

**Course:** EW410 Intro To Control Engineering

**Credits:** 4 credit – 3 recitation hours – 2 laboratory hours

**Course Description:** The teaching team has designed this course to provide students with an enhanced understanding of linear control systems and their applications to naval weapon systems currently employed by the U.S. Navy and Marine Corps using analytical, graphical, and computer techniques.

**Pre-requisites:** Physics II (SP212 or SP222), DE (SM212 or SM222), and Elec Eng I (EE221 or EE331).

**Course Coordinator:** LCDR Brad Berthelotte

**Textbook:** Nise, Norman S. Control Systems Engineering 8th Edition, John Wiley

**Course Objectives:** At the end of this course, students who complete the assigned reading, homework, labs and exams will be able to:

- a. Develop a mathematical model of simple: mechanical, rotational, electrical and combined (electro-mechanical) systems using Laplace transfer functions.
- b. Analyze the response of a linear system to several standard inputs.
- c. Design a linear control system to meet given specifications.
- d. Use classical root locus to design proportional, integral and differential controllers to achieve desired requirements.
- e. Use MATLAB tools to design and analyze control systems.
- f. Implement proportional and integral controllers using digital computer software.

**Topics:**

Laplace transform and solving of Differential Equations  
Modeling Translational/Rotational/Electrical/Geared/DC motor systems  
1st Order System Response/Performance  
2nd Order System Response/Performance  
Design by Root Locus  
Proportional Control Design and Implementation  
Proportional/Derivative Control Design  
Proportional/Integral Control Design and Implementation  
Proportional/Integral/Derivative Control Design and Implementation

**Last Updated:** 10-December-2020