GENERIC ELECTIVE COURSE - (BIOMED-GE-) PATHOLOGICAL BASIS OF DISEASE

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Pathological Basis of Disease	4	3	-	1	XII Passed.	Have basic knowledge of biology

Learning Objective:

- Learn how diseases develop and progress by studying changes in cells, tissues, and organs. Understand basic terms like inflammation, infection, and degeneration.
- Identify common symptoms and causes of diseases, including infections, genetic disorders, environmental factors, and lifestyle influences.
- Gain insight into the processes underlying widespread diseases such as cardiovascular disorders, and autoimmune conditions.
- Learn about common diagnostic tools like blood tests, imaging studies, and histopathology/ biopsies, and their role in understanding diseases.

Learning Outcomes

Having successfully completed this course, students will have a comprehensive understanding of

- Human pathology, including the underlying mechanisms of disease.
- Identify and accurately use common terms in pathology such as etiology, pathogenesis, and prognosis.

- Understanding of diagnostic methods, and the clinical relevance of pathological findings.
- They will be equipped to understand laboratory results, histopathological slides, and clinical data in relation to human diseases.

SYLLABUS **45 hrs**

Unit I: **Introduction:** **(2 hrs)**

History of Pathology, Basic definitions and common terms used in pathology, Basic Concepts in Cell and Tissue Organization.

Unit II: Tools and Techniques used in Pathology **(7 hr)**

Basic overview of tools and techniques: Biochemical assays for urine and blood testing, Immunological assays for disease detection, Histopathological examination (Tumors), PCR-based assays for identifying diseases (dengue), Imaging techniques for diagnostic purposes.

Unit III: Cell Injury and responses of cells to injury **(12 hrs)**

An overview of cellular adaptation: Hyperplasia, Hypertrophy, Atrophy, Metaplasia; Causes and mechanisms of cell injury, reversible and irreversible injury, Necrosis, Apoptosis, Types of apoptosis.
Neoplasia: Definitions, Nomenclature, characteristics of benign and malignant neoplasms.

Unit IV: **Inflammation, Tissue Regeneration and Repair**
(12 hrs)

Basic concepts of acute and chronic inflammation: Vascular Changes, cellular events, important chemical mediators of inflammation. Study of morphological patterns of inflammation taking tuberculosis as an example.
Mechanism of tissue regeneration, role of ECM, repair by healing, scar formation, cutaneous wound healing, tissue remodeling - cirrhosis and fibrosis in liver.

Unit V: Hemodynamic Derangements **(12 hrs)**

An overview of Edema, hyperemia, congestion, hemorrhage, hemostasis and thrombosis, Embolism, Infarction (Myocardial infarction) and shock

Practical: **(30 Hours)**

(Wherever wet lab experiments are not possible the principles and concepts can be demonstrated through any other material or medium including videos/virtual labs etc.)

1. Qualitative detection of protein, ketones and glucose in artificially prepared urine samples using biochemical assays.
2. Study of histological slides showing hypertrophy, hyperplasia, dysplasia.

3. To perform Platelet count and its pathological significance
4. Hematological assessment: Study and analysis of a blood report: CBC and LFT.
5. Immunological kit based detection of CRP and hCG.
6. Study of four distinct stages of alcoholic liver disease through permanent slide.
7. Study of fractures using x-ray films.
8. Virtual demonstration of detection of any one disease using PCR.
9. Visit to Pathological Laboratory

Essential Readings:

- Kumar, V., Abbas, A.K., Aster, J.C. and Fausto, N. (2020). 10th Edition. Robbins and Cotran Pathologic basis of disease. Philadelphia, USA: Saunders Publishers. ISBN 13: 9780323531139.
- Cross, S.S. (2024). 8th Edition. Underwood's Pathology: a Clinical Approach. ISBN: 9780443116995
- Sood, R. (2024). 7th Edition Volume 1 and 2. Medical laboratory technology methods and interpretations. India: Jaypee Brothers Medical Publishers. ISBN-9789354652493

Suggested Readings:

- Goswami, P; Kalla, A.R; Khatri, K. Dubey, A and Goswami, K. (2022) 1st Edition, Comprehensive Pathology Practical and Technical book , Scientific Publishers. ISBN: 9789392590313.
- Copstead-Kirkhorn, L. C. (2021). 7th Edition. Pathophysiology. Philadelphia, USA: d1Saunders. ISBN: 9780323761550.