



**BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI**  
**PILANI CAMPUS**  
**INSTRUCTION DIVISION**  
**FIRST SEMESTER 2016-2017**  
**Course Handout (Part II)**

28/07/2016

In addition to part-I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course)

**Course No.** : PHA G512  
**Course Title** : CHEMISTRY OF NATURAL DRUGS  
**Instructor-in-charge** : Atish T. Paul  
**Instructor** : Atish T. Paul

**1. Scope and Objective of the course:**

This course deals with the selected classes of drugs of natural origin which are of current therapeutic importance. The course structure has been designed with topics relevant to the isolation, characterization of natural drugs and their significance in new drug design and development. On the whole the lectures will explain how natural products have been used as templates for the development of important medicines.

**2. Text Book (T):**

T1: S. V. Bhat, B. A. Nagasampagi, M. Sivakumar, Chemistry of Natural Products, Sixth reprint, 2010.

T2: I. L. Finar, Stereochemistry and the Chemistry of Natural Products, Sixth Edition, Vol. 2, 2006.

**Reference Books (R):**

R1: B. K. Garg, Plant Analysis: Comprehensive Methods and Protocols, Scientific Publishers (India), 2012.

R2: Burger's Medicinal Chemistry & Drug Discovery, Ed. By Donald Abraham, Sixth Edition, Vol 1: Drug Discovery, 2007.

R3: Atta-ur-Rahman, Nuclear Magnetic Resonance, Basic Principles, Springer Verlag, 1986.

**4. Course Plan:**

Lecture No.	Learning Objectives	Topic to be covered	Reference
1	Introduction to Chemistry of	Historical view, Role in drug discovery and understanding the biosynthesis of natural	T1: General





	natural drugs	products	Introduction
2-3	Study on various separation techniques	Isolation, identification and application of GLC, HPLC, SEPBOX and counter current chromatography, flash chromatography for separation and analysis of plant constituents.  Outline on Bioassay and Synergy based separation methods.	Class notes
4-5	Study on characterization techniques	Application of various spectroscopic techniques to structural studies of natural products	R3 and class notes
6	Standardization of natural drugs	Various procedures of standardization, use of instruments, marker and biomarker concepts.	R1: Chap-11
7-12	Natural products as leads for phytopharmaceuticals	Chemistry of some natural molecules and their role as lead (Cannabinoids, Khellin, Podophyllotoxins, Artemisinin, Silybin)	R2: Chap 20
13-25	Natural products obtained from terrestrial sources	Isolation, structure elucidation, chemistry, synthesis and medicinal uses of important class of natural products. 1. Phenolic dyes: Anthocyanidins 2. Flavonoids: Quercetin, Rutin 3. Triterpenes: Betulinic acid & Boswellic acid 4. Steroids: Withanolides 5. Alkaloids: Ergotamine	Journal Review articles *
26-30	Natural products obtained from other sources like microbes, marine organisms, etc.	Important class of natural products like, 1. Halichondrins 2. Cyclicpeptides 3. Prostaglandins	T1: Chap 3
31-39	Natural products currently under research and development	Awareness on the active constituents of natural origin currently under research and development. Main focus will be on Anti-cancer anti-diabetic and antiobesity drug discovery.	Journal Review articles *





\* Study material will be distributed in the classroom. Some of the aspects of the above topics will be covered during the laboratory hours.

#### 5. Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Remarks
Mid Term Exam	90 min	30	8/10 4:00 - 5:30 PM	CB
Literature survey, Seminars, Laboratory Component*		40		OB
Comprehensive Exam	180 min	30	8/10 4:00 - 5:30 PM	CB

\*Laboratory component will include research work based on theory covered in the class. Mode of evaluation and number will be announced on the first day of the laboratory class.

**6. Attendance:** Regularity in attendance will be one of the criteria in deciding the borderline cases at the time of final grading.

#### 7. Grading Procedure:

1. It is not necessary that all the five grades (i.e. A to E) would be awarded.
  2. In borderline cases subjective judgment will be exercised for pull-up's (max. 2%). Basic guiding factors will be regularity, consistency in performance (above average) or/and steady improvement throughout the semester.
- 8. Make-up:** Make-up will be given only for genuine reasons. It is expected that students shall avoid misuse of this feature.
- 9. Chamber consultation hours:** To be announced in the class.
- 10. Notices:** Notices pertaining to this course will be displayed only on Pharmacy Department Notice board.

Instructor-In-Charge

PHA G512

