

Aerospace Engineering Graduate Degree Programs Virginia Tech

"Virginia Tech's AOE Department does not only provide an amazing academic curriculum, but also pushes for each student, undergraduate and graduate, to involve themselves in pertinent research in the aerospace and ocean field providing for a more hands on experience. For my graduate studies, I focused on the design and evaluation of geometric nonlinearities using a joined wing sensorcraft flight test article. This required me to be a part of every engineering aspect that goes into an aircraft. All of this was immediately applicable when I moved to my professional career and provided me with a great foundation for what I do now! "

--Jeffrey Garnand-Royo, M.S.

Who Should be Interested?

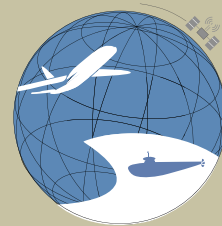
- Students with a background in engineering, science, mathematics, or physics.
- Individuals seeking to apply mathematics, physics, or associated scientific principles to the design, development, and operation of aerospace systems.
- Aerospace engineering professionals wanting to advance in their career in the aerospace industry, or in research and development.
- Anyone wanting to enhance their technical, analytical, critical thinking, and research skills within the field of aerospace engineering.



Program Overview

Aerospace engineering requires a comprehensive background in all of the areas associated with aerospace systems:

- **Aerodynamics:** Subsonic, supersonic, transonic, and computational aerodynamics are all part of the Aerospace Engineering program.
- **Structures:** Light yet super-strong, modern aerospace structures employ composite materials and innovative geometries. Aerospace engineering students learn the latest experimental and numerical techniques for structural analysis.
- **Propulsion:** From props to turbo-props to jets to rockets, aerospace engineering students use their backgrounds in fluid dynamics, physics, and thermodynamics to understand and analyze the propulsion systems of the future.
- **Flight Mechanics:** Key to making the aerospace systems of tomorrow go faster, further, higher, and deeper into space is understanding astrodynamics, aircraft performance, stability, and control.
- **Electives:** Other courses include engineering design optimization, automatic flight control, computational aerodynamics, computational structural analysis, and computational fluid dynamics.



Virginia Tech's Program is Designed for Student Success

- Earn a degree from Virginia Tech's College of Engineering ranked as one of the Top 25 graduate schools by U.S. News and World Report.
- Engage in an exciting curriculum that provides students with the knowledge and tools to enter the diverse field of aerospace engineering.
- Learn from leading aerospace engineering faculty who bring real-world experience from the space and aviation industries.
- Be among the best of the best - Virginia Tech's aerospace engineering graduates are employed with the leading aerospace companies.
- Collaborate with students from all over the world to bring a dynamic exchange to the classroom.

Engineering by Design

Escalate your career with Virginia Tech's
Masters and Doctoral Degrees in Aerospace Engineering

"The AOE Department has facilitated my development as a professional through a range of exciting research and teaching opportunities! The Space@VT group has allowed me to complete research that spans multiple engineering disciplines and apply techniques from each to tackle new problems."

--John Janeski, Ph.D.

For more information, visit our website
at www.aoe.vt.edu
or call 540-231-6612.

Graduate Programs

The Aerospace and Ocean Engineering Department offers Masters and Doctoral programs in aerospace engineering, a Masters program in ocean engineering, and a certificate program in naval engineering. Within aerospace engineering, graduate students may pursue a non-thesis Master of Engineering degree, a Master of Science degree (thesis or non-thesis option), or a Doctor of Philosophy degree. Within ocean engineering, graduate students may pursue a Master of Science degree (thesis or non-thesis option). Students wishing to pursue a doctorate in an ocean engineering related topic may do so as a specialization within the aerospace engineering Ph.D. program. A certificate in naval engineering may be obtained with any of these degrees.

The department's unique blend of aerospace engineering and ocean engineering exploits commonalities in the design and analysis of vehicles and structures that operate in fluids. While the properties of the ambient fluid may differ dramatically for ocean, atmospheric, and space vehicles/structures, the dominant physical processes that govern the behavior of these systems are quite similar. Graduate students may leverage the department's broad faculty expertise to master tools and methods that span a wide range of application domains.

The aerospace and ocean engineering graduate programs emphasize a broad background in aero/hydrodynamics, vehicle structures, and vehicle dynamics and control, with deeper specialization in areas of interest to the student. Doctoral students, for example, must declare a specialization in applied mathematics, applied physics and space engineering, aero/hydrodynamics, dynamics and control, ocean engineering, or structures.

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

Points of Interest

Number of Active Faculty: 24

Number of Masters and Ph.D. Students: More than 100

Unique Facilities: Stability, Open-Jet, Boundary-Layer, Low Speed, Transonic, Supersonic, and Hypersonic Wind Tunnels; new propulsion laboratory, new Space@VT building, new Kentland Experimental Aerial Systems Laboratory, new Center for Renewable Energy and Aerodynamic Testing (CREATe)

Multidisciplinary Research Programs: Collaborative Center for Multidisciplinary Sciences, Naval Engineering Program, Virginia Center for Autonomous Systems

Tracks and Courses

Masters students must complete 30 graduate credit hours, including four core courses listed below. Doctoral students must complete 90 graduate credit hours.

- AOE 4404: Applied Numerical Methods
- AOE 5024: Vehicle Structures
- AOE 5104: Advanced Aero and Hydrodynamics
- AOE 5204: Vehicle Dynamics and Control

Up to 50% of the graded courses on the Plan of Study may be transferred from a graduate program at another institution. A final comprehensive oral exam is required. Specific requirements for each track can be found in the Graduate Study Policies and Procedures Manual.

¹ Course titles are found in the Graduate Catalog (graduateschool.vt.edu/graduate_catalog/).



Master of Engineering Non-Thesis Track

- Students must complete 3-6 credits of AOE 5904¹.
- Students must complete a minimum of 15 credits of graded course work numbered 5000 and higher.
- A maximum of 9 credits of AOE 5974¹ and AOE 5984¹ is allowed.
- A maximum of 6 credits of approved 4000 level course work is allowed.
- A minimum of one approved math course is required.

Master of Science Thesis Track

- Students must complete 9-12 credits of approved electives.
- Students must complete 6-10 credits of AOE 5994¹.
- Students must complete a minimum of 12 credits of graded course work numbered 5000 and higher.
- A maximum of 6 credits of AOE 5974¹ and AOE 5984¹ is allowed.
- A maximum of 6 credits of approved 4000 level course work is allowed.

Master of Science Non-Thesis Track

- Students must complete 18 credits of approved electives.
- Students may complete 3-6 credits of AOE 5904¹.
- Students must complete a minimum of 12 credits of graded course work numbered 5000 and higher.
- A maximum of 9 credits of AOE 5974¹ and AOE 5984¹ is allowed.
- A maximum of 6 credits of approved 4000 level course work is allowed.

Doctor of Philosophy Track

- Students must complete a minimum of 30 credits of AOE 7994¹.
- Students must complete a minimum of 27 credits of graded course work numbered 5000 and higher.
- A maximum of 18 credits of AOE 5974¹ and AOE 5984¹ is allowed.
- A maximum of 6 credits of approved 4000 level course work is allowed.

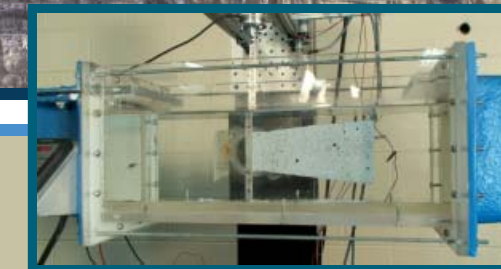
Program Eligibility

Admissions Requirements

- A bachelor's degree, typically in engineering, mathematics, or physics 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 required.
- Full admission to the Virginia Tech Graduate School (www.graduateschool.vt.edu).

Application Documents

- Official transcripts sent to both the Graduate School and to the Aerospace and Ocean Engineering Department.
- Statement of Interest and Curriculum Vitae, which can be attached to the online graduate application (www.applyweb.com/apply/vtechg/index.html).
- Graduate Record Examination (GRE) Scores.
- Three Letters of Recommendation.
- Test of English as a Foreign Language (TOEFL) Scores for international applicants.
- Immigration Information Form for international applicants.



Aerospace and Ocean Engineering

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