FREQUENTLY ASKED QUESTIONS

WHAT ARE THE PREREQUISITES?

- Acceptance by the ECE Department. Process requires a sufficient background in mathematics and technical undergraduate studies. Applicants with a BSEE degree will usually satisfy the requirements.
- Command/Company Endorsement.

IS THERE A SERVICE COMMITMENT?

Per OPNAVINST 1520.23C, a Naval officer will incur a 1 year service obligation upon completion or withdrawal from the Certificate Program, which is served concurrently with any other service obligation. All students must submit a signed Participation Agreement prior to enrolling in the program.

WHO IS ELIGIBLE?

Applicants with a US government affiliation, government laboratory engineers, active or reserve military personnel, Navy civilians, current NPS resident students, and a limited number of contractors sponsored by Department of Defense (DOD) organizations.

WHEN DOES THE PROGRAM START?

Annually, beginning either in Summer or Winter quarters.

HOW LONG DOES IT TAKE TO COMPLETE?

Usually 4 quarters (1 course per quarter).

CONTACT INFORMATION

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For more information on the ECE department, go to:

www.nps.edu/ece

For more information on other NPS DL programs, go to:

www.nps.edu/dl

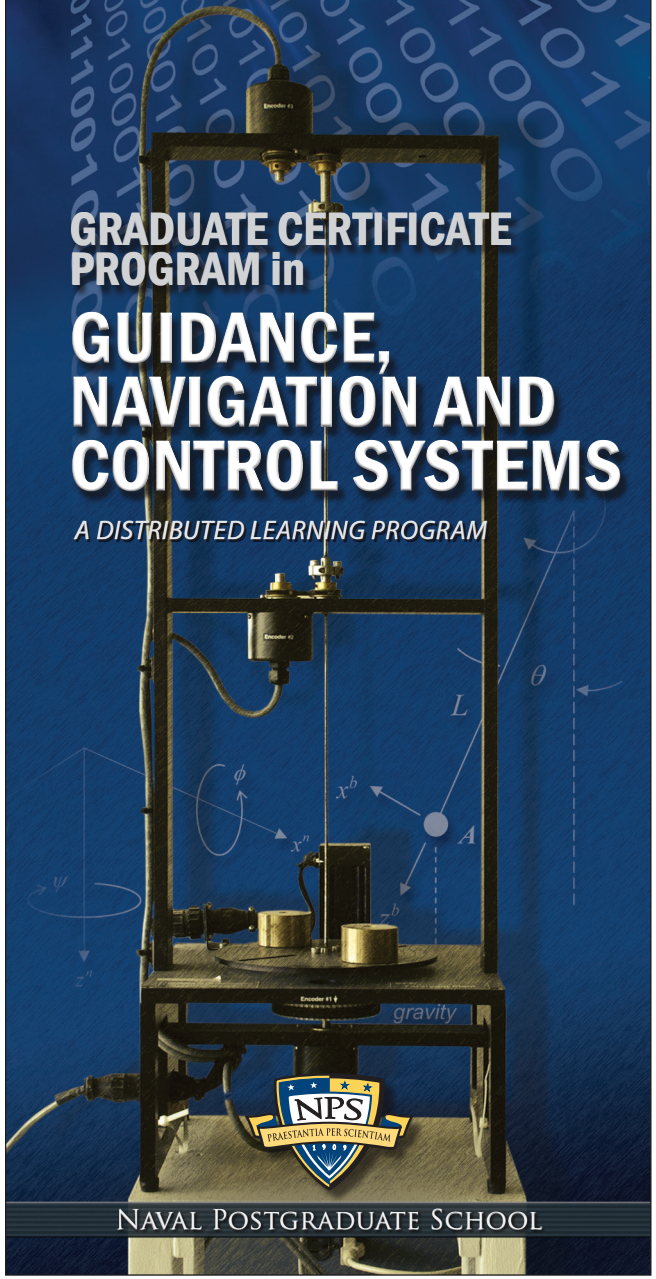
Produced by:
Naval Postgraduate School

GEAC
GRADUATE EDUCATION ADVANCEMENT CENTER

DEPARTMENT OF
ELECTRICAL and COMPUTER ENGINEERING

GRADUATE CERTIFICATE PROGRAM in GUIDANCE, NAVIGATION AND CONTROL SYSTEMS

A DISTRIBUTED LEARNING PROGRAM

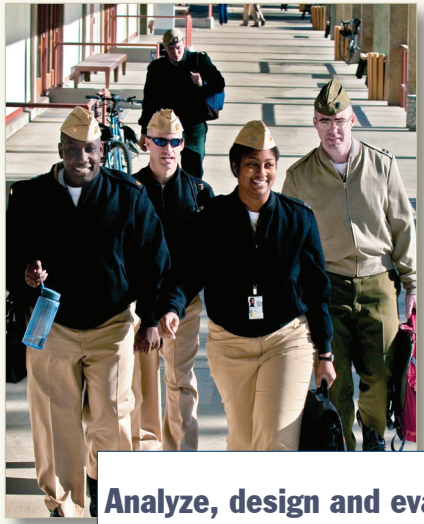


NPS
PRAESTANTIA PER SCIENTIAM

NAVAL POSTGRADUATE SCHOOL

THE PROGRAM

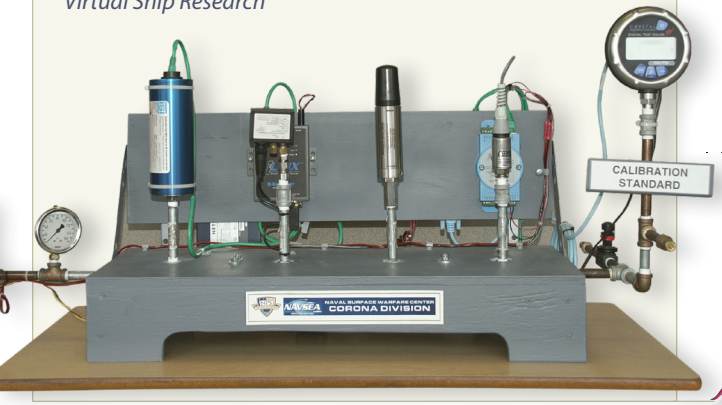
The Guidance, Navigation, and Control Systems Certificate Program equips students with a technical foundation that prepares them for assignments related to research, design, development, procurement, maintenance and life cycle management of guidance, navigation and control components of electronic systems.



Analyze, design and evaluate guidance, navigation and control systems

Enhance Your Career!

Virtual Ship Research



THE CURRICULUM

EC3310 Optimal Estimation: Sensor and Data Association (3-2)
This course covers optimal estimation and Kalman filtering with extensions to sensor fusion and data association. Main topics include the theory of optimal and recursive estimation in linear (Kalman filter) and nonlinear (extended Kalman filter) systems, with applications to target tracking.

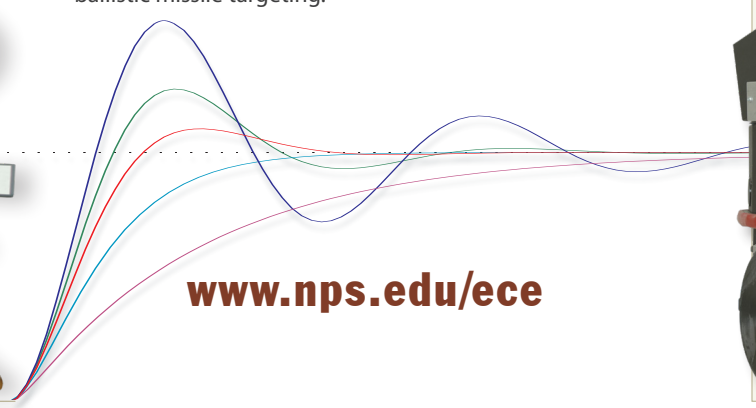
EC3320 Optimal Control Systems (3-2)
This course addresses the problem of designing control systems which meet given optimization criteria.

EC4350 Nonlinear Control Systems (3-2)
This course presents techniques for automatic control of nonlinear systems with application to current military and robotic systems.

Select one among:

EC4310 Fundamentals of Robotics (3-2)
This course presents the fundamentals of land-based robotic systems Main topics include homogeneous transform, quaternion, robotic manipulator kinematics, mobility and mobile robots, motion control, motion planning, localization, and mapping.

EC4330 Navigation, Missile and Avionics Systems (3-2)
This course discusses principles of missile guidance, including guidance control laws, basic aerodynamics and six degree-of-freedom motion simulation. Additional topics are selected from the following areas to address the general interests of the class: advanced guidance laws, passive sensors, INS guidance, fire control and tracking systems, and ballistic missile targeting.



www.nps.edu/ece

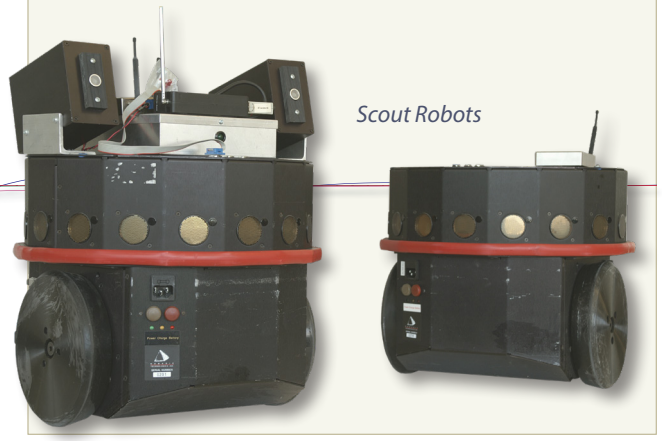
THE OUTCOMES

Upon completion of the Guidance, Navigation & Control Systems Certificate Program, students will have the ability to:

- Analyze, design and evaluate guidance, navigation and control systems and apply these skills in a military systems environment.
- Design and analyze optimal estimation methods for linear and nonlinear systems.
- Design a Kalman filter to optimally process noisy measurement data in a linear system and to design an extended Kalman filter for nonlinear systems.
- Design optimal control laws for control systems, including minimum time control, minimum energy control, and the linear quadratic regulator.
- Analyze and design nonlinear control systems using Lyapunov stability theory.
- Design nonlinear control systems based on exact feedback linearization.

And depending on elective courses selected:

- Analyze and design control and motion planning algorithms for autonomous robotic systems.
- Analyze and design missile guidance and inertial navigation systems, ballistic missile targeting systems, and missile motion simulators.



Scout Robots