

Syllabus of CCUME, 2025 Academic Years, 1st Semester

Course Name : (Chinese) 電腦輔助機械製造 (English) Computer-Aided Manufacturing					Course Department ME	Course Code 4205201	
Instructor	Lin, Rong-Shine	Credits	3	<input type="checkbox"/> Required Course <input checked="" type="checkbox"/> Elective Course	Target Students	Master's Program	
全英文授課 EMI	<input checked="" type="checkbox"/> 是 <input type="checkbox"/> 否						
Prerequisite(s) : Calculus 、 Engineering Math.							
Course Outline : This course applies computer techniques toward manufacturing automation. The techniques include geometric modeling, CNC automation, robotics, ... etc. By using these techniques, the manufacturing lead time can be significantly reduced, and the product quality can be improved.							
Course Objective : The objective for this course is to teach the manufacturing automation, using computer techniques. The students will be trained with the abilities in engineering analyses, computer programming, and writing the technique report.							
Textbook & references	<input checked="" type="checkbox"/> “Computer-Aided Manufacturing,” by T. Chang, R. Wysk, and H. Wang, Prentice Hall, 1998.						
教學要點概述							
教材編選 teaching materials	<input type="checkbox"/> 自製簡報(ppt) <input checked="" type="checkbox"/> 課程講義 <input type="checkbox"/> 自編教科書 <input type="checkbox"/> 教學程式 <input type="checkbox"/> 自製教學影片 <input checked="" type="checkbox"/> 其他(自編教材)						
教學方法 teaching methods	<input checked="" type="checkbox"/> 講述 <input type="checkbox"/> 小組討論 <input checked="" type="checkbox"/> 學生口頭報告 <input type="checkbox"/> 問題導向學習 <input type="checkbox"/> 個案研究 <input type="checkbox"/> 其他						
評量工具 Evaluation tools	<input type="checkbox"/> 期中考 <input type="checkbox"/> 期末考 <input type="checkbox"/> 隨堂測驗 <input type="checkbox"/> 隨堂作業 <input checked="" type="checkbox"/> 課後作業 <input checked="" type="checkbox"/> 期中報告 <input checked="" type="checkbox"/> 期末報告 <input type="checkbox"/> 專題報告 <input type="checkbox"/> 評量尺規 <input type="checkbox"/> 其他						
教學資源 teaching resources	<input type="checkbox"/> 課程網站 <input checked="" type="checkbox"/> 教材電子檔供下載 <input type="checkbox"/> 實習網站						
教師相關訊息 instructor's information	None						
Course Outline			Hours				Achievable Core Competence of Course
Topic	Contents		Lecture	Demonstration	Assignments	Other	
Introduction to Manufacturing	Mfg. systems, Conventional Mfg. system, Advanced Mfg. system, Automation types and layout		6				<u>D1</u>

Geometric Modeling/ Representation	2-D geometry 3-D geometry Parametric curve Geometry properties (curves) Bezier / B-Spline curve Bi-cubic surface Geometry properties (surfaces) Solid modeling	9				<u>D1</u> <u>D2</u> <u>D3</u> <u>D4</u>
Robotics Applications	Introduction to robotics Forward kinematics Inverse kinematics Jacobian method Motion control	9				<u>D1</u> <u>D2</u> <u>D3</u> <u>D4</u>
CAD/CAM/ CNC Integration	CNC g-code program APT program CNC Full Automation CNC 5-axis machining	12				<u>D1</u> <u>D2</u> <u>D4</u>
CAD/CAM Additive Manufacturing Integration	Introduction to 3D Printing Data processing Slicing Simulations	6				<u>D1</u> <u>D2</u>
Achievable Core Competence of Course		Achievable Indicators of Core Competence				
D1	Has expertise in the field of mechanical and opto-mechanical integration engineering	Learn Computer Control of Manufacturing System professional knowledge				
D2	Ability to plan and execute special research projects in the field of mechanical and opto-mechanical integration engineering	Computer Control of Manufacturing System related project				
D3	Ability to write scientific papers and presentations	Practices on final project report and presentation				
D4	Ability to think creatively and solve mechanical and opto-mechanical integration engineering problems independently	Self solving on Computer Control of Manufacturing project problems				

Notes:				
Session	Location	Evaluation	Office hour	Assessment of Teaching quality
Tu. & Th. 14:45~16:00	215 R	Homework 40% Projects(2) 60%	Rm. 426, Tel: ext.33300 E-mail:imelin@ccu.edu.tw	1.Student Evaluation of Teaching 2 Questionnaire on the Level of Achievement of Core Competence
Week	Subject & Homework			Remarks
1	Mfg. systems			
2	Advanced Mfg. system			

3	2-D geometry	HW#1
4	3-D geometry	
5	Parametric curve	HW#2
6	Geometry properties (curves)	Proect I
7	Bezier / B-Spline curve	
8	Bi-cubic surface	HW#3
9	Solid modeling	
10	Forward kinematics	HW#4
11	Inverse kinematics	Project II
12	Jacobian method	
13	CNC g-code program +APT program	HW#5
14	CNC Full Automation	
15	CNC 5-axis machining	
16	Final Project Presentation	
17	Flexible learning week	
18	Flexible learning week	
Other: English is the official language in this course.		