114學年度第2學期 機械系日間部碩士班 課程公告
2026 Spring semester courses list

節次 time	一 Mon	二 Tue	三 Wed	四 Thu	五 Fri
1 08:10 to 09:00					
2 09:10 to 10:00		選修 G502 微系統製造技術 潘吉祥老師 國秀樓409教室 Elective-G502 Fabrication Technologies of Micro-systems Prof. Pan, Chi-Hsiang 409 classroom, Guoxiu Building		選修 G506 深度學習 (限18人) 廖能通老師 國秀樓3A教室 Elective-G506 Deep Learning (limited to 18 people) Prof. Liao, Neng-Tung 3A classroom, Guoxiu Building 3F	選修 G508 精密加工 (全英語授課) 林侑民老師 國秀樓3A教室 Elective-G508 Precision Machining (all taught in English) Prof. Omid 3A classroom, Guoxiu Building 3F
3 10:10 to 11:00		選修 G503 精密機械設計 陳紹賢老師 國秀樓410教室 Elective-G503 Design for Precision Machinery Prof. Chen, Shao-Hsien 410 classroom, Guoxiu Building			
4 11:10 to 12:00					
5 13:10 to 14:00		第6節-第8節 選修 G504 自動化光學檢測 (全英語授課/限15人) 陳正和老師 機械館4F電腦輔助產品設計電腦教室 Elective-G504 Automated Optical Inspection (all taught in English, limited to 15 people) Prof. Chen, Cheng-Ho Computer aided product design Lab, Machinery Building 4F			選修 G509 機器人學 (全英語授課) 蘇恩平老師 國秀樓4A教室 Elective-G509 Robotics (all taught in English) Prof. Amir Reza Ansari Dezfol 4A classroom, Guoxiu Building 4F
6 14:10 to 15:00	選修 G501 緊固邊界特論 陳志明老師 機械館B1材料實驗室 Elective-G501 The fundamental of fastener boundaries Prof. Chen, Chih-Ming Material Lab, Machinery Building B1		必修 書報討論 (演講題目及教室請查閱班群公告) Required Seminar (Please refer to the LINE group announcement for speech topics and class room) international students can choose course taught in English (course code-L097)	選修 G507 流體機械 (全英語授課) 林侑民老師 國秀樓3A教室 Elective-G507 Turbomachinery (all taught in English) Prof. Omid 3A classroom, Guoxiu Building 3F	
7 15:10 to 16:00		第5節-第7節 選修 G505 防蝕工程 (限20人) 鄭文達老師 國秀樓3A教室 Elective-G502 Corrosion Engineering (limited to 20 people) Prof. Jheng, Wern-Dare 3A classroom, Guoxiu Building 3F			選修 G510 工程振動學 (全英語授課) 林侑民老師 國秀樓3A教室 Elective-G510 Mechanical Vibrations (all taught in English) Prof. Omid 3A classroom, Guoxiu Building 3F
8 16:10 to 17:00					

機械工程系(科) 114 學年度 二 學期選修課教學課程摘要

日間部(碩士班) 星期 一 第 5,6,7 節 人數限制： 50 人

開課年級	碩一、二	開課學期	第二學期	使用實驗室	材料實驗室	
科目名稱	緊固邊界特論			修 別	選修	學分數／學時數 3/3
授課教師	陳志明					
教 科 書	自編講義					
參 考 書	規範及國際期刊論文					
內容綱要	課程摘要 　　本課程主要是探討緊固邊界各單元之原理、功能、設計及性能檢測，使學習者能了解並應用於多元化產業中。			教學單元 1. 緒論 2. 緊固邊界各單元之原理及功能 3. 緊固邊界各單元之性能檢測 4. 緊固邊界各單元之應用 5. 感知型緊固邊界之應用與檢測		

National Chin-Yi University of Technology Mechanical Engineering Department

Year of 2026 Syllabus(II)

Year		Semester	☐	Pre-taking Course		
Course	The fundamental of fastener boundaries			☐ Required ☐ Optional	Optional	Credit／Hour 3/3
Instructor	Chih-Ming Chen					
Textbook	Handout					
Reference	Specification and SCI Journal papers					
Syllabus	This course is to discuss the fastener boundaries principle, function, design, and performance testing so that students can understand and apply them to advance industries.			1. Introduction 2. The principle and function of the fastener boundaries parts 3. The performance testing of the fastener boundaries system 4. The applications of the fastener boundaries 5. Design and detection the smart fastener boundaries		

機械工程系(科) 114 學年度下學期選修課教學課程摘要

日間部部(碩士班) 星期＿二＿ 第＿2，3，4＿節 人數限制：＿無＿

開課年級	碩一(與大四合開)	開課學期	第二學期	使用實驗室	須用電腦桌及投影設施
科目名稱	微系統製造技術		修　別	選修	學分數／學時數 3/3
授課教師	潘吉祥				
教　科　書	自編講義				

參考書

- 微系統技術 作者: Menz, W. & Mohr, J. & Paul, O.著/溫榮弘譯
- 微機電技術之世界趨勢，國科會科資中心科技資訊分析報告，89 年 3 月。
- 微機電系統之技術現況與發展，中華民國八十六年二版修訂, 工業技術研究院 機械工業研究所.
- Silicon micromachining, Elwenspoek, M./Jansen, H. V. /Cambridge University Press
- Micromachines:a new era in mechanical engineering, Fujimasa, Iwao, /Oxford University Press
- The physics of microfabrication, Brodie Ivor
- Fundamentals of microfabrication, Madou, Marc J. /CRC Press
- SPIE Handbook of Microlithography, Micromachining and Microfabrication, Volume 1: Microlithography; Volume 2: Micromachining and Microfabrication, Rai-Choudhury P./ 1997, IEE Materials and Revices Series 12
- Application of microfabrication to fluid mechanics, Bandyopadhyay, Promode R./Breuer, Kenneth S./Blechinger, C. J./Interna/American Society of Mechanical Engineers 1994
- Materials science of microelectromechanical systems (MEMS) devices, Heuer, A. H. /Materials Research Society
- Micromachining and micropackaging of transducers, Fung Clifford D. ed./Papers from the Workshop on Micromachinging and M/Elsevier

內容綱要

課程摘要
微系統製造技術已成為學術研究及產業開發的焦點，並且形成具有極大的應用潛能，特別是在半導體、微機電及奈米工程上。本課程期盼對工程方面的學生，有系統地介紹目前重要的微系統製造技術，這包括基本的矽微加工技術以及半導體-微機電 (CMOS-MEMS) 整合製程技術。此外，為了讓學生可理論與實務並重，並可有實作之經驗，本課程安排有參訪、實習及專題實作。

教學單元
1. 前言(Preface)
   微系統製造技術之歷史背景及應用 (Background and Application of Micro-Fabrication Technologies)
2. 微機械加工技術(Micro/Meso Scale Mechanical Manufacturing, M^4)
   - 微工廠概念
   - 微車削、銑削、鑽加工及研磨(CMP)
   - 微放電加工、(準分子)雷射加工
   - 微電鑄(LIGA)技術、電子束加工
3. 矽基微細加工 (IC Process-based Micromachining, Micro/Nano Scale)
   - 半導體製程
   - 矽微加工技術(Silicon Micromachining)
4. 三、奈米加工(Nano-machining)
   原子力顯微鏡加工(AFM Machining)
5. 個案研討(Cases Study)
6. 專家演講

National Chin-Yi University of Technology <u>Mechanical Engineering</u> Department

Year of ___2026___ Syllabus(four-year   program)

Year	1, 2	Semester	■ spring	Pre-taking Course	None		
Course	Fabrication Technologies of Micro-systems			☐ Required ■ Optional		Credit / Hour	3/3
Instructor	Pan Chi Hsiang						
Textbook	Teacher's lectures						
Reference	♦ 微系統技術 作者: Menz, W. & Mohr, J. & Paul, O.著/溫榮弘譯 ♦ 微機電技術之世界趨勢，國科會科資中心科技資訊分析報告，89 年 3 月。 ♦ 微機電系統之技術現況與發展，中華民國八十六年二版修訂，工業技術研究院 機械工業研究所. ♦ Silicon micromachining, Elwenspoek, M./Jansen, H. V. /Cambridge University Press ♦ Micromachines:a new era in mechanical engineering, Fujimasa, Iwao, /Oxford University Press ♦ The physics of microfabrication, Brodie Ivor ♦ Fundamentals of microfabrication, Madou, Marc J. /CRC Press ♦ SPIE Handbook of Microlithography, Micromachining and Microfabrication, Volume 1: Microlithography; Volume 2: Micromachining and Microfabrication, Rai-Choudhury P./ 1997, IEE Materials and Revices Series 12 ♦ Application of microfabrication to fluid mechanics, Bandyopadhyay, Promode R./Breuer, Kenneth S./Blechinger, C. J./Interna/American Society of Mechanical Engineers 1994 ♦ Materials science of microelectromechanical systems (MEMS) devices, Heuer, A.						
Scoring	Participation (20%) Homework(20%) Mid-term (20%) Final exam (40%)						

Syllabus	.	1. Preface
		  ● Background and Application of Micro-Fabrication Technologies
		2. Fundamentals of Micro-system Fabrication
		  ● Standard semiconductor processes
		  ● Silicon micromachining
		3. Multi-layer Process- [MCNC-MUMPs or MPMC]
		4. CMOS + MEMS [iMEMS, ICMEMS] processes
		5. Computer-aided Design for Micro-system Fabrication)
		  ● Mask Layout Edit
		  ● Process Design and 3D Solid Modeling of Process Components
		  ● Performance Analysis of Components
		  ● Material Property Simulation
		  ● System Simulation
		6. Cases Study
		7. Experiments					

機械工程系(科) 114 學年度 2 學期選修課教學課程摘要

日間部(碩士班) 星期_二_ 第_2-4_節 人數限制：___30___

開課年級	**碩、博**	開課學期	第二學期	使用實驗室	未定		
科目名稱	精密機械設計			修　別	選修	學分數／學時數	3/3
授課教師	陳紹賢						
教 科 書	自編教材						
參 考 書	1.孫葆銓、機械準確性的基礎、2.范光照、精密量測、高立圖書、3.ISO 規範						

內 容 綱 要	課程摘要	教學單元		
	主要讓同學瞭解工具機的種類與形式，其重要的關鍵元件與技術，在元件包含進給系統、主軸、結構與控制器，因此如何設計工具機則需正確計算與應用相關設備。 This course allows students to effectively understand the trend of precision machine tools, theory and design principles	週次	章節	課程主題
		1	Ch1	Machine Tool technology status and development trend
		2、3	ch2	Machine Tool t pe
		4、5、6	Ch3	Machine Tool structure and Design
		7、8、9	Ch4	Feed System Design
		10、11、12	Ch5	Spindle System Design
		13	Ch5	Spindle System Design and Bearing select
		14、15、16	Ch6	Control System
		17	Ch7	Intelligent machine tools
		18		Test

National Chin-Yi University of Technology Mechanical Engineering Department

Year of ___2025___ Syllabus()

Year	2025	Semester		Pre-taking Course			
Course	Design for Precision Machinery			☐ Required ☐ Optional	Optional	Credit／Hour	3/3
Instructor	Shao Hsien. Chen						
Textbook							
Reference							

Syllabus	This course allows students to effectively understand the trend of precision machine tools, theory and design principles	週次	章節	課程主題
		1	Ch1	Machine Tool technology status and development trend
		2、3	ch2	Machine Tool type
		4、5、6	Ch3	Machine Tool structure and Design
		7、8、9	Ch4	Feed System Design
		10、11、12	Ch5	Spindle System Design
		13	Ch5	Spindle System Design and Bearing select
		14、15、16	Ch6	Control System
		17	Ch7	Intelligent machine tools
		18		Test

機械工程系(科) __114__ 學年度__下__學期選修課教學課程摘要

日間部(碩士班) 星期__二__ 第__6,7,8__節 人數限制：__15__

開課年級	**碩一**	開課學期	第二學期	使用實驗室	電腦輔助產品設計電腦	
科目名稱	自動化光學檢測			修　　別	選修	學分數/學時數 3/3
授課教師	陳正和					
教 科 書	自編講義與蒐集資料					
參 考 書	自動化光學檢測、精密量測					
內容綱要	課程摘要 介紹自動化光學檢測技術原理與應用，培養學生相關理論基礎與應用能力。內容包含影像處理技術、二維檢測及三維形貌檢測，在檢測原理與應用實例的搭配下，教導學生得以運用所學於自動化光學檢測的實務上，達成學以致用的目標。			教學單元 1. 自動化光學檢測技術發展與現況 2. 光學檢測系統元件 3. 視覺定位技術與應用 4. 影像處理原理 5. 自動化光學檢測系統軟體 6. 自動化光學檢測應用實例		

National Chin-Yi University of Technology Mechanical Engineering Department

Year of__2025__Syllabus()

Year	2025	Semester	☐ Spring	Pre-taking Course			
Course	Automated Optical Inspection			☐ Required ☐ Optional	Optional	Credit/Hour	3/3
Instructor	Cheng-Ho Chen						
Textbook	Lecture notes and collected materials						
Reference	Automated Optical Inspection, Precision Measurement						
Syllabus	Introduce principles and applications of automated optical inspection technology. Develop theory basics and application abilities for the students. The content includes image processing technology, 2D and 3D inspection. With the combination of theories and examples, teach students how to apply what they learn in automated optical inspection.			1. AOI Development and State of the Art 2. Selection of Machine Vision Components 3. Visual Positioning Technology and Application 4. Imaging processing Principles 5. Automated optical inspection software 6. Examples of AOI Application			

機械工程系(科) 114 學年度第二學期選修課教學課程摘要

日間部(碩士班) 星期二　第 5-7 節　人數限制： 20

開課年級	碩一	開課學期	第二學期	使用實驗室	3A		
科目名稱	防蝕工程			修　別	選修	學分數／學時數	3/3
授課教師	鄭文達						
教 科 書							
參 考 書							
內容綱要	課程摘要 從電化學觀點帶入導致材料腐蝕的成因，解析材料崩壞的原理與微觀反應的機制，進而推導出如何在工程設計上的妥適考量，以防蝕的概念去規畫製作出可耐久使用的產品。			教學單元 第 1 章 前言 第 2 章 熱力學和電極電位 第 3 章 電化動力學 第 4 章 鈍化 第 5 章 加凡尼腐蝕 第 6 章 間隙腐蝕和孔穴腐蝕 第 7 章 微觀組織的作用 第 8 章 沖磨腐蝕 第 9 章 環境助長破裂 第 10 章 腐蝕環境 第 11 章 高溫腐蝕 第 12 章 防蝕設計和材料選擇 第 13 章 陰極和陽極防蝕 第 14 章 表面處理				

National Chin-Yi University of Technology Mechanical Engineering Department

Year of ＿＿＿＿＿ Syllabus()

Year		Semester	☐	Pre-taking Course	
Course				☐ Required ☐ Optional	Optional
Instructor					
Textbook					
Reference					

Credit／Hour 3/3

機械工程系(科) 2025 02 選修課教學課程摘要

日間部(碩士班) 星期四 第 2 3 4 節 人數限制： 18

開課年級	碩一	開課學期	第二學期	教室	碩 3A		
科目名稱	深度學習（**Deep Learning**）			修　別	選修	學分數／學時數	3/3
授課教師	廖能通						
教 科 書	"ゼロから作る**Deep Learning** —**Python**で学ぶディープラーニングの理論と実装" 斎藤 康毅.						
參 考 書	1. "Introducing Python," Bill Lubanovic. 2. "Keras handbook". 3. " Deep Learning with Python," Francois Chollet, 2017.						
內 容 綱 要	**課程摘要** 　　人工智慧是當代很重要的應用科學，其中最主要的學科是機器學習，而其核心是深度學習。本課程目標將教導學生使用 Python 程式語言並應用於 Deep Learning (DL)。由零開始學習 DL 的基本觀念與程式撰寫，並介紹如何利用 Keras 的框架寫出精簡的 DL 程式碼。		**教學單元** 1. Python 程式語言入門 2. 感知器(perceptron) 3. 神經網路與學習(Neural network learning) 4. 誤差反向傳播(back propagation) 5. DNN 神經網路(Deep Neural network) 6. CNN 神經網路(convolutional neural network) 7. Keras 介紹 8. RNN 神經網路(Recurrent Neural Network)				

National Chin-Yi University of Technology Mechanical Engineering Department

Year of 　2025　 Syllabus()

部別 Department	■日間部 Regular Day School □進修部 Division of Continuing Education	學制 School System	□博士 Doctoral Degree ■碩士 Master's Degree □四技 Bachelor's Degree (4-year College) □二技 Bachelor's Degree (2-year College) □二專 Associate Degree (2-year program)
授課教師 Instructor(s)	林侑民 Omid Ali Zargar	開課代碼 Course Code	-
科目名稱 Course Name	流體機械 Turbomachinery	必/選修 Required/Elective	□必修 Required ■選修 Elective
開課年級 Grade	碩一、二 First and second year master	開課學期 Semester	□上 Fall ■下 Spring
開課單位 Course Department	機械工程系 Mechanical Engineering	學分/學時數 Credit/Hours	3/3
全程外語授課 Foreign language Teaching entirely	■是 Yes □否 No	主要授課語言 Main language	英語 English
先修課程 Prerequisite course(s)	無 None		
優質課程類別 Course attributes (可複選)	■一般課程 General Courses □智慧財產權 Intellectual Property □內涵式服務學習課程 Service Learning □性別平等 Gender Equality □綠色課程 Green Technology□創新創意課程 Innovation □工作（職場）倫理課程 Career Ethics □工具機技術研發 Tool Machine Technology Development 創新、創意課程定義：課程目標為「激發學生獨特的想像與創意思考，透過企劃與執行以創新模式解決實際問題。 Definition of Innovation and Creative courses: the objectives of the course aim to stimulate students' imagination and creative thinking skills, and to solve practical problems with innovative modes through planning and implementing different tasks.		
課程與校核心能力關聯 Core competence (可複選，至多選4項)	■表達溝通能力 Communication and Presentation Skill □創意創新能力 Innovation Skill □關懷服務能力 Community Care and Service Skill ■思考推理能力 Thinking and Reasoning Skill □專業實務能力 Professional Practice Skill □宏觀視野能力 Macro Skill		
教科書 Textbook	Principles of turbomachinery, Seppo A. Korpela, Second edition, WILEY, 2020.		
參考書目 Other References	Turbomachinery, Fundamentals, Selection and Preliminary Design, Marco Gambini, Michela Vellini, SPRINGER, 2021.		
課程目標 Course objectives	This course aims to explore the principles of energy transfer within various turbomachines, including axial and radial flow turbines, as well as axial and centrifugal flow compressors. Additionally, it will consider the fundamental aspects governing the operation and design of these turbomachines.		
評量方式 Evaluation	出席 Attendance（10％） 作業 Assignments (10％) 平時考 Quizzes/Tests（-） 期中考 Midterm Exam (30％) 期末考 Final Exam (40％)		

	其他:(請敘述非筆試之評量方式) Other (please explain the evaluation methods if there are no written exams): Presentation of a journal article (10%)
內容綱要 Course Outline	This course will extensively cover the foundational concepts of thermodynamics and fluid mechanics relevant to turbomachines. Additionally, it will address topics such as energy analysis and efficiency specific to turbomachines, as well as the principles governing hydraulic pumps and turbines. The course will further explore the operational principles of axial flow fans, turbines, and compressors, along with centrifugal compressors and radial flow turbines. Other key topics include turboexpanders and wind turbines. Lastly, students will be introduced to predictive maintenance techniques tailored for gas turbines, including vibration analysis, thermography, oil analysis, and condition monitoring, providing valuable insights for their future endeavors in the industry.
自編教材 Self-compiled textbook (非自編教材請填寫原因)	■是 Yes □否 No,原因 Reason(s):
符合智財規範 Compliance with Intellectual property (不符合智財規範請填寫原因)	■是 Yes □否 No,原因 Reason(s):
備註 Note	

教學進度 Course schedule		
週次 Week	教學與作業進度 Teaching Schedule/Assignments	備註 Note
1	Energy and fluid machines, Principles of thermodynamics and fluid flow	
2	Compressible flow, Gas dynamics of wet steam	
3	Principles of turbomachine analysis, Steam turbines	
4	Axial turbines, Axial compressors	
5	Centrifugal compressors and pumps	
6	Radial inflow turbines, Wind turbines	
7	Hydraulic turbines, Hydraulic transmission of power	
8	Propellers, Cavitation	
9	期中考 Midterm Exam	
10	Reciprocating engine, Gas turbines	

11	Power generation, Hydroelectricity	
12	Gas turbine engine compressors, Comparison between axial and centrifugal compressor	
13	Staged compression, Mixed-flow compressor	
14	Free-piston engine, Turboexpander	
15	Open and closed turbomachines, Turbomachines for concentrating solar power plant	
16	Predictive maintenance in gas turbines, Vibration analysis, Dynamic balancing of gas turbine rotor	
17	Thermography, Oil analysis, Condition monitoring	
18	期末考 Final Exam	

國立勤益科技大學
National Chin-Yi University of Technology
___114___ 學年度___下___學期課程大綱
Year of 2026 Syllabus

部別 Department	■日間部 Regular Day School □進修部 Division of Countinuing Education	學制 School System	□博士 Doctoral Degree ■碩士 Master's Degree □四技 Bachelor's Degree (4-year College) □二技 Bachelor's Degree (2-year College) □二專 Associate Degree (2-year program)
授課教師 Instructor(s)	林侑民 Omid Ali Zargar	開課代碼 Course Code	-
科目名稱 Course Name	精密加工 Precision Machining	必/選修 Required/Elective	□必修 Required ■選修 Elective
開課年級 Grade	碩一、二 First and second year master	開課學期 Semester	□上 Fall ■下 Spring
開課單位 Course Department	機械工程系 Mechanical Engineering	學分/學時數 Credit/Hours	3/3
全程外語授課 Foreign language Teaching entirely	■是 Yes □否 No	主要授課語言 Main language	英語 English
先修課程 Prerequisite course(s)	無 None		
優質課程類別 Course attributes (可複選)	■一般課程 General Courses □智慧財產權 Intellectual Property □內涵式服務學習課程 Service Learning □性別平等 Gender Equality □綠色課程 Green Technology□創新創意課程 Innovation □工作（職場）倫理課程 Career Ethics □工具機技術研發 Tool Machine Technology Development 創新、創意課程定義：課程目標為「激發學生獨特的想像與創意思考，透過企劃與執行以創新模式解決實際問題。 Definition of Innovation and Creative courses: the objectives of the course aim to stimulate students' imagination and creative thinking skills, and to solve practical problems with innovative modes through planning and implementing different tasks.		
課程與校核心能力關聯 Core competence (可複選，至多選4項)	■表達溝通能力 Communication and Presentation Skill □創意創新能力 Innovation Skill □關懷服務能力 Community Care and Service Skill ■思考推理能力 Thinking and Reasoning Skill □專業實務能力 Professional Practice Skill □宏觀視野能力 Macro Skill		
教科書 Textbook	Hassoan El-Hofy, Advanced Machining Processes: Non-traditional and Hybrid Machining Processes, International Edition 2005, Mcgraw-Hill.		
參考書目 Other References	Steven Y. Liang, Albert J. Shih, Analysis of Machining and Machine Tools, Springer 2016.		
課程目標 Course objectives	The precision machining technology aim to discuss theoretical and practical concepts and experiences in critical topics such as tool design, tolerances, CNC programing, CAD-CAM design, metallurgy, tool manufacturing, jig and fixture design, and precision measurements techniques.		
評量方式 Evaluation	出席 Attendance（10％） 作業 Assignments（10％）平時考 Quizzes/Tests（-）期中考 Midterm Exam (30％) 期末考 Final Exam (40％) 其他:(請敘述非筆試之評量方式) Other (please explain the evaluation methods if there are no written exams): Presentation of a journal article (10%)		

內容綱要 Course Outline	This course provides the opportunity for students to develop better understanding of topics such as advanced machining processes, non-traditional and hybrid machining processes. Moreover, some practical case studies related to advanced manufacturing systems will discuss in details.
自編教材 Self-compiled textbook (非自編教材請填寫原因)	■是 Yes □否 No,原因 Reason(s):
符合智財規範 Compliance with Intellectual property (不符合智財規範請填寫原因)	■是 Yes □否 No,原因 Reason(s):
備註 Note	

教學進度 Course schedule		
週次 Week	教學與作業進度 Teaching Schedule/Assignments	備註 Note
1	Metal Cutting Process	
2	Abrasive Grinding	
3	Wire Electrical Discharge Machining	
4	Pulse Generator	
5	Machine Tool Feed Drives	
6	Wire Transport System	
7	Fabrication of Micro Cutting Tools by Wire Electrical Discharge Machining	
8	Micro Electrical Discharge Machining (Micro EDM)	
9	期中考 Midterm Exam	
10	Electrochemical Machining	
11	Laser Beam Machining	
12	Electron Beam Machining	

13	Ion Beam Machining	
14	Sequential Machining and Hybrid Machining	
15	Research Direction of Precision Manufacturing	
16	High speed Machining	
17	Micromachining	
18	期末考 Final Exam	

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授課教師 Instructor(s)	蘇恩平 Amir Reza Ansari Dezfoli	開課代碼 Course Code	-
科目名稱 Course Name	機器人學 Robotics	必/選修 Required/Elective	□必修 Required ■選修 Elective
開課年級 Grade	碩一、二	開課學期 Semester	□上 Fall ■下 Spring
開課單位 Course Department	機械工程系 Mechanical Engineering	學分/學時數 Credit/Hours	3/3
全程外語授課 Foreign language Teaching entirely	■是 Yes □否 No	主要授課語言 Main language	英語 English
先修課程 Prerequisite course(s)	無		
優質課程類別 Course attributes (可複選)	■一般課程 General Courses □智慧財產權 Intellectual Property □內涵式服務學習課程 Service Learning □性別平等 Gender Equality □綠色課程 Green Technology□創新創意課程 Innovation □工作（職場）倫理課程 Career Ethics □工具機技術研發 Tool Machine Technology Development 創新、創意課程定義：課程目標為「激發學生獨特的想像與創意思考，透過企劃與執行以創新模式解決實際問題。 Definition of Innovation and Creative courses: the objectives of the course aim to stimulate students' imagination and creative thinking skills, and to solve practical problems with innovative modes through planning and implementing different tasks.		
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教科書 Textbook	Robot Programming: A Guide to Controlling Autonomous Robots 1st Edition		
參考書目 Other References	-		
課程目標 Course objectives	"Robotics" cover multiple science and technology disciplines including machine learning, artificial intelligence, data science, design, and engineering. The delivered materials in this course enable students to grab helpful tools for the analysis, design, and programming of robots.		
評量方式 Evaluation	出席 Attendance（10%）作業 Assignments（30%）平時考 Quizzes/Tests（10%）期中考 Midterm Exam（20%）期末考 Final Exam（30%） 其他:(請敘述非筆試之評量方式) Other (please explain the evaluation methods if there are no written exams):		

內容綱要 Course Outline	"Robotics" course focuses on microcontrollers, sensors, and robotics components such as robotic arm and robotic automobiles. Students will learn how to program and design robot to perform a task in a way that a robot can process. This course provides the fundamentals of robotic programming and help student to build intelligent robots. Also, voice detection, computer training and artificial intelligence application in robotics will be covered.
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符合智財規範 Compliance with Intellectual property (不符合智財規範 請填寫原因)	■是 Yes ☐否 No,原因 Reason(s):
備註 Note	Closed-book exams

教學進度 Course schedule		
週次 Week	教學與作業進度 Teaching Schedule/Assignments	備註 Note
1	Introduction to robotics.	
2	Micro controllers; type and applications.	
3	LED; controlling, application and programing.	
4	Servo motors; fundamental, application and programing.	
5	Moving motors; controlling and programing.	
6	Ultrasonic sensor; fundamental, application and programing.	
7	Vibration sensors; fundamental, application and programing.	
8	Robotics Arm; fundamental, application and programing.	
9	期中考 Midterm Exam	
10	Movement sensors; fundamental, application and programing.	
11	Temperature and humidity sensors; fundamental, application and programing.	
12	Combination of motors and sensors I	

13	Combination of motors and sensors II	
14	Combination of motors and sensors III	
15	Voice Communication with a Robot	
16	Robotics vision	
17	Artificial intelligence and robotics	
18	期末考 Final Exam	

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授課教師 Instructor(s)	林侑民 Omid Ali Zargar	開課代碼 Course Code	-
科目名稱 Course Name	工程振動學 Mechanical Vibrations	必/選修 Required/Elective	□必修 Required ■選修 Elective
開課年級 Grade	碩一、二 First and second year master	開課學期 Semester	□上 Fall ■下 Spring
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教科書 Textbook	Mechanical vibrations, Sixth edition in SI units, Singiresu S. Rao, Pearson 2018.		
參考書目 Other References	Mechanical Vibrations and Condition Monitoring, Juan Carlos A. Jauregui Correa and Alejandro A. Lozano Guzman, 2020 Elsevier		
課程目標 Course objectives	Understanding of the mathematical models, mechanical vibration principles, solve the equations of motions, oscillatory systems, numerical simulation, vibration measurements, and vibration control.		
評量方式 Evaluation	出席 Attendance（10％） 作業 Assignments（10％）平時考 Quizzes/Tests（-）期中考 Midterm Exam（30％） 期末考 Final Exam（40％） 其他:(請敘述非筆試之評量方式) Other (please explain the evaluation methods if there are no written exams): Presentation of a journal article (10%)		

內容綱要 Course Outline	Most machines and structures are required to operate with low levels of vibration as smooth running leads to reduced stresses and fatigue and little noise. This course provides a thorough explanation of the principles and methods used to analyses the vibrations of engineering systems, combined with a description of how these techniques and results can be applied to the study of control system dynamics. Numerous worked examples are included, as well as problems with worked solutions, and particular attention is paid to the mathematical modelling of dynamic systems and the derivation of the equations of motion. Moreover, some practical vibration analysis case studies related to industrial rotary equipment will discuss in details.
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符合智財規範 Compliance with Intellectual property (不符合智財規範請填寫原因)	■是 Yes □否 No,原因 Reason(s):
備註 Note	

教學進度 Course schedule		
週次 Week	教學與作業進度 Teaching Schedule/Assignments	備註 Note
1	Fundamentals of vibration	
2	Free vibration of single degree of freedom systems	
3	Harmonically excited vibration	
4	Vibration under general forcing condition	
5	Two degree of freedom systems	
6	Multi degree of freedom systems	
7	Determination of natural frequencies and mode shapes	
8	Continuous systems	
9	期中考 Midterm Exam	
10	Vibration control	

11	Vibration measurements and applications	
12	Numerical vibration analysis	
13	Acoustic excitation	
14	Understanding CNC Machine Vibration	
15	Preventive maintenance, Predictive maintenance, Machine condition monitoring, and fault diagnosis	
16	Vibration analysis of rotary equipment such as centrifugal compressors, centrifugal pumps, reciprocating pumps, reciprocating compressors and so on.	
17	Reliability-centered maintenance, computerized maintenance management system	
18	期末考 Final Exam	