هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد
NCAAA

2024
TP-153

Course Specification
(Bachelor)

Course Title:	Plastic Recycling and Sustainability
Course Code:	ICHM212
Program:	Industrial Chemistry 1
Department:	Department of Chemistry
College:	College of Science
Institution:	Majmaah 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)					
2. Course type					
A.	☐University	☐ College	☒ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (5)					
4. Course General Description:					
The course provides a foundation in the principles of environmental sustainability and the relationship of polymers and plastics to the environment. The course introduces principles of lifecycle and material flow analysis, waste management, circular design, green chemistry and engineering and renewable materials. The basic concepts underpinning recyclability and toxicity are covered. We discuss current challenges of waste management systems and future options for increasing use of secondary feedstocks. Students learn about properties of biobased and biodegradable plastics.					
5. Pre-requirements for this course (if any)**:**					
Plastic Processing Technology ICHM111					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
1. Discuss some of the limitations of current recycling methods 2. Introduce the various types of recycling, mechanical and chemical, and discusses potential and limitations for these methods. 3. Provide various examples of current practices in upcycling, downcycling, and reclaiming different types of waste will be given					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom		90
2	E-learning		10
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	20
2.	**Laboratory/Studio**	20
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	40
Total		100

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	**Knowledge of concepts and principles in Industrial Chemistry along with the ability to evaluate and interpret.**		**-Lectures -Conduct scientific research -Seminars -Discussions -Brainstorming**	**-Theoretical tests(Quarterly and final)- Short tests- Quizzes. - Homework- Class exercises- Evaluation of research**
1.2	**Identify key material design properties that their application in the Industrial Chemistry.**			
...				
2.0	**Skills**			

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
2.1	Conduct advanced research or professional projects using specialized research and enquiry methodologies in a discipline in Industrial Chemistry.		-Active learning-E-learning-Self-learning-Cooperative Education-Examinations-Theoretical tests(Quarterly and final)-Short tests-Quizzes. -Homework-Class exercises-Evaluation of research	-Active learning-E-learning-Self-learning-Cooperative Education-Examinations-Theoretical tests(Quarterly and final)-Short tests-Quizzes. -Homework-Class exercises-Evaluation of research
2.2	Communicate effectively orally and written using appropriate presentation formats for different issues with recipients of different types			
...				
3.0	**Values, autonomy, and responsibility**			
3.1	Demonstrate the ability of working independently and with group		Simulation programs -Cooperative work -Working in groups	Practical tests-Practical reports-Note card-Research papers
3.2				
...				

C. Course Content

No	List of Topics	Contact Hours
1.	Current State of Plastics Waste and Recycling	2
2.	Challenges Intrinsic to Recycling	2
3.	Chemical Recycling	6
4.	Mechanical Recycling	2
5.	Upcycling vs. Downcycling	2
6.	Plastics from Sustainable Sources	2
7.	Biodegradable Plastics	4

8.	Experimental: selected experiments on the synthesis of biodegradable polymer	10
Total		30

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Homework	Continues	10%
2.	Midterm exam	5-7th	20%
3.	E. exam	8th	10%
4.	Final Practical exam	10th	20%
5.	Final theoretical exam	End of semester	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	Plastics Technology Handbook 5th Edition, Manas Chanda, Taylor & Francis Group, 2018 Handbook of Sustainable Polymers: Processing and Applications, Vijay Kumar Thakur & Manju Kumari Thakur, Jenny Stanford Publishing, 2016
Supportive References	
Electronic Materials	http://www.chemweb.com http://www.sciencedirect.com http://www.rsc.org
Other Learning Materials	PowerPoint presentation. Interactive and multimedia soft-books

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms, E- learning, blackboard
Technology equipment (projector, smart board, software)	Data show, Smart Board

Items	Resources
Other equipment (depending on the nature of the specialty)	**None**

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	**Faculty**	**Direct**
Effectiveness of Students assessment	**Faculty**	**Direct**
Quality of learning resources	**Faculty**	**Direct**
The extent to which CLOs have been achieved	**Faculty**	**Direct**
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	