

COURSE NUMBER: ME 5281, 4 credits	COURSE TITLE: Analog & Digital Control
TERMS OFFERED: Fall	1. PREREQUISITES: ME 3281
TEXTBOOKS/REQUIRED MATERIAL: "Feedback Control of Dynamic Systems", Franklin, Powell and Emami-Naeini, Prentice-Hall, 5th Edition	PREPARED BY: Professors Rajamani, Durfee DATE OF PREPARATION: March 1, 2001 Updated: May 23, 2007
COURSE LEADER(S): Professors Rajamani, Li, Durfee, Stelson	CLASS/LABORATORY SCHEDULE: Two 120 minute lectures per week CONTRIBUTION OF COURSE TO MEETING PROFESSIONAL OBJECTIVES: 100 % Engineering Topics
CATALOG DESCRIPTION: Feedback control systems. Frequency response, stability, poles and zeros; transient responses; Nyquist and Bode diagrams; root locus; lead-lag and PID compensators, Nicols-Ziegler design method. Digital implementation aliasing; computer-aided design and analysis of control system.	COURSE TOPICS: 1. Introduction to feedback control 2. Mathematical models of systems, Laplace transforms and state space representations. 3. The performance of feedback control systems 4. The stability of linear feedback systems 5. Frequency response techniques 6. Stability in the frequency domain 7. Root locus techniques 8. Design via frequency response 9. Design via state space 10. Digital control systems

COURSE OBJECTIVES	<ol style="list-style-type: none"> 1. Provide a basic background to dynamic systems, analysis of their stability and response and the design of control systems. 2. Provide both a rigorous mathematical treatment and real-world applications of the mathematical theory.
COURSE OUTCOMES*	<p>(Letters shown in brackets are linked to program outcomes a-k)</p> <ol style="list-style-type: none"> 1. Students are able to write the dynamic equations for common mechanical and electromechanical systems. [a] 2. Students can analyze stability and response of dynamic systems using frequency domain and state space techniques [a, e]. 3. Students can design practical controllers using a variety of classical control methods [a, c] 4. Students can simulate the response of open and closed loop systems using Matlab. [k]
ASSESSMENT TOOLS:	<ol style="list-style-type: none"> 1. Homework assignments 2. Mid-semester exam 3. Final exam

ME 5281

Nature of Changes:

The required course materials have been changed from "Modern Control Systems", Dorf and Bishop, Prentice-Hall, 9th Edition to "Feedback Control of Dynamic Systems", Franklin, Powell and Emami-Naeini, Prentice-Hall, 5th Edition