

Subject No. 4

PHARMACOLOGY, PATHOLOGY AND GENETICS

Total Hours: 115

Theory Hours: 105

Lab Hours: 10

**SECTION B - PATHOLOGY AND GENETICS
(PART- I –PATHOLOGY)**

Total Hours: 40

Theory Hours: 30

Lab Hours: 10

AIM:

- This course is designed to help the student to develop an understanding of pathology of various disease conditions and apply this knowledge in practice of nursing.

OBJECTIVES:

At the end of course students will be able to develop:

- Understanding basic concept of pathology and patho physiological changes in different system disorders.
- Understanding of various pathological tests conducted in the clinical fields.
- Understanding to collect and send the pathological samples and infer their results with patient conditions.

COURSE CONTENTS:

Unit I - Introduction

- Importance of the study of pathology, definition of the terms, Methods & techniques, cellular and tissue changes, infiltration and regeneration, inflammations and infections, wound healing, vascular changes.
- Cellular growth, Neoplasm's. Normal and cancer cell. Benign and malignant growths.. In - situ carcinoma. Disturbances of fluid and electrolyte imbalance.

Unit II - Special Pathology:

- Pathological changes in disease conditions of various systems:
- Respiratory tract: Tuberculosis, Bronchitis, Pleural effuses and pneumonia, lung abscess, emphysema, bronchiectasis, Bronchial asthma, chronic obstructive pulmonary disease and tumors.
- Cardio – vascular system: Pericardial effusion. Rheumatic heart disease. Ineffective endocarditis, atherosclerosis. Ischemia, infarction, aneurysm.
- Gastro Intestinal tract: Peptic ulcer, typhoid. Carcinoma of GI tract – buccal, Esophageal. Gastric and intestinal. Liver, gall bladder and pancreas: Hepatitis, chronic liver abscess, cirrhosis. Tumors of liver, gall bladder and pancreas. Cholecystitis.
- Kidneys and urinary tract: Glomerulonephritis. Pyelonephritis. Calculi, renal failure, renal carcinoma and cystitis, nephritic syndrome
- Male genital system: Cryptorchidism, testicular atropy. Prostatic hyperplasia, carcinoma penis and prostrate.

- Female genital system: Fibroids. Carcinoma cervix and endometritis. Vesicular mole, choriocarcinoma. Ectopic gestation ovarian cyst and tumors. Cancer breast.
- Central nervous system: Hydrocephalus, meningitis, encephalitis. Vascular disorders, thrombosis, embolism. Stroke, paraplegia, quadriplegia. Tumors, meningiomas – gliomas. Metastatic tumors.
- Skeletal system: Bone healing, osteoporosis, osteomyelitis. Arthritis & Fracture, tumors.

Unit III - Clinical pathology:

- Various blood and bone marrow tests in assessment and monitoring of disease conditions: Hemoglobin. RBC, WBC & Platelets counts. Bleeding time, clotting time and prothrombin time. Blood grouping and cross matching. Blood chemistry. Blood culture. Serological and immunological tests. Other blood tests. Examination of bone marrow.
- Methods of collection of blood specimens for various clinical pathology, biochemistry, microbiology tests, inference and normal values.

Unit IV - Examination of body cavity fluids, transudates and exudates:

- The lab tests used in CSF analysis.
- Examination of other body fluids, transudates and exudates – sputum, wound discharge etc.
- Analysis of gastric and duodenal contents.
- Analysis of semen sperm count, motility, morphology and their importance in infertility treatment.
- Methods of collection of CSF and other cavity fluids, specimens for various clinical pathology, biochemistry, microbiological tests, inference and normal values.

Unit V - Urine & Faeces:

- Urine: Physical characteristics. Analysis. Culture and sensitivity.
- Faeces: Characteristics. Stool examination: occult blood, ova, parasite and cyst, reducing substance etc.
- Methods for collection of various tests, inference and normal values.

Unit No. & Hrs.	Objectives	Contents with distributed hours		
		Must Know	Desirable to Know	Nice to Know
I (3 Hrs)	At the end of unit student are able to Knowledge: Describe the normal and abnormal cell structure and function. Skill: Differentiate between normal and cancer cells and benign and malignant growth. Attitude: Recognize fluid and electrolyte imbalance.	Introduction: <ul style="list-style-type: none"> Importance of the study of pathology, definition of the terms, Methods & techniques, cellular and tissue changes, infiltration and regeneration, inflammations and infections, wound healing, vascular changes. Cellular growth, Neoplasm: <ul style="list-style-type: none"> Normal and cancer cell. Benign and malignant growths. In - situ carcinoma.(2 hours) 	<ul style="list-style-type: none"> Disturbances of fluid and electrolyte imbalance (1 hr) 	

Unit I

Course outcome	Programme outcome						
Students should be able to-	Nurse/Clinician	Professional	Communicator	Leader & Member	Lifelong learner	Critical thinker	Researcher
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO-1: Define pathology and enumerate the importance of the study of pathology.	3	3	1	3	3	2	1
CO-2: Explain the methods and techniques for the study of pathology.	3	3	1	3	3	2	1

CO-3: Define cell injury. Write down the pathogenesis and morphology of reversible cell injury.	3	3	2	3	3	1	1
CO-4: Define necrosis. Explain the various types of necrosis with their pathological events.	3	3	2	3	3	1	1
CO-5: Define gangrene. Explain the various types of gangrene along with their morphology.	3	3	2	3	3	1	1
CO-6: Define cellular adaptation/Explain various cell adaptations.	3	3	2	3	3	1	1
CO7: Define inflammation. Explain the vascular and cellular events of acute inflammation.	3	3	2	3	3	2	1
CO8: Elaborate morphology and systemic effects of acute inflammation with examples.	2	3	1	2	3	1	1
CO9: Define chronic inflammation. What are the various types of chronic inflammation? Enlist its	3	3	2	3	3	1	1

general feature.							
CO10: Define healing and repair.Explain the mechanism of wound healing by primary first and second intention.	3	3	2	3	3	1	1
CO11: List out various complications of wound healing. Describe wound contraction with its mechanism.	3	3	2	3	3	1	1
CO12: Elaborate difference between a normal cell and cancerous cell.	3	3	2	3	3	2	1
CO13: Define neoplasia. Give detailed classification of tumors also list down the characteristics of a tumor	3	3	2	3	3	2	1
CO14; Define anaplasia. Explain the morphological and functional alterations in the neoplastic cells.	3	3	2	3	3	1	1
CO15: Define metastasis. What are the various routes of metastasis?	3	3	2	3	3	2	1

CO16: Interpret the meaning of carcinoma in situ and explain its treatment.		3	3	2	3	3	2	1
CO17: Interpret the meaning of oedema its various types and explain its pathogenesis.		3	3	2	3	3	2	1
CO18: Explain the morphology and pathogenesis of renal oedema and cardiac oedema.		3	3	2	3	3	2	1
CO19: Interpret the meaning of dehydration. Write down its various causes, symptoms and treatment.		3	3	2	3	3	2	1
CO20: Describe overhydration. Explain the associated pathogenesis, causes and clinical effects.		3	3	2	3	3	2	1
CO21: Describe the disturbances of electrolytes.		3	3	2	3	3	2	1
II (15 Hrs)	At the end of unit student are able to Knowledge: Understand and explain pathological changes in various systemic diseases.	Systemic Pathology: • Pathological changes in disease conditions of various systems: • Respiratory tract: Tuberculosis, Bronchitis, Pleural effuses and pneumonia, lung abscess, emphysema,				Male genital system: • Prostatic hyperplasia, carcinoma penis and prostate.		Male genital system: • Cryptorchidism, testicular atrophy.

	<p>Skill: Identify the pathological changes in special diseases.</p> <p>Attitude: Recognize implications of pathological changes in diseases for nursing care practices.</p>	<p>bronchiectasis, Bronchial asthma, chronic obstructive pulmonary disease and tumours.</p> <ul style="list-style-type: none"> • Cardio – vascular system: Pericardial effusion. Rheumatic heart disease. Ineffective endocarditis, atherosclerosis. Ischemia, infarction, aneurysm. • Gastro Intestinal tract: Peptic ulcer, typhoid. Carcinoma of GI tract – buccal, Esophageal. Gastric and intestinal. • Liver, gall bladder and pancreas: Hepatitis, chronic liver abscess, cirrhosis. Tumours of liver, gall bladder and pancreas. Cholecystitis. • Kidneys and urinary tract: Glomerulonephritis, pyelonephritis. Calculi, renal failure, renal carcinoma and cystitis nephritic syndrome • Skeletal system: Bone healing, osteoporosis, osteomyelitis, Arthritis & tumors. Fracture (8 hrs) 	<p>Male genital system:</p> <ul style="list-style-type: none"> • Fibroids. • Carcinoma cervix and endometritis. • Cancer breast. • Ovarian cyst and tumors. • Central nervous system: Hydrocephalus, meningitis, encephalitis. Vascular disorders, thrombosis, embolism. Stroke, paraplegia, quadriplegia. Tumors, meningiomas – gliomas. Metastatic tumors.(5 hours) 	<p>Male genital system:</p> <ul style="list-style-type: none"> • Vesicular mole, choriocarcinoma. ❖ Ectopic gestation (2hrs)
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Unit II							
Course outcome	Programme outcome						
Students should be able to-	Nurse/Clinician	Professional	Communicator	Leader & Member	Lifelong learner	Critical thinker	Researcher
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO-1: Define tuberculosis. Write down the pathogenesis of tuberculosis and explain its	3	3	2	3	3	2	1

various types of tuberculosis.							
CO-2: Define pneumonia. Enlist its classification and describe its pathologic changes and complications.	3	3	2	3	3	2	1
CO-3: Interpret the meaning of lung abscess and elaborate the various causes and symptoms of lung abscess.	3	3	2	3	3	2	1
CO-4: Define chronic obstructive pulmonary disease. Explain its etiopathogenesis, pathologic changes and clinical features.	3	3	2	3	3	2	1
CO-5: Define bronchial asthma. What are its various types? Explain its pathologic changes and clinical features.	3	3	2	3	3	2	1
CO-6: Interpret the meaning of bronchiectasis. Describe etiopathogenesis and pathologic changes associated with bronchiectasis.	3	3	2	3	3	2	1
CO7: Define emphysema. Enumerate its various types. Explain its causes and clinical features.	3	3	2	3	3	2	1

CO8: Define bronchogenic carcinoma. Describe pathologic changes associates with different histological types of bronchogenic carcinoma.	3	3	2	3	3	2	1
CO9: Define pleural effusion its classification, causes, risk factors and difference between transudate and exudates.	3	3	2	3	3	2	1
CO10: Define Pericardial effusion and explain the various types of effusions and their causes.	3	3	2	3	3	2	1
CO11: Define rheumatic heart disease.List out various pathologic changes associated with disease.	3	3	2	3	3	2	1
CO12: Define bacterial Ineffective endocarditis.enumerate various clinical forms and explain its pathogenesis and clinical features.	3	3	2	3	3	2	1
CO13: Define atherosclerosis,list out etiology and risk factors associated with it and explain its pathogenesis.	3	3	2	3	3	2	1

CO14; Explain ischaemic heart disease with its etiopathogenesis and describe the acute myocardial infarction and various pathological events leading to disease.	3	3	2	3	3	2	1
CO15: Define aneurys, enlist its various types and explain syphilitic and dissecting aneurysms.	3	3	2	3	3	2	1
CO16: Interpret the meaning of Peptic ulcer, enlist its various types and explain morphological features of various peptic ulcers.	3	3	2	3	3	2	1
CO17: Interpret the meaning of typhoid (enteric fever) and explain its clinical features and pathogenesis.	3	3	2	3	3	2	1
CO18: Explain the morphology and pathogenesis of typhoid fever.	3	3	2	3	3	2	1
CO19: Explain the etiology and morphology of oral and esophageal carcinoma and describe its mode of spread.	3	3	2	3	3	2	1

CO20: Define gastric carcinoma, List out its etiology and pathological changes and explain such carcinoma spread via different routes.	3	3	2	3	3	2	1
CO21: Define colorectal carcinoma. List out its morphology and clinical features.	3	3	2	3	3	2	1
CO22: Define Hepatitis. enlist its classification and explain pathological changes in acute and chronic hepatitis.	3	3	2	3	3	2	1
CO23: Interpret the meaning of chronic liver abscess and explain pyogenic and amoebic liver abscess.	3	3	2	3	3	2	1
CO24: Define cirrhosis, enlist its classification, etiology, clinical manifestation and explain various pathologic changes in cirrhosis.	3	3	2	3	3	2	1
CO25: Explain the morphology and pathogenesis of Tumours of liver.	3	3	2	3	3	2	1

CO26: Interpret the meaning of carcinoma of gall bladder and enumerate the etiology,clinical feature and explain its pathological changes.	3	3	2	3	3	2	1
CO27: Define carcinoma of pancreas and enumerate the etiology,clinical feature and explain its pathological changes.	3	3	2	3	3	2	1
CO28: Define.cholecystitis,explain various morphologic changes associated with acute and chronic cholecystitis and list out its clinical features.	3	3	2	3	3	2	1
CO29: Define glomerulonephritis.explain various types with associated morphological features.	3	3	2	3	3	2	1
CO30: Interpret the meaning of pyelonephritis and explain its acute and chronic morphology.	3	3	2	3	3	2	1
CO31: Interpret the meaning of urinary calculi/renal calculi and explain its types.	3	3	2	3	3	2	1

CO32: Define renal failure and describe the etiopathogenesis and morphology of acute and chronic renal failure.	3	3	2	3	3	2	1
CO33: Define renal carcinoma and explain the morphology of various benign and malignant renal tumors.	3	3	2	3	3	2	1
CO34: Interpret the meaning of cystitis. Explain pathologic features of various types of cystitis.	3	3	2	3	3	2	1
CO35: Define nephrotic syndrome and explain its types and pathophysiology.	3	3	2	3	3	2	1
CO36: Explain the various pathophysiological events leading to healing of fractures.	3	3	2	3	3	2	1
CO37: Interpret the meaning of osteoporosis. Explain various types with associated pathological changes.	3	3	2	3	3	2	1
CO38: Define osteomyelitis and Explain morphology and clinical features of pyogenic osteomyelitis.	3	3	2	3	3	2	1

CO39: Define osteoarthritis and describe its types and pathogenesis.	3	3	2	3	3	2	1
CO40: Interpret the meaning of bone tumor. Classification of bone tumors and explain osteoblastic tumors with their morphology.	3	3	2	3	3	2	1
CO41: Define chondroblastic tumors and describe various types and its morphology of each types.	3	3	2	3	3	2	1
CO42: Explain about the prostatic hyperplasia with its clinical feature and morphology.	3	3	2	3	3	2	1
CO43: Describe carcinoma of penis.	3	3	2	3	3	2	1
CO44: Define cryptorchidism. Enlist its etiology along with morphology, clinical features.	3	3	2	3	3	2	1
CO45: Interpret the meaning of testicular atrophy.	3	3	2	3	3	2	1
CO46: Define fibroids	3	3	2	3	3	2	0

CO47: Define cervical cancer. Enlist various types of cervical cancer and explain etiopathogenesis and clinical staging of cervical cancer.	3	3	2	3	3	2	1
CO48: Describe endometrial carcinoma with different types and explain modes of termination, clinical features, and diagnostic evaluation along with its management.	3	3	2	3	3	2	1
CO49: Define ectopic gestation its classification and explain modes of termination, clinical features and diagnostic evaluation along with its management.	3	3	2	3	3	2	1
CO50: Define ovarian tumor its classification and explain each type briefly along with morphologic features.	3	3	2	3	3	2	1
CO51: Interpret the meaning of breast cancer.Enumerate various sign and symptomsits classification and explain etiopathogenesis of various types of breast cancer.	3	3	2	3	3	2	1

CO52: Explain Vesicular mole	3	3	2	3	3	2	1
CO53: Describe choriocarcinoma.	3	3	2	3	3	2	1
CO54: Interpret the meaning of hydrocephalus. Enlist its various symptoms and explain various types along with their pathophysiology.	3	3	2	3	3	2	1
CO55: Define meningitis. Explain its various types along with associated morphology.	3	3	2	3	3	2	1
CO56: : Interpret the meaning of encephalitis. Describe various types and morphology of each type.	3	3	2	3	3	2	1
CO57: Describe about brain strokes.	3	3	2	3	3	2	1
CO58: Explain Vascular disorders	3	3	2	3	3	2	1
CO59: Explain thrombosis. and embolism.	3	3	2	3	3	2	1
CO60: Describe tumors of CNS with special reference to glioma and meningomas	3	3	2	3	3	2	1

CO61: Define glioma.explain pathology of various types.	3	3	2	3	3	2	1
CO62: Describe about metastatic tumors with its causes and symptoms.	3	3	2	3	3	2	1

III (7 hours)	At the end of unit student are able to Knowledge: Understand and explain the procedures for various diagnostic investigations. Skill: Collects blood samples and assists in bone marrow sample. Carries out blood grouping, and other cytological investigations. Attitude: Take interest in conducting various investigations and analyzes the results of various tests.	Clinical pathology: <ul style="list-style-type: none">• Various blood and bone marrow tests in assessment and monitoring of disease conditions: Hemoglobin. RBC, WBC & Platelets counts. Bleeding time, clotting time and prothrombine time. Blood grouping and cross matching. Blood chemistry. Blood culture. Serological and immunological tests. Other blood tests.• Methods of collection of blood specimens for various clinical pathology, biochemistry, microbiology tests, inference and normal values. (4 hrs)			• Examination of bone marrow. (3 hr)		
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Unit III

Course outcome	Programme outcome						
Students should be able to-	Nurse/Clinician	Professional	Communicator	Leader & Member	Lifelong learner	Critical thinker	Researcher
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO-1: Describe about the Sahil's haemometer procedure for estimation of hemoglobin.	3	3	2	3	3	2	1

CO-2: Explain about the Red blood cell count procedure	3	3	2	3	3	2	0
CO-3: Explain about the white blood cell count procedure.	3	3	2	3	3	2	0
CO-4: Explain about the platelet or thrombocyte count procedure.	3	3	2	3	3	2	0
CO-5: Differentiate between bleeding time and clotting time procedure.	3	3	2	3	3	2	0
CO-6: Explain about prothrombin time method.	3	3	2	3	3	2	0
CO-7: Explain the procedure of blood grouping with its principles.	3	3	2	3	3	2	0
CO-8: Explain the procedure of cross matching.	3	3	2	3	3	2	0
CO-9: Describe blood sugar analysis with glucose oxidase method and glucose tolerance test.	3	3	2	3	3	2	0
CO-10: Interpret the meaning of urea, creatinine, uric acid, bilirubin, cholesterol estimation with its principle.	3	3	2	3	3	2	0

CO-11: Describe about Widal test methods with slide agglutination and tube agglutination test.	3	3	2	3	3	2	0
CO-12: Explain about veneral disease research laboratory test (VDRL) procedure.	3	3	2	3	3	2	0
CO-13: Describe calcium and serum glutamate oxalacetate transaminase (SGOT) procedure with its principle.	3	3	2	3	3	2	0
CO-14: Describe about the examination of bone marrow procedure and procedure of blood collection.	3	3	2	3	3	2	0
IV (3 hrs)	At the end of unit student are able to Knowledge: Understand and explain various laboratory tests performed on body cavity fluids, transudates and exudates. Skill: Assists in collecting samples. Attitude: Interpret results of tests performed.		Examination of body cavity fluids, transudates and exudates: <ul style="list-style-type: none"> • The lab tests used in CSF analysis. Methods of collection of CSF and other cavity fluids, specimens for various clinical pathology, biochemistry, microbiological tests, inference And normal values. • Examination of other body fluids, transudates and exudates – sputum, wound discharge etc <p style="text-align: center;">(1)</p> Analysis of gastric and duodenal contents (2 hrs)			<ul style="list-style-type: none"> • Analysis of semen sperm count, motility, morphology and its importance in infertility treatment. <p style="text-align: center;">(1 hour)</p>	

Unit IV							
Course outcome	Programme outcome						
Students should be able to-	Nurse/Clinician	Professional	Communicator	Leader & Member	Lifelong learner	Critical thinker	Researcher
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO-1: Describe the methods of collection of CSF in laboratory.	3	3	2	3	3	2	0
CO-2: Explain about the naked eye examination, cytological examination, chemical tests, and bacteriological and serological examination test used in CSF analysis.	3	3	2	3	3	2	0
CO-3: Explain gastric analysis and duodenal content examination procedure.	3	3	2	3	3	2	0
CO-4: Describe microscopic examination of analysis of semen and list out its importance in infertility treatment.	3	3	2	3	3	2	0
CO-5: Explain sputum examination with its gross and microscopic examination.	3	3	2	3	3	2	0

CO-6: Describe pleural aspiration procedure with its causes.	3	3	2	3	3	2	0
CO-7: Explain examination of wound discharge with nagler's reaction.	3	3	2	3	3	2	0

V (2 hrs)	At the end of unit student are able to	Urine & Faeces: <ul style="list-style-type: none"> • Urine: Physical characteristics. Analysis. Culture and sensitivity. • Faeces: Characteristics. Stool examination: occult blood, ova, parasite and cyst, reducing substance etc. • Methods for collection of various tests, inference and normal values. (2 hours)
	Knowledge: Describe laboratory tests for examination of urine and faeces. Skill: Perform naked eye and microscopic examination of urine and feces. Attitude: Collects and educates to collect the urine and feces sample correctly.	

Unit V

Course outcome	Programme outcome						
Students should be able to-	Nurse/Clinician	Professional	Communicator	Leader & Member	Lifelong learner	Critical thinker	Researcher
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO-1: Describe examination of urine in laboratory with its physical, chemical and microscopic examination.	3	3	2	3	3	2	0

CO-2: Explain examination of fecal specimen in laboratory with its chemical and microscopic examination.	3	3	2	3	3	2	0
CO-3: Enumerate the characteristics /Gross examination of fecal specimen.	3	3	2	3	3	2	0
CO-4: Explain examination of stool for helminthic ova.	3	3	2	3	3	2	0

Total Teaching Hours: 40

Lectures: 30

Lab. Hours: 10

ASSIGNMENTS: Theory:

A. Section 'B' : Pathology

Theory:

Sr. No	Assignments	No./Quantity	Marks Per Assignment	Total Marks
1	Home assignment	One	20	20
2	Journal	One	20	20
Total Marks				40

- While calculating Internal Assessment –Marks obtained in the assignments of Pharmacology and Pathology & Genetics shall be amalgamated as one subject, 'Pharmacology, Pathology and Genetics'.
- Students shall maintain a Journal and write the experiments performed/Observed in the lab. Marks of Theory and Practical Assignments shall be amalgamated as an Assignment is theory as there is no practical examination for the subject.

TEACHING METHODS

- Lectures, Laboratory Demonstration, Group Discussion, Clinical Observation. Integrated teaching program and **Tutorial**

A.V. AIDS:

- Over head projector, L.C.D. Computer Assisted Instruction, Flip Chart, Posters, Black Board.

Distribution of Lab hours: (10 hours)

<i>Sr. No.</i>	<i>Area of experience</i>	<i>No. of hours</i>
1	Pathology laboratory set up Preparation of patient for pathological tests	1
2	Urine Examination – Routine and microscopic	1
3	Feces Examination – Ova cyst and occult blood	1
4	CSF Biochemistry	1
5	Sputum for AFB	1

6	Malaria Parasite and filariasis	1
7	FNAC	1
8	Cavity fluids – Pleural, peritoneal	1
9	Semen	1
10	Blood Biochemistry	1

LIST OF RECOMMENDED BOOKS:

- Harsh Mohan : Textbook of Pathology
- Heller : Pathology – Comprehensive Review
- Emanuel Rubin M. D., John L Farber : Pathology
- Carol Mattson Porth : Pathophysiology
- Ramzis S. Cotran et al : Robbins
- J C E Underwood : General and systemic pathology
- Canjanov and Linder ; Anderson’s Pathology
- Vinay Kumar M. D. Et al Basic Pathology
- Parakrama Chandrasoma : Concise Pathology
- Walter F Coulson : Surgical Pathology
- Lynn’s Gracia M. S. and David A Brucker : Diagnostic Medical Pathology
- Harber et al Differential Diagnosis in Pathology

