國立中正大學機械工程學系 114 學年度第一學期教學大綱表

課程名稱：(中文) 線性系統 (英文) Linear System					開課單位	機械系
					課程代碼	4205005
授課教師	洪博雄	學分數	3	選修	開課年級	大四、碩博士班

全英文授課 EMI	■是　　　□否					

先修科目或先備能力：Basic knowledge of linear algebra

課程概述：

The course deals with the theoretical aspects of linear dynamic systems as they apply to engineering modeling, analysis and design. The mathematical concepts of time and frequency domain are covered in detail. Furthermore, the theoretical foundations and application of system stability are discussed thoroughly. Finally, the properties of controllability and observability are studied in order to apply them to deign of feedback controllers and observers.

目標：

Students are expected to learn modelling and control. Thereby, they can understand the issues and challenges, while being exposed to the pragmatics of designing and implementing control systems.

教科書	Chi-Tsong Chen, Linear System Theory and Design, Oxford University Press, 2012. Ref: Norman S. Nise, Control Systems Engineering, 5th ed., John Wiley & Sons, Inc., 2008 「請尊重智慧財產權，不得非法影印教師指定之教科書籍」

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
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	Email: imehbs@ccu.edu.tw

課程大綱		分配時數				可達成核心能力
單元主題	內容綱要	講授	示範	習作	其他 [1]	
Introduction	Scope of this course	3				D1, D2, D4
Mathematical Descriptions of Systems	Linear systems	3				D1, D2, D4
Linear Algebra	Diagonal and Jordan Form, Lyapunov Equations	9				D1, D2, D4
State-Space Solutions and Realizations	LTI state equations, solutions and realizations	9				D1, D2, D4
Stability	Input-output stability, Lyapunov Theorem	9				D1, D2, D4
Controllability and Observability	Canonical decomposition, Jorden-form equations	9				D1, D2, D4
Minimal Realizations and Coprime Fractions	Minimal realizations, Realizations from matrix coprime fractions	9				D1, D2, D4

可達成核心能力		核心能力達成指標
D1	具備機械領域之專業知識	具線性系統領域之專業知識。Well established advanced knowledge in linear system
D2	策劃及執行機械及其相關領域專題研究之能力	具備策劃及執行線性系統及其相關領域專題研究之能力 Competence in planning and conducting research and development projects in linear system and related disciplines
D4	創新思考及獨立解決機械問題之能力	創新思考及獨立解決線性系統問題之能力。Capacity of innovative thinking and independent problem solving for linear system problems

教學要點概述:					
上課時間	上課地點	學習成果評量方式	Office hour		教學品質評量方式
四 10-12	214 左	Homework25% Midterm I 25% Midterm II 25% Final exam 25%	星期五 19:00-21:00		教學意見調查核心能力重要性及達成度分析問卷
週次	教 學 與 作 業 進 度				備 註
1	Introduction				
2	Mathematical Descriptions of Systems				
3~5	Linear Algebra				

6~8	State-Space Solutions and Realizations	Midterm exam I
9~11	Stability	
12~14	Controllability and Observability	Midterm exam II
15~17	Minimal Realizations and Coprime Fractions	
18	Final Exam	Final exam
其他:		