Course Code	Course Name	Credits
26BY109	PHYTOCHEMISTRY AND PHARMOCOGNOSY	04

Course Objectives

- To introduce the basic concepts of extraction techniques and natural products with their isolation and characterization.
- To understand the chemistry, classification, and biological importance of glycosides, Vitamins, steroids, and terpenoids.
- To study natural pigments, drug discovery principles, and evaluation of natural products.
- To gain knowledge of pharmacognosy, plant drugs, and their adulteration and pharmacognostic evaluation.

Learning Outcomes

Upon successful completion of this course it is intended that a student will be able to:

- Explain extraction methods, solvent selection, and the isolation of natural products.
- Understand the structure, classification, and significance of glycosides, vitamins, steroids, and terpenoids.
- Analyze natural pigments and their role in drug discovery and evaluation.
- Identify medicinal plant drugs and understand pharmacognostic studies, including detection of adulteration

Unit 1 - Extraction and Natural Products (12 Hrs.)

Extraction: Introduction, principles, and types of extraction methods with their merits and demerits. Solvents: Selection and purification of solvents for extraction. Natural products: Methods of isolation, purification, and characterization of citric acid, pectin, sennosides, lawsone, hesperidin, curcumin, lemongrass oil, and caffeine.

Unit 2 – Glycosides and Vitamin (12 Hrs.)

Glycosides: Introduction, definition, classification, nomenclature, sources, and importance. Chemistry and structural elucidation of glycosides. Cardiac glycosides (digoxin), anthracene glycosides (sennosides) and steroidal glycosides (diosgenin). Vitamins: Introduction, definition, classification, nomenclature, sources, importance, structure, and chemistry. Structural elucidation of ascorbic acid.

Unit 3 – Steroids and Terpenoids (12 Hrs.)

Steroids - Introduction, definition, classification, nomenclature, sources, and importance of cholesterol. Basic chemistry and biological significance of steroids in natural products. Terpenoids - Introduction, definition, classification, nomenclature, sources, and importance of citral, menthol, and zingiberene. Basic chemistry and biological significance of terpenoids in natural products.

Unit 4 - Natural Pigments and Drug Discovery (12 Hrs.)

Natural pigments: Introduction, definition, classification, nomenclature, sources, and importance of carotene, lycopene, bixin, chlorophyll, quercetin, and indigotine. Natural products in drug discovery: Role of natural products as markers for new drug discovery. Drug evaluation: Evaluation of drugs, active and non-active principles, and general account of drug constituents.

Unit 5 – Pharmacognosy (12 Hrs.)

Pharmacognosy: Introduction, scope, indigenous traditional drugs, and market adulteration. Plant drugs & pharmacognostic study: Root drugs (*Glycyrrhiza, Ipecac, Rauvolfia, Satavari, Colchicum, Withania);* rhizome drugs (*Ginger);* leaf drugs (*Andrographis, Clitoria, Senna*); bark drugs (*Terminalia arjuna,* Holarrhena); flower drugs (*Saffron);* seed drugs (*Piper longum, Mucuna*); fruit drugs (*Cumin, Amla, Senna pods*); whole plant drugs (*Catharanthus roseus*).

Reference Books:

1. Harborne, J. B. (1998). Phytochemical Methods: A Guide to Modern Techniques of Plant Analysis. Chapman & Hall, London.
2. Trease, G. E., & Evans, W. C. (2002). Pharmacognosy. Saunders Elsevier, Edinburgh.
3. Kokate, C. K., Purohit, A. P., & Gokhale, S. B. (2012). Pharmacognosy. Nirali Prakashan, Pune.
4. Dewick, P. M. (2009). Medicinal Natural Products: A Biosynthetic Approach. Wiley, UK.
5. Evans, W. C. (2009). Trease and Evans Pharmacognosy. Elsevier, London.
6. Wallis, T. E. (1967). Textbook of Pharmacognosy. CBS Publishers, New Delhi.
7. Samuelsson, G. (2004). Drugs of Natural Origin: A Textbook of Pharmacognosy. Swedish Pharmaceutical Press.