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國立高雄科技大學
NATIONAL KAOHSIUNG
UNIVERSITY OF SCIENCE
AND TECHNOLOGY

授課大綱 Syllabus

部別：日間部博士

112學年度第2學期

列印日期：2024/03/01

中文課程名稱：環境生物技術	英文課程名稱：Environmental Biotechnology	授課教師：SINGHANIA R. R
開課班級：水產科技博班二甲	學分：3.0	授課時數：3.0
合班班級：		實習時數：0.0

1. 中文教學目標(Chinese Teaching objectives)

Establish a basic concept of environmental biotechnology and develop an appropriate attitude towards scientific learning. Establish the basis for studying courses in Environmental Biotechnology and related fields. Establish the ability to interpret general relevant engineering scientific information.

2. 英文教學目標(English Teaching objectives)

Establish a basic concept of environmental biotechnology and develop an appropriate attitude towards scientific learning. Establish the basis for studying courses in Environmental Biotechnology and related fields. Establish the ability to interpret general relevant engineering scientific information.

3. 中文教學綱要(Chinese CourseDescription)

This course of environmental biotechnology will be conducted completely in English. This course content will include environment sustainability, utilization of microorganisms for detoxification/degradation/bioremediation of harmful waste, characteristics of microorganisms involved and bioreactors for their applications. The teaching materials will be self-produced handouts and teaching method is classroom instructions.

4. 英文教學綱要(English CourseDescription)

This course of environmental biotechnology will be conducted completely in English. This course content will include environment sustainability, utilization of microorganisms for detoxification/degradation/bioremediation of harmful waste, characteristics of microorganisms involved and bioreactors for their applications. The teaching materials will be self-produced handouts and teaching method is classroom instructions.

5. 中文核心能力

	核心能力名稱	核心能力百分比
1	生物資源永續	25%
2	產銷管理能力	25%
3	整合與研究能力	25%
4	創新溝通能力	25%

6. 英文核心能力

	核心能力名稱	核心能力百分比
1	Biological resource sustainability	25%
2	Production and sales management capabilities	25%

3	Integration and research skills	25%
4	Innovative communication skills	25%

7. 教科書

中文書名： 英文書名：Environmental Science (Tenth Edition)

中文作者： 英文作者：G. TYLER MILLER JR.

1 中文出版社： 英文出版社：BROOKS COLE THOMPSON

出版日期： 年 月 備註：

8. 參考書

中文書名： Node 英文書名：Node

中文作者： 英文作者：

1 中文出版社： 英文出版社：

出版日期： 年 月 備註：

9. 教學進度表

週次或項目 Week or Items	中文授課內容 Chinese Course Content	英文授課內容 English Course Content	分配節次 Assigned Classes	備註 Note
1	Definition - concept and scope of environmental biotechnology	Definition - concept and scope of environmental biotechnology	3	
2	Applications of biotechnology in environmental monitoring	Applications of biotechnology in environmental monitoring	3	
3	Microbial characteristics - Principles - Use of GEMS in environmental remediation - merits and demerits	Microbial characteristics - Principles - Use of GEMS in environmental remediation - merits and demerits	3	
4	Bio tools - Bio sensors in environmental protection and monitoring	Bio tools - Bio sensors in environmental protection and monitoring	3	
5	Waste water treatment - Role of Microbial systems - Immobilization technology in waste water treatment	Waste water treatment - Role of Microbial systems - Immobilization technology in waste water treatment	3	
6	Bioreactors - types, designs and functional characteristics -	Bioreactors - types, designs and functional characteristics -	3	

	Microbial metabolism	Microbial metabolism	
7	Biodecolourization of effluents - oil degradation by super bugs - mechanisms involved. Reed bed system for wastewater treatment - Rhizosphere engineering	Biodecolourization of effluents - oil degradation by super bugs - mechanisms involved. Reed bed system for wastewater treatment - Rhizosphere engineering	3
8	Mid Examination	Mid Examination	3
9	Bio remediation - principles - biodegradation of pesticides - pathways	Bio remediation - principles - biodegradation of pesticides - pathways	3
10	Xenobiotics - bio degradation -mechanisms involved in degradation	Xenobiotics - bio degradation -mechanisms involved in degradation	3
11	Role of GEMs in bio degradation of xenobiotic compounds	Role of GEMs in bio degradation of xenobiotic compounds	3
12	Bioscrubbers - bio leaching of metals - bio pulping	Bioscrubbers - bio leaching of metals - bio pulping	3
13	Bio processes in waste treatment - Production of value added products from waste	Bio processes in waste treatment - Production of value added products from waste	3
14	Single Cell Protein (SCP), ethanol, methane and hydrogen, amino acids, vitamins	Single Cell Protein (SCP), ethanol, methane and hydrogen, amino acids, vitamins	3
15	Enzyme production from wastes - Biodegradable plastics - Environmental implications	Enzyme production from wastes - Biodegradable plastics - Environmental implications	3
16	Biotechnology of Microbial composting - Biofertilizers- Biopesticides	Biotechnology of Microbial composting - Biofertilizers- Biopesticides	3
17	Bioindicators - Biomarkers -Biosensors	Bioindicators - Biomarkers -Biosensors	3

	-Biomonitoring - Polluted environment - Short and long term monitoring of remediated sites	-Biomonitoring - Polluted environment - Short and long term monitoring of remediated sites	
18	Discussion	Discussion	3
10. 中文成績評定(Chinese Evaluation method)			
Attendance, quiz, homework, and the mid-/final- exams			
11. 英文成績評定(English Evaluation method)			
Attendance, quiz, homework, and the mid-/final- exams			
12. 中文課堂要求(Chinese Classroom requirements)			
Projector/online teaching setup			
13. 英文課堂要求(English Classroom requirements)			
Projector/online teaching setup			
14. 本課程與SDGs相關項目(This course is relevant to these of SDGs as following)			
3. 良好健康和福祉(Good Health and Well Being);7. 可負擔的潔淨能源(Affordable and Clean Energy);			

「遵守智慧財產權」；「不得非法影印」！