

QUICK FACTS & ADMINISTRATION

WHO IS THE PROGRAM FOR?

- Students interested advancing their careers in the fields of unmanned vehicles (UxVs), robotics, and autonomous systems will be well suited for this certificate program.
- Resident and non-resident U.S. military officers, U.S. government civilians, and DoD contractors.

QUALIFICATIONS

- Baccalaureate degree in engineering or closely related field.
- Experience with computer programming.
- Command/company endorsement.

PROGRAM LENGTH & COMMITMENT

- Four quarters, **online**, with two one-week travel periods for hand-on labs.
- Begins annually in the Summer quarter.
- Students participating in academic programs at the Naval Postgraduate School (NPS) may incur service and/or employment obligations.

HOW TO APPLY

Applications are handled through the Office of Admissions at NPS.

www.nps.edu/web/admissions/apply1



CONTACT INFORMATION

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www.nps.edu/web/mae/robotics

More information on NPS Distance
Learning (DL) programs

www.nps.edu/dl



Brochure developed by
Naval Postgraduate School

**Graduate Education
Advancement Center (GEAC)**

411 Dyer Rd., Knox 120, Monterey, CA 93943



GRADUATE CERTIFICATE in ROBOTICS ENGINEERING

*REAL-TIME AND FLEXIBLE-TIME
DISTANCE LEARNING PROGRAM*



*Advance your skills in one
of the fastest trending,
in-demand, and defense
relevant technology sectors.*



NAVAL POSTGRADUATE SCHOOL

PROGRAM OVERVIEW

The Naval Postgraduate School (NPS) offers the **Graduate Certificate Program in Robotics Engineering**. This highly-relevant, four-course online program helps DoD professionals advance their careers and

become leaders in the emerging fields of unmanned vehicles (UxVs), robotics, and autonomous systems. Students will also gain hands-on lab experience during scheduled on-site visits to Monterey, CA.

CURRICULUM: 4 COURSES

Foundations

1st Quarter

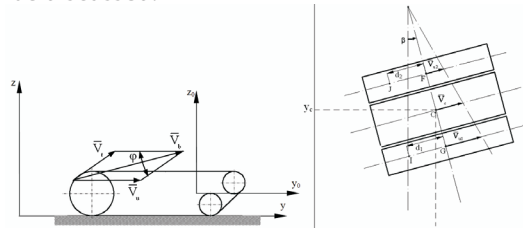
ME3420 Computational Foundations for Robotics (3-2)

This course prepares students for future engineering coursework at NPS. It offers a hands-on introduction to foundational computational concepts and development practices employed in the engineering of robotics and autonomous systems. Topics include both general purpose programming and intermediate techniques specific to robotics, e.g., component-based development, event-based programming, cyber-physical interface, and real-time execution.

2nd Quarter

EC4310 Fundamentals of Robotics (3-2)

This course presents the fundamentals of land-based robotic systems covering the areas of locomotion, manipulation, grasping, sensory perception, and teleoperation. Main topics include kinematics, dynamics, manipulability, motion/force control, real-time programming, controller architecture, motion planning, navigation, and sensor integration. Several Nomad mobile robots will be used for class projects. Military applications of robotic systems will be discussed.



Applications

3rd Quarter

PC3014 Intermediate Applied Physics Laboratory (3-4)*

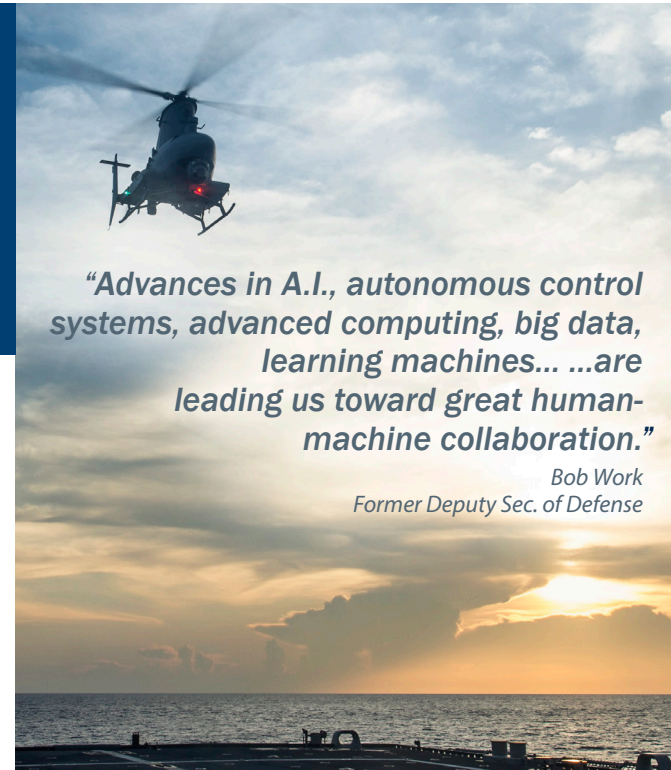
This course continues with the instrumentation and signal processing topics begun in PC2013. Included are: controllable oscillators and RF modulation/demodulation techniques, basic electrical noise sources, device damage and failure modes, elementary digital logic gates and lcs. Also included are an overview of relevant microcomputer topics, such as digital encoding schemes, analog and digital interfacing, and serial communications and networking. At the discretion of the instructor, hands-on projects incorporating the course material, may be assigned. Typical projects are: in-air sonar systems, radio receivers and transmitters, and opto-electronic communications links.

4th Quarter

AE4820 Robotic Multibody Systems or Elective (3-2)*

This course focuses on the analytical modeling, numerical simulations and laboratory experiments of dynamics and control of autonomous maneuvering of robotic multibody systems. Students learn about robotic manipulation on fixed and moving bases. Applications include orbiting spacecraft, underwater, surface, ground and airborne vehicles.

**Applications courses may be substituted for a variety of other courses across campus, pending availability and demand.*



“Advances in A.I., autonomous control systems, advanced computing, big data, learning machines... ..are leading us toward great human-machine collaboration.”

*Bob Work
Former Deputy Sec. of Defense*

MQ-8B Fire Scout, UAV

OUTCOMES / CAREER ADVANCEMENT

The Robotics Engineering graduate certificate provides:

- Technical concepts and skills necessary to understand, design, and operate robotic systems.
- Faculty-led instruction plus hands-on (lab and collaborative) activities.
- Flexible and self-paced learning experiences.
- Challenging opportunities to apply knowledge to defense-related problems and contexts.
- Career advancement and an added credential for practicing engineers.

For civilian and active-duty service members.