

## PAPER-IV: MEDICINAL CHEMISTRY–II (NATURAL PRODUCTS)(Theory)

<b>Total Hours: 50 (2 hr/week),</b>	<b>Examination</b>	<b>Max Marks</b>
	Annual	100
	Internal Assessment Exam:	30
	Seminar Evaluation:	20
	Total:	150

### GOAL:

- To train the student to learn in detail about different biological constituents of plants and to study their biosynthetic path ways.
- To train the student to isolate and identify the different principles from plant source.

### OBJECTIVES:

1. To impart a thorough knowledge to the student about different medicinally active principles, their formation, isolation and identification.
2. The candidate is trained to improve the yield of the active principles by suitable bio-chemical modifications.
3. The candidates are trained to modify the chemical structure of the active constituents to improve their pharmacological activity.

<b>S.N</b>	<b>Syllabus</b>	<b>Hr/Week</b>
<b>1</b>	<b>A) General chemical methods of structural elucidation of natural products.</b>	<b>15</b>
	<b>B) Structure elucidation of the following compounds based on chemistry, chemical degradation and synthesis of the compounds;</b>	
a)	Morphine alkaloids: Morphine, Papavarine	3
b)	Cardiac glycosides: Lanatoside C, Ouabain	3
c)	Rauwolfia alkaloid: Reserpine	3
d)	Vinca alkaloids: Vinblastine and vincristine	3
e)	Ipecacuanha alkaloid: Emetine	3
<b>2.</b>	<b>Microbial conversions as tools in the preparation of drugs</b>	<b>4</b>
a)	Introduction	
b)	Practical aspects of microbial transformation	
c)	Some theoretical aspects of microbial transformation	
d)	Conversion by microorganism	
<b>3.</b>	<b>A) General introduction and classification of steroids</b>	<b>9</b>
	<b>B) Hormones:</b>	
a)	Female and male sex hormones –development of antifertility agents.	3
b)	Adrenal cortex hormones and their derivatives	3
c)	Carotenoids and their therapeutic importance.	1
d)	Development of anabolic steroids and antifertility agents	2
		<b>10</b>
		1

<b>4. Antibiotics :</b>	<b>1</b>
a) Penicillins and Cephalosporins:	1
i) Early Penicillins and cephalosporins	2
ii) AmidoPenicillins	1
iii) Beta lactamase stable cephalosporins	
iv) Antipsuedomonalpenicillins and cephalosporins	1
v) New oral compounds and future prospects	1
b) Other betalactam agents	1
i) Nocardins and monobactams	1
ii) Clavulanic acid analogs	
iii) Carbapenams	<b>8</b>
Other fused Betalactam systems	
	<b>2</b>
<b>5. Purine,Pyrimidines and their applications</b>	
a) The metabolism of purines and pyrimidines, allopurinol and xanthine oxidase	2
	2
b) Purine and pyrimidine antimetabolites as antineoplastic agents	2
c) Purine and pyrimidine related Antiparasitic agents	<b>4</b>
d) Purine and pyrimidine related Antifungal agents	2
	2
<b>6. Chemistry of vitamins</b>	
a) Water soluble vitamins: Vitamin B <sub>1</sub> , B <sub>2</sub> , B <sub>6</sub> and Vitamin C	
b) Fat soluble vitamins: Vitamin A, D, E and K	

#### **PAPER-IV: MEDICINAL CHEMISTRY–II (NATURAL PRODUCTS)(Practical)**

<b>Total Hours: 150 (6 hr/week),</b>	<b>Examination</b>	<b>Max Marks</b>
	Annual	<b>100</b>
	Internal Assessment Exam:	<b>30</b>
	Practical record Evaluation:	<b>20</b>
	Total:	<b>150</b>

#### **Part –1: Isolation and Characterization of following active constituents**

1. Eugenol from Clove
2. Curcumin from Turmeric
3. Sennosides from senna
4. Hesperidine from Orange Peel
5. Embelin from Embelia Ribes
6. Glycyrrhizin from Glycyrrhiza Glabra
7. Plumbagin from Plumbago Rosea
8. Solanine from potatoes
9. Naringen from Grape Fruit Peel
10. Trimyristin and Myristin from Nutmeg
11. Azylic acid from Castor Oil
12. Pectin from Orange Peel
13. Lycopene from Tomato Peel

14. Epicatechin from Cashew Kernel outer covering
15. Piperine from Black pepper

**Part-II: Degradation reaction of following natural products and the identification of the degraded intermediates by micro TLC and qualitative tests.**

1. Atropine,
2. Caffeine,
3. Ephedrine,
4. Saponification of Trimyristin

**Scheme of Practical Examination**

Sl. No	Synopsis	Experiments		Viva-voce	Total
		Major	Minor		
1	20	35	25	20	100

**TEACHING AND LEARNING ACTIVITIES**

**Journal club**

Each student is required to present any two recent articles relevant to the Advanced Pharmaceutical Chemistry from any of the journals in an year.

**Seminars**

Each student is required to give two seminars relevant to this subject in a year.

**Field/Industrial visits**

It is desirable to make to one visit to the relevant / Laboratory / Industry

**Conference / Meetings**

Each student has to be encouraged to attend at least one relevant national conference.

**Reference Books:**

1. Modern Methods of Plant Analysis- Peech and M.V. Tracey
2. Phytochemistry Vol-I and II by Miller, Jan Nostrant Rein Hold.
3. Recent Advances in Phytochemistry-Vol-I-IV Scikel Runeckles
4. Chemistry of Natural Products Vol-I onwards IWPAC
5. Natural Products Chemistry Nakanishi Golo
6. Natural Products Chemistry "A Laboratory Guide"-Raphael Ikan, IInd Edition, Academic Press New York.
7. The Alkaloid Chemistry and Physiology- Volumes RHF Manske
8. Introduction to Molecular Phytochemistry-CHJ Wells, Chapmanstall.
9. Comparative Phytochemistry edited by T.Swain
10. Organic Chemistry of Natural Products- Vol-I & II – Gurdeep Chatwal, Himalaya publishing house, Mumbai..
11. Organic Chemistry Vol-I & II by I.L. Finar, ELBS Longman, 5th Edition , London
12. Elements of biotechnology by P.K. Gupta
13. Pharmaceutical Biotechnology by S.P.Vyas and V.K.Dixit, CBS publisher, New Delhi.

14. Biotechnology by Purohit and Mathur , Agro Botanical publishers, Bikaner.
15. Phytochemistry method by Harborne
16. Burger's Medicinal Chemistry, 5th Edition, Vol.I, II. John Wiley and Sons, New York.
17. Burger's Medicinal Chemistry, 4th Edition, Vol. II, Part-II, John Wiley and Sons, New York.
18. Comprehensive Medicinal Chemistry, Vol.II by Corwin Hansch, Pergamon Press, New York

**Journals:**

(At least one international journal is to be subscribed)

1. Indian Journal of Pharmaceutical Sciences
2. JMAPS
3. Indian Journal of Natural Products
4. Phytopharma
5. Journal of Natural Products.
6. Indian Journal of Chemistry.
7. Phytochemistry

