

AEROSPACE ENGINEERING (ENAE)

Graduate Degree Program
College: Engineering

Abstract

The Aerospace Engineering Department offers a broad program in graduate studies leading to the degrees of Master of Science (thesis and non-thesis) and Doctor of Philosophy. Graduate students can choose from the following areas of specialization: aerodynamics, hypersonics and propulsion; dynamics, control and autonomy; rotorcraft; space systems; and structural dynamics and composites. Within these disciplines, the student can tailor programs in related topics such as computational fluid dynamics, aeroelasticity, hypersonics, composites, smart structures, finite elements, space propulsion, robotics, and human factors.

Financial Assistance

Financial assistance for graduate study may be in the form of fellowships or research or teaching assistantships. Both fellowship students and research assistants work with a faculty advisor on a specific research topic which often leads to a thesis, scholarly paper, or dissertation. Teaching assistants are assigned to specific courses to help professors with instruction, grading, or other classroom tasks. All full-time applicants are automatically considered for these fellowships and assistantships, which often cover tuition in addition to a stipend.

Contact

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Website: <http://www.aero.umd.edu>

Courses: ENAE (<https://academiccatalog.umd.edu/graduate/courses/enae/>)

ADMISSIONS

GENERAL REQUIREMENTS

- Statement of Purpose
- Transcript(s)
- TOEFL/IELTS/PTE (international graduate students (<https://gradschool.umd.edu/admissions/english-language-proficiency-requirements/>))

PROGRAM-SPECIFIC REQUIREMENTS

- Letters of Recommendation (3)
- Graduate Record Examination (GRE) (optional)
- CV/Resume
- Writing Sample (optional)
- Description of Research/Work Experience

- Portfolio PDF Upload (optional)
- GPA: 3.2 for M.S. and 3.5 for Ph.D.

Applicants should have a B.S. degree in Aerospace Engineering (or in a closely related field) with a recommended minimum GPA of 3.2/4.0 from an accredited institution. Applicants with a marginal academic record may be conditionally approved for admission to the M.S. program if other evidence of accomplishment is provided (i.e. publications or exceptional letters of recommendation). Admission to the Ph.D. program requires an academic record indicating promise of the high level of accomplishment required for the degree. The Graduate Record Examination (GRE) is strongly encouraged for applicants seeking financial support.

APPLICATION DEADLINES

Type of Applicant	Fall Deadline	Spring Deadline
Domestic Applicants:		
US Citizens and Permanent Residents	April 2, 2025	October 10, 2024
International Applicants:		
F (student) or J (exchange visitor) visas; A,E,G,H,I and L visas and immigrants.	March 14, 2025	September 26, 2024

RESOURCES AND LINKS:

Program Website: [aero.umd.edu \(http://www.aero.umd.edu/\)](http://www.aero.umd.edu/)

Application Process: [gradschool.umd.edu/admissions/application-process/step-step-guide-applying \(https://gradschool.umd.edu/admissions/application-process/step-step-guide-applying/\)](https://gradschool.umd.edu/admissions/application-process/step-step-guide-applying)

REQUIREMENTS

- Aerospace Engineering, Doctor of Philosophy (Ph.D.) (<https://academiccatalog.umd.edu/graduate/programs/aerospace-engineering-enaе/aerospace-engineering-phd/>)
- Aerospace Engineering, Master of Science (M.S.) (<https://academiccatalog.umd.edu/graduate/programs/aerospace-engineering-enaе/aerospace-engineering-ms/>)

FACILITIES AND SPECIAL RESOURCES

The departmental laboratories and facilities for large-scale experimental research include the following:

- **Space Systems Laboratory (SSL):** Houses the Neutral Buoyancy Research Facility (NBRF), a multi-million dollar laboratory featuring a 50-foot diameter by 25-foot deep water tank, for simulating the microgravity environment of space as well as for developing and testing spacecraft systems.
- **Alfred Gessow Rotorcraft Center (AGRC):** An Army/Navy/NASA designated Vertical Lift Center of Excellence. The AGRC conducts multidisciplinary research focused on advancing the field of rotorcraft technology, using experimental rotor rigs capable of testing 6-foot diameter rotors and other hover test facilities.
- **Glenn L. Martin Wind Tunnel (GLMWT):** A subsonic wind tunnel that has served the department for over 75 years, with 8-foot by 11-foot test section and airspeeds of up to 330 feet per second. Recent

upgrades and modernization ensure it remains a valuable resource for testing UAVs, cars, rotorcraft and other aircraft models.

- **High-speed Aerodynamics and Propulsion Laboratory (HAPL):** Houses high-speed wind tunnels capable of simulating hypersonic flight conditions. The high-temperature Ludwig tube (HTLT) can generate Mach numbers of 6.2 and 8.0 for about 100 milliseconds, while a reflected shock tunnel (HyperTERP) with Mach 6 nozzle is capable of reservoir temperatures and pressures up to 1500 K and 25 atmospheres.

Beyond these large-scale facilities, the department boasts a diverse range of specialized laboratories catering to various research areas, including:

- **Advanced Propulsion Research Laboratory:** Houses a high-enthalpy vitiated-air testing facility for studying advanced propulsion concepts.
- **Aerodynamics Laboratory:** Houses a 6-inch by 6-inch supersonic wind tunnel for high-speed aerodynamic education and research.
- **Collective Dynamics and Control Laboratory:** Equipped for investigating cooperative control of autonomous robotic systems.
- **Composites Research Laboratory:** Provides resources for research on composite materials, including a microprocessor-controlled autoclave and an environmental conditioning chamber.
- **Dynamic Effects Laboratory:** Specializes in explosive testing capabilities.
- **Extended Reality Flight Simulation and Control Laboratory:** Focuses on advanced flight simulation techniques.
- **Hydrogen and Electric Flight Laboratory:** Conducts research on electric and hybrid propulsion systems, with facilities for testing these engines.
- **Machine Learning for Dynamical Systems Laboratory:** Explores the application of machine learning algorithms in aerospace engineering.
- **Motion and Teaming Laboratory:** Develops algorithms and methods for autonomous robots and multi-agent systems.
- **Planetary Surfaces and Spacecraft Laboratory:** Utilizes advanced techniques to study the physics of the space environment.
- **Separated and Transient Aerodynamics Laboratory:** Focuses on the aerodynamics of flapping wings, turbines, and rotorcraft flows.
- **Space Power and Propulsion Laboratory:** Equipped with various plasma sources, probes, and diagnostic tools for research in space propulsion technologies.
- **Tilt Rotor Laboratory:** Houses the Maryland Tiltrotor Rig (MTR) for studying tiltrotors.
- **The X Laboratory:** Specializes in the design of cyber-physical and autonomous multi-agent systems.