Syllabus of CCUME, 2024 Academic Years, 1st Semester

Course Name：(Chinese) 電腦輔助機械製造 (English) Computer-Aided Manufacturing					**Course Department**	INTENSE
					Course Code	4616006
Instructor	Lin, Rong-Shine	**Credits**	3	☐Required Course ■Elective Course	**Target Students**	Master's Program
全英文授課 EMI	■是 ☐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	■ "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	☐ 自製簡報(ppt) ■課程講義 ☐自編教科書 ☐ 教學程式 ☐自製教學影片 ■其他(自編教材)					
教學方法 teaching methods	■講述 ☐小組討論 ■學生口頭報告 ☐問題導向學習 ☐個案研究 ☐其他					
評量工具 Evaluation tools	☐期中考 ☐期末考 ☐隨堂測驗 ☐隨堂作業 ■課後作業 ■期中報告 ■期末報告 ☐專題報告 ☐評量尺規 ☐其他					
教學資源 teaching resources	☐課程網站 ■教材電子檔供下載 ☐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				D1

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				D1 D2 D3
Robotics Applications	Introduction to robotics Forward kinematics Inverse kinematics Jacobian method Motion control	9				D1 D3 D5
CAD/CAM/ CNC Integration	CNC g-code program APT program CNC Full Automation CNC 5-axis machining	12				D1 D3 D5
CAD/CAM Additive Manufacturing Integration	Introduction to 3D Printing Data processing Slicing Simulations	6				D1 D3 D5

Achievable Core Competence of Course		**Achievable Indicators of Core Competence**
D1	Well established advanced knowledge in mechanical engineering	Learn Computer Control of Manufacturing System professional knowledge
D2	Competence in planning and conducting research and development projects in mechanical engineering and related disciplines	Computer Control of Manufacturing system related project capability
D3	Proficiency at professional writing in mechanical engineering	Writing mechanical engineering professional report capability
D4	Capacity of innovative thinking and independent problem solving for mechanical engineering challenges	innovative thinking and independent problem solving for mechanical engineering challenges capability
D8	Engagement to lifelong learning	Self learning of Computer Control of Manufacturing capability

Notes:

Session	**Location**	**Evaluation**	**Office hour**	**Assessment of Teaching quality**
Tu. & Th. 14:45~16:00	ME 214 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)	
7	Bezier / B-Spline curve	Proect I
8	Bi-cubic surface	HW#3
9	Solid modeling	
10	Forward kinematics	HW#4
11	Inverse kinematics	
12	Jacobian method	Project II
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	Supplementary materials
18	Flexible learning week	Supplementary materials
Other: English is the official language in this course.		