School of Engineering and Computer Science
ECE 489: Introduction to Control Systems
Master Syllabus

Catalog Data:	**489: Introduction to Control Systems** – 3 credits. Laplace Transform, modeling techniques, block diagrams, system characteristics (linearity, time invariance, stability, steady-state error, etc.), root locus, frequency response methods, PID controllers, controller design with MATLAB, and state-space methods. Typically offered in Spring.
Class Schedule:	Two lecture hours per week, for one semester.
Laboratory Schedule:	None
Prerequisites by Course:	ECE 321 or MECH 304
Prerequisites by Topic:	1. Understanding of differential equations and linear algebra 2. Understanding of circuit theory, modeling, and analysis
Typical Text:	Ogata, Kat., Modern Control Engineering, 5th Edition, 2010, Prentice-Hall Publishing, ISBN 978-0136156734.
Course Coordinator:	Dr. Josue Campos do Prado
Course Objectives:	Students will: 1. Use mathematical and physical principles to model electrical, mechanical, and other engineering systems. 2. Represent a linear system in state space and transfer function form. 3. Study the system characteristics in both time and frequency domain. 4. Design controllers that satisfy the desired transient and steady-state response. 5. Use computational tools to model, simulate, and analyze different systems.
Topics Covered:	1. The Laplace Transform 2. System Modeling 3. System Characteristics 4. Root Locus Analysis 5. Frequency Response Methods 6. PID Controllers 7. State-Space Methods
Lab Experiments and Activities:	None

Course Outcomes:		Students will be able to:
	Assessed for Student Outcomes	1-c. Use time-domain and frequency-domain models to formulate solutions. 1-d. Apply differential equations and Laplace transform to solve different engineering problems. 2-b. Apply design process to satisfy system requirements. 6-b. Conduct analysis and interpretation of the data.
	Other	1-a. Demonstrate fundamental knowledge of modeling and analysis of engineering systems. 2-d. Produce solutions that meet specified needs for system designs. 6-a. Use MATLAB for modeling different types of systems.
Relationship of Course to Program:		Meets: Educational Objectives: 1, 2, 3, 4 Student Outcomes: 1, 2, 6
Prepared by:		Dr. Josue Campos do Prado **Date:** Jan. 24, 2022