



### EXCELLENCE IN INSTRUCTION

Engagement between the faculty and students is the central thrust of our ocean engineering graduate program. Our faculty brings diverse and extensive experience in naval ship design, marine propulsion, and aero/hydrodynamics. Other developing fields, such as global positioning system (GPS) and cyber-physical security, will enhance your classroom and lab experience.

The department is home to a number of unique ocean engineering facilities, including Hydro-Elasticity Laboratory, Hydrodynamics Laboratory, Marine Robotics Laboratory, and Newport News Shipbuilding (NNS) / Aerospace and Ocean Engineering (AOE) Teaching and Research Laboratory.

### DESIGNED FOR STUDENT SUCCESS

AOE graduate alumni have been highly successful after graduation. Many seek and obtain research and development positions with industry or government agencies, while others pursue academic positions at colleges and universities. The department's strong academic reputation and the outstanding professional performance of our alumni ensure that aerospace and ocean engineering graduates remain in very high demand.



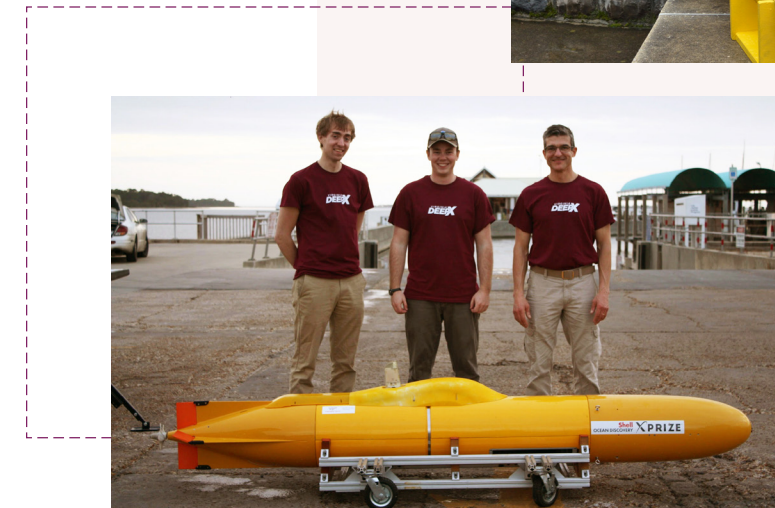
### ADMISSION REQUIREMENTS

- A bachelor's degree, typically in engineering, science, mathematics, or closely related field from an accredited institution.
- Applicants should provide evidence that shows genuine promise of success in graduate study of a good academic record. A 3.0 GPA or better on a 4.0 scale is generally required.
- Full admission to the Virginia Tech Graduate School ([www.graduateschool.vt.edu](http://www.graduateschool.vt.edu)).

### APPLICATION DOCUMENTS

- Official transcripts sent to the Graduate School.
- Statement of Interest and Curriculum Vitae, which can be attached to the online graduate application (<https://applyto.graduateschool.vt.edu/pages/login.php>).
- Three Letters of Recommendation.
- GRE General Test (Waived for applicants with significant work experience. Email [gradadvise-g@vt.edu](mailto:gradadvise-g@vt.edu) to see if you qualify).
- Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS) Scores for international applicants.
- Immigration Information Form for international applicants.

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## YOU ARE WHAT TOMORROW WILL NEED

A number of engineering achievements in the past century shaped the world we live in today: flight, space exploration, the birth of computers and the internet. Future engineers expect to tackle complex 21st century issues such as providing energy from fusion, engineering the tools for Earth and planetary sciences and securing cyber-physical systems.

Ocean engineers develop, design, and analyze technology that operates in the unpredictable environment on or below the surface. You will design ships that are faster and ensure protection from cyber-physical threats, keeping our waters safe and secure.

- The Kevin T. Crofton Department of Aerospace and Ocean Engineering is ranked as #11 for aerospace and ocean engineering graduate schools by U.S. News and World Report.
- Engage in an exciting and challenging curriculum. While courses on a wide range of traditional ocean engineering subjects are offered, you will also explore modern-day issues such as cyber-physical systems and distributed control, aero/hydroacoustics and ethics in autonomous systems.
- Learn from leading ocean engineering faculty experts, who bring experience from the U.S. Navy, industry research and design arenas.
- Our Masters students are heavily involved in hands-on research and often work in teams with other graduate students on a wide-range of topics, some focused in newly developing areas and some multidisciplinary in nature.

## GRADUATE PROGRAMS

The Kevin T. Crofton Department of Aerospace and Ocean Engineering offers Masters and Doctoral programs in aerospace engineering, a Masters in ocean engineering, and a certificate program in naval engineering. The department's unique blend of aerospace engineering and ocean engineering capitalizes on the commonalities in the design and analysis of vehicles and structures that travel in space, air and the oceans.

## PROGRAM REQUIREMENTS

Students must complete 30 graduate credit hours, including four core courses:

- AOE 4404: Applied Numerical Methods (Spring)
- AOE 5074: Advanced Ship Structural Analysis (Fall)
- AOE 5204: Vehicle Dynamics and Control (Fall)
- AOE 5334: Advanced Ship Dynamics (Spring)

Up to 50% of the graded courses on the Plan of Study may be transferred from a graduate program at another institution.

Students are required to complete one of two tracks, either a Master of Science Thesis, which focuses more on research, or a Master of Science Non-Thesis which is project based. Specific requirements for each track can be found in the Graduate Study Policies and Procedures Manual.

All students must undergo a final comprehensive oral exam upon completion of the degree requirements.

## TYPICAL COURSES IN THE FALL SEMESTER

- AOE 5104: Advanced Aero and Hydrodynamics
- AOE 5204: Vehicle Dynamics and Control
- AOE 5434G: Advanced Introduction to Computational Fluid Dynamics
- AOE 5774: Nonlinear Systems Theory

## TYPICAL COURSES IN THE SPRING SEMESTER

- AOE 4404: Applied Numerical Methods
- AOE 5034: Mechanical and Structural Vibrations
- AOE 5054: Elasticity Stability
- AOE 5064: Structural Optimization
- AOE 5144: Boundary Layer Theory and Heat Transfer
- AOE 6145: Computational Fluid Dynamics
- AOE 6444: Verification and Validation of Scientific Computing
- AOE 6744: Linear Control Theory

## VARIABLE CREDIT COURSES

- AOE 5904: Project and Report
- AOE 5974: Independent Study
- AOE 5984: Special Study
- AOE 5994: Research and Thesis

\*Course titles are found in the Graduate Catalog at [http://graduateschool.vt.edu/graduate\\_catalog](http://graduateschool.vt.edu/graduate_catalog)

## NAVAL ENGINEERING GRADUATE CERTIFICATE

Naval Engineering includes engineering and sciences applied in the research, development, design, construction, operation, maintenance and logistic support of surface and subsurface ships, craft, aircraft, and vehicles (manned and autonomous) used by the Navy for the nation's defense.

This certificate program is inherently multidisciplinary and is available to all departments in the College of Engineering as well as other colleges.

The program attracts and enables graduate students throughout the college to better prepare for this critical profession. It is open to all graduate students in the College of Engineering including distance-learning students.

## REQUIRED COURSEWORK IN ADDITION TO GRADUATE DEGREE:

- AOE 5304: Advanced Naval Architecture or equivalent
- AOE 5305: Marine Engineering or equivalent\*
- AOE 5314: Naval Ship System Design and Effectiveness\*\*

\* May substitute AOE 5074: Advanced Ship Structural Analysis if Marine Engineering was taken previously as an undergraduate or other.

\*\* It is strongly recommended that students who wish to take AOE 5314: Naval Ship System Design and Effectiveness, first take AOE 4264: Principles of Naval Engineering.