2023
TP-153

Course Specification
(Bachelor)

Course Title:	**Plant Morphology and Anatomy**
Course Code:	**BIOE1301**
Program:	**Environmental Sciences**
Department:	**Biology**
College:	**Science**
Institution:	**UmmAl-Qura University**
Version:	*Course Specification Version Number*
Last Revision Date:	**24 December 2024**

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (3hr.)					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (Second level)					
4. Course General Description:					
Morphologic studies of plants include structure and varieties in roots, stems, leaves, flowers, fruits, and seeds in dicotyledonous and monocotyledonous plant species. Anatomic studies of plant organs, tissues in roots, stems, and leaves at monocotyledonous and dicotyledonous plants.					
5. Pre-requirements for this course (if any)**:**					
General Biology (BIO1101)					
6. Pre-requirements for this course (if any)**:**					
None					
7. Course Main Objective(s):					
The student will be able to: - Become familiar with basic plant morphology and anatomy. - Identify plants using morphological characteristics. - Differentiate between the morphology of root and shoot systems. - Understand modifications of roots, stems, and leaves. - Learn the differences between meristematic and permanent tissue. - Learn the differences between the anatomy of leaves, stems, and roots. - Predict the optimum conditions for seed germination.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	5hr/Week	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	45
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		75

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Identify general facts, principles, scientific terminology, and concepts across plant morphological and anatomical features.	K1	Lectures	exams
1.2	Classify plants based on their different characteristics.	K2	Lectures	exams
2.0	**Skills**			
2.1	Distinguish between various parts of a plant as well as their structure, metamorphosis, functions, and anatomical features.	S1	Open discussion-brainstorming	Practical Exam
2.2	Compare morphological and anatomical characteristics of monocot and dicot roots, stems, and leaves.	S2	Activities-cooperative learning	Practical Exam-Practical reports

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
3.0	**Values, autonomy, and responsibility**			
3.1	Assess proper collaboration to achieve specific individual or group tasks.	V1	Open Discussion	Activities Evaluation

C. Course Content

No	List of Topics	Contact Hours
1.	Seed and seed germination	4L+6P
2.	Morphological of the root, function, root, and modification	2L+3P
3	Morphological structure of stem, function, and metamorphosis of the stem	2L+3P
4	Morphological structure of leaf function and metamorphosis of the leaf	2L+3P
5	Flower composition and kind of fruits	4L+6P
6	Mid-Term Exam	
7	Kind of inflourances	2L+3P
8	Introduction to plant anatomy: plant cells and tissues (simple complexes and secretory tissues), classification of meristems and permanent tissues.	6L+9P
9	Anatomy of Monocot and Dicot Root	2L+3P
10	Anatomy of Monocot and Dicot Stem	2L+3P
11	Anatomy of Monocot and Dicot leaves	2L+3P
12	Final Lab Exam	
13	Final Lecture Exam	
Total		

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Activities	Periodically	10
2.	Mid-term Exam	8th	20
3.	Practical reports and quizzes	Periodically	10
4.	Final Practical Exam	16th	20
5.	Final Exam (written test)	17th	40

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Plant Systematics; Samuel B. Jones, Jr. and Arlene E. Luchsinger. Fourth ed. (2009). McGraw-Hill, Inc. Plant Anatomy and Morphology: Structure, Function and Development Hardcover –2020 by Luke Fitzgerald (Editor) Tayal, M.S. (1979): Plant anatomy. Rastogi Publications, India.
Supportive References	
Electronic Materials	Blackboard website Website of Saudia Digital Library
Other Learning Materials	Microsoft Office package. - Multi-media associated with the textbook and the relevant websites

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	The lecture room is suitable for 35 students. The laboratory is suitable for 20 students.
Technology equipment (projector, smart board, software)	Data show
Other equipment (depending on the nature of the specialty)	Preserved specimens

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Indirect - Questionnaires
Effectiveness of Students assessment	Program committee. - Staff members. - Students.	Direct - Questionnaires. - Reports. - Meetings
Quality of learning resources	Program leaders. - Peer Reviewer.	Direct & Indirect - Questionnaires. - Reports. - Meetings
The extent to which CLOs have been achieved	- Peer Reviewers Students	Direct & Indirect
Other	NA	NA

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	

Course Specification
(Bachelor)

Course Title:	General physics
Course Code:	PHYS1101
Program:	Environmental Sciences
Department:	Physics
College:	Science
Institution:	Umm Al-Qura University
Version:	
Last Revision Date:	*Pick Revision Date.*

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (3)					
3 credit hours					
2. Course type					
A.	☐University	☒ College	☐Department	☐Track	Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (2nd Level/1st Year)					
4. Course General Description:					
The course covers some of the main principles and basics in general physics, such as measurements, vectors, motion in one dimensions, newton's laws, work and energy.					
5. Pre-requirements for this course (if any)**:**					
NONE					
6. Co-requisites for this course (if any)**:**					
NONE					
7. Course Main Objective(s):					
The course is designed to provide students with some basic and essential concepts in general physics of units and unit conversions; vectors; Motion in one-, two-, and three-dimensions; Energy; Work, and Power. In addition to these items, the students should gain practical skills through conducting related experiments in the laboratory.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	75	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	45
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		75

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	**Define the concepts of measurements, length, time, and weight.**	**K1**	**Lectures**	**Exams, and quizzes**
1.2	**Differentiate between vectors and scalars**	**K2**	**Lectures**	**Exams, and quizzes**
2.0	**Skills**			
2.1	**Apply Newton's laws of motion to calculate the position, velocity and acceleration.**	**S1**	**Lectures**	**Exams, and quizzes**
2.3	**Relate force to potential and kinetic energies**	**S2**	**Lectures**	**Exams, and quizzes**
3.0	**Values, autonomy, and responsibility**			
3.1	**Work effectively responsibly in teamwork**	**V1**	**Lectures and labs**	**Exams, quizzes, final practical exam**

C. Course Content

No	List of Topics	Contact Hours
1.	**Measurement** Measuring Things, The International System of Units, Changing Units, Time, Mass	**2**
2.	**Motion Along a Straight Line**	**4**

	Motion, Position and Displacement, Average Velocity and Average Speed, Instantaneous Velocity and Speed, Acceleration, Constant Acceleration, Free-Fall Acceleration	
3.	**Vectors** Vectors and Scalars, Adding Vectors Geometrically, Components of Vectors, Unit Vectors, Adding Vectors by Components, Multiplying Vectors	**4**
4.	**Motion in Two and Three Dimensions** Position and Displacement, Average Velocity and Instantaneous Velocity, Average Acceleration and Instantaneous Acceleration, Projectile Motion, Uniform Circular Motion	**6**
5.	**Force and Motion** Newton's First Law, Force, Mass, Newton's Second Law, Newton's Third Law, Applying Newton's Laws, Friction (static and dynamic)	**6**
6.	**Kinetic Energy and Work** Kinetic Energy, Work, Work and Kinetic Energy, Power.	**4**
7.	**Potential Energy and Conservation of Energy** Potential Energy, Determining Potential Energy Values, Conservation of Mechanical Energy, Work Done on a System by an External Force, Conservation of Energy	**4**
8.	**Practical Part:** Students will conduct various experiments in the practical part of the course. Each student will perform the experiments, collect data, extract results, and prepare a written report every week.	**45**
Total		**75**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Lecture Activities	All weeks	10
2.	Lab Quiez	All weeks	10
3.	Midterm exam	9th week	20
4.	Final exam	End of term	40
5.	Final Lab	17th week	20

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	**Halliday & Resnick, Jearl Walker, "Fundamentals of Physics" John Wiley & sons, 10th Edition (2018)**
Supportive References	
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	**Classrooms and labs**
Technology equipment (projector, smart board, software)	**Projector**
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Questionnaire
Effectiveness of Students assessment	Instructors of the course	Peer review of exam marking
Quality of learning resources	Instructor	Course report
The extent to which CLOs have been achieved	Instructor	Course report
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Physics Department
REFERENCE NO.	
DATE	1/1/2025

Course Specification
(Bachelor)

Course Title:	Environmental Microbiology
Course Code:	BIOE1401
Program:	Environmental Sciences
Department:	Department of Biology
College:	Faculty of Science
Institution:	Umm Al-Qura University
Version:	Version 2
Last Revision Date:	28 December 2024

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (3 credit hours)					
3 credit hours					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (1st year / level 2)					
4. Course general Description:					
The course will cover the principle of eukaryotic and prokaryotic microbes and viruses, but will emphasize environmental microbiology. This course will provide a conceptual and experimental background in microbiology sufficient to enable students to take courses that are more advanced in related fields					
5. Pre-requirements for this course (if any)**:**					
General Biology (BIO1101)					
6. Pre-requirements for this course (if any)**:**					
Not applicable					
7. Course Main Objective(s):					

- **Define the principles and concepts of Microbiology.**
- **List roles the microorganisms in the nature**
- **Differentiate between Eukaryotes and Prokaryotes cell structure.**
- **Apply basic laboratory skills and techniques for studying microorganisms.**
- **Explain the bases of diversity, structure, physiology, microbial growth, environmental effects, growth and control, and general taxonomy of microorganisms.**
- **Describe the importance of microorganisms in relation to Biology and environment.**
- **Describe the role of microorganisms in environmental clean up**
- **Evaluate students' interest in ethical aspects in the exploitation of environmental microbiology**

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	72	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom	-	-

No	Mode of Instruction	Contact Hours	Percentage
	• E-learning		
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	42
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	
Total		72

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Describe the importance of microorganisms in relation to biology and environment	**K2, K3**	1.In-class lecturing where the previous knowledge is linked to the current and future topics. 2.Homework assignments. 3.Discussions (connecting what they learn in the class and applying this information in laboratory). 4. Handout of lecture notes for each topic	Exams, Assignments, Course activities and Written analyses
1.2	Describe microbe-microbe, microbe-plant, microbe-animal interactions	**K2, K3**	1.In-class lecturing where the previous knowledge is linked to	Exams, Assignments, Course activities

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
			the current and future topics. 2.Homework assignments. 3.Discussions (connecting what they learn in the class and applying this information in laboratory). 4. Handout of lecture notes for each topic	and Written analyses
1.3	Describe the unique cell structures present in prokaryotes	**K2, K3**	1.In-class lecturing where the previous knowledge is linked to the current and future topics. 2.Homework assignments. 3.Discussions (connecting what they learn in the class and applying this information in laboratory). 4. Handout of lecture notes for each topic	Exams, Assignments, Course activities and Written analyses
1.4	Explain the roles of microorganisms in bioremediation and environmental clean-up	**K1, K2, K3**	1.In-class lecturing where the previous knowledge is linked to the current and future topics. 2.Homework assignments. 3.Discussions (connecting what they learn in the class and applying this information in laboratory). 4. Handout of lecture notes for each topic	Exams, Assignments, Course activities and Written analyses
2.0	**Skills**			

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.1	Interpret the positive and negative roles of microorganisms different environments	**S1, S2, S3**	Students will receive credit for these activities based on their responses to the particular questions and assignments. These will include reading summaries, reflective questions, quizzes	Evaluation of the topics prepared by students according to the content, arrangement, and covering of the topic. Midterm and final exams. Checking the homework assignments. Course work reports
2.2	Evaluate methods for studying microbial communities and activities in different environments (soil, water, gut)	**S2, S3**	Students will receive credit for these activities based on their responses to the particular questions and assignments. These will include reading summaries, reflective questions, quizzes	Evaluation of the topics prepared by students according to the content, arrangement, and covering of the topic. Midterm and final exams. Checking the homework assignments. Course work reports
2.3	Link between microbes in the environments and environmental phenomenon	**S1, S2, S3**	Students will receive credit for these activities based on their responses to the particular questions and assignments. These will include reading summaries, reflective questions, quizzes	Evaluation of the topics prepared by students according to the content, arrangement, and covering of the topic. Midterm and final exams. Checking the homework assignments. Course work reports
3.0	**Values, autonomy, and responsibility**			

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
3.1	To demonstrate independently and with multi-disciplinary teams.	**V1, V2**	Engage student in carrying out internet search. The ability to debate the scientific basis of topics related to safety and occupational health in laboratories. Writing group reports. Solving problems in team. Cooperative learning and application of scientific method in thinking the scientific problem solving. Work as part of a team. Conducting group experiments and writing group reports.	1-Oral exams. 2-Evaluation of student essays assignments and search work. 3-Observation of student ethical and moral behavior. 4-Students' attendance is recorded during lectures. 5-Assessment of the student reports. 6-Grading homework assignments
3.2	To cooperate in providing scientific and technical services in microbiology	**V1, V2**	Engage student in carrying out internet search. The ability to debate the scientific basis of topics related to safety and occupational health in laboratories. Writing group reports. Solving problems in team. Cooperative learning and application of scientific method in thinking the scientific problem solving. Work as part of a team. Conducting group experiments and writing group reports.	1-Oral exams. 2-Evaluation of student essays assignments and search work. 3-Observation of student ethical and moral behavior. 4-Students' attendance is recorded during lectures. 5-Assessment of the student reports. 6-Grading homework assignments

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
3.3	To demonstrate responsibility and accountability	**V3**	Engage student in carrying out internet search. The ability to debate the scientific basis of topics related to safety and occupational health in laboratories. Writing group reports. Solving problems in team. Cooperative learning and application of scientific method in thinking the scientific problem solving. Work as part of a team. Conducting group experiments and writing group reports.	1-Oral exams. 2-Evaluation of student essays assignments and search work. 3-Observation of student ethical and moral behavior. 4-Students' attendance is recorded during lectures. 5-Assessment of the student reports. 6-Grading homework assignments

C. Course Content

No	List of Topics	Contact Hours
1.	**Introduction:** - Including historical background. - Importance of microorganisms. -Studying concepts of classification, nomenclature, and identification of microorganisms. -An overview about the role of microorganisms in the environment and their applications in different fields - Distribution of microorganisms in the environment - Different between the prokaryotes and Eukaryotes	**2**
2.	**Bacterial cell morphology and structure** - Structure, cell shape and arrangement of bacteria. - External and internal structures	**2**
3.	**Eukaryotic microorganisms (Fungi and Algae)**	**2**

	- General characteristics, occurrence, diversity, economic importance, morphology, structure and function, classification, nutrition, and reproduction	
4.	**Viruses** - General characteristics, occurrence, economic importance, morphology and structure, classification, replication, and bacteriophages	**2**
5	**Introduction to metabolism of microorganisms** -Basic definitions, modes of nutrition of microorganisms. Nutrient requirements and concepts of energetic	**2**
6.	**Factors affecting microbial activity and growth** Nutritional factors, temperature, pH, water activity, Oxygen requirement	**2**
7.	**Microbial growth and reproduction** Cell growth and reproduction in microorganisms. Microbial growth curve and phases of growth. Determination of microbial growth	**2**
8.	**Control of microbial activity** importance of control of microbial activity, physical and chemical approach of control of microbial activity	**2**
9.	**Overview of the role of microorganisms in diseases of human, animals and plants** importance of microorganisms as causative agents of various diseases in human, animals, and plants	**2**
10.	**Environmental Microbiology** Distribution and diversity of microorganisms in soil, water, sewage, and air	**2**
11.	**Microbial interactions** -positive and negative interactions): Neutralism, Commensalism, Symbiosis, Antagonisms, Prediation, Parasitism Microbe-microbe interactions : lichens / Bdellovibrio and E. coli -Plant-Microbe interaction: Rhizobium and legumes / Mycorrhiza and plants -Animal-Microbe interaction: rumen microbiology / termites-microbes interactions / leaf-cutter ants and fungal gardens	**4**
12	**Study of some Environmental problems caused by Microorganisms:** - Biodeterioration of fuels - Biodeterioration of paints - Biodeterioration and concrete corrosion - Biodeterioration and Metal corrosion	**2**
11.	**Roles of microorganisms in biodegradation of environmental pollutants:** - Biodegradation of hydrocarbons pollutants -microbes-heavy metals interactions -Biodegradation of plastics - Biodegradation of herbicides and insecticides	**2**
12	**Bioremediation of environmental pollution and environmental clean up** -what is bioremediation	**2**

	-advantages of bioremediation -comparison between bioremediation and other methods of removal of crude oil pollution -types of bioremediation (biostimulation and bioaugmentation) -differences between biostimulation and bioaugmentation -environmental factors affecting the speed and capacity of bioremediation (temperature, oxygen levels, nutrients availability)	
Total		**30 hours**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes	4, 10	10%
2.	Exam Midterm	6	20%
3.	Laboratory reports	Every week	15%
4.	Practical final exam	15	15%
5.	Final Exam	16	40%
	Total		**100%**

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	**(1)- Willey J., Sandman K., Wood D. (2019) Prescotts' Microbiology 11th edition. McGraw-Hill (ISBN: 1260409023).** **(2)- Madigan MT, Martinko JM. Parker J. (2020) Brock Biology of Microorganisms 16th edition. Pearson (ISBN: 0135845688)** **(3)- Chess, B. (2020) Talaro's Foundation in Microbiology: Basic Principles 11th edition. McGraw-Hill (ISBN: 1260575381)** **(4)- Madsen E. (2015) Environmental Microbiology from Genomes to Biogeochemistry 2nd edition. Wiley (ISBN: 978-1118439630)** **(5)- Pepper I eta l. (2014) Environmental Microbiology 3rd edition. Academic Press (ISBN: 0123946263)** **(6)- Nakatsu C. et al. (2016) Manual for Environmental Microbiology 3rd edition. ASM Press (ISBN: 978-1555816025)** **(7)- Oliver B and Magot M (2005) Petroleum Microbiology. ASM Press 9ISBN: 1555813275)**

	(8)- Atlas R, Philp J (2006) Bioremediation: Applied Microbial Solutions for Real-World Environmental Cleanup. ASM Press (ISBN: 1555812392)
Supportive References	
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms
Technology equipment (projector, smart board, software)	Projector, data show, smart board
Other equipment (depending on the nature of the specialty)	Laboratory equipped with incubators, autoclave, glassware and microbiological media and stains

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	questionnaires
Effectiveness of Students assessment	Instructor	Random marking of students work by other staff member
Quality of learning resources	Student and instructor	questionnaires
The extent to which CLOs have been achieved	instructor	Mapping students' performance with specific CLO's
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	PREPARED BY PROF. HUSSEIN ABULREESH AND PROF. MAJDAH AL-TUWAJRI
REFERENCE NO.	
DATE	

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

2023
TP-153

Course Specification
(Bachelor)

Course Title:	Organic Chemistry
Course Code:	CHM1415
Program:	Environmental Sciences
Department:	Chemistry
College:	Faculty of Sciences
Institution:	Umm Al-Qura University
Version:	*Course Specification Version Number*
Last Revision Date:	*Pick Revision Date.*

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: 3 Hours (2 Theoretical and 1 Practical)					
2. Course type					
A.	☐ University	☐College	☒ Department	☐Track	Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (2nd level / 1st year)					
4. Course general Description:					
This course introduces the principles of organic chemistry with a focus on their application to environmental sciences. Students will learn about the structure, properties, and reactivity of organic compounds and their roles in environmental processes like pollution, biodegradation, and the carbon cycle. Through a combination of theoretical study and practical activities, the course emphasizes the importance of organic chemistry in understanding and solving environmental challenges.					
5. Pre-requirements for this course (if any):					
CHM1101 **General Chemistry 1**					
6. Course Main Objective(s):					
This course aims to provide students with a solid understanding of organic chemistry principles, focusing on the structure, properties, and reactivity of organic molecules and their environmental significance. Students will explore the role of organic compounds in environmental processes such as pollution, biodegradation, and the carbon cycle. They will also apply this knowledge to address environmental challenges through practical problem-solving, laboratory experiments, and case studies.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	75	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	45
3.	**Field**	0
4.	**Tutorial**	0
5.	**Others (specify)**	0
Total		75

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Name and classify the organic compounds	**K1**	Lectures	Quiz. Final and mid-term exam.
1.2	Recognize the physical and chemical properties of functional groups and their applications in organic compounds.	**K4**	Lectures	Quiz. Final and mid-term exam.
2.0	**Skills**			
2.1	Apply the IUPAC rules for nomenclature of all organic compounds	**S1**	Lectures	Quiz. Final and mid-term exam.
2.2	Practice chemical processes and techniques for identification and investigation of organic compounds and their functional groups.	**S2**	Lectures and Lab work	Quiz. Final and mid-term exam. Lab exam
3.0	**Values, autonomy, and responsibility**			
3.1	Demonstrate commitment to professional and academic values and ethics.	**V1**	Library visit.	Assignments and activities
3.2	Work individually and in a team to perform a specific experiments and preparing a report on the organic chemistry	**V3**	Lab work	Assignments. Lab exam.

C. Course Content

No	List of Topics	Contact Hours
1.	**Introduction to Organic Chemistry**: Basic concepts.	**2**
2.	Aliphatic and Aromatic compounds.	**4**
3.	Introduction to IUPAC naming system, isomerism and stereochemistry.	**4**
4.	Introduction to functional groups.	**4**
5.	**Chemical reactions of organic compounds:** Substitution, addition, elimination, and environmental reaction pathways.	**4**
6.	Introduction to carbohydrate.	**4**
7.	**Introduction to industrial chemistry:** Applications, and issues related to microplastics and polymer degradation..	**2**
8.	Introduction to organic chemical waste and pollutants.	**2**
9.	**Carbon Cycle and Biogeochemistry**: Role of organic molecules in global carbon cycling and environmental interactions.	**2**
10.	**Green Chemistry**: Sustainable practices and environmentally friendly organic processes.	**2**
Total		**30**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	1st periodic exam	5	10%
2.	Assignments and activities		5%
3.	Quizzes and class discussions		5%
4.	2nd periodic exam	10	10%
5.	Practical Exam	15	30%
6.	Final Exam.(2 hours exam)	16	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	John McMurry's "*Organic Chemistry, 8th edition, International Edition*" **2011**, Brooks/Cole.
Supportive References	1. Amit Arora "*Introductory Organic Chemistry*" **2006**, Discovery Publishing House New Delhi

	2. T. W. Graham Solomons, Craig B. Fryhle, Scott A. Snyder "*Organic Chemistry, 11th Edition, International Student Version*" **2013**, John Wiley & Sons.
Electronic Materials	• Lecture Hand-out available as a PowerPoint presentation. • http://www.chemweb.com • http://www.rsc.org
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom with capacity of (30) students. A laboratory with capacity of (15) students Including all practical facilities
Technology equipment (projector, smart board, software)	Teaching halls and laboratories are equipped with data show.
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer Reviewer	Direct
Effectiveness of Students assessment	Program leader, curriculum committee; external reviewers	Direct
Quality of learning resources	Students, faculty members and External reviewers	Direct
The extent to which CLOs have been achieved	Peer Reviewer	Direct
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	