



---

**Second Semester 2020-2021**  
**AUGSD-GSRD**  
**Course Handout (Part II)**

**Date: 11/03/2021**

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 G522*  
**Course Title** : *Chemistry of Macromolecules*  
**Instructor In-charge** : *Dr. Atish T. Paul*

**1. Course Description**

The course deals with the selected classes of macromolecules, their introduction, synthesis, sequencing and their significance in new drug design and development based on pharmacological and bio-chemical pathways involved.

**2. Scope and Objectives**

To make student understand classification, stereochemistry, reaction, medicinal and pharmaceutical use of macromolecules

**3. Prescribed Text Book**

- T1.** Finar, IL, Organic Chemistry, Vol. II,: Stereochemistry and Chemistry of Natural Products, V Edn., ELBS/Longman, Reprint-1983.  
**T2.** S.V. Bhat , M Shivkumar : Chemistry of Natural Products, NAROSA publishing house, New Delhi. 2005

**4. Reference Books**

- R1.** Koji Nakanishi et al., Natural Products Chemistry, Vol. I, Kodansha Ltd, Academic Press Inc., Tokyo, 1974.  
**R2.** Thomson, R.H., The Chemistry of Natural Products, II Edn. Blackie Academic and Professional, Chapman and Hall, Madras, 1993.  
**R3.** Moore, J.A., Macromolecular Synthesis, Collective Volume: I, John Wiley and Sons Inc., New York, 1977.  
**R4.** Ravve, A., Principles of Polymer Chemistry: Kluwer academic/Plenum Publishers, 2<sup>nd</sup> edn, New York, 2000.





**Journals:** Journals of Medical Chemistry, Journals of Natural Products, Journals of Organic Chemistry, Phytochemistry

### 5. Course Plan

Module Number	Lecture session/Tutorial Session.	Reference	Learning Outcome
1. Chemistry of Natural Drugs	Classification of Natural Products	T1	Understanding the Introduction, isolation, separation techniques for natural products
	Chemistry of various natural products classes		
	Biosynthesis of various natural products classes		
	Isolation of Natural Products		
	Characterization of Natural Products		
2. Carbohydrates	Classification of carbohydrates	TB2; TB1	Students will learn the chemical and biological aspect and uses of carbohydrates
	Nomenclature of carbohydrates		
	Biosynthesis of carbohydrates		
	Stereochemistry of carbohydrates		
	Purification of carbohydrates		
	Reaction uses of carbohydrates		
	Pharmaceutical uses of carbohydrates		
	Tutorial One based on Topic 1 & 2		
3. Proteins and Peptides	Classification of Amino acids	TB2; TB1	Students will learn the chemical and biological aspect and uses of Proteins and peptides
	Nomenclature of Amino acids		
	Biosynthesis of Amino acids		
	Stereochemistry of Amino acids		
	Study of the structure of proteins		
	Peptide synthesis		
	Sequencing of peptides		
4. Steroids and related compounds	Introduction of steroids synthesis	TB2; RB:1	Students will learn the chemical and biological aspect and uses of steroids
	Biosynthesis of steroids		
	Structural modification of testosterone and corticosteroids		
	Structural modification of testosterone and corticosteroids		
	Tutorial two based on Topic 3 & 4		
5. Prostanoids	Nomenclature of Prostanoids	TB2	Students will learn the chemical and biological aspect and uses of Prostanoids
	Biosynthesis of Prostanoids		
	Biological significance of Prostanoids		
	Synthetic approaches for prostaglandin		
6. Natural and synthetic polymers	Introduction to Polymers	TB1; RB4	Students will learn the chemical and biological aspect and uses of Polymers
	Polymerization reactions, free radical, anionic and cationic polymerizations, copolymers, rubbers		
	Uses of polymers in healthcare/medicine		





	Tutorial Three based on topic 5 and 6		
7. Nucleic Acids	Introduction to Nucleic acid	TB2: RB:2-3	Students will learn the chemical and biological aspect and uses of Nucleic Acids
	Biosynthesis of nucleic acids		
	Sequencing of nucleic acids		
	Drugs acting as anti- nucleosides and related drug design		
8. Biologically active drugs derived from natural origin	Various biological activities reported for natural products and their importance	Journals	Students will learn about various biologically active drugs of natural origin
	Marine and microbial origin molecules	Journals	
	Tutorial Four based on topic 7 and 8		

# Latest information on above Topics will also be covered, besides information in text, reference books and will be included in all evaluation components. Some classes will be used for evaluations of assignments, presentations, reports etc.

#### 6. Evaluation Scheme:

Evaluation Component	Weightage (Marks)	Date & Time	Remarks
Mid-Sem.	30% (30)		Closed Book
Comprehensive	30% (60)		Closed Book
Continuous assessment* (Assignment(s), Presentation, Reports)	40% (40)		Open book

\* Assignment(s) may be practical / theory oriented, for which a proper report in a standard format should be submitted as per deadline(s) that would be announced. Presentation will be based research articles. All evaluation components are equally important irrespective of weightage. Hence, students failing to attend or absenting themselves in one or many of the evaluation components may become ineligible for obtaining a valid grade at the end of the semester. It shall be the responsibility of the individual student to be regular in maintaining the self study schedule as given in the course handout, attend lectures as per the schedule announced

**Chamber consultation hour:** To be announced in class.





BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani  
Pilani Campus  
AUGS-AGSR Division

---

**Notices:** Notices concerning the course will be displayed on the Pharmacy Group Notice Board only.

**Make-Ups:** Make-Ups are not given as a routine. It is solely dependent upon the GENUINENESS OF THE CIRCUMSTANCES under which a student fails to appear in a scheduled evaluation component. In such circumstances, prior permission should be obtained from the Instructor-in-Charge. In no case the make-up letter be slipped inside the chamber of the Instructor-In-Charge. No makeup of Continuous assessment components will be given

**Closed Book Test:** No reference material of any kind will be permitted inside the exam hall.

**Open Book Exam:** Use of any printed / written reference material (books and notebooks) will be permitted inside the exam hall. Loose sheets of paper will not be permitted. Computers of any kind will not be allowed inside the exam hall. No exchange of any material will be allowed.

(Atish T. Paul)  
Instructor In charge  
PHA F G522



Please Do Not Print Unless Necessary

