature of Question Paper

Faculty with Year: SECOND MBBS
Subject: PATHOLOGY
Paper: 1
Total Marks: 40
Time: 3 Hours

Instructions:
1) All questions are compulsory
2) MCQ question paper should be conducted and completed in first 30 min. written question paper must be given only after taking back the MCQ answer sheet
3) Fill (dark) the appropriate empty circle below the question number once only.
4) Use blue/black ball point pen only.
5) Each MCQ carries one / half mark.
6) Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked on MCQ.
7) For Question no. 2,3 and 4 time duration is 2.30 hour
8) Draw diagrams wherever necessary for Question no. 2, 3 and 4.
9) Answers of Questions and Sub questions must be written strictly according to the serial order of question paper.
10) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

<table>
<thead>
<tr>
<th>Question No.</th>
<th>Question Description</th>
<th>Division of Marks</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Total MCQs : 16</td>
<td>16 X ½</td>
<td>08</td>
</tr>
<tr>
<td>2.</td>
<td>Long answer question two</td>
<td>2 X 5</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>a)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>b)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Short answer questions four</td>
<td>4 X 3</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>a)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>b)</td>
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<td></td>
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<tr>
<td></td>
<td>c)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>d)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Very short answer questions ten</td>
<td>10X 1</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>a)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>b)</td>
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<td>f)</td>
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<td>g)</td>
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<td></td>
<td>h)</td>
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<td>i)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>j)</td>
<td></td>
<td></td>
</tr>
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Instructions:
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</tr>
<tr>
<td></td>
<td>a) b)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td><strong>short answer questions four</strong></td>
<td>4 X 3</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>a) b) c) d)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td><strong>very short answer questions ten</strong></td>
<td>10X 1</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>a) b) c) d) e) f) g) h) i) j)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

c. Paper wise distribution of theory topics and number of questions:-

**Paper I:** General Pathology inclusive of general neoplasia, Haematology inclusive of transfusion medicine. Out of 2 LAQs, 1 question should be from General Pathology and General Neoplasia and one question should be from Haematology inclusive of transfusion medicine.

**Paper II:** Systemic Pathology inclusive of systemic Neoplasia and Clinical Pathology.

Out of 2 LAQs, 1 question should be from Systemic Pathology and Systemic Neoplasia and one question should be from Clinical Pathology.

d. Marking scheme

Each paper of 40 marks as shown in the above table.
e. Nature of practical’s and duration

Practicals Marks

<table>
<thead>
<tr>
<th>Practical</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. 10 Spots 2 minutes each (4 specimen, 1 instrument, 3 histopathology slides, 1 haematology slide and 1 chart)</td>
<td>25</td>
</tr>
<tr>
<td>Identification - 1/2 mark together 1 mark for Specific short question - 1/2 mark each spot</td>
<td></td>
</tr>
<tr>
<td>b. Urine Examination - Physical and two abnormal constituents</td>
<td>05</td>
</tr>
<tr>
<td>c. Histopathology slides : Diagnosis and discussion</td>
<td>03</td>
</tr>
<tr>
<td>d. Haematology examination</td>
<td></td>
</tr>
<tr>
<td>i) Peripheral blood smear stain and report</td>
<td>03</td>
</tr>
<tr>
<td>ii) Hb/TLC/Blood group</td>
<td>04</td>
</tr>
</tbody>
</table>

Total 25 marks

f. Viva: duration and topic distribution

Viva consists of two tables; on each table the student will face 2 examiners for 5 minutes each:

Table - I General and Systemic Pathology - 8 marks
Table - II Clinical Pathology and Haematology - 7 marks

Total 15 marks

g. Plan for internal assessment

Marks for Internal Assessment:

- Theory: 15
- Practical: 15

The time-table for internal assessment will be as follows:

- First term examination : At the end of 3rd semester (After 120 teaching days)
- Second term examination : At the end of 4th semester
- Pre-University examination: At the end of 5th semester examination: (Minimum 4 weeks gap mandatory between Preliminary and University examinations)
• Internal assessment shall be computed on the basis of three term ending examinations (Two terminals & one preliminary examination before the university examination).
• Marks of Best of 1st and 2nd Term examination plus Pre-university exam (In case, because of genuine reason if student is not able to appear for Pre-University Examination, both 1st and 2nd term marks be considered for internal evaluation. Genuineness of the reason is to be verified and certified by the Dean of the Institution and permission for absence be granted by the Dean of the Institution is this respect)

THEORY:

<table>
<thead>
<tr>
<th>Examination</th>
<th>No. of Papers</th>
<th>Pattern</th>
<th>Duration of each paper</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1st Terminal</strong></td>
<td>One - 40 Marks</td>
<td>Patter of exam as in University Examination (courses will be as covered in the semesters)</td>
<td>3 Hours</td>
<td>40</td>
</tr>
<tr>
<td><strong>2nd Terminal</strong></td>
<td>One - 40 marks</td>
<td>Patter of exam as in University Examination (courses will be as covered in the semesters)</td>
<td>3 Hours</td>
<td>40</td>
</tr>
<tr>
<td><strong>Pre University (As per final University pattern)</strong></td>
<td>Two - 40 marks each</td>
<td>Patter of exam as in University Examination</td>
<td>3 Hours each paper</td>
<td>80</td>
</tr>
</tbody>
</table>

Final internal assessment in theory shall be computed on the basis of actual marks obtained out of 120, reduced to marks out of 10 and 5 marks reserve for day to day assessment. Total internal assessment marks theory shall be out of (10+5) 15. In case student has not appeared in Pre University examination then it shall be computed on the basis of actual marks obtained out of 80.

PRACTICAL:
• Internal assessment in Practical’s shall be computed on the basis of three term ending examinations and the marks allotted to Practical Record Book/seminar/assignment.

<table>
<thead>
<tr>
<th>Examination</th>
<th>Pattern</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1st Terminal</strong></td>
<td>Patter of exam as in University Examination (courses will be as covered in the semesters)</td>
<td>40</td>
</tr>
<tr>
<td><strong>2nd Terminal</strong></td>
<td>Patter of exam as in University Examination(courses will be as covered in the semesters)</td>
<td>40</td>
</tr>
<tr>
<td><strong>Pre University (As per final University pattern)</strong></td>
<td>Patter of exam as in University Examination</td>
<td>40</td>
</tr>
</tbody>
</table>

Actual marks obtained out of 80 shall be reduced to out of 12. Add marks obtained out of 3 for Practical Record Book/seminar/assignment. Total internal assessment marks for Practical shall be out of (12+3) 15.

**Total Internal Assessment:**

- Theory --- 15
- Practical -- 15
- ------ Total: 30
Curricula for II M.B.B.S.

MICROBIOLOGY

1. 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.

2. Educational objectives

(a) Knowledge: The student at the end of one and half years should be able to:

i. 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.

ii. understand commensal, opportunistic and pathogenic organisms of human body and describe host parasite relationship.

iii. know and describe the pathogenesis of diseases caused by microorganisms.

iv. state the sources and modes of transmission of pathogenic and opportunistic micro-organisms including knowledge of insect vectors & their role in transmission of infectious diseases.

v. choose appropriate laboratory investigations required for clinical diagnosis.

(b) Skills

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

ii. 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.

iii. perform simple laboratory tests, which help to arrive at rapid diagnosis.

iv. be conversant with proper methods of collection, storage & transport of clinical material for microbiological investigations.

v. 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.

vi. understand methods of disinfection and sterilization and their application to control and prevent hospital and community acquired infections including universal biosafety precautions and waste disposal.
vii. recommend laboratory investigations regarding bacteriological examination of food, water, milk and air.
viii. the student should be well equipped with the knowledge of prevalent communicable diseases of national importance and of the newer emerging pathogens.

(c) Attitude
i. the student will be regular, sincere, punctual and courteous and regular in studies.
ii. the student will follow all the rules laid down by the department and participate in all activities.
iii. the student will understand the importance of, and practice asepsis, waste segregation and appropriate disposal.
iv. the student will understand the importance of, and practice the best methods to prevent the development of infection in self and patient. (E.g. hand washing, using aprons for hospitals in hospitals only, regularly washing the aprons, wearing gloves (as and when required / handling specimens etc.).
v. the student will understand the use of the different antimicrobial agents including antibiotics to use judiciously and prevent misuse, (prescribing attitude).
vi. the student will understand the significance of vaccinations and will receive appropriate vaccines (e.g. TT, Hepatitis B and any other as per needs).
vii. the student will wash his/her hands with soap after each practical class. viii. the student will leave the area allotted for his practical neat and tidy.
ix. the student will discard the slides in the appropriate container provided for the same.
x. the student will report any injury sustained in class, immediately.
xi. the student will report any breakage occurring during class times immediately. xii. the student may give suggestions to improve teacher student association.

3. Total duration of para-clinical teaching
   3 semesters
   Total 360 teaching days

Total number of teaching hours allotted for Microbiology
250 hrs

4. Syllabus
a. Learning methods
Lectures, practicals: Distribution of teaching hours
A) Theory (lectures & ….. 71
   (tutorials ….. 26
B) Practicals and Revision ………………… 120
C) Assessments …………………………. 33

------------------------------------------------------------------------------------------------------------------------
Total …………………………………. 250
**b. & c. Sequential organisation of contents and their division**

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 the body.

**A) GENERAL MICROBIOLOGY: (n=10)**

<table>
<thead>
<tr>
<th>No</th>
<th>Topic of lecture</th>
<th>Must know (MK)</th>
<th>Desirable to know (DK)</th>
<th>Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction and Historical background</td>
<td>Definitions: Medical Microbiology, pathogen, commensal, symbiont etc. To cover Anton van Leeuwenhoek, Pasteur, Lister, Koch, Flemming etc. In History: Scope to cover the importance of Med. Microbiology on diagnosis and prevention of infectious diseases.</td>
<td>Micro-organisms as models in Molecular Biology and Genetic engineering.</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Morphology of bacteria and Classification</td>
<td>Bacterial cell and its organelles, morphological classification, methods of studying bacteria, staining methods &amp; their principles Grams &amp;Zeil Nelson 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.</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Physiology of bacteria including growth requirements &amp; metabolism</td>
<td>Nutrition, respiration (anaerobic &amp; aerobic) and growth of bacteria, growth curve, physical factors influencing growth. Culture media: Definition, classification and application.</td>
<td>Important constituents of culture media.</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Sterilization</td>
<td>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 &amp; their application.</td>
<td>Working and efficacy testing of autoclave, inspissator and hot air oven. Central Sterile Supply Department (CSSD) – concept only.</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Disinfectants</td>
<td>Asepsis and antisepsis, modes of Action of chemical agents on microbes. Phenols, Halogens, Aldehydes, Acids, Alcohol, heavy metals, oxidizing agents etc. Universal biosafety precautions.</td>
<td>Dyes, soaps and detergents. Concentration and contact time.</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Waste disposal</td>
<td>Definition of waste, classification, segregation, transport and disposal.</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Bacterial genetics and drug</td>
<td>Introduction – codon, lac operon, mutation, transformation, transduction &amp; conjugation,</td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>
resistance to antimicrobial agents. 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).

| 8. | Host parasite relationship and bacterial infections | Commensal, pathogenic and opportunistic organisms, their pathogenic factors and modes of transmission. Microbial factors: spores, capsule, toxins, enzymes, intracellular parasitism, antigenic variation & extrinsic factors etc. leading to establishment of infection. Types of infection: primary, secondary, general, local, natural, nosocomial, iatrogenic, zoonotic. | 1 |

| 9. | Normal flora | Introduction – various sites, types and role | 1 |


**B) IMMUNOLOGY: (n=12)**

<table>
<thead>
<tr>
<th>No.</th>
<th>Topic</th>
<th>Must know</th>
<th>Desirable to know</th>
<th>Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
<td>Definition of immunity, types of immunity, factors responsible, mechanism of innate immunity, active and passive immunity, local immunity.</td>
<td>Herd immunity</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Antigens, HLA</td>
<td>Definition, types, antigen determinants, properties of antigen. MHC- concept, class- I, II &amp; III functions, indication of typing, MHC restriction.</td>
<td>Nature of determinants, e.g. of haptens, e.g. of cross-reactive antigen.</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Antibodies</td>
<td>Definition, nature, structure of immuno-Globulins, papain digestion, understand isotypic, allotypic and idiotypic markers, immunoglobulin classes, physical and biological properties of immunoglobins.,</td>
<td>Pepsin digestion, amino acid sequence, immunoglobulin domain, abnormal immunoglobins.</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Serological reactions</td>
<td>Definition, characteristics, titre, sensitivity &amp; specificity, antigen- antibody interaction-primary, secondary &amp; tertiary, prozone phenomenon, principle, types and application of precipitation, agglutination, complement fixation, enzyme immunoassay,</td>
<td>Techniques of precipitation and their uses, blocking antibodies, antglobulin</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>5 Immune response</td>
<td>Types, development, role of --thymus, bone marrow, lymph nodes &amp; spleen, cells of lymphoreticular system, morphology and role of T subsets, NK cells, B cells, plasma cells and macrophages, B &amp; 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.</td>
<td>Lymphokines and their role, clonal selection, mechanism of immunoregulation, theories of antibodies formation, techniques of monoclonal antibody formation, detection of CMI, types of immunotolerance.</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>6 Complement</td>
<td>Definition, synthesis, pathways, activation, role &amp; biological functions, components, measurement.</td>
<td>Regulation of complement activation, complement deficiency.</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>7 Hypersensitivity</td>
<td>Definition, classification, difference between immediate and delayed reaction, mechanism of anaphylaxis, manifestations of anaphylaxis, types of anaphylaxis, atopy, e.g. of anaphylactic reaction, tests for anaphylaxis, mechanism and e.g. of type-II &amp; type-III reactions, mechanism &amp; types of delayed hypersensitivity.</td>
<td>Desensitization in anaphylaxis, type V reaction, ADCC, Shwartzman phenomenon.</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>8 Autoimmunity</td>
<td>Definition, mechanism, classification, pathogenesis.</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9 Transplantation &amp; tumour immunology</td>
<td>Types of transplants, mechanism of transplant rejection, prevention of graft rejection, GVH reaction, IR to tumours, tumour antigens, mechanism of IR to tumours.</td>
<td>Type of tumour antigens, immune surveillance.</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>10 Immuno-Deficiency</td>
<td>Classification, examples, laboratory tests for detection, manifestations.</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
C) SYSTEMIC BACTERIOLOGY: (n=21)

Pathogenesis includes:
- Infectious agent
- Habitat
- Source / reservoir
- Mode
- Infective dose
- Multiplication, spread
- Clinical features, pathology
- Complications

Laboratory diagnosis:
- Specimen selection
- Collection
- Transport
- Primary smear, hanging drop
- Selection of media
- Pathogenicity testing
- Anti microbial drug susceptibility testing
- Serological interpretation

Key to the abbreviations used in the table below:
A- Classification, B- Morphology, C- Culture and isolation, D- Biochemical reactions,
E- Viability, F- Virulence, G- Diseases, H- Antigens, I- Pathogenesis, J- Laboratory diagnosis, K- Prevention and control, L- Immune response

<table>
<thead>
<tr>
<th>No</th>
<th>Topic/ hours</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>
<th>K</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Staphylococci (1 hour)</td>
<td>mk</td>
<td>mk</td>
<td>dk</td>
<td>dk</td>
<td>mk</td>
<td>mk</td>
<td>mk</td>
<td>dk</td>
<td>mk</td>
<td>mk</td>
<td>mk</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Streptococci, Pneumococci (1 hour)</td>
<td>mk</td>
<td>mk</td>
<td>dk</td>
<td>dk</td>
<td>mk</td>
<td>mk</td>
<td>mk</td>
<td>mk</td>
<td>dk</td>
<td>mk</td>
<td>mk</td>
<td>mk</td>
</tr>
<tr>
<td>3</td>
<td>Neisseria (1 hour)</td>
<td>dk</td>
<td>mk</td>
<td>dk</td>
<td>dk</td>
<td>mk</td>
<td>mk</td>
<td>mk</td>
<td>dk</td>
<td>mk</td>
<td>mk</td>
<td>mk</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>C. diphtheriae (1 hour)</td>
<td>dk</td>
<td>mk</td>
<td>dk</td>
<td>-</td>
<td>mk</td>
<td>mk</td>
<td>mk</td>
<td>-</td>
<td>mk</td>
<td>mk</td>
<td>mk</td>
<td>dk</td>
</tr>
<tr>
<td>5</td>
<td>M. Tuberculosis (1 hour)</td>
<td>mk</td>
<td>mk</td>
<td>li.growth time mk</td>
<td>dk</td>
<td>mk</td>
<td>mk</td>
<td>mk</td>
<td>mk</td>
<td>mk</td>
<td>mk</td>
<td>dk</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Atypical mycobacteria (1 hour)</td>
<td>mk</td>
<td>mk</td>
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<td>8</td>
<td>Bacillus Methods of anaerobiosis &amp; classification. Non sporing anaerobes (1 hour)</td>
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<td>Clostridium welchii, tetani, botulinum (1 hour)</td>
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<td>Enterobacteriaceae (1 hour)</td>
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<td>Salmonella typhi (1 hour)</td>
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<td>Vibrio &amp; Campylobacter (1 hour)</td>
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<td>Actinomycosis &amp; Nocardia (1 hour)</td>
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<td>20</td>
<td>Chlamydia &amp; Mycoplasma (1 hour)</td>
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<td>21</td>
<td>Bacteriology of air, water, milk and food (1 hour)</td>
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**D) MYCOLOGY: (n=4)**

<table>
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<tr>
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<th>Hrs</th>
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<tbody>
<tr>
<td>1</td>
<td>Introduction to Mycology</td>
<td>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,</td>
<td>Growth requirements, ecological, medical and industrial importance of fungi (brief account).</td>
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<tr>
<td>2</td>
<td>Agents of Superficial mycosis</td>
<td>Enumerate, predisposing factors, morphological features, Lab. Diagnosis</td>
<td>Colony characteristics of dermatophytes</td>
<td>1</td>
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<tr>
<td>3</td>
<td>Subcutaneous mycosis</td>
<td>Enumerate, predisposing factors, Mycetoma, Rhinosporidiosis, Pathogenesis, Lab. Diagnosis</td>
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<tr>
<td>4</td>
<td>Systemic mycosis Opportunistic fungal infections</td>
<td>Classification, predisposing factors, Candida, Cryptococcus, Histoplasma morphology, pathogenesis, lab. Diagnosis Classification, predisposing factors, Mucor, Aspergillus, Pneumocystis carinii</td>
<td>Cultural characteristics</td>
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**E) VIROLOGY: (n=12)**

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

<table>
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<tr>
<th>No</th>
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<th>Hrs</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>General Virology</td>
<td>Size, shape, symmetry, structure, resistance, multiplication, properties and classification of viruses, pathogenesis, bacteriophages, concept of viroms</td>
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<tr>
<td>No</td>
<td>Topic of lecture</td>
<td>Must know</td>
<td>Desirable to know</td>
<td>Hrs</td>
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</tr>
<tr>
<td>2</td>
<td>Laboratory diagnosis of viral infections</td>
<td>Collection of samples, transport, cultivation and methods of diagnosis</td>
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<tr>
<td>3</td>
<td>Viral immunity</td>
<td>Viral immunity, interferon, viral vaccines</td>
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<tr>
<td>4</td>
<td>Pox viruses</td>
<td>Small pox and Molluscum</td>
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<tr>
<td>5</td>
<td>DNA viruses</td>
<td>Papova, Adeno, Herpes viruses (Herpes simplex, Varicella zoster, CMV, EBV)</td>
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<tr>
<td>6</td>
<td>Respiratory viruses</td>
<td>Orthomyxo and Paramyxoviruses, Ag shift and drift Rhinoviruses</td>
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<tr>
<td>7</td>
<td>Picornaviruses</td>
<td>Polio, Coxsackie, Enteroviruses, Viruses causing diarrhoea – Rota viruses, Immunity (polio)</td>
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<tr>
<td>8</td>
<td>Hepatitis viruses</td>
<td>Hepatitis viruses, immunity and laboratory diagnosis</td>
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<td>1</td>
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<tr>
<td>9</td>
<td>Arboviruses</td>
<td>Dengue, KFD, Japanese encephalitis – definition, classification, enumeration in India, Pathogenesis, laboratory diagnosis and control</td>
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<tr>
<td>10</td>
<td>Rhabdoviruses</td>
<td>Rabies</td>
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<tr>
<td>11</td>
<td>Slow and Oncogenic viruses</td>
<td>Characteristics of slow virus infections, pathogenesis and laboratory diagnosis and viruses associated with it</td>
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<tr>
<td>12</td>
<td>Retroviruses</td>
<td>HIV/AIDS, Immunity, USP</td>
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</tbody>
</table>

F) PARASITOLOGY: (n=11)

**Must know** –

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

<table>
<thead>
<tr>
<th>No</th>
<th>Topic of lecture</th>
<th>Must know</th>
<th>Desirable to know</th>
<th>Hrs</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to medical Parasitology</td>
<td>Parasites: their nature, classification, and explanation of terminologies, epidemiology, emerging parasitic infections, (pathogenicity and laboratory diagnosis)</td>
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<tr>
<td>2</td>
<td>E. histolytica</td>
<td>Amoebic infections</td>
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<tr>
<td>3</td>
<td>Free living amoebae and</td>
<td>Free living amoebae, PAME, Giardia &amp;Trichomonas</td>
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<tr>
<td>No</td>
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<tr>
<td>1</td>
<td>Gastrointestinal infections (diarrhoea and dysentery) and their laboratory diagnosis</td>
<td>2</td>
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<tr>
<td>2</td>
<td>Upper respiratory tract infection (patch and sore throat) and their laboratory diagnosis</td>
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<tr>
<td>3</td>
<td>Lower respiratory tract infection (pneumonia, bronchitis, bronchiolitis etc.) and their laboratory diagnosis</td>
<td>2</td>
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<tr>
<td>4</td>
<td>Urinary tract infection and their laboratory diagnosis</td>
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<tr>
<td>5</td>
<td>Infections of the central nervous system (meningitis, encephalitis, brain abscess) and their laboratory diagnosis</td>
<td>2</td>
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<tr>
<td>6</td>
<td>Wound infections and pyogenic infections</td>
<td>2</td>
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<tr>
<td>7</td>
<td>Septicemia and laboratory diagnosis and PUO</td>
<td>2</td>
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<tr>
<td>8</td>
<td>Eye infections and their laboratory diagnosis</td>
<td>2</td>
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<tr>
<td>9</td>
<td>Sexually transmitted disease (STD) and their laboratory diagnosis (genital ulcerative disease)</td>
<td>2</td>
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<tr>
<td>10</td>
<td>Role of laboratory in cross infection, Nosocomial infections / outbreak / epidemic</td>
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</table>

TUTORIALS (APPLIED MICROBIOLOGY) : (n=26)

Regular tutorials, student seminars & symposia shall be conducted in addition to lectures.

Students 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

<table>
<thead>
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<tbody>
<tr>
<td>4</td>
<td>Hemoflagellates</td>
<td>L. donovani: life cycle, morphology, pathogenicity, and lab. Diagnosis etc.</td>
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<tr>
<td>5</td>
<td>Malaria</td>
<td>Malarial parasites: life cycle, morphology, pathogenicity, laboratory diagnosis etc.</td>
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<td>6</td>
<td>Misc. Pathogenic protozoa</td>
<td>Toxoplasma, Cryptosporidium, Isospora, B.coli</td>
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<td>7</td>
<td>Cestodes</td>
<td>Taeniasaginata&amp;solium, Echinococcusgranulosus, life cycle, morphology, pathogenicity and laboratory diagnosis.</td>
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<tr>
<td>8</td>
<td>Trematodes</td>
<td>Schistosomiasis: life cycle, morphology, pathogenicity &amp; lab diagnosis. Brief account of Fasciola hepatica</td>
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<td>9</td>
<td>Intestinal Nematodes</td>
<td>A.duodenale, A. lumbricoides, E. vermicularis, T. tritura</td>
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<td>10</td>
<td>Tissue Nematodes</td>
<td>W. bancrofti, D. medinensis, in brief T. spiralis</td>
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TUTORIALS (APPLIED MICROBIOLOGY) : (n=26)

Regular tutorials, student seminars & symposia shall be conducted in addition to lectures.

Students must know:

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- Interpretation of laboratory report

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<th>Topic of Tutorial</th>
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<tr>
<td>1</td>
<td>Gastrointestinal infections (diarrhoea and dysentery) and their laboratory diagnosis</td>
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<td>Upper respiratory tract infection (patch and sore throat) and their laboratory diagnosis</td>
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<td>Lower respiratory tract infection (pneumonia, bronchitis, bronchiolitis etc.) and their laboratory diagnosis</td>
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<td>4</td>
<td>Urinary tract infection and their laboratory diagnosis</td>
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<tr>
<td>5</td>
<td>Infections of the central nervous system (meningitis, encephalitis, brain abscess) and their laboratory diagnosis</td>
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<td>6</td>
<td>Wound infections and pyogenic infections</td>
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<td>7</td>
<td>Septicemia and laboratory diagnosis and PUO</td>
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<td>Eye infections and their laboratory diagnosis</td>
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<td>9</td>
<td>Sexually transmitted disease (STD) and their laboratory diagnosis (genital ulcerative disease)</td>
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<tr>
<td>10</td>
<td>Role of laboratory in cross infection, Nosocomial infections / outbreak / epidemic</td>
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</table>
### Suggested topics for integrated teaching:

- Tuberculosis and Leprosy
- Pyrexia of Unknown Origin (PUO)
- Sexually Transmitted Diseases
- Hepatitis HIV / AIDS
- Malaria
- Diarrhoea and Dysentery

### d. Term-wise distribution

<table>
<thead>
<tr>
<th>Term</th>
<th>Broad Topics</th>
<th>No. of Classes</th>
<th>Tutorials</th>
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<td>First term (4 months)</td>
<td>General Microbiology</td>
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<td>Systemic Bacteriology</td>
<td>18</td>
<td>24</td>
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<td>Mycology</td>
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<td></td>
<td>Parasitology</td>
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<td>Third term (4 months)</td>
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### System-wise distribution

<table>
<thead>
<tr>
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<th>Broad Topics</th>
<th>Lectures (1 hour)</th>
<th>Practicals (2 hours)</th>
<th>Tutorials (2 hours)</th>
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<tr>
<td>First term</td>
<td>General Microbiology</td>
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<td>Immunology</td>
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<td>Mycology</td>
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<td>Parasitology</td>
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<td>Third term</td>
<td>Applied microbiology</td>
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### e. Practicals: Total hours, number & contents: (n=100)

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<td>Introduction to Microbiology, Microscopy and Micrometry.</td>
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<tr>
<td>2</td>
<td>Morphology and physiology of bacteria and methods staining.</td>
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<td>3</td>
<td>Growth requirements of bacteria (media) and identification of bacteria (biochemical reactions).</td>
<td>4</td>
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<tr>
<td>4</td>
<td>Scheme for laboratory diagnosis of infectious diseases and collection, storage and transport of microbiological specimens and laboratory animals.</td>
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<tr>
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<td>Sterilization- the physical agents. Sterilization- the chemical agents and method of waste disposal.</td>
<td>4</td>
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<tr>
<td>6</td>
<td>Serological tests for diagnosis of microbial infections.</td>
<td>4</td>
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<tr>
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<td>Staphylococci and other gram-positive cocci.</td>
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<tr>
<td>8</td>
<td>Streptococci and Pneumococci.</td>
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<td>Gram negative cocci</td>
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</table>
10. C. diphtheriae and other gram positive non sporing bacilli 4
11. Mycobacteria 4
12. Spore bearing aerobic and anaerobic bacilli. 4
13. Enteric gram-negative bacilli – lactose fermenters - E.coli etc 4
14. Non lactose fermenters – Salmonella and Shigella 4
15. V. cholerae and other Vibrio like organisms 4
16. Other gram-negative bacilli including Pseudomonas, Proteus and hospital acquired infection. 4
17. Spirochetes 4
18. Actinomycetes, Nocardia and Fungi. 4
19. Rickettsia, Chlamydia, Mycoplasma and Viruses 4
20. Introduction to Parasitology and Protozoal infections (including Isospora & Cryptosporidium) 4
21. Haemoflagellates 4
22. Plasmodia and toxoplasma. 4
23. Cystodes and trematodes 4
24. Intestinal nematodes 4
25. Extra-intestinal nematodes. 4

The number of practical’s and lectures can be changed as per the needs.

**f. Books recommended:**

1. Textbook of Microbiology - R. Ananthanarayan, C. K. JayaramPanikar
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. JayaramPanikar
6. Textbook of Medical Parasitology - Arora and Arora
7. Textbook of Medical Parasitology - S.C. Parija
8. Microbiology in clinical practice - D. C. Shanson

A Textbook of Parasitology - Dr. R.P. Karyakarte and Dr. A.S. Damle

**Reference books:**

1. Mackie McCartney practical Medical Microbiology - Colle IG, 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 infections - Marmion BP, Swain RHA
5. Evaluation a. Methods:

a. Theory, Practical & Viva

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**Passing:** A candidate must obtain 50% in aggregate with a minimum of 50% in Theory including oral and minimum of 50% in practical’s

b. Pattern of Theory Examination including Distribution of Marks, Questions, Time.

**Nature of Question Paper**

*Faculty with Year: Second MBBS*

*Subject: Microbiology*

*Paper: I*

*Total Marks: 40*

*Time: 3 Hours*

Instructions:
1) All questions are compulsory
2) MCQ question paper should be conducted and completed in first 30 min. written question paper must be given only after taking back the MCQ answer sheet
3) Fill (dark) the appropriate empty circle below the question number once only.
4) Use blue/black ball point pen only.
5) Each MCQ carries one / half mark.
6) Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked on MCQ.
7) For Question no. 2,3 and 4 time duration is 2.30 hour
8) Draw diagrams wherever necessary for Question no. 2, 3 and 4.
9) Answers of Questions and Sub questions must be written strictly according to the serial order of question paper.
10) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

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<td>Long answer question two</td>
<td>2 X 5</td>
<td>10</td>
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<td></td>
<td>a) b)</td>
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<td>Short answer questions four</td>
<td>4 X 3</td>
<td>12</td>
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<td>a) b) c) d)</td>
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<tr>
<td>4.</td>
<td>Very short answer questions ten</td>
<td>10 X 1</td>
<td>10</td>
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<td>a) b) c) d) e) f) g) h) i) j)</td>
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Faculty with Year: Second MBBS  
Subject: Microbiology  
Paper: II  
Total Marks: 40  
Time: 3 Hours

Instructions:
1) All questions are compulsory
2) MCQ question paper should be conducted and completed in first 30 min. written question paper must be given only after taking back the MCQ answer sheet
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A) MICROBIOLOGY PAPER I

General Microbiology
Systematic bacteriology including Rickettsia, Chlamydia and Mycoplasma
Related applied microbiology.

B) MICROBIOLOGY PAPER II

Parasitology Mycology Virology Immunology
Related applied Microbiology.

d. Marking scheme

Each paper of 40 marks as shown in the above table.
e. Nature of practical’s and duration

Practical examination in MICROBIOLOGY will be of 26 marks and oral (viva) of 14 marks of THREE hours duration.

Q.1: Gram staining 5
Q.2: Zeil – Nelson’s staining 5
Q.3: Stool examination for Ova/cyst 5
Q.4: Spot identification (Ten spots)* 10

Total- 25

(*Spots- Microscopic slides, Mounted specimen, Instruments used in laboratory, Serological tests, Inoculated culture medium, Sterile culture medium, Vaccines / serum).

f. Viva (Two tables) Marks

A: General & Systemic Microbiology 8
B: Mycology, Parasitology, Virology, Immunology 7

g. Plan for internal assessment

Marks for Internal Assessment:

Theory: 15
Practical: 15

The time-table for internal assessment will be as follows:

- First term examination : At the end of 3rd semester (After 120 teaching days)
- Second term examination : At the end of 4th semester
- Pre-University examination: At the end of 5th semester examination: (Minimum 4 weeks gap mandatory between Preliminary and University examinations)

- Internal assessment shall be computed on the basis of three term ending examinations (Two terminals & one preliminary examination before the university examination).
- Marks of Best of 1st and 2nd Term examination plus Pre-university exam (In case, because of genuine reason if student is not able to appear for Pre- University Examination, both 1st and 2nd term marks be considered for internal evaluation. Genuineness of the reason is to be verified and certified by the Dean of the Institution and permission for absence be granted by the Dean of the Institution is this respect)
THEORY:

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<th>Pattern</th>
<th>Duration of each paper</th>
<th>Total Marks</th>
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<tr>
<td>1st Terminal</td>
<td>One -40 Marks</td>
<td>Patter of exam as in University Examination (courses will be as covered in the semesters)</td>
<td>3 Hours</td>
<td>40</td>
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<td>2nd Terminal</td>
<td>One - 40 marks</td>
<td>Patter of exam as in University Examination (courses will be as covered in the semesters)</td>
<td>3 Hours</td>
<td>40</td>
</tr>
<tr>
<td>Pre University (As per final University pattern)</td>
<td>Two - 40 marks each</td>
<td>Patter of exam as in University Examination</td>
<td>3 Hours each paper</td>
<td>80</td>
</tr>
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Final internal assessment in theory shall be computed on the basis of actual marks obtained out of 120, reduced to marks out of 10 and 5 marks reserve for day to day assessment. Total internal assessment marks theory shall be out of (10+5) 15. In case student has not appeared in Pre University examination then it shall be computed on the basis of actual marks obtained out of 80.

PRACTICAL:

- Internal assessment in Practical’s shall be computed on the basis of three term ending examinations and the marks allotted to Practical Record Book/seminar/assignment.

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<td>Patter of exam as in University Examination (courses will be as covered in the semesters)</td>
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Actual marks obtained out of 80 shall be reduced to out of 12. Add marks obtained out of 3 for Practical Record Book/seminar/assignment. Total internal assessment marks for Practical shall be out of (12+3) 15.

Total Internal Assessment: Theory --- 15
Practical -- 15
----- Total: 30
Curricula for II M.B.B.S.
PHARMACOLOGY AND PHARMACOTHERAPEUTICS

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

2. Educational objectives
(a) Knowledge
At the end of the course, the student shall be able to -

i. describe the pharmacokinetics and pharmacodynamics of essential and commonly used drugs
ii. list the indications, contraindications, interactions and adverse reactions of commonly used drugs
iii. indicate the use of appropriate drug in a particular disease with consideration of its cost, efficacy and safety for - individual needs, and mass therapy under national health programmes and write prescriptions accurately, on rationale basis for common ailments.
iv. describe the pharmacokinetic basis, clinical presentation, diagnosis and management of common poisonings
v. Integrate the list the drugs of addiction and recommend the management
vi. Classify environmental and occupational pollutants and state the management issues
vii. Explain pharmacological basis of prescribing drugs in special medical situations such as pregnancy, lactation, infancy and old age
vii. explain the concept of rational drug therapy in clinical pharmacology
viii. state the principles underlying the concept of `Essential Drugs”
ix. evaluate the ethics and modalities involved in the development and introduction of new drugs

(b) Skills
At the end of the course, the student shall be able to –

i. prescribe drugs for common ailments
ii. identify adverse reactions and interactions of commonly used drugs
iii. interpret the data of experiments designed for the study of effects of drugs
iv. scan information on common pharmaceutical preparations and critically evaluate drug formulations
v. develop understanding regarding handling of the various dosage forms (formulations).
(c) Integration
Practical knowledge of rational use of drugs in clinical practice will be acquired through integrated teaching vertically with pre-clinical & clinical subjects and horizontally with other para-clinical subjects.

3. Total duration of para-clinical teaching
   3 Semesters (III, IV, V)
   Total 360 teaching days

Total number of teaching hours allotted to Pharmacology
   300 hours

4. Syllabus
   a. Learning methods
   Lectures, tutorials, Practical’s: Distribution of teaching hours

   Theory
   Lectures
   127 ± 5
   Tutorials/Seminar/Interactive classes
   20 ± 5
   Total
   147 ± 10

   B) Practical’s ........110 ± 5
   C) Revision & Evaluation (Internal Assessment) ...........60

   b. & c. Sequential organisation of contents & their division

   A) INTRODUCTION: Pharmacology- a foundation to clinical practice (N=2)
   Development and branches of pharmacology, Scope of Pharmacology, definitions and explanation of various terms, sources of drugs and drug-information (n=2)

   B) GENERAL PHARMACOLOGY: (N=10)
   Pharmacokinetics: Characteristics of Process of absorption and factors affecting it, bioavailability and bioequivalence, Distribution, redistribution and Plasma protein binding, Metabolism of drugs and its variation, Elimination of drugs (n=4)

C) AUTONOMOUS NERVOUS SYSTEM (N=12)
General consideration of ANS; Adrenergic system: Adrenergic neurotransmitter, synthesis, storage, release, uptake and metabolism of adrenergic transmitter. Drugs affecting the above steps and clinical importance of the same (n=1) Adrenergic system: effects of adrenaline, noradrenaline and dopamine and other sympathetic drugs including receptors mediation in these effects and therapeutic uses (n=2) Adrenergic system: Beta adrenoceptor blockers actions, therapeutic uses and ADR (n=2) Adrenergic system: Alpha adrenoceptor blockers actions, therapeutic uses and ADR (n=1) Adrenergic system: Drugs affecting Adrenergic neurone function. therapeutic uses and ADR (n=1)
Cholinergic neurotransmitter, Cholinergic system: Cholinergic agonist, Cholinesterase inhibitors actions, uses & ADR, Special reference to Organophosphate poisoning and principles of its treatment (n=2) Anticholinergic drugs: actions, uses and ADR. Drugs acting on autonomic ganglia (n=1)
Skeletal muscle relaxants (n=1) Glaucoma: drugs for glaucoma (n=1)

D) AUTACOIDS (N= 4)
Autacoids: Histamine and Anti-histaminics (n=1) Autacoids: 5HT, actions and receptor involvement, drugs acting through 5 HT mechanism, Treatment of migraine (n=2) Prostaglandins physiological role, therapeutic uses and drugs acting through PG mechanism (n=1)
E) RESPIRATORY SYSTEM
(N=3)
Bronchial asthma: Drugs and Pharmacotherapy (n=2)
Cough and drugs in treatment of cough (n=1)

F) GASTRO INTESTINAL SYSTEM
(N=5)
Peptic Ulcer. Drugs and Pharmacotherapy (n=2)
Antiemetic Drugs (n=1)
Drugs for constipation (n=1)
Drugs for diarrhea, Drugs use in specific condition of GIT (Irritable bowel syndrom, Crohn’s disease, Ulcerative colitis) (n=1)

G) DRUGS ACTING ON BLOOD
(N=7)
Agents used in therapy of iron deficiency anaemia (n=2)
Agents used in therapy of megaloblastic anaemia & other related disorders (n=1)
Hypolipidaemic drugs (n=1)
Anticoagulants & Coagulants (n=2)
Thrombolytics, Anti thrombolytic & Antiplatelet Agents (n=1)

H) CARDIO VASCULAR SYSTEM
(N=15)
Introduction to cardiovascular disorders and drugs therapy (n=1)
Diuretics (n=2)
ACE inhibitors, vasodilators, Calcium channel blockers and other antihypertensive drugs and management of hypertension (n=4)
Angina pectoris: nitrates and other drugs (n=2)
Management of myocardial infarction (n=1)
Management of Shock (n=1)
Management of CHF: Inotropes, vasodilators and Digitalis glycosides (n=2)
Pharmacotherapy of arrhythmias (n=2)

I) NEUROPSYCHIATRIC PHARMACOLOGY INCLUDING INFLAMMATION, PAIN AND SUBSTANCE OF ABUSE
(N=22)
Introduction to CNS in perspective of Neurotransmitters (n=1)
Analgesics: Opioids (n=2)
Analgesics: NSAIDs (n=2)
Pharmacotherapy of rheumatoid arthritis (n=1)
Pharmacotherapy of gout (n=1)
Local anesthetics (n=1)
General anesthetics and pre anaesthetic medication (n=2)
Sedative-Hypnotics (n=1)
Antiepileptics (n=2)
Alcohol (n=1)
Psychopharmacology: Antianxiety, Antipsychotics, Antidepressants (n=5)
Therapy of neurodegenerative disorders: CNS stimulants & cognition enhancers, Anti-Parkinsonian agents (n=2)
Management of drug abuse (n=1)

J) ENDOCRINOLOGY (N= 17)
Introduction to endocrinology & Hypothalamic and Anterior Pituitary hormones (n=2)
Anti diabetic drugs and treatment of Diabetes Mellitus (n=4)
Thyroxine and antithyroid agents (n=2)
Corticosteroids (n=2)
Oestrogens & antagonists (n=1)
Progestins & antagonists (n=1)
Oral contraceptives & profertility agents (n=1)
Testosterone & anabolic steroids (n=1)
Drugs acting on Uterus (n=1)
Calcium metabolism/parathyroid hormone (n=2)

K) CHEMOTHERAPY INCLUDING CANCER CHEMOTHERAPY (N=27)
General considerations & principles of Antimicrobial use (n=2)
Beta lactum antibiotics: Penicillins & Cephalosporins (n=3)
Sulphonamides & Cotrimoxazole (n=1)
Quinolones (n=1)
Aminoglycosides (n=1)
Macrolides (n=1)
Tetracyclines & Chloramphenicol (n=1)
Glycopeptide, linezolid and other antibiotics: (n=1)
Pharmacotherapy of UTI and STD (n=1)
Pharmacotherapy of tuberculosis (n=3)
Anti-leprotic agents (n=1)
Pharmacotherapy of malaria (n=2)
Antiprotozoal agents: Antiamoebic and Anti Kala azar (n=1)
Antihelminthics (n=1)
Antifungal agents (n=1)
Antiviral agents including antiretroviral agents (n=2)
Principles of cancer chemotherapy and their adverse drug reactions (individual drug need not to be covered in details) (n=2)
Immunopharmacology: Immunomodulators & Immunosuppresants (n=2)

I) Miscellaneous (N=5)
   1. Dermatopharmacology (n=1)
   2. Ocular pharmacology (n=1)
   3. Chelating agents (n=1)
   4. Vitamins & Vaccines, Environmental and occupational pollutants (n=1)
   5. Special precautions, drug used in pregnancy, lactation, elderly, children (n=1)

d. Term-wise distribution

I term (N= 41)
Introduction and General Pharmacology (n=12)
Autonomous Nervous System (n=10)
Autacoids (n=4)
Respiratory System (n=3)
Gastro intestinal System (5)
Drugs acting on blood (n=7)
II term  
(N= 43)

Cardiovascular system (n= 15)
Neuropsychiatric Pharmacology (n= 22)
Endocrinology (n=6)

III term  
(N = 43)

Endocrinology (n=11)
Chemotherapy Including Cancer Chemotherapy (n=27)
Miscellaneous (n=5)

e. Practical’s: Total hours, number & contents

Total hours: 110
Number: 35

Contents:
(Sequence of the Practical-topics should be relevant to the theory topics covered in the term, by end of third term all the practical topics will be covered.)

Routes of administration (n=2)
Dosage forms and Handling of dosage forms (n=2)
Pharmacokinetics: clinical application using a simulation model and calculation (n=1)
Experimental pharmacology using computer simulation module/animal experiment
Effects of drugs on isolated tissues, concept of dose-response curve and its clinical interpretations (n=2)
Effects of drugs on intact animals, their clinical interpretations (n=3)
Effects of drugs in eye (n=1)
New drug development (n=1)
Drug Regulation in India /Banned and bannable drug(n=1)/
Adverse drug reactions and pharmacovigilance (n=2)
Drug Promotional Literature (n=1)
Essential Drug List (n=1)/Pharmacoeconomics
Principles & Practice of Prescription writing; Rational Pharmacotherapy and P drug concept (n=2)
*Prescription writing, comments on therapeutic problems and handling of dosage-forms (formulations) in various systems: Respiratory system (n=2)
Gastro-intestinal tract (n=2)
Anaemia (n=2)
Pain management (n=1)
Cardiovascular system (n=2)
Diabetes mellitus (n=2)
Common Infections (n=1)
Malaria & other infections (n=1)
Skin disorders (n=1)
Fixed dose combinations: Use and misuse of commonly used preparations: vitamins, antioxidants, enzymes etc. (n=1)
Emergency therapeutics (n=2)
Concept and practice of Clinical pharmacology (n=2)

*Special note:
(a) Exercises above this heading will lead to development of better understanding about rationale therapeutics, application of principles of therapy in practice and will have relevance of pharmacology in day to day to practice of science of medicine.
(b) It is to be emphasized that while doing the **Prescription writing exercises there should not be load on memory by remembering the doses and formulations of the drugs.** There should be access to the information about doses and formulations of the drugs while solving these exercises. **This is done by providing a “Drug Doses and Formulation-information booklet” or allowing the students to use CIMS, MIMS or Drug Index**
(c) Exercises on **Handling of dosage-forms (formulations)** will give the students a special opportunity to be conversant with of uses of drugs in actual practice. Students are expected to read the instructions about use of formulations, understand the units of strength of drugs expressed on label, calculate the proper dose for a given patient, particularly for children when dose is expressed as mg/kg or rate as mg/kg/min etc. In case of injectable drug administration the student needs to select the syringe and needle, follow the proper technique of filling the syringe with drugs from ampoule/vial, adjust the intravenous infusion-set, set the proper rate of intravenous infusion, observe appropriate precautions and know the proper techniques of disposal of needle and syringes. Also know the practical aspects of while handling of other formulations like MDI, dry powder for Syrup for paediatric use, Eye drops etc.
** Following are the examples of exercises, which can be incorporated during training in practical sessions at appropriate time.**

**Intravenous infusions of the drugs like:**
- Dopamine
- Aminophylline
- Insulin for diabetic coma
- Quinine
- Ringer lactate/Saline for acute dehydration
- Oxytocin
- Lignocaine for arrhythmia
- Sodium nitroprusside
To fill up syringe with drugs like:

- Insulin (combination)
- Benzathine Penicillin
- Ceftriaxone
- Adrenaline for s.c. injection
- Adrenaline for slow i.v. injection
- Atropine for colicky pain
- Atropine for organo-phosphate poisoning
- Aminophylline for slow i.v. injection
- Furosemide

MDI salbutamol, beclomethasone, etc,
**Powder** for preparing syrup for child: amoxicillin, **Eye drops** etc.

(d) From the point of uniformity of teaching at various institutions and clarity of areas to be studied in practical-sessions a Practical Manual / Practical Journal is recommended at University level.

**f. Books recommended:**
2. Pharmacology & Pharmacotherapeutics. Satoskar RS, Bhandarkar SD (Ed), Publisher: Popular Prakashan, Bombay.

**Reference books:**
5. Evaluation

Methods

a. Theory, Practical & viva

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<td>Internal assessment (theory – 15, practical’s – 15)</td>
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<td>16 X ½</td>
<td>08</td>
</tr>
<tr>
<td>2.</td>
<td>Long answer question two</td>
<td>2 X 5</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>a) b)</td>
<td></td>
<td></td>
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<tr>
<td>3.</td>
<td>Short answer questions four</td>
<td>4 X 3</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>a) b) c) d)</td>
<td></td>
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<tr>
<td>4.</td>
<td>Very short answer questions ten</td>
<td>10X 1</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>a) b) c) d) e) f) g) h) i) j)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Instructions:
1) All questions are compulsory
2) MCQ question paper should be conducted and completed in first 30 min. written question paper must be given only after taking back the MCQ answer sheet
3) Fill (dark) the appropriate empty circle below the question number once only..
4) Use blue/black ball point pen only.
5) Each MCQ carries one / half mark.
6) Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked on MCQ.
7) For Question no. 2, 3 and 4 time duration is 2.30 hour
8) Draw diagrams wherever necessary for Question no. 2, 3 and 4.
9) Answers of Questions and Sub questions must be written strictly according to the serial order of question paper.
10) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

<table>
<thead>
<tr>
<th>Question No.</th>
<th>Question Description</th>
<th>Division of Marks</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Total MCQs : 16</td>
<td>16 X ½</td>
<td>08</td>
</tr>
<tr>
<td>2.</td>
<td>Long answer question two a) b)</td>
<td>2 X 5</td>
<td>10</td>
</tr>
<tr>
<td>3.</td>
<td>short answer questions four a) b) c) d)</td>
<td>4 X 3</td>
<td>12</td>
</tr>
<tr>
<td>4.</td>
<td>very short answer questions ten a) b) c) d) e) f) g) h) i) j)</td>
<td>10X 1</td>
<td>10</td>
</tr>
</tbody>
</table>

c. Topic distribution
Topics for Paper I
General Pharmacology, Autonomic nervous system, Histamine and anti-histaminics and anti-vertigo drugs, 5 HT related drugs, Neuro-muscular Pharmacology; Cardiovascular system including Renin-Angiotensin- Aldosterone system, nitric oxide, drugs affecting coagulation and those acting on kidneys; Haematinics, Drugs used in Gastro-intestinal disorders; Ocular pharmacology; Anti-asthmatics and anti-tussives; Drugs and extremes of age, pregnancy and organ-dysfunction; Diagnostic and chelating agents; Environmental and occupational pollutants.

Topics for Paper II
Neuro-psychiatric pharmacology, including Analgesics, drug-addiction and its management; Prostaglandins and Anti-inflammatory drugs, Drugs for rheumatoid arthritis and gout; Anesthesia, Local anaesthesia, peri-operative management; Endocrinology, Drugs acting on uterus; Chemotherapy including cancer chemotherapy; Immunomodulators; Dermatology; Vaccines & sera; Vitamins.
**d. Marking scheme:-** Each paper of 40 marks as shown in the above table.

**e. Nature of practical’s and duration**
During Practical examination there will be 3 practical exercises (25 marks)

The details of the practical examination are as under:

**Exercise 1.** Prescription writing and **viva on it: 7 marks**
**Exercise 2:** Handling of dosage forms and **viva on it: 8 marks**
**Exercise 3:** Spotting (table work): **10 Marks**

**Exercise 1.** Each student will get a **separate exercise** to write a prescription on a ‘case’ presented. There will be **viva** on the exercise.

Each student will get a **separate exercise** to write a prescription on a ‘case’ presented. The student is expected to apply the concept of rational therapeutics and p-drugs and make proper selection of drug, dosage form, route of administration, frequency of administration etc and write an **accurate prescription in proper format**. There should be appropriate follow up instruction. While writing the prescription a **student will have access to the “Informative Script: Dose and Dosage Forms”** or drug index like MIMS, CIMS. There will be **viva** on the exercise. That would cover the defense for selection of drug, route, dosage form, possibility of alternative therapy, possible ADR and drug interactions, reasons for follow up etc.

**Exercise 2: Handling of dosage forms and viva on it: 8 marks**
Each student will get a **separate exercise**
(a) to **set intravenous infusion** of a given drug for a given purpose, or
(b) to **fill syringe** with the given drug for the given purpose or
(c) to handle other dosage forms like metered dose inhaler (MDI) with or without spacer, nebulizer, powder for syrup, eye drops etc.

Here the student is suppose to
1. Do the **calculation** involved for: (a) setting of infusion, (b) filling up a syringe with the given drug for the given purpose, (c) if needed for handling other dosage forms.
2. Demonstrate the **handling of dosage** form like filling up the syringe, setting the i.v. drip etc.
3. **answer the oral questions (viva voice)** on this exercise: The students are expected to explain: the calculation, about action and uses, acute toxicity features of parenterally administered drugs, the expression of the strengths of the preparations, the precautions to be observed, the proper methods of disposal of needles and syringes, etc.

**Following are some examples for this exercise:**
**Intravenous infusions of the drugs like:**
- Dopamine
- Aminophylline
- Insulin for diabetic coma
- Quinine
- Ringer lactate/Saline for acute dehydration
- Oxytocin
- Lignocaine for arrhythmia
- Sodium nitroprusside

**To fill up syringe with drugs like:**
- Insulin (combination)
- Benzathine Penicillin
- Ceftriaxone
- Adrenaline for s.c. injection
- Adrenaline for slow i.v. injection
- Atropine for colicky pain
- Atropine for organo-phosphate poisoning
- Aminophylline for slow i.v. injection
- Furosemide

**MDI salbutamol, beclomethasone, etc,**

**Powder** for preparing syrup for child: amoxicillin,

**Eye drops** etc.

---

**Exercise 3: Spotting (table work): 10 Marks**

**Ten spots (exercises) are arranged at different stations. They will be Objective and Structured ('question –answer type’) exercises. There will be coverage of the various areas studied during the training sessions.**

The various areas include:
- Dosage forms, Experimental Pharmacology graphs, ADRs and important drug-interactions,
- Pharmacokinetics problem, FDCs, and Therapeutic problems, New Drug Development, Clinical Pharmacology and Emergency Therapeutics.

**Time distribution:**

For Prescription writing Exercise and the exercise of Handling of dosage forms time given is ½ hour; after completing the exercises there will be viva on both the exercises. 5 minutes each. For exercise 3 (spotting) 20 min will be given.

**f. Viva: duration and topic distribution**

<table>
<thead>
<tr>
<th>Viva</th>
<th>15 marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration</td>
<td>10 mins</td>
</tr>
<tr>
<td>Examiners</td>
<td>5 mins with each candidate</td>
</tr>
</tbody>
</table>

Two examiners for topics of paper I - systems to be distributed

Two examiners for topics of paper II - systems to be distributed

At each table marks out of 16 will be given and then marks at two tables are averaged to calculate marks out of 16.
g. Plan for internal assessment

Marks for Internal Assessment:

- **Theory:** 15
- **Practical:** 15

The time-table for internal assessment will be as follows:

- **First term examination:** At the end of 3rd semester (After 120 teaching days)
- **Second term examination:** At the end of 4th semester
- **Pre-University examination:** At the end of 5th semester examination: *Minimum 4 weeks gap mandatory between Preliminary and University examinations*

  - Internal assessment shall be computed on the basis of three term ending examinations (Two terminals & one preliminary examination before the university examination).
  - Marks of Best of 1st and 2nd Term examination plus Pre-university exam (In case, because of genuine reason if student is not able to appear for Pre- University Examination, both 1st and 2nd term marks be considered for internal evaluation. Genuineness of the reason is to be verified and certified by the Dean of the Institution and permission for absence be granted by the Dean of the Institution is this respect)

**THEORY:**

<table>
<thead>
<tr>
<th>Examination</th>
<th>No. of Papers</th>
<th>Pattern</th>
<th>Duration of each paper</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Terminal</td>
<td>One -40 Marks</td>
<td>Patter of exam as in University Examination (courses will be as covered in the semesters)</td>
<td>3 Hours</td>
<td>40</td>
</tr>
<tr>
<td>2nd Terminal</td>
<td>One - 40 marks</td>
<td>Patter of exam as in University Examination (courses will be as covered in the semesters)</td>
<td>3 Hours</td>
<td>40</td>
</tr>
<tr>
<td>Pre University (As per final University pattern)</td>
<td>Two - 40 marks each</td>
<td>Patter of exam as in University Examination</td>
<td>3 Hours each paper</td>
<td>80</td>
</tr>
</tbody>
</table>

Final internal assessment in theory shall be computed on the basis of actual marks obtained out of 120, reduced to marks out of 10 and 5 marks reserve for day to day assessment .total internal assessment marks theory shall be out of (10+5) 15. In case student has not appeared in Pre University examination then it shall be computed on the basis of actual marks obtained out of 80.

**PRACTICAL:**

Internal assessment in Practical’s shall be computed on the basis of three term ending examinations and the marks allotted to Practical Record Book/seminar/ assignment.
<table>
<thead>
<tr>
<th>Examination</th>
<th>Pattern</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; Terminal</td>
<td>Patter of exam as in University Examination (courses will be as covered in the semesters)</td>
<td>40</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Terminal</td>
<td>Patter of exam as in University Examination(courses will be as covered in the semesters)</td>
<td>40</td>
</tr>
<tr>
<td>Pre University (As per final University pattern)</td>
<td>Patter of exam as in University Examination</td>
<td>40</td>
</tr>
</tbody>
</table>

Actual marks obtained out of 80 shall be reduced to out of 12. Add marks obtained out of 3 for Practical Record Book/seminar/ assignment. Total internal assessment marks for Practical shall be out of (12+3) 15.

**Total Internal Assessment:**

- Theory --- 15
- Practical -- 15
- ------ Total: 30
Curricula for II M.B.B.S.
FORENSIC MEDICINE AND MEDICAL JURISPRUDENCE
INCLUDING TOXICOLOGY

1. Goal
The broad goal of teaching undergraduate students 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 making 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 respect for codes of Medical ethics.

2. Educational objectives
(a) Knowledge
At the end of the course, the student shall be able to
i. identify the basic Medico-legal aspects of hospital and general practice
ii. define the Medico-legal responsibilities of a general physician while rendering community service either in a rural primary health centre or an urban health centre
iii. appreciate the physician’s responsibilities in criminal matters and respect for the codes of Medical ethics
iv. diagnose, manage and identify also legal aspect of common acute and chronic poisonings
v. describe the Medico-legal aspects and findings of post-mortem examination in cases of death due to common unnatural conditions and poisonings
vi. detect occupational and environmental poisoning, prevention and epidemiology of common poisoning and their legal aspects particularly pertaining to Workmen’s Compensation Act
vii. describe the general principles of analytical toxicology

(b) Skills: A comprehensive list of skills and attitude recommended by Medical Council of India Regulation, 1997 desirable for Bachelor of Medicine and Bachelor of Surgery (MBBS) Graduate for Forensic Medicine and Toxicology
At the end of the course, the student shall be able to
i. make observations and logical inferences in order to initiate enquiries in criminal matters and Medico-legal problems
a. to be able to carry on proper Medico-legal examination and documentation/Reporting of Injury and Age
b. to be able to conduct examination for sexual offences and intoxication
c. to be able to preserve relevant ancillary materials for medico-legal examination
d. to be able to identify important post-mortem findings in common unnatural deaths

ii. diagnose and treat common emergencies in poisoning and chronic toxicity
iii. make observations and interpret findings at post-mortem examination
iv. observe the principles of medical ethics in the practice of his profession

(c) 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 health care. Integration with relevant disciplines will provide scientific basis of clinical toxicology e.g. Medicine, Pharmacology etc.

3. Total duration of Para-clinical teaching
   3 Semesters
   Total 360 teaching days

   Total number of teaching hours allotted for Forensic Medicine & Toxicology
   100 hours

4. Syllabus
   a. Learning methods
   Lectures, tutorials, practical demonstrations

   Distribution of teaching hours
   Didactic lectures should not exceed one third of the time schedule, two third schedule should include Practical, Demonstrations, Group discussions, Seminars and Tutorials.

   Learning process should include living experiences and other case studies to initiate enquiries in criminal matters and Medico-legal problems.

   A) Theory (lectures &
   Tutorials, seminar & allied)

   Total ..... 60
B) Practicals (including demonstrations) ..... 25

...... 15

Total ..... 40

This period of training is minimum suggested. Adjustments whenever required, depending on availability of time, be made.

b. & c. Sequential organisation of contents & their division

Topic wise distribution

The course is designed to meet the needs of a General Practitioner and includes the following topics:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Forensic Medicine</td>
</tr>
<tr>
<td>2.</td>
<td>Toxicology</td>
</tr>
<tr>
<td>3.</td>
<td>Medical Jurisprudence</td>
</tr>
<tr>
<td>4.</td>
<td>Legal Procedures in Medico-Legal cases</td>
</tr>
<tr>
<td>5.</td>
<td>Court attendance when medical evidence is being recorded</td>
</tr>
<tr>
<td>6.</td>
<td>Integrated approach towards allied disciplines</td>
</tr>
<tr>
<td>7.</td>
<td>Tutorial and Seminars</td>
</tr>
<tr>
<td>Total:</td>
<td>100 Hrs</td>
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</tbody>
</table>

Part – 1 Forensic Medicine: (N=40)

Contents & division

Note: Must Know (MK), Desirable to Know (DK) and "*" is Nice to Know (NK)

A) DEFINITION, SCOPE RELEVANT TO SUBJECT

1. History of Forensic Medicine

2. Need, Scope, Importance and probative value of Medical evidence in Crime Investigation

B) PERSONAL IDENTITY NEED AND ITS IMPORTANCE.

1. Data useful for Identification of Living and Dead

2. Age estimation and its medico-legal Importance

3. Sex determination and it’s medico-legal importance

4. Other methods of establishing identity: Corpus Delicti, Dactylography, Tattoo marks, Deformities, Scars and other relevant factors

5. Identification of decomposed, mutilated bodies and skeletal remains

6. Medico legal aspect of *DNA fingerprinting - a brief introduction

7. Medico - legal aspect of blood and blood stains Collection, Preservation and Dispatch of Specimen for Blood and other ancillary material for identification and Medico-legal examination
C) MECHANICAL INJURIES AND BURNS
1. Definition and classification of injuries: Abrasions, Contusions, Lacerations, Incised and Stab injury, Firearm and Explosion injury, Fabricated and Defence injury
3. Causative Weapon and appearance of Suicidal, Accidental and Homicidal injuries
4. Physical methods of Torture and their identification
5. Reporting on Medico-legal cases of Hurts
6. Regional injuries: Head injury, cut throat injuries and Road traffic accident injuries
7. Thermal injuries: Injuries due to heat and cold, Frostbite, Burns, Scalds and Bride burning
8. Injuries due to Electricity, Lightening
Collection, Preservation and Dispatch of Specimen for Blood and other ancillary material for Medico-legal examination

D) MEDICO-LEGAL ASPECTS OF SEX, MARRIAGE AND INFANT DEATH
1. Sexual Offences and perversions: Natural (Rape, Adultery, and Incest), Unnatural (Sodomy, Bestiality and Buccal coitus) Lesbianism, perversions and relevant sections of I.P.C. and Cr.P.C.
2. Fertility, Impotence, Sterility, Virginity, and Nullity of marriage and divorce on Medical ground
5. Infant death (Infanticide)
   i. Definition Causes, Manners and Autopsy features
   ii. Determination of age of Foetus and Infant
   iii. Signs of live-born, stillborn and dead born child
Collection, Preservation and Dispatch of Specimen: Hair, seminal fluid/ stains and other ancillary material for medico-legal examination, examination of seminal stains and vaginal swabs

E) MEDICO-LEGAL ASPECTS OF DEATH
1. Definition and concept of death, stages, modes, Signs of death and its importance
2. Changes after death, Cooling, Hypostasis, Changes in eye, Muscle changes, Putrefaction, Saponification, Mummification, Estimation of time since death
3. Death Certification, Proximate causes of death, causes of sudden deaths, Natural deaths. Presumption of death and survivorship, disposal and preservation of dead
5. Medico-legal aspects and findings of post-mortem examination in cases of death due to common unnatural conditions
6. Sudden unexpected death, deaths from starvation, cold and heat and their medico-legal importance
7. Medico-legal aspects of death from Asphyxia, Hanging, Strangulation, Suffocation and Drowning

F) MEDICO-LEGAL AUTOPSY
1. Autopsy: Objectives, Facilities, Rules and Basic techniques, Proforma for reporting medico-legal autopsy
2. Exhumation, examination of mutilated remains, Obscure autopsy and post-mortem artifacts
3. Collection, preservation and despatch of material for various investigations to Forensic Science Laboratory

G) FORENSIC PSYCHIATRY
1. Definition, General terminology and Basic concept of normality and abnormality of human behaviour, Civil and Criminal responsibility
2. Examination, Certification, restraint and admission to Mental Hospital
3. Mental Health Act – Principles and Objectives

Part – 2 Toxicology: (N=20)

A) POISONS AND THEIR MEDICO-LEGAL ASPECTS
1. Definition of poison, General consideration and Laws in relation to poisons\Narcotic drugs and psychotropic substances Act, *Schedules H and L drugs, *Pharmacy Act, Duties and responsibilities of attending physician
2. Common poisons and their classification, Identification of common poisons, Routes of administration, Actions of poisons and factors modifying them, Diagnosis of poisoning (Clinical and Confirmatory), Treatment/ Management of cases of acute and chronic poisonings
3. Addiction and Habit forming drugs, drug dependence
4. Analytical Toxicology
Part – 3 Medical Jurisprudence: (N=12)

A) LEGAL AND ETHICAL ASPECTS OF PRACTICE OF MEDICINE

1. The Indian Medical Council, the Act, Formation and Functions; State Medical Council: Formation, Functions, and Registration
2. Rights and obligations of Registered Medical Practitioners and patient, Duties of physicians and patients, Euthanasia
3. Infamous conduct, Professional secrecy and privileged communications
4. Codes of Medical Ethics, medical etiquette, 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
5. Medical Ethics and prohibition of Torture & care of Torture Victims

B) DEFINITION OF HEALTH AND ITEMS TO CERTIFY ABOUT HEALTH

1. Common medico-legal problems in Hospital practice, Consent in Medical Examination and treatment, under treatment/ Sickness and Fitness certificate, maintenance of medical records
2. Social, Medical, Legal and Ethical problems in relation to AIDS

C) ACTS AND SCHEMES RELATED TO MEDICAL PROFESSION IN BRIEF:


Part – 4 Legal procedures in medico-legal cases: (N=8)

A. Medico-Legal Investigations of death in suspicious circumstances, different Inquest, type of offences
B. Types of Criminal courts and their powers, punishments prescribed by law, kinds of witnesses, Evidence, Documentary Medical evidence, Dying declaration and Dying deposition
C. The Trial of criminal cases, Rules and Conventions to be followed by Medical Witness at Medical evidence, subpoena, conduct money
D. Relevant Sections from the Indian Evidence Act, Indian Penal code and Criminal Procedure code
E. Medical jurisprudence including medical ethics

NOTE : desirable to know and „* „
d. Term-wise distribution

<table>
<thead>
<tr>
<th>Terms</th>
<th>Lectures</th>
<th>Demonstrations</th>
<th>Practicals</th>
<th>Tutorials, seminar &amp; allied</th>
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<tr>
<td>I Term</td>
<td>15</td>
<td>08</td>
<td>06</td>
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<tr>
<td>II Term</td>
<td>15</td>
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<td>05</td>
<td>06</td>
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<tr>
<td>III Term</td>
<td>10</td>
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<td>04</td>
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<td>Total</td>
<td>40</td>
<td>25</td>
<td>15</td>
<td>20</td>
</tr>
</tbody>
</table>

This period of training is the minimum suggested. Adjustments whenever required, depending on availability of time, be made

e. Practicals (including demonstrations) : Total no.of hours & contents

Practicals will be conducted in the laboratories.
Objective will be to assess proficiency in skills, conduct of experiment, interpretation of data and logical conclusion.
Emphasis should be on candidate’s capacity in making observations and logical inferences in order to initiate enquiries in criminal matters and medico-legal problems.
Total Marks: 25 + 15 = 40
Contents:
Part 1 Forensic Medicine
Report on:
1. Estimation/Certification of Age
2. Recording of fingerprints
3. Examination/Certification of the Injured
[Prescribed Forms]
4. Examination of the Causative Agents in cases of Injuries
(e.g. Weapons, Instruments)
   a. Hard and blunt weapons
   b. Sharp cutting, sharp pointed and Sharp Heavy cutting weapons
   c. Firearm weapons
5. Sexual offences :
   a. Examination/Certification of Victim
   b. Examination/Certification of Accused
6. Examination of Foetus to opine about age
7. Examination of Bones and teeth for Medico-legal purpose to determine age, sex, stature, cause of death, time since death
a. Skull and Mandible
b. Scapula, Sternum and Upper limb bones c. Sacrum and hip bone/ Pelvic bone
d. Lower limb bones

Study of:
8. Medical certification of cause of Death as per Birth and Death registration Act [Prescribed Forms]
9. Studies of Skiagrams for estimation of age, bony injury, foreign body, and pregnancy
10. Photograph of different events of Medico-legal importance and post- mortem changes
11. Study of Various museum specimens of medico-legal significance
12. Study of Various slides of medico-legal significance

13. Demonstration of Instruments:
a. Used in treatment of acute poisoning cases
b. Used for causing abortions
c. Used for carrying out autopsy
[Standard human autopsy dissection Box/set]

Part 2 Forensic Toxicology
1. Examination/Certification of Alcoholic [Prescribed Forms „A” &„B”]
2. Study of Common poisons:
[Sulphuric Acid, Nitric Acid, Hydrochloric Acid, Carbolic Acid and Oxalic Acid, Sodium and Potassium Hydro-Oxide, Phosphorous, Lead, Arsenic, Mercury, Copper, Glass powder, Castor, Croton, Capsicum, SemicarpusAnacardium (Bhilawa), CalatropisGigantea, AbrusPrecatorius (Ratti), Datura, Cannabis Indica, Opium, Aconite, Yellow Oleander, Strychnine, Snakes, Scorpion, Alcohol, Methyl Alcohol, Kerosene, Barbiturates, Organophosphorus compounds, OrganoChloro compounds, Carbamates (Carbaryl)] and other commonly used poisons, antidotes and preservatives

Part 3 Medical Jurisprudence
Study of Medical Certificates [Prescribed Forms]
a. Sickness Certificate
b. Fitness Certificate
c. Certificate of Physical fitness
d. * Medical certificate prescribed under Mental Health Act : 1987
e. * Medical Certificate of Sound/ Unsoundness of mind.

**Part – 4 Legal procedures in medico-legal cases**

**Study of the various prescribed Forms:**

Consent to surgery Anaesthesia and other Medical services, Request for sterilization, Consent to access to hospital records, Authorization for Autopsy, Dead body Challan used for sending a dead body for post-mortem examination, Request for the second inquest by Magistrate on the dead body, Provisional post-mortem certificate, Post-mortem form, Pictorial Post-mortem form, Form for the Final cause of death, Forms for despatch of exhibits other than the viscera to chemical analyser, Forms for despatch of Viscera for Histopathological Examination, Form for dispatch of viscera to chemical analyser, Forensic Science Laboratory report form, Summons to witness.

Each student shall attend and record as a clerk

a. As many as possible cases / items of medico-legal importance

b. 10 cases of medico-legal autopsies

Both above „a” and „b” should be recorded in the approved Proforma in the single Journal. The Journal should be scrutinised by the teacher concerned and presented for the inspection and evaluation during the university examination.

Each student shall attend the court at least 2 cases when Medical Evidence is being recorded.

**f. Books recommended**

1. Modi”s Textbook of Medical Jurisprudence and Toxicology
   Ed. 22, 1999, by B.V. Subramanyam, Butterworth

2. The Essentials of Forensic Medicine & Toxicology by K.S. Narayan Reddy

3. Text Book of Forensic Medicine and Toxicology by krishan Vij

4. Text Book of Forensic Medicine – J.B. Mukherjii VOL 1 & 2

5. Principles of Forensic Medicine - A. Nandy

6. Comprehensive Toxicology by V.V.Pillay

7. Bernard Knight et. All: Cox”s Medical Jurisprudence & Toxicology
Reference books

1. Russell S. Fisher & Charles S. Petty: Forensic Pathology
2. Keith Simpson: Forensic Medicine
4. Gradwohl – Legal Medicine
5. A Doctors Guide to Court – Simpson
6. Polson C.J.: The essentials of Forensic Medicine
8. Atlas of Legal Medicine (TomroWatonbe)
10. A Hand Book of Legal Pathology (Director of Publicity)
12. Ratanlal & Dhirajlal, The Indian Penal Code; Justice Hidayatullah & V.R. Manohar
15. Medical Law & Ethic in India – H.S. Mehta
16. Bernard Knight: Forensic Pathology

5. Evaluation

a. Methods

Theory, Practical & viva

b. Pattern of Theory Examination including Distribution of Marks, Questions, Time

a. Theory, Practical & Viva

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Total marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Theory (1 papers – 40)</td>
<td>40</td>
</tr>
<tr>
<td>2</td>
<td>Oral (Viva)</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>Practical</td>
<td>30</td>
</tr>
<tr>
<td>4</td>
<td>Internal assessment (theory –10, practical’s –10)</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>100</td>
</tr>
</tbody>
</table>

Passing: A candidate must obtain 50% in aggregate with a minimum of 50% in Theory including oral and minimum of 50% in practical’s
Nature of Question Paper
Faculty with Year: SECOND MBBS
Subject: FORENSIC MEDICINE & TOXICOLOGY
Paper: --

Total Marks : 40
Time : 3 Hours

Instructions:
1) All questions are compulsory
2) MCQ question paper should be conducted and completed in first 30 min. written question paper must be given only after taking back the MCQ answer sheet
3) Fill (dark) the appropriate empty circle below the question number once only.
4) Use blue/black ball point pen only.
5) Each MCQ carries one / half mark.
6) Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked on MCQ.
7) For Question no. 2,3 and 4 time duration is 2.30 hour
8) Draw diagrams wherever necessary for Question no. 2, 3 and 4.
9) Answers of Questions and Sub questions must be written strictly according to the serial order of question paper.
10) Do not write anything on the blank portion of the question paper. If written anything, such type of act will be considered as an attempt to resort to unfair means.

<table>
<thead>
<tr>
<th>Question No.</th>
<th>Question Description</th>
<th>Division of Marks</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Total MCQs : 16</td>
<td>16 X ½</td>
<td>08</td>
</tr>
</tbody>
</table>
| 2.           | Long answer question two  
   a) b)           | 2 X 5             | 10          |
| 3.           | short answer questions four  
   a) b) c) d)     | 4 X 3             | 12          |
| 4.           | very short answer questions ten  
   a) b) c) d) e) f) g) h) i) j) | 10X 1 | 10 |

c. Topic distribution in the theory
Question No 1 evenly distributed
Question No 2,3,4: definition, scope relevant to subject, personal identity need and its importance.
mechanical injuries and burns , medico-legal aspects of sex, marriage and infant death , medico-legal aspects of death , medico-legal autopsy , legal procedures in medico-legal cases:
2 Questions in Question No3 and 3 Questions in Question No 4 from forensic psychiatry, poisons and their medico-legal aspects, medical jurisprudence including medical ethics

d. Marking scheme
As shown above
e. Nature of practicals and duration

**Practical’s**  
**Marks 30**


1. An Injured OR Age of the child
2. Bone OR Determination of age of Foetus
3. Weapon
4. Certificate of Sickness, fitness OR Death.
5. Report on TWO Poison
6. Report on any TWO articles: [Skiagram OR Photographs OR Slides OR Museum Specimens OR Instruments]

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TOTAL 30 Marks

In respect of items 1 to 6, students will be expected to prepare their Reports as if they would be required to submit it to the investigating authority concerned within the time allotted, and the examiners will be assessing proficiency in skills, conduct of experiment, interpretation of data and logical conclusion. Emphasis should be on candidate’s capacity in making observations and logical inferences in order to initiate enquiries in criminal matters and medico-legal problems.

f. Viva: duration and topic distribution

Viva-você: Time: About 20 Min

There will be TWO tables examining each student separately on the topics „a” and „b”.

Viva 10 marks
Duration 20 mins
Four examiners 10 mins with each candidate
Two examiners for topics a. Toxicology and Medical Jurisprudence
Two examiners for topics b. Forensic Medicine and Legal Procedures

At each table marks given will be out of 5 and then added together (total out of 10)
g. Plan for internal assessment

Marks for Internal Assessment:

Theory: 10
Practical: 10

The time-table for internal assessment will be as follows:

- First term examination: At the end of 3rd semester (After 120 teaching days)
- Second term examination: At the end of 4th semester
- Pre-University examination: At the end of 5th semester examination: *(Minimum 4 weeks gap mandatory between Preliminary and University examinations)*

- Internal assessment shall be computed on the basis of three term ending examinations (Two terminals & one preliminary examination before the university examination).
- Marks of Best of 1st and 2nd Term examination plus Pre-university exam (In case, because of genuine reason if student is not able to appear for Pre-University Examination, both 1st and 2nd term marks be considered for internal evaluation. Genuineness of the reason is to be verified and certified by the Dean of the Institution and permission for absence be granted by the Dean of the Institution is this respect)

**THEORY:**

<table>
<thead>
<tr>
<th>Examination</th>
<th>No. of Papers</th>
<th>Pattern</th>
<th>Duration of each paper</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Terminal</td>
<td>One -40 Marks</td>
<td>Patter of exam as in University Examination (courses will be as covered in the semesters)</td>
<td>3 Hours</td>
<td>40</td>
</tr>
<tr>
<td>2nd Terminal</td>
<td>One - 40 marks</td>
<td>Patter of exam as in University Examination (courses will be as covered in the semesters)</td>
<td>3 Hours</td>
<td>40</td>
</tr>
<tr>
<td>Pre University (As per final University pattern)</td>
<td>One - 40 marks</td>
<td>Patter of exam as in University Examination</td>
<td>3 Hours each paper</td>
<td>40</td>
</tr>
</tbody>
</table>

Final internal assessment in theory shall be computed on the basis of actual marks obtained out of 80, reduced to marks out of 5 and 5 marks reserve for day to day assessment .total internal assessment marks theory shall be out of (5+5) 10.
PRACTICAL:

- Internal assessment in Practical’s shall be computed on the basis of three term ending examinations and the marks allotted to Practical Record Book/seminar/assignment.

<table>
<thead>
<tr>
<th>Examination</th>
<th>Pattern</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Terminal</td>
<td>Patter of exam as in University Examination (courses will be as covered in the semesters)</td>
<td>40</td>
</tr>
<tr>
<td>2nd Terminal</td>
<td>Patter of exam as in University Examination(courses will be as covered in the semesters)</td>
<td>40</td>
</tr>
<tr>
<td>Pre University (As per final University pattern)</td>
<td>Patter of exam as in University Examination</td>
<td>40</td>
</tr>
</tbody>
</table>

Actual marks obtained out of 80 shall be reduced to out of 8. Add marks obtained out of 2 for Practical Record Book/seminar/assignment. Total internal assessment marks for Practical shall be out of (8+2) 10.

**Total Internal Assessment:**

- Theory --- 10
- Practical -- 10

------ Total: 20