Course Description Form

1. Course Name:
Organic Chemistry III
2. Course Code:
Phpch25_229-
3. Semester / Year:
Second Semester \ Second Class
4. Description Preparation Date:
15/1/2026
5. Available Attendance Forms:
Second class list
6. Number of Credit Hours (Total) / Number of Units (Total)
30 hours\ 3 units
7. Course administrator's name (mention all, if more than one name)

Theoretical:

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8. Course Objectives	
Course Objectives	Identifying the various heterocyclic organic compounds, their properties, metho naming them, their reactions, some methods of preparation, in addition to a overview of their biological activity.

9. Teaching and Learning Strategies	
Strategy	• Interactive lectures (and supplementary resources via the online classroom) • Practical laboratory experiments (enhancing applied skills) • Classroom discussions and case studies (stimulating critical thinking and connecting concepts) • Student presentations (promoting self-directed learning) • Homework assignments and research activities (promoting self-directed learning)

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 Theoretical	A1- Explains to the student an introductio heterocyclic compour in general, including their properties and importance. C2- Display to the student how heterocy compounds are classified.	Introduction to heterocyclic compounds and their classification.	Interactive and enriching lectures vi the online classroon	Examinatio
	2 Practical	B1- The student appli methods for detecting functional groups. C1- The student adhe to safety procedures a professional conduct within the laboratory when handling chemicals.	Introduction to chemical identification method	practical laboratory experiments	Practical ex and report
2	2 Theoretical	A1- Explains to the student the natural sources of heterocycli compounds. C3- The student pract the systematic naming these compounds afte being shown the diffe naming methods used the various systems adopted by the source	Occurrence in nature and in medicinal products nomenclature of Heterocyclic Compounds	Interactive and enriching lectures vi the online classroon Classroom discussio and case analysis	Examinatio
	2 Practical	A2- The student distinguishes between the different types of salts of carboxylic aci B2- The student analy the methods for detec and distinguishing between different salt	Carboxylic acid salts identification : anionic par identification	practical laboratory experiments	Practical ex and report
3	2 Theoretical	C3- The student pract naming these compou systematically after being shown the diffe naming methods used according to the vario systems approved by sources.	Nomenclature of Fused Systems	Interactive and enriching lectures vi the online classroon	Examinatio

	2 Practical	A2- The student distinguishes between the negative and positive ions of the carboxylic acid salt.	Carboxylic acid salts identification : cationic identification	practical laboratory experiments	Practical ex and report
4	2 Theoretical	C3- The student pract naming these compou systematically after being shown the diffe naming methods according to the vario systems approved by sources.	Nomenclature of fused heterocyclic compounds	Interactive and enriching lectures vi the online classroon	Examinatio
	2 Practical	A2- The student distinguishes between the different types of salts. C3- The student pract methods for detecting different types of salts	Unknown: Carboxylic acid salts identification	practical laboratory experiments	Practical ex and report
5	2 Theoretical	A1- Explains to the student the properties reactions, and metho of preparing pyrrole, furan, and thiophene. C1- Lists to the stude some pharmaceutical compounds containin pyrrole, furan, and thiophene.	Five-membered heterocyclic compounds contain one heteroatoms (pyrrole, furan and thiophene).	Interactive and enriching lectures vi the online classroon	Examinatio and Homew
	2 Practical	A2- The student distinguishes between the different types of amines. C3- The student experiments with methods for detecting different types of ami	Classification and Chemical identifications amines	practical laboratory experiments	Practical ex and report
6	2 Theoretical	A1- Explain to the student the nature of aromatic electrophile substitution reactions these compounds, the active sites, and wher these reactions are directed. A2- The student identifies some satura cyclic compounds containing one heteroatomide, their	-Electrophilic substitution in pyrrole, furan, and thiophene. (Reactivity and orientation). -Saturated five-membered heterocyclic	Interactive and enriching lectures vi the online classroon	Examinatio

		methods of preparatio and their benefits.			
	2 Practical	C3- The student experiments with methods for detecting different types of ami	Unknown: Classification and Chem identifications of amines	practical laboratory experiments	Practical ex and report
7	2 Theoretical	A1- Explains some properties of epoxides the student. A2- Demonstrates son reactions of epoxides the student.	Properties and reactions of three member ring (epoxide)	Interactive and enriching lectures vi the online classroon	Examinatio
	2 Practical	A2- The student identifies the types of halides. B1- The student appli the following method for detecting alkyl an aryl halides.	identifications of Alkyl and aryl halides	practical laboratory experiments	Practical ex and report
8	Midterm exam				
9	2 Theoretical	A1- Explains the basi concepts of epoxide preparation to the student. 1C- Lists some pharmaceutical compounds containin the compounds mentioned above.	Preparation of three member rings (epoxides) an some examples	Interactive and enriching lectures vi the online classroon	Examinatio
	2 Practical	B1- The student appli the methods for detec alkyl and aryl halides	Unknown: identifications of Alkyl and aryl halides	practical laboratory experiments	Practical ex and report
10	2 Theoretical	A1- The student prov an introduction to pyridine and its compounds, including their properties and biological importance	Introduction of Six-membered ring compounds pyridine, Source of pyridine compounds, properties	Interactive and enriching lectures vi the online classroon	Examinatio
	2 Practical	B1- The student appli chemical reactions to synthesize a new substance. A2- The student learn the specific mathemat methods for calculatir the expected quantity a substance.	Synthesis of Benzimidazole	practical laboratory experiments	Practical ex and report

		C2- The student appreciates the importance of chemic reactions in synthesiz new substances and th significance in the pharmaceutical indust			
11	2 Theoretical	A1- The student expla the basic concepts and fundamental methods used in preparing pyridine and its derivatives.	Methods of Preparation of pyridine and their derivatives	Interactive and enriching lectures vi the online classroom	Examinatio
	2 Practical	B1- The student appli chemical reactions to synthesize a new substance. A2- The student learn the specific mathemat methods for calculatir the expected quantity a substance.	Unknown: Synthesis of Benzimidazole	practical laboratory experiments	Practical ex and report
12	2 Theoretical	A2- The student expla the reactions that pyridine and its derivatives undergo, s as electrophilic and nucleophilic substitut reactions, and oxidati reduction reactions.	Reactions of pyridine, electrophilic and nucleophilic substitution in pyridine	Interactive and enriching lectures vi the online classroom	Examinatio
	2 Practical	B1- The student appli chemical reactions to synthesize a new substance. A2- The student learn the specific mathemat methods for calculatir the expected quantity a substance. C2- The student appreciates the importance of chemic reactions in the synth of new substances and their significance in th pharmaceutical indust	Synthesis of thiopyrimidine	practical laboratory experiments	Practical ex and report
13	2 Theoretical	A2- The student prov an introduction to ind and its compounds, including their proper	Fused Ring Heterocyclic Compounds Indole	Interactive and enriching lectures vi the online classroom	Examinatio

		and biological importance. B2- The student understands the meth of preparing indole ar its reactions.			
	2 Practical	B1- The student appli chemical reactions to synthesize a new substance. A2- The student learn the specific mathemat methods for calculatir the expected quantity a substance.	Unknown: Synthesis of thiopyrimidine	practical laboratory experiments	Practical ex and report
14	2 Theoretical	A2- The student distinguishes quinolir from other heterocycl compounds and studi its physical and chem properties. B2- The student understands the pharmaceutical compounds that conta quinoline.	Fused ring heterocycles Quinoline	Interactive and enriching lectures v the online classroon	Examinatio
	2 Practical		Review		
15	2 Theoretical	A2- The student distinguishes betwee quinoline and isoquinoline among heterocyclic bicyclic compounds and studi their physical and chemical properties. B2- The student understands the pharmaceutical compounds that conta isoquinoline and the methods for preparing these compounds.	Fused ring heterocycles isoquinoline (benzopyridines)	Student presentatior	Presentatior evaluation

11. Assessment

• 20 marks for theoretical assessment

(Midterm written exam + short class quiz + attendance + seminar)

• 20 marks for practical assessment (attendance + practical exam + report)

• 60 marks for the final written theoretical exam • Total 100 marks	
12. Educational Resources	
Required textbooks (curricular books, if any)	Morrison RT, Boyd RN.Organic Chemistry. 6th edition ,2008
Main references (sources)	Textbook of organic chemistry for pharmacy students KS Mukheriee
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	**https://chemistry.com.pk/books/organic-chemistry-rt-morrison**
Curriculum update rate	5%