

<b>Course Number and Title:</b>	EEL 4652- Control Theory
<b>Credit Hours:</b>	3 credits: Lectures 3 Hours, Lab: 0
<b>Current Academic Term:</b>	Fall 2018
<b>Office:</b>	Room # IST-2097
<b>Office Hours:</b>	Hours: Tuesday and Thursday: 10:00-11:00 am, 3:00-5:00pm; Wednesday: 2:00-3:00 pm, or just stop by if not busy, or unavailable, contact the instructor for a mutually convenient time.
<b>Office Phone:</b>	Tel: (863)-874-8647
<b>Email:</b>	asargolzaei@floridapoly.edu
<b>Class Meeting Day, Time &amp; Location:</b>	Tuesday and Thursday: 11:00– 12:15 pm. Room # IST-1014
<b>Course Website:</b>	Canvas
<b>Official Catalog Course Description:</b>	The analysis of control systems in continuous time domains, methods for improving system response for transient and steady state behavior, system stability concept, methods for examining system stability in both time & frequency domains and determining the system stability margins are discussed.
<b>Prerequisite(s):</b>	EEL 3135 - Systems and Signals EEL 3112C - Circuits 2
<b>Pre-Requisite Policy</b>	<ul style="list-style-type: none"> <li>• The pre-requisite(s) and co-requisite(s) of a course as indicated in the course catalog will be strictly enforced, without exception.</li> <li>• A student who completes a course without first completing its prerequisites will be required to retake the class regardless of the grade received for the course.</li> </ul>
<b>Gordon Rule:</b>	NO
<b>Required Texts:</b>	Control Systems Engineering, 7th edition, by Norman S. Nise, Wiley, ISBN 978-1118170519, 2015.
<b>Instructional Materials”</b>	PowerPoint slides and in class lectures
<b>Equipment and Materials:</b>	You will need to use the MATLAB software with its control toolbox
<b>Course Objectives:</b>	<p>At the end of this course, you should be able to:</p> <ul style="list-style-type: none"> <li>• apply the Laplace Transform for finding mathematical models (transfer function) for linear, time invariant feedback control systems.</li> <li>• evaluate the time response from the transfer function as well as the use of poles and zeros to determine the response of a control system.</li> <li>• understand how to simplify a complex system using block diagrams and flow graphs.</li> <li>• evaluate the stability of a system represented as a transfer function.</li> <li>• analyze steady-state error for feedback control systems, with and without disturbances.</li> <li>• analyze stability of control systems using root locus, Nyquist and Bode plots to analyze stability.</li> <li>• define a root locus and how to sketch a root locus manually and using MATLAB.</li> <li>• apply the root locus in the feedback control systems analysis.</li> </ul>

<b>Course Learning Outcomes (CLOs):</b>	#	After successfully completing the course with a grade of C (2.0/4.0) or better, the student should be able to do the following:	<b>Learning Level</b>	<b>ABET Criteria</b>								
	1.	Demonstrate an understanding of the fundamentals of (feedback) control systems.	1	e								
	2.	Describe the stability conditions of control systems.	2	a								
	3.	Determine the steady- state and transient responses of open and closed-loop control systems.	3	a,c								
	4.	Apply software tools (MATLAB) to analyze the operation of a control system.	3	k								
	5.	Determine and use models of physical systems in forms suitable for use in the analysis and design of control systems.	3	d,e								
	6.	Design a feedback control system to meet certain specifications.	5	c								
<b>Attendance</b>	Attendance - see also University Policy at <a href="https://floridapolytechnic.org/wp-content/uploads/FPU-5.0010AP-Student-Attendance.pdf">https://floridapolytechnic.org/wp-content/uploads/FPU-5.0010AP-Student-Attendance.pdf</a> <i>Course specific attendance requirement:</i> Students are expected to attend class. Students whose absences exceed 8 classes may be Administratively Withdrawn at the discretion of the instructor unless prior arrangement is made to accommodate special circumstances.											
<b>Grading Scale:</b>	See also University Policy <a href="https://floridapolytechnic.org/wp-content/uploads/FPU-5.0071AP-Grading-Policy-10.20.15.pdf">https://floridapolytechnic.org/wp-content/uploads/FPU-5.0071AP-Grading-Policy-10.20.15.pdf</a>											
	0	55	58	63	67	70	73	77	80	83	87	90
	F	D-	D	D+	C-	C	C+	B-	B	B+	A-	A
<b>Assignment/Evaluation Methods:</b>	Grade items: Quizzes, assignments, and Final Exam throughout the semester after the completion of a specific topic area – see the schedule for more details.											Points
	Homework											20
	Project											15
	Quiz											15
	Midterm Exam											25
	Final Exam											25
	Total											100
<b>Make-Up:</b>	No makeup tests or quizzes, except in case of emergency, e.g. illness and accident. For makeup tests, medical certificate is required, and the instructor must be notified in advance of the test.											
<b>Final Grade Calculations</b>	The CANVAS calculates and displays the final letter grade based on the weighting factors as listed under <b>Assignment/Evaluation Methods</b>											
<b>Academic Support Resources</b>	<p><b>Library:</b> Students can access the Florida Polytechnic University Library through the student portal <a href="#">Pulse</a> and <a href="#">Canvas</a>, on and off campus. Students may direct questions to the Success Desk in the Commons or by email, <a href="mailto:library@floridapoly.edu">library@floridapoly.edu</a>.</p> <p><b>ASC:</b> The Academic Success Center, located in the Commons and at ASC East, provides a range of services. Students may direct questions to <a href="mailto:success@floridapoly.edu">success@floridapoly.edu</a>.</p>											

University Policies	<p><b>Academic Integrity:</b> All students must commit to the highest ethical standards in completion of all academic pursuits and endeavors: <a href="#">Academic Integrity</a></p> <p><b>Reasonable Accommodations:</b> Students who qualify for course or classroom adjustments under the Americans with Disabilities Act (ADA) must register with the Office of Disability Services: <a href="#">Request for Disability Services</a>.</p> <p><b>Accommodations for <a href="#">Religious Observances, Practices and Beliefs</a></b></p> <p><b>Title IX:</b> Florida Polytechnic University is committed to ensuring a safe, productive learning environment on our campus that prohibits sexual misconduct, including discrimination based on sex or gender, harassment, stalking, sexual assault, sexual exploitation, or intimate partner violence.</p> <p>If you or someone you know needs assistance, you may speak to any university employee; however, they have an obligation to report the incident to the Title IX Coordinator, who will keep that information private to the greatest extent possible. If you want to speak to someone permitted to keep your disclosure confidential, seek assistance from the Florida Polytechnic University Ombudsman, BayCare's Student Assistance Program, 1-800-878-5470 and locally within the community at Peace River Center, 863-412-2700 (24-hour hotline) or 863-412-2708 to schedule an appointment.</p> <p>If you or someone you know feels unsafe or may be in imminent danger, please call the Florida Polytechnic University Police Department 863-874-8472 or the local Police Department 911 immediately. For more information about policy, reporting options and resources at Florida Polytechnic University and the community, please visit the <a href="#">Title IX Website</a>.</p>
<b>Topics to be covered</b>	<ul style="list-style-type: none"> <li>• Introduction to control systems and its applications</li> <li>• Laplace transforms and transfer functions</li> <li>• Modeling electrical and mechanical systems in time and frequency domain</li> <li>• Reduction of complex systems to subsystems</li> <li>• Proportional, integral, derivative and combinations for control</li> <li>• Time response</li> <li>• Stability analysis</li> <li>• Frequency response technique and the Bode method</li> <li>• Root locus technique</li> <li>• Design with root locus</li> </ul>
<b>Expectations From Students</b>	<ul style="list-style-type: none"> <li>• Read the complete syllabus and the deadlines.</li> <li>• Submit assignments in the CANVAS by the due dates (normally one week after posting date) to avoid any grade penalty.</li> </ul>
<b>Tentative Dates and Schedule</b>	<ul style="list-style-type: none"> <li>• Final Exam is scheduled on the final exam week and is announced by the university.</li> <li>• Other importance dates will be posted in the CANVAS. Students need to check the CANVAS at least twice a week.</li> </ul>
<b>Exam policy</b>	<ul style="list-style-type: none"> <li>• Make sure to complete the assigned homework in order to do well in the exam.</li> <li>• No discussion is permitted during the exams.</li> <li>• Instructor is not compelled to give credit for something he cannot read or follow logically.</li> <li>• Cheating is considered as a serious offense. Students who are caught will receive the appropriate consequences.</li> </ul>

<b>Class policy</b>	<ul style="list-style-type: none"> <li>• <b>Attendance:</b> Attendance in the course is <b>mandatory</b> and student is not allowed to miss any class during the semester.</li> <li>• <b>Academic Misconduct:</b> For work submitted, it is expected that each student will submit their own original work. Any evidence of duplication, cheating or plagiarism will result at least a failing grade for the course.</li> <li>• <b>Excused Absences:</b> Only emergency medical situations or extenuating circumstances are excused with proper documentation. After reviewing documentation, you are required to email a description of the excuse and absence dates as a written record to asargolzaei@floridapoly.edu.</li> <li>• Students are encouraged to ask questions and to discuss course topics with the instructor and with each other.</li> <li>• <b>Any work submitted should display ID number and should be signed, as the students' own work, and that no unauthorized help was obtained.</b></li> <li>• Cell phones, communicators, MP3 players, head sets are not allowed to be used in the class.</li> <li>• <b>DO NOT</b> send assignments by email.</li> <li>• Instructor reserves right to change course materials, date, and schedules as necessary. These changed will be announced in the classroom and/or CANVAS.</li> </ul>	
<b>Expectations From The Faculty</b>	<ul style="list-style-type: none"> <li>• Assignment or Homework is always graded within 1 week of being turned in.</li> <li>• Exams are always graded and returned with 1 week of the examination date.</li> <li>• Response to any questions by e-mail or phone within 48 hours (expect Weekends, breaks, and holidays).</li> </ul>	
<b>Special Notes and instructions:</b>	<ul style="list-style-type: none"> <li>• All assignments must be turned-in on time. Late home works will <b>NOT</b> be accepted.</li> <li>• All reports must the submitted in PDF files at the CANVAS site unless otherwise stated. No-high resolution images of assignments.</li> <li>• DO NOT send assignments by e-mails. The CANVAS drop box is the only place to submit your assignments</li> <li>• Students are expected to spend at least two hours completing “out of class student work” for each hour in class. All out of class work will be graded and will comprise the percentage of the final course grade.</li> <li>• Last not the least, when you e-mail to the instructor, you must mention the course number in your note.</li> </ul>	
<b>Created by:</b>	Dr. Arman Sargolzaei	08/17//2017
<b>Last Modified:</b>	Dr. Arman Sargolzaei	08/17//2018
<b>Reviewed by:</b>	Dr. Muhammad H Rashid	08/20/2018

**TENTATIVE SCHEDULE**

weeks	Date	Reading - Sections	Topics	Classes	Assignments
1.	Aug 22-26		Read course syllabus and familiarize with CANVAS.	1	Quiz
2.	Aug 27 –Sep 2	Chapter 1	Introduction to control systems	2	
3.	Sep 3 – 9	Chapter 2	Review of Laplace transform, Modeling in the Frequency Domain	2	
4.	Sep 10 – 16	Chapter 2	Modeling systems in the Frequency Domain, linearization method	2	1
5.	Sep 17 – 23	Chapter 3	Modeling systems in the Time Domain	2	2
6.	Sep 24 – 30	Chapter 4	System response	2	3
7.	Oct 1 - 7	Chapter 4	System response	2	4
8.	Oct 8 – 14	Chapter 6	Stability of control systems	2	
9.	Oct 15 – 21	Chapter 6	Stability of control systems	2	5
10.	Oct 22 – 28	Chapter 5	Reduction of multiple subsystem, block diagram	2	Midterm exam
11.	Oct 29 – Nov 4	Chapter 7	Steady-State Errors	2	Midterm survey
12.	Nov 5 – 11	Chapter 8	Root Locus Technique	2	Mini project #1
13.	Nov 12 – 18	Chapter 8	Root Locus Technique	2	6
14.	Nov 19 – 25	Lecture notes	Design feedback control systems	1	Mini project #2
15.	Nov 26– Dec 2	Lecture notes	Design feedback control systems	2	Mini project #3
16.	Dec 3 – 5	Review slides	Review	1	
17.	Dec 6 – 7	Reading Days		0	
	Dec 8 – 13		Final Exams	1	
			Total	30	

**WITHTHDRWL DATE WITHOUT ACADEMIC PENALTY DEADLINE (W ASSIGNED): NOVEMBER 19, 2018**

**\*Quizzes are announced one week in advance.**