



Dr. Rafiq Zakaria Campus

Maulana Azad Educational Trust's

Y. B. CHAVAN COLLEGE OF PHARMACY

(B. Pharm, M. Pharm & Research Centre)

ISO 21001:2018 & ISO 14001:2015 CERTIFIED | NIRF-2022 ALL INDIA RANK 65TH

NAAC ACCREDITATION "A" GRADE WITH 3.23 CGPA SCORE

COURSE MODULE

Program Title	B. Pharmacy
Department	Pharmaceutical Chemistry
Course Title	Pharmaceutical Organic Chemistry -III

- 1. NAME OF INSTITUTION** : Y. B. CHAVAN COLLEGE OF PHARMACY,
AURANGABAD
- 2. AFFILIATED UNIVERSITY** : DR. BABASAHEB AMBEDKAR
MARATHWADA UNIVERSITY, AURANGABAD
- 3. DEPARTMENT** : Pharmaceutical Chemistry
PROGRAM TITL : B. PHARM
- 4. NAME OF INSTITUTION** : Y. B. CHAVAN COLLEGE OF PHARMACY,
AURANGABAD
- 5. AFFILIATED UNIVERSITY** : DR. BABASAHEB AMBEDKAR
MARATHWADA UNIVERSITY, AURANGABAD

6. **DEPARTMENT** : Pharmaceutical Organic Chemistry -III

7. **PROGRAM TITLE** : B. PHARM.

4.1. Program Outcomes (PO):

PO 01: Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

PO 02: Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

PO 03: Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

PO 04: Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

PO 05: Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

PO 06: Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

PO 07: Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

PO 08: Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

PO 09: The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

PO 10: Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 11: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

8. COURSE SPECIFICATION :

5.1.Course Identification and General Information

a. Course Title:	Pharmaceutical Organic Chemistry-III	
b. Course Number/Code	BP401T (Theory)	
c. Credit Hours	Theory	Practical
	45(3 Hrs/Week	60 (4Hrs. / Week)
d. Study level/semester at which this course is offered	B. Pharm IV semester	
e. Pre-requisite	POC-I (BP202T) and POC-II (BP301T)	
f. Co-requisite	NA	
g. Program in which the course is offered	B Pharm	
h. Language of teaching the course	English	

i. Prepared by	Mr. Sayad Imran
j. Approved by HOD	Dr. K. G. Baheti

5.2. Course Description:

The course is the continuation of Pharmaceutical Organic Chemistry-II studied in B. Pharm Second year (semester-III). It emphasizes on definition, types, mechanisms, examples, uses/application Stereo isomerism, Geometrical isomerism, Heterocyclic compounds and some name reaction. The various useful Heterocyclic compounds will be studied with reference to their physical properties, structures and uses.

5.3. Course Objectives:

Specific learning objectives for Pharmaceutical Organic Chemistry-III (BP401T) are mentioned below. By completing this course, students should be able to:

1. To explain the classification, principles/mechanisms, applications, examples of organic compound as per the syllabus.
2. Understand the methods of preparation and properties of organic compounds.
3. Explain the stereo chemical aspects of organic compounds and stereo chemical reactions
4. Know the medicinal uses and other applications of organic compounds

6.0. Course Outcomes (COs) : (Min. 4 and Max. 6)

(Use Bloom's Taxonomy words)

After completion course, student should be able to

CO Code	Course outcome
CO 401.01	Explain stereochemistry of organic compounds
CO 401.02	Identify the heterocyclic ring and write their IUPAC nomenclature
CO 401.03	Describe the reaction and mechanism of heterocyclic compounds
CO 401.04	Elaborate the mechanism of oxidation and reduction organic reaction

6.1. Knowledge and Understanding

(Alignment of POs to COs)

Course code (CO)	Program Outcome (PO)										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO 401.01	3	1	3	2	---	2	---	---	3	2	3
CO 401.02	2	1	2	3	---	1	---	---	1	---	3
CO 401.03	2	1	3	2	---	---	---	---	1	2	2
CO 401.04	2	1	1	1	---	---	---	1	1	1	2

Correlation levels 1, 2 or 3 as defined below: 1: Slight (Low); 2: Moderate (Medium); 3:

Substantial (High); If there is no correlation, put '-'

6.2. Teaching and Assessment Methods for achieving learning outcome:

Teaching Strategies(methods)/Tools used	Methods of Assessment
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Lectures (Constructivist learning)	Formative Assessment
Collaborative learning (Discussion)	Case study
Project based Learning	Class test
Blended learning	Multiple choice questions
Inquiry based learning	Assignments
Flash cards	Seminar
Video	Viva Voce
Equipment models	Synopsis
	Tutorials
	Summative Assessment

6.3. Tools for the Teaching and learning

Theory subjects
<ul style="list-style-type: none"> • PowerPoints presentation • Videos • Flash Card • Models • Software • Charts • Smart Boards • White boards • Online Platform

6.4. COURSE CONTENT

6.1. Theoretical Aspect:

Sr.	Unit and Subtopics list	No. of Weeks	Contact Hr.
1.	UNIT-I Stereo isomerism Optical isomerism –	2.5	10
2.	Chiral and achiral molecules		
3.	Elements of symmetry,		
4.	Optical activity		
5.	Enantiomerism, Diastereoisomerism,		
6.	Meso compounds		
7.	DL system of nomenclature of optical isomers, sequence rules, RS system of nomenclature of optical isomers		

8.	Racemic modification and resolution of racemic mixture.		
9.	Reactions of chiral molecules		
10.	Asymmetric synthesis: partial and absolute		
11.	UNIT-II Geometrical isomerism Nomenclature of geometrical isomers (Cis Trans, EZ, Syn Anti systems)	2.5	10
12.	Nomenclature of geometrical isomers (Cis Trans, EZ, Syn Anti systems)		
13.	Determination of configuration of geometrical isomers.		
14.	Conformational isomerism in Ethane		
15.	Conformational isomerism in n-Butane		
16.	Conformational isomerism in Cyclohexane		
17.	Stereo isomerism in biphenyl compounds (Atropisomerism) and		
18.	conditions for optical activity of Atropisomerism		
19.	Stereoselective reactions		
20.	Stereospecific reactions		
21.	UNIT-III Heterocyclic compounds Classification of Heterocyclic compounds	2.5	10
22.	Classification of Heterocyclic compounds		
23.	Nomenclature of Heterocyclic compounds		
24.	Nomenclature of Heterocyclic compounds		
25.	Synthesis, reactions and medicinal uses of following compounds/derivatives Pyrrole,		
26.	Synthesis, reactions and medicinal uses of Furan,		
27.	Synthesis, reactions and medicinal uses of Thiophene –		
28.	Relative aromaticity Pyrrole, Furan, Thiophene		
29.	Reactivity of Pyrrole, Furan, Thiophene		
30.	Basicity of pyrrole		
31.	UNIT-IV Synthesis, reactions and medicinal uses of following compounds/derivatives Pyrazole,	2	8
32.	Synthesis, reactions and medicinal uses of Imidazole, Pyridine,		
33.	Synthesis, reactions and medicinal uses of Oxazole and Thiazole		
34.	Synthesis, reactions and medicinal uses of Quinoline, soquinoline		
35.	Synthesis, reactions and medicinal uses of Acridine and Indole		
36.	Basicity of pyridine		
37.	Synthesis and medicinal uses of Pyrimidine, Purine		
38.	Synthesis and medicinal uses of azepines and their derivatives		
39.	UNIT-V Reactions of synthetic importance Metal hydride reduction (NaBH ₄ and LiAlH ₄),	2	8
40.	Clemmensen reduction		
41.	Wolff Kishner reduction and Birch reduction		
42.	Oppenauer-oxidation and Dakin reaction		

43.	Beckmanns rearrangement		
44.	Schmidt rearrangement.		
45.	Claisen-Schmidt condensation		

7.0. ASSESSMENT MECHANISM :

Sr. No.	Assessment Mechanism	Week due	Marks	Proportion of Final Assessment
1	Assignments, Exercises & Home works	2 nd week of every month	10	6%
2	Sessional (Internal Theory exam)	As per scheduled examination	15	10%
3	Continuous Practical Assessment (Sessional Practical exam)	Weekly during practicals	15	10%
4	Final exam (theory)	As per University at end of course	75	50%
5	Final exam(practical)		35	24%
Total			150	100%

8.0.STUDENT SUPPORT:

Office hours/week	Other procedures
Two hours minimum	Whatsapp, etc.

9.0.TEACHER'S AVAILABILITY FOR STUDENT SUPPORT:

Days	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Time	03:00-04:00	03:00-04:00	03:00-04:00	10:00-11:00	12:00-1:00	10:00-11:00

10.0. LEARNING RESOURCES:

Sr. No.	Title of Learning Material	Details
1	Text books	Morrison R.T. and Boyd R.M., Organic Chemistry, Prentice Hall Of India Ltd., New Delhi-110 001.
2	Essential references (as per syllabus)	Heterocyclic Chemistry by Raj K. Bansal; Heterocyclic Chemistry by T.L. Gilchrist
3	Reference material	1. House H.O., Modern Synthetic Reactions, W.A. Benjamin, London 2. Carey F.A., Organic Chemistry, The Mc Graw Hill Companies.

		3. Pine S.H., Organic Chemistry, Tata Mc Graw Hill Publishing Company 4. Reaction and reagent Sanyal and Sanyal Organic Chemistry by Bahl and Bahl
4	E-materials and websites	<ul style="list-style-type: none"> • http://nptel.ac.in/ • http://sayadimranpoc.blogspot.com/ • https://youtu.be/d0PRbuPkIQs
5	Other learning material

11.0. FACILITIES REQUIRED:

Sr. No.	Particular of Facility Required
1	Lecture Rooms (capacity for 60 students)
2	Laboratory (capacity for 20 students)
3	Computing resources: PC with latest version and hardware/software and utilization of open source and licensed application software

12.0. COURSE IMPROVEMENT PROCESSES:

12.1. Strategies for obtaining student feedback on effectiveness of teaching:

Course delivery evaluation by students using: Questionnaire forms and online questionnaires

12.2. Other strategies for evaluation of teaching by the instructor or by the department:

Periodic review by Academic Planning & Monitoring Committee and departmental review committee, Observations and assistance of colleagues, External assessments by advisors/ examiners and auditors.

12.3. Process for improvement of teaching:

Use of ICT tools, teaching aids, Simultaneous practical orientation and theory classes (SPOT), Adoption of reflective teaching.

12.3.1. Describe the planning procedures for periodically reviewing of course effectiveness and planning for improvement:

Periodic review by departmental meeting, Review of course delivery and outcome through assessment and feedback from all stake holders.

12.4. Course development plans:

Provide inputs for course improvement and update to University Course development Committees (Board of Studies)

**13.0. INFORMATION ABOUT FACULTY MEMBER RESPONSIBLE FOR THE
COURSE:**

Name	Mr. Sayad Imran
Location	Pharm. Organic Chem Lab., Ground Floor.
Contact Detail (e-mail & cell no.)	imranwsayad@gmail.com 9860923394
Office Hours	10:00 AM to 5:00 PM