

MECHANICAL ENGINEERING PROGRAM

ABET COURSE SYLLABUS

ME 429: Computer Control of Machines and Processes (3 credit): Elective Course

Course Description (2008-2010 Catalog):

Discrete control theory reduced to engineering practice through a comprehensive study of discrete system modeling, system identification and digital controller design. Selected industrial processes and machines utilized as subjects on which computer control is to be implemented. Focuses on the time-domain analysis of the control theory and programming.

Prerequisite Course: ME421

Prerequisite by Topic:

- Automatic Control

Textbook:

“Computer Control of Machines and Processes”, J.G. Bollinger and N.A. Duffie, Addison-Wesley, 1988

Other Reference Material: N/A

Course Coordinator: Woosoon Yim, Professor

Course learning outcomes:

1. Develop the discrete models the machines and processes both in theoretically and experimentally
2. Design the discrete controllers based on the discrete models students develop.
3. Select appropriate actuators and sensors for computer control system of machines and processes
4. Determine the stability of the discrete closed-loop control system

Relationship of Course to Mechanical Engineering Program Educational Outcomes:

Goal 1: Provide mechanical engineering graduates with technical capabilities.					Goal 2: Prepare the mechanical engineering graduates to have effective workplace skills.				Goal 3: Instilling a sense of responsibility as a professional member of society.			
1.a	1.b	1.c	1.d	1.e	2.a	2.b	2.c	2.d	3.a	3.b	3.c	3.d
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Topics Covered:

1. Discrete modeling
2. System responses
3. Discrete controller design
4. Sample period selection
5. Feedforward control
6. Cascade control
7. Control software design
8. Computer interface
9. Sensors and actuators
10. Command generation
11. Experimental process modeling
12. Z transformation
13. Controller design using Z transformation

Laboratory Projects: None**Assessment of Student Progress toward Course Objectives**

Two mid-term exams, Semester Project, final exam

Class/Laboratory Schedule: 75 minutes lecture two sessions per week

Contribution of Course for meeting Professional Component:

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| (a) Mathematics and basic sciences: | 0 credit |
| (b) Engineering Topics (Design/Science): | 3 credit |
| (c) General Education: | 0 credit |
| (d) Others: | 0 credits |

Person who prepared this description:

Woosoon Yim, Professor

October 12, 2009