MECHANICAL ENGINEERING PROGRAM

ABET COURSE SYLLABUS

ME 421L: Automatic Controls Laboratory (1 credit): Required Course

Course Description (2008-2010 Catalog):

Control system identification. Controller design, experimentation, computer simulation, and analysis of position and speed control systems. Control system performance optimization.

Prerequisite Course: Corequisite ME 421

Prerequisite by Topic: Automatic controls

Textbook: Feedback Control of Dynamic Systems Franklin, Powell et al. Addison-Wesley

Other Reference Material: N/A

Course Coordinator: Georg F. Mauer, Professor

Course learning outcomes:

- **Computer Programming.** Model and simulate feedback systems in Matlab and VisSim.
- **Controller Design.** Using the theories from the lecture, identify the dynamic system properties of real feedback control plants, design and optimize controllers for these plants, and verify the closed loop system performance.
- **Lab Reports.** Describe your analysis, design, and experimental results in weekly lab reports, one report per experiment.

Relationship of Course to Mechanical Engineering Program Educational Outcomes:

Goal1: 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.e**	**1.f**	**2.a**	**2.b**	**2.c**	**2.d**	**3.a**	**3.b**	**3.c**	**3.d**
H	**H**		**H**	**H**	**H**		**H**	**M**	**M**			

(L)ow (M)edium (H)igh

Topics Covered:

1. Introduction to control system simulations (3 labs)
2. Dynamic systems step response (DC Motor)(2 labs)
3. Time domain feedback system design (four different experiments: DC Motor fluid flow system, fluid level, pneumatic pressure) (4 labs)
4. Linear Series compensator design, DC Motor and fluid flow systems (2 labs)
5. System Identification: Experimental frequency response and step response methods

Laboratory Projects: yes

Class/Laboratory Schedule: class meets 1 time per week, 180 minutes per session

Assessment of Student Progress toward Course Objectives

Weekly Lab reports

Class/Laboratory Schedule: multiple lab sections (Fall Semester)

Contribution of Course for meeting Professional Component:

(a) Mathematics and basic sciences:	0 credit
(b) Engineering Topics (Design/Science):	1 credit
(c) General Education:	0 credit
(d) Others:	0 credits

Prepared By: **Date:**

Georg Mauer September 11, 2009