

國立中山大學 112學年度第1學期 課程教學大綱

National Sun Yat-sen University 112Academic year1st Semester Course syllabus

中文名稱 Course name(Chinese)	模糊邏輯控制與水下載具應用			課號 Course Code	UT543
英文名稱 Course name(English)	FUZZY LOGIC CONTROL AND ITS APPLICATION TO UNDERWATER VEHICLES				
課程類別 Type of the course	講授類	必選修 Required/Selected	選修	系所 Dept./faculty	海下科技研究所碩士班
授課教師 Instructor	周佑誠			學分 Credit	3

因應嚴重特殊傳染性肺炎(武漢肺炎)，倘若後續需實施遠距授課，授課方式調整如下：

- 同步遠距【透過網路直播技術，同時進行線上教學，得採Microsoft Teams、Adobe connect等軟體進行】
- 同步遠距含錄影【透過網路直播技術，同時進行線上教學並同時錄影，課程內容可擇日再重播，得採Microsoft Teams、Adobe connect等軟體進行】
- 非同步遠距【課堂錄影或錄製數位教材放置網路供學生可非同時進行線上學習，得採EverCam、PPT簡報錄影、錄音方式進行】
- 實作類課程，經評估無法採遠距課程教學，後續復課後密集補課

★遠距教學軟體操作說明連結

因應嚴重特殊傳染性肺炎(武漢肺炎)，倘若後續需實施遠距授課，評分方式調整如下：

1. Midterm exam : 60%
2. Final project : 40%

課程大綱 Course syllabus

本課程講授模糊邏輯之數學理論及其在水下載具控制方面之應用。
This course illustrates mathematical theory of fuzzy logic and its application to control of underwater vehicles.

課程目標 Objectives

1. 模糊集合與歸屬函數
Fuzzy sets and membership functions
2. 模糊關係
Fuzzy relations
3. 模糊邏輯
Fuzzy logic
4. 基於模糊規則之系統
Fuzzy rule-based systems
5. 模糊控制系統
Fuzzy control systems
6. 模糊分類與圖樣辨識
Fuzzy classification and pattern recognition
7. 模糊非線性模擬
Fuzzy nonlinear simulation
8. 水下載具動態系統數學建模
Dynamic system modeling of underwater vehicles
9. 水下載具運動控制器設計
Design of motion controllers for underwater vehicles
10. 水下載具模糊控制案例探討
Case studies on fuzzy control of underwater vehicles

授課方式 Teaching methods

課堂講授、討論與實作。
Lectures, discussions, and project practices.

評分方式〔評分標準及比例〕Evaluation (Criteria and ratio) 等第制單科成績對照表 [letter grading reference](#)

1. Midterm exam : 60%
2. Final project : 40%

參考書/教科書/閱讀文獻 Reference book/ textbook/ documents

〔請遵守智慧財產權觀念，不可非法影印。教師所提供之教材供學生本人自修學習使用，不得散播及做為商業用途〕

No copies for intellectual property rights. Textbooks provided by the instructor used only for self-study, can not broadcast or commercial use

序號	作者	書名	出版社	出版年	出版地	ISBN#
No.	Author	Title	Publisher	Year of publish	Publisher place	ISBN#
1	Timothy J. Ross	Fuzzy Logic with Engineering Applications 4/e	Wiley	2017	USA	978-1-119-23586-6
2	Li-Xin Wang	A Course in Fuzzy Systems and Control	Prentice-Hall	1997	USA	978-0-135-40882-7

每週課程內容及預計進度 Weekly scheduled progress

週次	日期	授課內容及主題
Week	Date	Content and topic
1	2023/09/03~2023/09/09	Classical sets and fuzzy sets
2	2023/09/10~2023/09/16	Classical relations and fuzzy relations
3	2023/09/17~2023/09/23	Membership functions
4	2023/09/24~2023/09/23	Fuzzy-to-crisp conversions
5	2023/10/01~2023/10/07	Fuzzy arithmetic, numbers, vectors, and the extension principle
6	2023/10/08~2023/10/14	Classical logic and fuzzy logic
7	2023/10/15~2023/10/21	Fuzzy rule-based systems
8	2023/10/22~2023/10/28	Fuzzy rule-based systems (contd.)
9	2023/10/29~2023/11/04	Midterm exam
10	2023/11/05~2023/11/11	Fuzzy control systems
11	2023/11/12~2023/11/18	Fuzzy classification and pattern recognition
12	2023/11/19~2023/11/25	Fuzzy nonlinear simulation
13	2023/11/26~2023/12/02	Dynamic system modeling of underwater vehicles
14	2023/12/03~2023/12/09	Design of motion controllers for underwater vehicles
15	2023/12/10~2023/12/16	Case studies on fuzzy control of underwater vehicles
16	2023/12/17~2023/12/23	Project presentation
17	2023/12/24~2023/12/30	Flexible learning week
18	2023/12/31~2024/01/06	Flexible learning week

課業討論時間 Office hours

時段1 Time period 1:
 時間 Time : 星期一12:00~ 14:00
 地點 Office/Laboratory : MA3045
 時段2 Time period 2 :
 時間 Time : 星期二12:00~ 14:00
 地點 Office/Laboratory : MA3045

系所學生專業能力/全校學生基本素養與核心能力 basic disciplines and core capabilities of the department and the university

系所學生專業能力/全校學生基本素養與核心能力 basic disciplines and core capabilities of the department and the university	課堂活動與評量方式 Class activities and evaluation										
	本課程欲培養之能力與素養 This course enables students to achieve.	紙筆考試或測驗 Test.	課堂討論(含個案討論) Group discussion (case analysis).	個人書面報告、作業、作品、實驗 Individual paper report/assignment/work or experiment.	群組書面報告、作業、作品、實驗 Group paper report/assignment/work or experiment.	個人口頭報告 Individual oral presentation.	群組口頭報告 Group oral presentation.	課程規劃之校外參訪及實習 Off-campus visit and internship.	證照/檢定 License.	參與課程規劃之校內外活動及競賽 Participate in off-campus/on-campus activities and competitions.	課外閱讀 Outside reading.
※系所學生專業能力 Basic disciplines and core capabilities of the department											
1.海下科技專業學理知能。 1. Professional skills in undersea technology.	√	√		√		√					√
2.海洋探測作業實務。 2. Ability to execute deepsea exploration.											
3.自我學習與解決問題能力。 3. Self-learning and problem solving techniques.	√	√		√		√					√
4.表達溝通能力。 4. Communication skills.	√	√		√		√					√
5.瞭解產學發展趨勢與國際潮流。 5. The sense to grasp both local and international	√	√		√		√					√

industry development trend.												
※全校學生基本素養與核心能力 Basic disciplines and core capabilities of the university												
1.表達與溝通能力。1. Articulation and communication skills	V	V		V		V						V
2.探究與批判思考能力。2. Inquisitive and critical thinking abilities	V	V		V		V						V
3.終身學習能力。3. Lifelong learning	V	V		V		V						V
4.倫理與社會責任。4. Ethnics and social responsibility												
5.美感品味。5. Aesthetic appreciation												
6.創造力。6. Creativity	V	V		V		V						V
7.全球視野。7. Global perspective												
8.合作與領導能力。8. Team work and leadership												
9.山海胸襟與自然情懷。9. Broad-mindedness and the embrace of nature												

本課程與SDGs相關項目：The course relates to SDGs items:

尚未建立SDGS資料

本課程校外實習資訊: This course is relevant to internship:

本課程無註記包含校外實習