Approval Chart for Curriculum Changes

A = Approve I= Information Item[1] R= Advise & Respond[2]

Course Number ENGR 436 or Degree Plan(s) _____

State the requested change and reason. A memo may be attached if more space is necessary.

See Attached

Circle the number that corresponds to the requested change. Degree plan changes are on the second page.

	Change to a Course	Dept./School	College Academic	Deans	COUNCIL[3]				Provost	President
					TEC	UGEC	UUAC	GRAD		
1.	Title (description unchanged)	A	A	A		I			I	I
2.	Description (not affecting content)	A	A	A		I			I	I
3.	Course term(s)	A	I	A		I			I	I
4.	Content (substantive change)	A	A	A		I			A	A
5.	Number of hours (lecture, lab, contact)	A	A	A		A			A	A
6.	Course number within the hundred	A	A	I		I			I	I
7.	Course number beyond the hundred	A	A	A		A			A	A
8.	Prerequisites	A	A	A		I			I	I
9.	Course fee(s)	A	--	A		--			A	I
10.	From U to G *or* G to U	A	A	A		A			A	A
11.	Cross list with another department: U or G level	A	A	A		A			A	A
12.	Department of record	A	A	A		A			A	A
13.	Open or close a course	A	A	A		A			A	A
14.	New course — See website for application and process. This change includes combining or splitting a course(s).	A	A	A		A			A	A

Note: When an academic unit does not have a council, the UGEC and/or UUAC will serve as its academic council, depending on the nature of the issue.

Approval Chart for Curriculum Changes

A = Approve I= Information Item[1] R= Advise & Respond[2]

	Change to a Degree Plan	Dept./School	College Academic	Deans	COUNCIL[3] TEC	UGEC	UUAC	GRAD	Provost	Faculty	President	Board of Trustees
1.	University Requirements — Change in approved course content[6]	A	A	A	A				A	--	A	--
2.	University Requirements — Add or drop a required course from the University Requirements chart[6]	A	A	A	A				A	A	A	--
3.	University Requirements — Add or drop a course from a menu within the University Requirements[6]	A	--	--	A				A	--	A	--
4.	University Requirements — Change hours within a menu on the University Requirements chart[6]	A	A	A	A				A	A	A	--
5.	Major — Revision of major [4,5]	A	A	A	A				A	--	A	--
6.	Major — Adopt or change admission requirements	A	A	A	A				A	--	A	--
7.	Major — Add [4,5]	A	A	A	A				A	A	A	I
8.	Major – Discontinue (proposed by the department or college)	A	A	A	A				A	A	A	I
9.	Major – Discontinue (proposed by the Provost)	See below.										
10.	GPA — Revise major or cumulative requirement	A	A	A	A				A	A	A	--
11.	Minor — Revise course selection	A	A	A	I				I	--	I	--
12.	Minor — Add	A	A	A	A				A	--	A	--
13.	Minor – Discontinue (proposed by the department or college)	A	A	A	A				A	--	A	--
14.	Minor – Discontinue (proposed by the Provost)	See below.										
15.	Degree — Add	A	A	A	A				A	A	A	I
16.	Degree – Discontinue (proposed by the department or college)	A	A	A	A				A	A	A	I
17.	Degree – Discontinue (proposed by the Provost)	See below.										
18.	Any change to a graduate degree program	A	A	A	A				A	--	A	--

	Provost-Proposed Change	Provost	Department	Dean	COUNCIL[3] TEC	UUAC	Graduate	Faculty	President	Board of Trustees
1.	Major/Graduate Program – Discontinue (proposed by the Provost)	A	R	R	A			A	A	I
2.	Minor – Discontinue (proposed by the Provost)	A	R	R	A			--	A	--
3.	Degree – Discontinue (proposed by the Provost)	A	R	R	A			A	A	I

Approval Chart for Curriculum Changes

A = Approve I= Information Item[1] R= Advise & Respond[2]

					COUNCIL[3]					
	Change to the Catalog Information	**Dept./School**	**College Academic**	**Deans**	**UGEC**	**UUAC**	**GRAD**	**Provost**	**Faculty**	**President**
1.	General requirements for graduation including course requirements that are common to all majors for all degrees[7]	--	--	--		A		A	A	A
2.	Admission requirements	--	--	--		A		A	A	A
3.	Policies governing academic probation and suspension	--	--	--		A		A	A	A
4.	Requirements for graduating with honors	--	--	--		A		A	A	A
5.	Other academic policy changes	--	--	--		A		A	--	A

[1] Councils may request additional information about "Information" items. These items are approved as "Consent Agenda."

[2] The Dean and Department should respond to the Provost's recommendation to close a program in writing. Advise & Respond (R) requires that the voting body should receive the written responses at least one week prior to the vote.

[3] All courses that meet University Requirements for general education must go through UGEC. Courses or degrees offered only to students seeking teacher certification must go through the Teacher Education Council. All undergraduate changes must go before the UUAC. All graduate degree plan changes must go through the Graduate Council.

[4] A minimum of 30 hours is required for a major. A maximum is specified for each degree (e.g., BA, BS). The university minimum for elective hours is 6, unless the requirements of external accrediting bodies make it impossible.

[5] Program or course changes that apply to any major that includes Teacher Certification will be reviewed by the college, the Teacher Education Council (TEC), and then the UUAC.

[6] Courses that satisfy ACU's University Requirements (General Education) will normally have lower-level numbering, be free of prerequisites and co-requisites, appeal to more than one or two majors, and "not narrowly focus on those skills, techniques, and procedures specific to a particular occupation or profession" (SACS 2.7.3). Departments may request exceptions to the first three criteria.

[7] The UUAC approved the clarification that "general requirements for graduation" means the enumerated items in the "General Requirements for Bachelor's Degrees" section of the catalog.

Revised 3-8-17

Curriculum/Catalog Changes Signature Page

Department/School Chair(s)	
Signature	Approval date 10/30/18
Signature	Approval date

College Academic Council(s)	
Signature	Approval date 11-20-2018
Signature	Approval date

Dean(s)	
Signature	Approval date 11/7/18
Signature	Approval date

Teacher Education Council	
Chair's signature	Approval date

General Education Council	
Chair's signature	Approval date

Undergraduate Academic Council	
Chair's signature	Approval date

Graduate Council	
Chair's signature	Approval date

Provost	
Signature	Approval date

Faculty	
Chair of faculty senate	Approval date

President	
Signature	Approval date

Abilene Christian University

Application for a New Course v10.6

Course ID *Subject and Number*	ENGR 436
Date APPROVED	
Date DENIED	

I. Systems and Catalog Information Complete each item.

1	Course Developer	Rich Jinkerson
2	Course Teacher	Rich Jinkerson or a member of the engineering and physics faculty
3	Course Title	Systems and Controls
4	Course Abbreviation (if title is over 30 characters)	
5	College	College of Arts and Sciences
6	Department	Department of Engineering and Physics
7	Number of Credit Hours	3
8a.	Number of contact hours - lecture	3
8b.	Number of contact hours – lab/activity	0
9	Is the course for a fixed or variable number of credit hours?	Fixed
10	Explanation for variable credit	
11	Is the course repeatable for additional credit?	No
12	Maximum total number of credit hours a student can earn for this course	3
13	What type of course is this? (Select one. Please see Schedule Type definitions above.)	_X_Traditional lecture ___Traditional lab ___Traditional lecture/lab ___Experiential Learning ___Seminar ___Studio ___Thesis

		___Dissertation
14	Instructor Workload	3 Hours
15	Grade Mode (check all appropriate):	_X_Standard ___Credit/No Credit (undergrad only)
16	Maximum Enrollment	18
17	**Catalog Description** (50 words or less)	A study of the techniques used for design and analysis of control systems, involving system modeling, Laplace transforms and feedback control methods.
18	List any prerequisites (course/s, test scores, class standing, major, etc.)	ENGR 221 and MATH 361
19	List any co-requisites	
20	If the course is cross listed, specify the Course ID(s); MUST have signature in Section V from all Department Chairs	
21	Does this course have any special student costs?	_X_No ___Yes (If yes, must *attach a completed "Request to Add or Change Course Fees" form. Describe in section IV-F.*)
22a	How frequently will the course be offered in the **Fall**? All, even or odd years?	Never
22b	How frequently will the course be offered in the **Spring**? All, even or odd years?	Odd
22c	How frequently will the course be offered in the **Summer**? All, even or odd years?	Never
23	First semester this course will be offered *New courses may not be taught under their approved course ID until they appear in the catalog, therefore, no earlier than the coming fall.*	Spring 2021
24	List course/s that should be deleted, (Also, include the last semester for course/s being deleted)	

	A course cannot be deleted when it is a requirement in a degree plan in any department.	

25	Is this course required for a degree/s? *If "Yes," attach a revised degree plan(s) reflecting the placement of the new course.*	_X_No ___Yes
26	Should the addition of this course be retroactively applied to the degree plan it supports?	_X_No ___Yes Explanation:
27	Has this course been offered as a Special Topics course?	_X_No ___Yes *If "Yes," specify the Course ID and enrollment for each term it was taught.* *(Note: New courses are NOT required to be taught as Special Topics courses prior to being approved. However, a course may be taught once as Special Topics before it is proposed. See the Course Descriptions section of the Catalog for details.)*
28	List any courses in which the content overlaps the proposed course. (Course ID and Name) *Attach a statement from the instructor/dept chair of the existing course justifying the new offering in Section IV-D.*	

II. Curriculum

1	**Degree Plan** Explanation of how this course affects degree requirements.	The course will be an elective component for the Mechanical Engineering Track within the BS of Engineering degree.
2	**Justification** State the justification for adding this course to the current curriculum. Represent the need.	A course in system and controls is a standard curriculum component for mechanical and electrical engineering students in traditional engineering programs. It has also been recommended by the Industrial Advisory Board as a curriculum enhancement for mechanical track students in the current general engineering degree program.

III. Course Design

1. Audience and Course Goal

1	Describe the intended audience, including prerequisite skills.	This course is a designated elective for engineering majors in the mechanical track, but it also has direct applicability as an elective for engineering majors in the electrical track. It will normally be taken in the third or fourth year of the engineering degree program. Prerequisite skills require completion of ENGR 221 and MATH 361.
2	State the overarching course goal(s) in performance terms.	1) Students will learn to model, design and analyze systems. 2) Students will learn the basic methods of feedback control for systems.

2. Competencies and Measurements

	Competency	Measurement
1	Develop mathematical models of mechanical, electrical and fluid systems.	Homework and Exam 1
2	Use Laplace transforms for system modeling and analysis of system response.	Homework and Exam 2
3	Understand and implement proportional, integral and derivative controller design methods.	Homework and Exam 2
4	Understand and apply the root locus design method for feedback systems.	Homework and Exam 3
5	Understand and apply the concepts of state-space design methods.	Homework and Exam 4
6		
7		
8		
9		

3. Text and Resources

Feedback Control of Dynamic Systems, 8th Edition, Gene Franklin and David Powell, Pearson, 2019.

1. Give the full publication information of the textbook/s and other required resources and outside readings.
2. For **combined undergraduate/graduate** courses; make two lists:
    a. full publication information; label **Undergraduate.**
    b. full publication information; label **Graduate**. Indicate number of pages required.

IV. Supporting Documentation

Supporting documents must accompany proposal prior to preliminary approval by chair and dean.

	1	**Library** — Submit new course application and syllabus to the Dean of the Library. Consult with the director and establish a deadline for completion of the library report. **Attach** the signed copy of the Library report.
	2	**Instructional Design** — The application and syllabus must be reviewed by the Adams Center. **Attach** a copy of the Adams Center Review Letter.
	3	**Content Overlap** — Include one document for each course you listed in Section I-I. **Attach** statement from instructor/dept chair of existing course justifying the new offering.
	4	**Departmental Resources** — List the resources that support the course and are available only through the department, if applicable. **Attach** the list of the holdings and the location/s.
	5	**Resources** — List resources (other than library or departmental resources) that are needed to support this course (computers, lab equipment, other technology, etc.). **Attach** a complete list of all items and indicate possible sources or estimated cost of each. List the sources of any needed funds.
	6	**Expenses** — List additional expenses needed to implement this course (full-time or part-time faculty, graduate or lab assistants, student employees, travel, special student costs, room renovation, storage facility, etc.). **Attach** a complete list of all items, the estimated cost of each and the source of the funds.
	7	**Justification** — **Attach** all documents referred to in Section II-2
	8	Syllabus — **Attach** the syllabus for the course based upon the anticipated first-semester offering.
	9	Provide documentation for all additional attachments here

V. Preliminary Approvals

All supporting documentation has been assembled and attached to this application. I believe this course is ready to be presented to appropriate councils. We have a plan to fund this new course.

Course Number and Name ENGR 436

Primary Department

Department Chair

10/30/18
Date

Dean of the College

11/27/18
Date

Cross-listing Department *Add more lines if multiple departments are cross-listing*

Department Chair

Date

Dean of the College

Date

Cross-listing Department *Add more lines if multiple departments are cross-listing*

Department Chair

Date

Dean of the College

Date

VI. Actions *Place all actions on one page.*

Course ID: _____

Course Title: _____

1. **College Academic Council**: (for all courses)
   Note: Insert additional lines for College Academic Council action for each college involved in cross-listed courses.

Approved ___ Denied___ _____ _____
College Dean or Director Date

Approved ___ Denied___ _____ _____
College Dean or Director Date

2. **Graduate Council**: (for graduate level courses)

Approved ___ Denied ___ _____ _____
Dean of Graduate School Date

3. **Teacher Education Council**: (when applicable)

Approved ___ Denied ___ _____ _____
TEC Chair Date

4. **University General Education Council**: (when applicable)

Approved ___ Denied ___ _____ _____
Provost's designee Date

5. **University Undergraduate Academic Council**: (*undergraduate level courses)*

Approved ___ Denied ___ _____ _____
Vice Provost Date

6. **Academic Provost**: (for all courses)

Approved ___ Denied ___ _____ _____
Provost Date

7. **President of the University**: (for all courses)

Approved ___ Denied ___ _____ _____
President Date

Attach notes, comments, or conditions from appropriate councils:

October 16, 2018

Professor Rich Jinkerson
OSC121A
Richard.jinkerson@acu.edu
325-674-4815

Re: Review of ENGR436

Dear Professor Jinkerson,

Thank you for submitting ENGR436: Systems and Controls. I have reviewed them based on the ACU Syllabus Guidelines and find the syllabus meeting the requirements in an exemplary way. Here are a few suggestions I would make for you to consider changing:

- For proximity, you might want to move university policies together, such as Academic integrity, ADA, and Title IX. For Title IX, I have some sample text and link here if you want to use it: https://tinyurl.com/acusyllabus

These are changes you can make yourself. There is no need for further review at the Adams Center. However, please note that this letter is not meant to be a final approval in the course application process. Instead it is intended as a reference, which will be read by your department chair and members of the council, who may also have questions or comments of their own.

If you have any questions, please feel free to let me know. Please also let me know if we can be of any help in the design and facilitation of this course.

Director of Instructional Design
Adams Center

ABILENE CHRISTIAN UNIVERSITY

LIBRARY

M E M O R A N D U M

DATE: 16:04

TO: Rich Jinkerson

FROM: Mark McCallon, Associate Dean for Library Services

RE: New Course Proposal, ENGR 436 – Systems and Control

The library has examined the course application and syllabus and is able to support the proposed course. Please contact Erica Pye (exp10a@acu.edu) , Librarian Liaison to the Department of Engineering and Physics, if additional library resources are needed for the course. Thank you for letting us review the course proposal.

Systems and Controls – ENGR 436
Abilene Christian University
Spring 2020

Catalog Description
A study of the techniques used for design and analysis of control systems, involving system modeling, Laplace transforms and feedback control methods.
Prerequisites: ENGR 221 and Math 361. Credit hours: 3

Class Meeting Times and Location
This class meets on Tuesday and Thursday from 9:30 to 10:50 PM in Bennett Room 219, but changes in time and location may occur with changes in department scheduling.

Required Text
Feedback Control of Dynamic Systems, 8th Edition, Gene Franklin and David Powell, Pearson, 2019.

Contact Information

Name:	Rich Jinkerson, P.E., Associate Professor of Engineering and Physics
Office:	Onstead Science Center 121A
Office Phone:	325-674-4815
Cell:	(817) 454-6163 (Text or Call)
Email:	richard.jinkerson@acu.edu
Office hours:	MWF 9-11 AM, TuTh 3-5 PM, or by appointment

Intended Audience
This course is a designated elective for engineering majors in the mechanical track, but it also has direct applicability as an elective for engineering majors in the electrical track. It will normally be taken in the third or fourth year of the engineering degree program. Prerequisite skills require completion of ENGR 222 and MATH 361.

The mission of ACU
To educate students for Christian service and leadership throughout the world.

The mission of the College of Arts and Sciences
The College of Arts and Sciences engages students with humanity's greatest ideas to create understanding, apply insights, and serve the world as Christian thinkers and problem solvers.

The mission of the Engineering and Physics Department
The ACU engineering program strongly supports the university's mission of educating students for Christian service and leadership throughout the world. In support of this mission, ACU engineering graduates will attain:

-A deep and broad understanding of engineering principles and practices as evidenced by professional employment, continued professional development and graduate study in engineering or other professional fields.

-An extensive knowledge of the innovative design processes unique to engineering professionals, as demonstrated by using critical thinking skills in contribution to scientific and technical literature, patents and intellectual property, professional societies, and creative designs.

-A thorough understanding of Christian service and leadership as shown in commitments to professionalism, ethics, and service and leadership within the engineering profession, church and society.

Teaching Philosophy

Engineering is a respected profession and the public places great trust in engineers as individuals who are honest, competent and ethical. Many codes of ethics demonstrate that a commitment to protecting the health, safety, and welfare of the public is of paramount importance. These values are in harmony with Christian principles and ideals that are exhibited in the Bible. In keeping with these principles, this course will be taught so that students may gain an appreciation for the professional nature of engineering. The instructor encourages the discussion of topics that relate to the integration of faith and professional responsibilities.

Class Format

Class time will usually be spent in lecture and discussion that builds on the treatment in the text of engineering control system principles. Class participation will not be graded formally, but active engagement by students will enhance the learning process. Reading before class will make the discussions more useful. Preparation should also be made so that a student is ready to assist in derivation and solution work if invited to do so. As students study example problems they should work to understand the reasons for problems being solved in a particular way. Developing the ability to understand why a solution step is appropriate is part of the process of gaining the skill for design decisions that will be made as an engineer.

Learning Objectives

This courses provides significant direct focus on the following ABET Student Outcomes (Criterion 3):

1. An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics.

3. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

These program outcomes will be promoted and actualized through instruction, graded homework assignments and examinations.

Competencies and Measurements

	Competency	Measurement
1	Develop mathematical models of mechanical, electrical and fluid systems.	Homework; Exam 1
2	Use Laplace transforms for system modeling and analysis of system response.	Homework; Exam 2
3	Understand and implement proportional, integral and derivative controller design methods.	Homework; Exam 2
4	Understand and apply the root locus design method for feedback systems.	Homework; Exam 3
5	Understand and apply the concepts of state-space design methods.	Homework; Exam 4

Course Policies

Academic Integrity

Academic integrity involves completion of assigned academic work for each class by the individual or group responsible for the work. Violations of academic integrity and other forms of cheating include the intention to deceive, mislead, or misrepresent, which are a form of lying. Academic misconduct includes, but is not limited to: failing to give credit to sources used in a work in an attempt to present the work as one's own; submitting papers or projects obtained from another source as one's own; falsifying information orally or in writing; and receiving, giving, or using unauthorized aid on examinations. Such actions may result in, but are not limited to, a zero grade for the assignment and/or a failing grade in the course. The Department Chairman, the Dean of the College of Arts and Sciences and the Dean of Student Life will also be notified of this activity. The full university policy, including the process for appealing a decision, may be found at the link: http://www.acu.edu/academics/provost/policies/index.html.

Attendance Policy

Attendance with prompt arrival is expected for all class sessions. Classes will typically involve the presentation and discussion of new material, discussion of reading assignments from the text, or the consideration of problem solutions. Students are required to attend at least 80% of class meetings in order to receive credit for the course. Absences cannot exceed 6 times regardless of the reason. A student who misses more than 20% of the scheduled classes will be dropped from the class with a grade of WF, which is averaged in the students overall GPA as a grade of F.

Grading Policy

Course Assignments	Due Date	Weight
Homework assignments and due dates are included in the Daily Schedule that is posted in the Class Info folder for this course in Canvas. Each homework problem will have points assigned based upon the level of effort that is required to solve the problem, and the student will see the number of points for each problem when the assignment is started. Homework will be due at the beginning of class on the date shown on the Daily Schedule. **No late homework will be accepted.** Students are encouraged to start on the homework in advance of the due date, and to visit with the instructor when difficulties are encountered with particular problems. Working together on problems is also encouraged, but all solutions presented for credit must be defensible by the student submitting them for credit. The final homework grade will be calculated as a percentage ratio of the number of points awarded to the number of points possible. **Homework Guidelines:** • All homework solutions must be submitted on engineering paper which may be purchased at the ACU Bookstore or from Mr. Chad Longley in Bennett. The latter source is encouraged because it is less expensive and it supports the Engineering Students Association (ESA). • Homework must be neat and legible with only one problem per page.	**Shown on the Daily Schedule**	**25%**

• The problem statement and associated figures must be shown along with the answer. • Sign conventions and assumptions must be clearly stated or shown for each problem. • Free body diagrams or other drawings must be complete and well labeled. • All work that is needed to reach an answer or conclusion must be shown to receive full credit. • Proper units must be included with final answers that are identified clearly with a box or circle, or by underlining.		
Regular Exams Four examinations are scheduled for this class, with dates and times for the exams shown on the Daily Schedule. Each exam will focus on material covered during the period immediately preceding the exam, but each exam will build on concepts and skills that have been developed in the course until that time. All students are expected to take each exam at the scheduled times. Each student will be allowed to bring one single-sided 8½ X 11 sheet of handwritten notes to the exam containing content that is selected by the student.	**Exam 1 – 2/4** **Exam 2 – 3/5** **Exam 3 – 4/14** **Exam 4 – 4/30**	**15%** **15%** **15%** **15%**
Final Exam The final examination will be comprehensive and will cover material from throughout the period of the course.	**Friday – 5/10**	**15%**

Calculation of Final Course Grade*

90% and above . . . . . A
80% - 89% . . . . . B
70% - 79% C
60% - 69% . . . . . D
59% and below . . . . . F

*The instructor reserves the right to decrease the lower bound for grade cut-offs.

ADA Compliance Statement

Abilene Christian University is dedicated to removing barriers and opening access for students with disabilities in compliance with ADA and Section 504 of the Rehabilitation Act. The Alpha Scholars Program facilitates disability accommodations in cooperation with instructors. In order to receive accommodations, a student must be registered with Alpha Scholars Program, and must complete a specific request for each class in which he or she needs accommodation. If a student has a documented disability and wishes to discuss academic accommodations, he or she may call the office directly at 325-674-2667.

ENGR 436 Systems and Controls
Spring 2020 Daily Schedule (Preliminary)

Class Sessions: TR 9:30-10:50 AM in Bennett 219
Text: Franklin & Powell: Feedback Control of Dynamic Systems, 8th Edition, Pearson, 2019
Instructor: Rich Jinkerson, P.E.
Email: Richard.jinkerson@acu.edu

Class	Date	Day	Chapter	Class Agenda
1	1/14	Tu	1	Introductions Course Policy Statement 1.1 – 1.4 Introduction to Feedback Systems Feedback System Fundamentals
2	1/16	Th	2	2.1 Dynamics of Mechanical Systems Translational Motion Rotational Motion Combined Rotation and Translation
3	1/21	Tu	2	2.1 Dynamics of Mechanical Systems Distributed Parameter Systems Rigid Body Motion
4	1/23	Th	2	2.2 – 2.3 Electrical and Electromechanical System Models Electric Circuit Modeling Electromechanical System Modeling
5	1/28	Tu	2	2.4 Heat and Fluid Flow Modeling Heat Flow Incompressible Fluid Flow
6	1/30	Th	3	3.1 Review of Laplace Transforms Convolution Response Transfer Functions and Frequency Response Laplace Transforms
7	2/4	Tu		**EXAM ONE** FEEDBACK CONTROL OF DYNAMIC SYSTEMS CHAPTERS 1 - 2
8	2/6	Th	3	3.1 Review of Laplace Transforms Properties of Laplace Transforms Inverse Laplace Transforms by Partial Fractions Final Value Theorem

9	2/11	Tu	3	3.1 Review of Laplace Transforms Laplace Transform Applications Poles and Zeros Linear System Analysis
10	2/13	Th	3	3.2 – 3.3 System Modeling with Laplace Transforms Block Diagrams Pole Location Effects
11	2/18	Tu	3	3.4 Time Domain Specifications Rise Time Overshoot and Peak Time Settling Time
12	2/20	Th	3	3.5 – 3.6 Pole-Zero Effects and Stability Effects of Zeros and Additional Poles Bounded Input-Bounded Output Stability Routh's Stability Criterion
13	2/25	Tu	4	4.1 – 4.2 Initial Analysis of Feedback Basic Control Equations Steady-State Error Control
14	2/27	Th	4	4.3 Three Term Controllers Proportional Control Integral Control Derivative Control PI and PID Control
15	3/3	Tu	5	5.1 – 5.2 Root Locus Control of Feedback Basic Feedback Root Locus Root Locus Design Rules Parameter Selection
16	3/5	Th		**EXAM TWO** FEEDBACK CONTROL OF DYNAMIC SYSTEMS CHAPTERS 3 - 4
17	3/17	Tu	5	5.4 Dynamic Compensation Design Lead Compensation Lag Compensation Notch Compensation
18	3/19	Th	6	6.1 – 6.2 Frequency Response Design Bode Plot Techniques Steady-State Errors Neutral Stability
19	3/24	Tu	6	6.3 Nyquist Stability

20	3/26	Th	6	6.4 Stability Margins
21	3/31	Tu	6	6.5 – 6.6 Bode's Gain – Phase Relationship Closed Loop Frequency Response
22	4/2	Th	6	6.7 Compensation PD Compensation Lead Compensation PI Compensation
23	4/7	Tu	6	6.7 Compensation Lag Compensation PID Compensation Design Considerations
24	4/9	Th	7	7.1 – 7.2 Introduction to State Space Design State-Space Advantages State-Space System Description
25	4/14	Tu		**EXAM THREE** FEEDBACK CONTROL OF DYNAMIC SYSTEMS CHAPTERS 5 - 6
26	4/16	Th	7	7.3 – 7.4 State Space Systems System Description and Block Diagrams
27	4/21	Tu	7	7.5 Control Law Design for Full-State Feedback Control Laws Reference Inputs with Full-State Feedback
28	4/23	Th	7	7.6 Pole Location Selection Dominant Second-Order Poles Symmetric Root Locus
29	4/28	Th		Topical Review
30	4/30	Th		**EXAM FOUR** FEEDBACK CONTROL OF DYNAMIC SYSTEMS CHAPTER 7
31	5/8	Fr		**FINAL EXAM** 10:00-11:45 AM