Course Title:	Waste Management and Recycling
Course Code:	EVS 1472
Program:	Bachelor of Science in Environmental Science
Department:	Biology
College:	Science
Institution:	Imam Mohammed Ibn Saud Islamic University
Version:	1
Last Revision Date:	-

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A. General information about the course:

1. Course Identification

1. Credit hours: 2 (Lecture 2)					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (Level 7/ 4th Year)					
4. Course General Description:					
This module aims to provide the students with an introduction to waste management and recycling and an overview of its environmental impacts. The objective of the course is to show how the waste management and recycling process can help the environment for cleanliness how waste materials can be converted to produce industrial products and how it can be a useful product for the country and human beings.					
5. Pre-requirements for this course (if any)**:**					
EVS 1326 Environmental Pollution and Bio-degradation					
None					
7. Course Main Objective(s):					

- Understand the importance of the environmental impact of waste management and recycling
- Explain various models of Waste management and recycling
- Understand basic concepts and tools used for waste management and recycling to solve the environmental pollution problems
- Describe the process of recycling and conversion of waste to industrial products.
- An understanding of valuable methods of waste management and recycling
- Understand the various environmental policies and instruments used in environmental waste management.
- Provide environmentally eco-friendly services and industrial products from waste management and recycling materials as well as solve the air pollution, water pollution, and semi-solid and solid waste deposition problems in society.
- Explain the relationship between economic industrial growth and bioproducts development and its impact on the environment.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	√	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**	0
3.	**Field**	0
4.	**Tutorial**	0
5.	**Others (specify)**	0
Total		30

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

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Explain the importance of the environmental impact of waste management and recycling	**K1**	Lecture and take-home research assignment	Quizzes, midterm exam and final exam
1.2	Outline the various models of Waste management and recycling	**K2**	Lecture and take-home research assignment	Quizzes, midterm exam and final exam
1.3	Discuss the basic concepts and tools used for the waste management and recycling to solve the	**K3**	Lecture and take-home research assignment	Quizzes, midterm exam and final exam

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	environmental pollution problems			
2.0	**Skills**			
2.1	Relate the process of recycling and conversion of waste to industrial products and understanding of valuable methods of waste management and recycling	**S1**	Take-home research assignment	Activity and exam
2.2	Evaluate the various environmental policies used in environmental waste management and recycling.	**S2**	Take-home research assignment	Activity and exam
2.3	Analyze the environmentally eco-friendly services and useful industrial products from waste management and recycling materials.	**S3**	Take-home research assignment	Activity and exam

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
3.0	**Values, autonomy, and responsibility**			
3.1	Show independence and responsibility and cooperate effectively in a team to carry out research work	**V1**	Group discussions	-Presentations -Reports
3.2	Share in the discussion of the scientific issues and present research results via oral presentations and in written format.	**V2**	Group discussions	-Presentations -Reports
3.3	Adhere to the relevant ethical rules	**V3**	Group discussions	-Presentations -Reports

C. Course Content

No	List of Topics (lectures)	Contact Hours
1.	Introduction to waste, disposal and recycling	**4**
2.	Sources types and composition of different wastes	**4**
3.	Physical, chemical and biological properties of Agro-Biological waste	**4**
4.	Physical, Chemical and biological properties of municipal waste	**2**
5.	Waste collection, handling separation and storage processing	**2**
6.	Waste separation processing and transformation (transfer and transport Processing) and reduction of greenhouse gas emission	**2**
7.	Treatment of waste: Biological and Chemical conversion of solid and semisolid waste, Industrial waste and food waste	**2**
8.	Recycling of waste for materials production (Plastic, Municipal and Agrowaste, food waste) and pollution control	**4**
9.	Soruce reduction of waste toward zero waste and people's responsibility for waste management	**4**
10.	Landfill design and recycling Industries establishment and pollution control	**2**
Total		**30**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm exam 1	Around 4th - 5th week	20%
2.	Midterm exam 2	Around 7th - 8th week	20%
3.	Quizzes, Participation, and Attendance ,Data search assignment	During the semester	20%
4.	Final Exam	16th week	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	Ioannis S. Arvanitoyannis, Waste Management for the Food Industries. Elsevier Inc. 2008. Agamuto S. Solid waste Management and Practices, University Malaya Press, Kuala Lumpur. 2009.
Supportive References	Sadhan Kumar Ghosh, Recent Trends in Waste Water Treatment and Water Resource Management. Springer Nature Singapore Pte Ltd. 2020. Paul T. Williams, Waste Treatment and Disposal. John Wiley & Sons Ltd, The Atrium, 3 Southern Gate, Chichester, West Sussex PO19 8SQ, England 2005 Hossain ABMS and M. Aleissa. Bioconversion and Bioprocess of waste. Lambert Academic Publishing Co. 2014.
Electronic Materials	• Saudi Digital Library https://www.sdl.edu.sa/SDLPortal/Publishers.aspx
Other Learning Materials	Videos, slides and presentations

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories
Technology equipment (projector, smart board, software)	Projector and Smart board
Other equipment (depending on the nature of the speciality)	Environmental Microbiology-related instruments

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Direct
Effectiveness of Students assessment	Program Leader	Direct
Quality of learning resources	Peer Reviewer	Indirect
The extent to which CLOs have been achieved	Program Leader	Direct
Other	-	-

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Head of Biology Department**
REFERENCE NO.	
DATE	