CURRICULA FOR II MBBS IN PATHOLOGY

1. GOAL

Enable the medical graduate to acquire adequate knowledge and skill to understand and interpret varied clinical and morphological alterations in disease and make optimum use of these in diagnosis , management and prevention of disease processes .

2. LEARNING OBJECTIVES

2.1 KNOWLEDGE

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

2.1.1

Understand , interpret and correlate the general mechanisms, effects and sequelae of injurious influences on cell and tissues

2.1.2

Comprehend and correlate morphological and functional effects in various organs and systems due to genetic, environmental, immunological infectious and neoplastic influences .

2.1.3

Grasp the essential aspects of pathogenesis and pathology of common diseases and neoplasia relevant to specific agents , systems and organs with

their clinical and diagnostic implications .

2.1.4

Acquire basic and essential knowledge of genesis and characteristics of important hematological disorders , essentials of transfusion medicine and clinical pathology .

2.2 SKILLS

At the end of the course candidate should be capable of

2.2.1

Chose relevant and essential lab investigations in common and specific clinical conditions in a rational and systematic manner , interpret the results, correlate them with the clinical features and arrive at a reasonable diagnosis .

2.2.2

Should be capable of giving clear instructions to the patient, collect the correct and adequate sample/specimen with required knowledge of the specific requirements of the laboratory including principles of important laboratory investigations .

2.2.3

Perform essential haematological and clinicopathological investigations pertinent to the symptoms and clinical features of the patient .

2.2.4

Recognise and interpret important gross and microscopic alterations of
tissues and organs in common diseases .

2.3 INTEGRATION

At the end of the course of one and a half years, the candidate should be able to
integrate the his knowledge and skill in important clinical conditions and utilize it
efficiently in arriving at diagnosis for optimum management and preventive
measures .

3 LEARNING SCHEDULE

3.1 Semesters (Terms) 3,4 and 5

3.2 Minimum working days - 315

3.3 Distribution of working hours

3.3.1 Lectures and seminars - 104 Hrs

3.3.2 Tutorials , group discussions – 50 Hrs

3.3.4 Practicals and demonstrations – 100 Hrs

3.3.5 Revisions , evaluation - 46 Hrs

3.3.6 Total 300 Hrs

4 SYLLABUS

4.1 Distribution of teaching hours

	Lectures / Seminars(1hr)	Tutorials (2hrs)	Practicals (2hrs)
4.1.1 General Pathology	34	04	13
4.1.2 Haematology	18	07	10
4.1.3 Systemic Pathology	46	09	11
4.1.4 Clinical Pathology	04	03	04
4.1.5 Autopsy	02	02	02

4.2 COURSE CONTENTS

The broad area of study shall be

4.2.1General Pathology including general neoplasia

4.2.2 Systemic Pathology including specific neoplasia

4.2.3 Hematology including essential of transfusion medicine .

4.2.4 Clinical Pathology

4.3 LECTURE AND SEMINAR TOPICS(Desirable to know **x**)

4.3.1 CELL INJURY

(1) Introduction to Pathology

History -Evolution of pathology, important definitions , common aetiological factors causing disease with examples

(2) General response to injury at cellular level including role of free radicals .

(3) Reversible cell injury – intracellular accumulations – hydropic and fatty change - I

(4) Reversible cell injury - Pigment and other substances - II

(5) Irreversible injury - Types of necrosis , gangrene and pathological calcification .

(6) Apoptosis – Mechanisms and its relevance in disease and neoplasia

(7) Amyloidosis – Pathogenesis and diagnosis .

4.3.2 INFLAMMATION AND REPAIR

(1) Acute inflammation – Definition , vascular and cellular response .

(2) Acute inflammation – Chemical mediators – their role

(3) Acute inflammation – Chemical mediators - control mechanisms .

(4) Chronic and granulomatous inflammation

(5) Repair and regeneration – Wound healing and factors influencing .

(6) Repair in specialisedtissues , bone ,muscle,nerve,parenchymal organs

4.3.3 IMMUNOPATHOLOGY

(1) Immunity – General and cells involved in immune mechanisms .

(2) Hypersensitivity – Mechanism and types .

(3) Autoimmune diseases – Pathogenesis and Mechanisms.

(4) Autoimmune disorders – SLE , Rheumatoid arthritis .

(5) Mechanism and effects of transplant rejection and graft versus host reaction .

4.3.4 INFECTIOUS DISEASES

(1) Mycobacterial diseases – tuberculosis .

(2) Mycobacterial diseases – Leprosy .

(3) Bacterial infections – Typhoid , Dysentery , syphilis .

(4) Viral – AIDS , Transmission pathogenesis , pathology and diagnosis**.**

(5) Fungal infections ; Superficial and deep – Pathology .

(6) Parasitic diseases

4.3.5 CIRCULATORY DISTURBANCES

(1) Oedema – Pathogenesis and Pathology in important organs .

(2) Hyperemia – Chronic Venous Congestion – Lung , Liver ,Spleen .

(3) Thrombosis – Mechanisms and Morphology .

(4) Embolism and infarction .

(5) Hypertension – Pathogenesis and its effects on various systems
and organs .

(6)Haemorrhage and shock .

4.3.6 GROWTH DISTURBANCES AND GENERAL NEOPLASIA

(1) Alterations and adaptations in cells and tissues due to environmental
influences – Definitions and illustrative examples .

(2) Neoplasia – Definitions and characters of benign and malignant
neoplasms , metastasis .

(3) Neoplasia – Nomenclature , grading , staging , predispositions .

(4) Carcinogenesis – Chemical carcinogens , radiation , microbial agents **.**

(5) Molecular basis of cancer **.,** **x**

(6) Tumor and host interactions – Effect of tumor on host ,Paraneoplastic**x**
Syndromes , Tumor immunity .

(7) Laboratory diagnosis of cancer , Cytology , biopsy , tumor markers .

4.3.7 MISCELLANEOUS DISORDERS

(1) Important genetic disorders with examples .

(2) Protein Energy malnutrition and obesity .

(3) Vitamin deficiency disorders **, x**

(4) Effects of radiation **.x**

4.3.8 HAEMATOLOGY AND TRANSFUSION MEDICINE

(1) Anemias – Etiological classification . Normal parameters and
morphological classification .

(2) Nutritional anemias – Iron deficiency , vitamin B_{12} and folic acid .

(3) Haemolyticanemias – Classification and investigations .

(4) Hereditary haemolyticanemias – Thalassaemia , Sickle cell anemia , **x**
Hereditary spherocytosis and G6PD deficiency .

(5) Immunohaemolyticanemias and acquired haemolyticanemias .

(6) Haemorrhagic disorders – Platelet , vascular disorders

(7) Haemorrhagic disorders – Coagulation disorders .

(8) Investigation in haemorrhagicdisorders .

(9) Leucocytosis , leucopenia , leukaemoid reactions .

(10) Classification and criteria for diagnosis of acute leukaemias .

(11) Chronic leukaemias .

(12) Myelodysplasticsyndrome **., x**

(13) Myeloproliferative disorders **., x**

(14) Plasma cell dyscrasias anddysproteinemias .

(15) Blood transfusion – Important blood groups , antigen and antibodies .
Grouping and cross matching .

(16) Blood collection , storage , blood components .

(17) Transfusion reactions and their investigations

4.3.9 CARDIOVASCULAR SYSTEM

(1) Rheumatic Heart Disease – Pathogenesis, pathology, sequelae

(2) Infective endocarditis Pathogenesis, pathology, effects

(3) Atherosclerosis – Etiological factors, morphology and complications *****

(4) Ischaemic Heart Disease - Effects of coronary artery disease

(5) Congenital heart diseases, aneurysms **, x**

(6) Pericarditis, cardiomyopathy **x**

(7) Other diseases of blood vessels - Vasculitis, tumours**x**

4.3.10 RESPIRATORY TRACT

(1) Inflammation of bronchi – Bronchitis, asthma, bronchiectasis

(2) Pneumonia – Lobar, bronchopneumonia and interstitial

(3) Lung abscess, empyema, emphysema

(4) Nasopharyngeal and laryngeal tumours**x**

(5) Tumours of the Lung – Important benign and malignant tumours

Morphology and behaviour

(6) Occupational Lung Disease – Anthracosis, silicosis, asbestosis,effects**, x**

(7) Atelectasis and hyaline membrane disease **x**

4.3.11 GASTROINTESTINAL TRACT

(1) Lesions of oral cavity and salivary glands **x**

(2) Gastritis and peptic ulcer – Pathogenesis pathology and sequelae

(3) Tumours of upper GIT – Oesophagus and stomach

(4) Tumours of intestines – Polypi, benign and malignant tumours

(5) Idiopathic inflammatory bowel disease

(6) Pancreatitis, tumours of the pancreas **x**

4.3.12 HEPATOBILIARY SYSTEM

(1) Pathogenesis and pathology of acute and chronic hepatitis
(2) Alcoholic liver disease Pathology and complications
(3) Cirrhosis of liver – Classification and morphology
(4) Tumours of liver and gall bladder **x**

4.3.13 KIDNEY AND URINARY TRACT

(1) Etiopathogenesis, pathology and effects of nephritic syndrome
(2) Etiopathogenesis, pathology and effects of nephrotic syndrome
(3) Acute renal failure – clinicopathological correlations
(4) End stage renal disease and chronic renal failure – sequelae*****
(5) Important tumours of the kidneys and urinary tract , **x**
(6) Nephrolithiasis and obstructive uropathy**x**

4.3.14 LYMPHORETICULAR SYSTEM

(1) Benign lesions, granulomas of lymph nodes ; Spleen in important diseases
(2) Hodgkin's Lymphoma and general features of lymphoma
(3) Non Hodgkin'sLymphoma **x**

4.3.15 REPRODUCTIVE SYSTEM

(1) Carcinoma cervix, tumours of the uterine corpus
(2) Trophoblastic diseases – Hydatidiform mole, choriocarcinoma**x**
(3) Tumours of the ovary
(4) Tumours of the testis
(5) Hyperplasia and carcinoma of prostate and penis **x**
(6) Benign lesions of the breast
(7) Malignant tumours of the breast

4.3.16 BONE AND SOFT TISSUE

(1) Osteomyelitis and metabolic diseases of the bone
(2) Tumours of the bone – Osteosarcoma, giant cell tumour, Ewing's sarcoma, Chondrosarcoma
(3) Arthritis – Rheumatoid arthritis and others
(4) Tumours and tumour like lesions of soft tissue – fibrous tissueFibrohistiocytic**x**
(5) Tumours and tumour like lesions of soft tissue – Adipose tissue, muscle, peripheral nerves**x**

4.3.17 ENDOCRINE ORGANS

(1) Diabetes Mellitus, pathogenesis, pathology, complications *****
(2) Benign thyroid swellings
(3) Tumours of the thyroid
(4) Adrenal hyperplasia, atrophy, tumours**x**

4.3.18 CENTRAL NERVOUS SYSTEM

(1) Inflammatory disorders of meninges and brain
(2) CNS tumours – Glioma, menigioma, metastatic tumours**x**

4.3.19 SKIN

(1) Tumours – Squamous cell carcinoma, basal cell carcinoma , nevi and melanoma

4.3.20 CLINICAL PATHOLOGY

(1) Differential diagnosis of jaundice, investigations and interpretation
(2) Investigations in renal disease with special emphasis on urine Examination
(3) Investigation in Diabetes Mellitus
(4) Examination of body fluids – CSF, Exudate, Transudate, Semen

4.3.21 AUTOPSY

(1) Importance, indication and procedures for medical autopsies

x

5. TOPICS FOR TUTORIALS, GROUP DISCUSSIONS, DEMONSTRATIONS

1. Cell injury
2. Inflammation
3. Circulatory disturbances
4. Tuberculosis
5. Neoplasia
6. Collection of blood and other specimens, anticoagulants, smears , needles
7. Anaemia, hemoglobin and hematological parameters
8. Peripheral blood smear examination
9. Leucocyte disorders
10. Haemorrhagic disorders
11. Urine examination
12. Clinical charts – Interpretation and differential diagnosis
13. Cardiovascular system I
14. Cardiovascular system II
15. Respiratory system
16. Genito Urinary system

17. Liver and Spleen
18. Diseases of Lymph nodes
19. Tumours and tumour like lesions of bone
20. Tumours and tumour like lesions of soft tissues
21. Lesions of the breast
22. Diabetes Mellitus
23. Haematology transparencies
24. Systemic and general pathology transparencies
25. Discussion of museum specimens 1
26. Discussion of museum specimens 2
27. Discussion of typical clinical pathology and hematology charts
28. Orientation to theory examination
29. Orientation to practical examination

6. TOPICS FOR INTEGRATED TEACHING, SEMINARS, SYMPOSIA

1. Rheumatic heart disease
2. Hypertension
3. Diabetes Mellitus
4. Tuberculosis
5. AIDS
6. Nephritic and Nephrotic syndrome
7. Acute and chronic renal failure
8. Jaundice
9. Malaria
10. Ischaemic Heart Disease
11. Enteric fever
12. Pneumonia
13. Salivary gland lesions

7. PRACTICALS AND DEMONSTRATIONS

1. Tissue processing and microscopy

2. Identification of cells
3. Reversible cell injury .degenerations
4. Acute inflammation
5. Chronic inflammation
6. Necrosis , gangrene and infarction
7. Hyperaemia ,Oedema , Thrombosis and Embolism
8. Pigments , Calcification , Amyloid
9. Leprosy , Syphilis
10. Tuberculosis
11. Neoplasia I – Benign Tumors
12. Neoplasia II – Non pigmented skin tumors , Adenocarcinoma
13. Neoplasias III – Pigmented skin tumors , Sarcoma
14. Collection of blood , Bulbs and needles
15. Haemopoiesis
16. Haemoglobin estimation
17. Total WBC count
18. Differential leucocyte count
19. Peripheral blood smear examination
20. Investigation of anaemia
21. Leukaemia
22. Blood groups and blood transfusion
23. Investigations of haemorrhaegicdisorders , charts
24. Cardiovascular system I
25. Cardiovascular system II
26. Respiratory system
27. Kidney
28. Urine examination
29. Gastrointestinal tract
30. Liver diseases
31. CNS lesions / CSF examination
32. Diseases of lymph node
33. Diseases of bone and joint
34. Male / Female genital tract
35. Breast , Endocrine system
36. Diabetes /GTT

37. Pregnancy test / Semen examination
38. Cytological preparations ID

39 . Autopsy

40. Autopsy

8. DRAWING OF SLIDES

These are grouped under two headings as slides the students
a) Must see (M) b) Desirable to see (D)

8.1 Histopathology slides
8.2 Haematology slides
8.3 List of specimens

8.1 Histopathology slides

- Fatty change liver (M)
- Uterus – Leiomyoma with hyaline change (M)
- Kidney amyloid (D)
- Lymph node – Caseous necrosis (M)
- Kidney infarct (M)
- Acute ulcerative appendicitis (M)
- Pyogenic meningitis (D)
- Tuberculoid leprosy – skin (M)
- Actinomycosis (D)
- Granulation tissue (M)
- Tuberculous lymphadenitis (M)
- Lung Chronic passive congestion (M)
- Liver Chronic passive congestion (M)
- Artery – recent/organized thrombus
- Pulmonary oedema (D)
- Skin – Papilloma (M)
- Thyroid – Follicular adenoma (D)
- Uterus – Leiomyoma (M)

- Lipoma (M)
- Skin – Squamous cell carcinoma (M)
- Skin Basal cell carcinoma (M)
- Skin – Nevus and Malignant melanoma (M)
- Malignant soft tissue tumour (D)
- Salivary gland – Pleomorphic adenoma (D)
- Adenocarcinoma colon (M)
- Heart – healed infarct (M)
- Skin – Capillary hemangioma (M)
- Cavernous hemangioma (D)
- Heart – rheumatic myocarditis (D)
- Aorta – atherosclerosis (D)
- Lung – Lobar and bronchopneumonia (M)
- Lung fibrocaseous tuberculosis (M)
- Kidney – Chronic Pyelonephritis (M)
- Kidney – Crescentic Glomerulonephritis (D)
- Kidney – Renal cell carcinoma (D)
- Ileum – typhoid ulcer (D)
- Stomach – Chronic peptic ulcer (M)
- Liver – Cirrhosis (M)
- Liver – massive necrosis (D)
- Brain – Meningioma (D)
- Neurilemmoma (D)
- Lymph node – Hodgkin’s lymphoma (M)
- Lymph node – Non Hodgkin’s lymphoma (D)
- Lymph node – Metastasis (M)
- Bone – Osteogenic sarcoma (M)
- Bone – Giant cell tumour (M)
- Bone – Chondroma (D)
- Bone – Ewing’s sarcoma (D)
- Benign Prostatic hyperplasia (M)
- Mature cystic teratoma (M)
- Testis – Seminoma (M)
- Products of conception (D)
- Breast – Fibroadenoma (M)

- Breast – Infiltrating duct carcinoma (M)
- Hashimoto's thyroiditis (D)
- Thyroid – Multi nodular goiter (D)

8.2 Haematology slides

- Eosinophilia (M)
- PolymorphonuclearLeucocytosis (M)
- Iron deficiency anaemia (M)
- Hemolytic anaemia (M)
- Macrocytic anaemia (M)
- Chronic myeloid leukaemia (M)
- Acute leukaemia (D)
- Bone Marrow – Plasma cells, megakaryocytes, megaloblast (M)
- Malarial Parasite (M)

8.3 List of specimens

- Liver – Fatty change (M)
- Kidney – Cloudy change (D)
- Atheroma with calcification (D)
- Kidney – Infarct (M)
- Spleen – Infarct (M)
- Intestine – Gangrene (M)
- Foot – Gangrene (D)
- Lymph node – Caseation (M)
- Lobar pneumonia (M)
- Kidney – Abscess (D)
- Liver – Abscess (M)
- Acute appendicitis (M)
- Acute pyogenic meningitis (M)
- Fibrinous pericarditis (M)
- Syphilitic aortitis (D)
- Lymph node – TB (M)
- Lung – Miliary TB (M)
- Fibrocaseous TB (M)

- Kidney - Amyloidosis (D)
- Spleen – Amyloidosis (D)
- Liver and spleen – Malaria (M)
- Liver and spleen – Prusssian blue reaction
- Liver – Chronic passive congestion (M)
- Lung – Chronic passive congestion (M)
- Intestine – gangrene (M)
- Infarction – Kidney, spleen (M)
- Infarction – Lung, testis (D)
- Heart – Left ventricular hypertrophy (M)
- Heart – Brown atrophy (M)
- Kidney – Hydronephrosis (M)
- Skin – Papilloma (M)
- Adenomatous polyp (M)
- Fibroadenoma breast (M)
- Squamous cell carcinoma – skin (M)
- Basal cell carcinoma – skin (M)
- Adenocarcinoma – colon (M)
- Metastasis – lung, liver (M)
- Leiomyoma uterus (M)
- Soft tissue – Lipoma (M)
- Soft tissue sarcoma (D)
- Melanoma Metastasis in LN, liver (M)
- Rheumatic mitral stenosis (M)
- Healed myocardial infarct (M)
- Atheroma with complications (M)
- Aortic aneurysm (D)
- Bacterial endocarditis (D)
- Lung – Lobar/bronchopneumonia (M)
- Lung abscess (D)
- Bronchogenic carcinoma (M)
- Fibrocaseous TB (M)
- Lung – emphysema, bronchiectasis (D)
- Flea bitten kidney (M)
- Large white kidney (D)

- Contracted granular kidney (M)
- Renal cell carcinoma (M)
- Bladder – transitional carcinoma (D)
- Stomach – Chronic peptic ulcer (M)
- Stomach carcinoma (M)
- Intestine TB (M)
- Colon – amoebic colitis, carcinoma colon (M)
- Liver – Amoebic abscess (M)
- Liver – Cirrhosis (M)
- Liver – Hepatocellular carcinoma (D)
- Liver – Metastasis (M)
- Brain – Meningitis (M)
- Brain – Glioma (M)
- Brain – hemorrhage (CVA) (D)
- Lymph Node TB (M)
- Lymph Node Lymphoma (D)
- Spleen – Infarct, splenomegaly (D)
- Bone – giant cell tumour (M)
- Bone – Osteogenic sarcoma (M)
- Seminoma –Testis (M)
- Teratoma _ Testis (M)
- Uterus – Leiomyoma (M)
- Ovary – Dermoid cyst (M)
- Breast – fibroadenoma (M)
- Breast – carcinoma (M)
- Thyroid – Multinodular goiter (M)
- Thyroid adenoma (M)

9. TEACHING / LEARNING METHODS

-Lectures
-Structured interactive sessions
-Small group discussions
-Seminar and symposia , integrated teaching sessions
-Problem based learning with different clinical situations and written case

scenario
-Self learning tools and resources selection
- Interactive learning
- e – modules

10. BOOKS RECOMMENDED FOR READING

1. Robbins Basic Pathology – Kumar Cotran Robbins
2. de Gruchy's Clinical Haematology in Medical Practice
3. Pathology – Muir
4. Clinical Pathology
   - Essential Lab Medicine – V.H.Talib ,
   - Medical Lab Technology by Kanai Mukherjee Vol. I,II,III
   - Clinical Pathology by Sanyal
5. IAPM text book of Pathology
6. Y.M. Bhendes General Pathology – S.G.Deodhar
7. Text book of Pathology – Harsh Mohan
8. Atlas & text book of haematology – Dr.Tejinder Singh

11 REFERENCE BOOKS

1. Robbins and Cotran's Pathologic basis of disease – Kumar & Abbas
2. Pathology Rubin , Farber
3. Anderson's Pathology- Vol I & II
4. Pathology Illustrated – Govan , Callander
5. Concise Pathology – Chandrasoma
6. Internet resources

12 EVALUATION METHODS

Internal assessment examination and comprehensive final examination at
the end of 1 ½ years of learning in Theory, Orals and Practicals

12.1 INTERNAL ASSESSMENT

Evaluation shall be done at the end of 3rd ,4th and 5th term as per the following pattern

12.1.1 MODE OF EXAMINATION TIME OF EXAMINATION

		TOTAL MARKS
THEORY	3rd Term ending	50
	4th Term ending	50
	5th Term ending (Preliminary exam)	80
	Total theory (to be reduced to 15)	180
PRACTICALS	3rd Term ending	40
	4th Term ending	40
	5th Term ending (Preliminary exam)	40
	Total practicals (to be reduced to 12)	120
	Journal (5th Term ending)	03

Thus total marks for consideration of internal assessment is 30

12.1.2 Preliminary examination shall be in the pattern of the final University Examination(Theory, Oral and Practicals) and will be conducted at least 4 weeks before the date of the final University examination

12.1.3 The term ending examination will have the following pattern

Theory 150 minutes

MCQ (1/2 mark each) 20 = 10 marks
SAQ (3 marks each) 8/9 = 24 marks
LAQ (8 marks each) 2/2 = 16 marks

TOTAL 50 marks

Practicals 90 minutes

Bench work 20 marks
Viva 20 marks

TOTAL 40 marks

12.2 Final University Examination

12.2.1 Theory examination(Pathology,)

Two papers 40 marks each for Pathology

Sections	**Nature of Questions**	**Total no. of Questions**	**Marks for each question**	**Total Marks**
SECTION - A	One line Answer Question	8 out of 10	1	08
	Long Answer Question	2 out of 3	7	14
SECTION - B	Short Answer Question	6 out of 8	3	18
Total				**40**

Theory examination topics in Pathology

Pathology Paper I

General Pathology including general neoplasia, Haematology and transfusion medicine

Pathology Paper - II

Systemic Pathology and Clinical pathology.

12.2.2 PRACTICALS Total Marks = 40

Practical examination will be conducted as per the following schedule

Exercise Marks (Total 26)

- 10 spots, 90 seconds each

4 specimens, 1 instrument } Identification ½ mark
3 histopathology slides } Specific short
1 haematology slide and } question ½ mark
1 chart } Total 1 mark for each spot - 10

- Urine examination

Complete physical examination and detection - 08
of two abnormal constituents

- One exercise to be chosen by lot system from

(i) Haemoglobin estimation
(ii) Blood smear staining and study - 08
(iii) Total leucocyte count

(iv) Blood grouping

12.2.3 ORAL EXAMINATION (VIVA)

Two tables. Each candidate will face 2 examiners for 5 minutes each

Table I	General and Systemic Pathology	07 marks
Table II	Clinical Pathology and Haematology	07 marks
	TOTAL	14 marks

These marks will be added to theory marks

Note : Number of candidates for practicals should not exceed 30/day