

105-1 Full Curriculum of Da-Yeh University

Information			
Title	Automatic Control	Serial No./ID	2059 / MAB3003
Required/Credit	Required /3	Time/Place	(Wed)BCD / H341
Language	Chinese	Grade Type	Number
Lecturer /Full- or Part-time	Cheng Chiang Ho /Full-time	Graduate Class	Non-graduating Class
School System /Dept /Class, Grade	/Department of Mechanical and Automation Engineering /Class 1, Grade 3		
Office Hour / Place	(Wed) 13:20~14:10, (Wed) 14:20~15:10, (Thu) 08:10~09:00, (Thu) 09:10~10:00 / H211		
Lecturer	n.a.		

Introduction

Provide an understanding of the principle of automatic control such as the follows:

- 1 Basic concept of the system dynamics,
- 2 Basic concept of the system integration.
- 3 Basic concept of the stability analysis.
- 4 Basic control of the controller design.

Outline

Automatic control is a fundamental course dealing with analysis and design technologies in control system. This course will cover the principle of dynamic models, block diagram of the control system, time responses of the control system, steady state error in the control system, stability analysis for the control system, design method for the controller. Lecture materials will provide students a clear and thorough understanding of the above feature. The adequate ability to understanding the theorem of the control system and practical application will be introduced.

Prerequisite

Calculus, Engineering Mathematics, kinematics, electric circuit

The Relationship Between Courses and Departmental Core Competencies and Basic Skills

knowledge of contemporary issues; an understanding of the impact of engineering solutions in environmental, societal, and global contexts;

-  ability to execute fundamental knowledge of mathematics and engineering
-  ability to conduct experiments, as well as to analyze and interpret data
-  ability to carry out mechanical and automation engineering practice
-  ability to utilize software of engineering design, and manufacturing
- ability to manage projects, multidisciplinary ,communicate effectively and function in a team
-  ability to analyze and solve Integrated practical engineering problems

Teaching Plan

Core Capability	Weight(%) 【A】	Ability index(Performance Indicators)	Teaching Methods	Assessment and Weight	Core Competency Learning Outcomes 【B】	Final Exam Grades 【C=B*A 】
ability to execute fundamental knowledge of mathematics and engineering	30	Students can apply the knowledge of calculus to develop the relevant equations in the mechanical engineering fields. Students can integrate knowledge of mechanics, electrics, and machinery into electromechanical applications.	Lecturing	Final Exam: 25% Midterm Exam: 25% Homework Assignment: 20% Course Participation: 20% Class Notes: 10%	Total: 100	30
ability to conduct experiments, as well as to analyze and interpret data	20	Students can arrange and carry out experimental processes. Students can acquire needed experimental data and resolve the trouble arising from experiments. Students can display experimental results by figures or tables, and explain the trend of data.	Lecturing	Midterm Exam: 25% Final Exam: 25% Homework Assignment: 20% Course Participation: 20% Class Notes: 10%	Total: 100	20
ability to carry out mechanical and automation engineering practice	20	Students can operate machine tools to make simple mechanical parts. Students can produce engineering drawing by computer aided drawing tools. Students can operate computers and write computer programs.	Lecturing	Final Exam: 25% Midterm Exam: 25% Homework Assignment: 20% Class Notes: 10% Course Participation: 20%	Total: 100	20

ability to utilize software of engineering design, and manufacturing	20	Students can design machinery or electromechanical parts by using computer aided engineering tools. Students can design components of machinery, vehicles and automatic manufacturing systems.	Lecturing	Midterm Exam: 25% Final Exam: 25% Homework Assignment: 20% Course Participation: 20% Class Notes: 10%	Total: 100	20
ability to analyze and solve Integrated practical engineering problems	10	Students can spot design errors and estimate design requirements. Students can find ways of remedying design errors and ways of meeting design requirements.	Lecturing	Midterm Exam: 25% Final Exam: 25% Course Participation: 20% Homework Assignment: 20% Class Notes: 10%	Total: 100	10

Grade Auditing

Final Exam: 25%

Midterm Exam: 25%

Course Participation: 20%

Homework Assignment: 20%

Class Notes: 10%

Book Type (Respect intellectual property rights. Please use official textbooks and do not illegally photocopy others' works.)

Book Type	Book name	Author
Textbook	自動控制	晉茂林

Lesson Plan

Weeks	Content	Teaching Methods
1	控制系統簡介 & Intellectual Property Protection (use legitimate textbooks only)	Lecturing
2	系統轉移函數的定義與求法	Lecturing
3	系統方塊圖的簡化	Lecturing

4	梅生增益公式	Lecturing
5	常微分方程式在控制理論上的解法	Lecturing
6	機械系統	Lecturing
7	電子系統	Lecturing
8	機電整合系統	Lecturing
9	一階線性齊次常微分方程組的解	期中考、Lecturing
10	物理系統的近似模型	Lecturing
11	非線性元件	Lecturing
12	考慮干擾輸入情況	Lecturing
13	羅斯赫維茲穩定法則	Lecturing
14	草繪根軌跡圖六大法則、考慮的系統參數非比例因子	Lecturing
15	使用MATLAB根軌跡圖工具指令rltool設計控制器	Lecturing
16	波德圖	Lecturing
17	波德圖、奈奎士圖	Lecturing
18	奈奎士圖	期末考、Lecturing