

# ENGINEERING, MASTER OF SCIENCE (M.S.) WITH A CONCENTRATION IN AEROSPACE ENGINEERING

## Program mission

The mission of the M.S. in Engineering degree is to provide graduate students with learning opportunities for acquiring a broad foundation of engineering knowledge including business and manufacturing aspects; an in-depth research experience at the frontiers of engineering; and skills for lifelong learning and professional development. Graduates of this program will pursue careers in business/industry and government, or will pursue doctoral degrees.

1. **Advanced research skills:** To produce graduates who possess the necessary advanced analytical, technical and research skills in engineering and the sciences – responds directly to the higher goal of fulfilling the needs of industry, academe and research laboratories for effective, productive engineers, professors and researchers
2. **Communication:** To produce graduates who possess a facility with both written and oral communications – emanates from the requirement that engineers, researchers and professors must be able to interact and share ideas with others in the work environment, and at a higher level, be capable of creative self-expression, conveying knowledge and leadership
3. **Advanced problem-solving:** To produce graduates who demonstrate creativity and innovation in solving technological problems – stems from the realization that new knowledge and new solutions to existing problems are necessary to meet the needs of our changing society and to advance the quality of human life

## Student learning outcomes

1. **Apply advanced knowledge of mathematics, science or engineering:** Graduates will demonstrate an ability to apply advanced knowledge of mathematics, science or engineering.
2. **Communicate effectively:** Graduates will demonstrate an ability to communicate effectively.
3. **Identify, formulate and solve engineering problems:** Graduates will demonstrate an ability to identify, formulate and solve engineering problems.

## VCU Graduate Bulletin, VCU Graduate School and general academic policies and regulations for all graduate students in all graduate programs

The VCU Graduate Bulletin website documents the official admission and academic rules and regulations that govern graduate education for all graduate programs at the university. These policies are established by the graduate faculty of the university through their elected representatives to the University Graduate Council.

It is the responsibility of all graduate students, both on- and off-campus, to be familiar with the VCU Graduate Bulletin as well as the **Graduate School website** and academic regulations in individual school and department publications and on program websites. However, in all cases,

the official policies and procedures of the University Graduate Council, as published on the VCU Graduate Bulletin and Graduate School websites, take precedence over individual program policies and guidelines.

Visit the **academic regulations section for additional information on academic regulations for graduate students.**

## Degree candidacy requirements

A graduate student admitted to a program or concentration requiring a final research project, work of art, thesis or dissertation, must qualify for continuing master's or doctoral status according to the degree candidacy requirements of the student's graduate program. Admission to degree candidacy, if applicable, is a formal statement by the graduate student's faculty regarding the student's academic achievements and the student's readiness to proceed to the final research phase of the degree program.

Graduate students and program directors should refer to the following degree candidacy policy as published in the VCU Graduate Bulletin for complete information and instructions.

Visit the **academic regulations section for additional information on degree candidacy requirements.**

## Graduation requirements

As graduate students approach the end of their academic programs and the final semester of matriculation, they must make formal application to graduate. No degrees will be conferred until the application to graduate has been finalized.

Graduate students and program directors should refer to the following graduation requirements as published in the Graduate Bulletin for a complete list of instructions and a graduation checklist.

Visit the **academic regulations section for additional information on graduation requirements.**

## Other information

Student handbook (<http://www.egr.vcu.edu/current-students/graduate-student-services/resources-forms/>) is available on the College of Engineering website.

Apply online today. (<https://www.vcu.edu/admissions/apply/graduate/>)

## Admission requirements

Degree:	Semester(s) of entry:	Deadline dates:	Test requirements:
M.S.	Fall (preferred)	Jun 1 (Jan 15 for financial assistance)	Language test as required by International Admissions
	Spring	Nov 15	

**Note:** Students may begin a course of study in either the fall, spring or summer semesters for the engineering programs, although a start in the fall semester is preferred.

In addition to the general admission requirements of the VCU Graduate School (<http://bulletin.vcu.edu/graduate/study/admission-graduate-study/admission-requirements/>) and the College of Engineering, applicants to the aerospace engineering concentration must have a B.S. degree in a closely related discipline.

## Degree requirements

In addition to the VCU Graduate School graduation requirements (<http://bulletin.vcu.edu/academic-regs/grad/graduation-info/>), students must meet the following requirements.

### Thesis option

Students seeking the M.S. degree are required to take a minimum of 30 credit hours of approved graduate courses (including research). Each student must complete 12 credit hours in concentration course work, 12 credit hours in concentration electives and six credit hours in thesis research. The student's adviser must review and approve all course work and thesis research credit hours. At least half of the didactic credit hours required in the student's program must be those designated as exclusively for graduate students, that is, those at the 600 level or above. A GPA of 3.0 at the time of completion is required for graduation.

Each student must conduct an original investigation under the supervision of the permanent adviser and prepare a thesis reporting the results of this research and analyzing its significance in relation to existing scientific knowledge. This study is reported in a thesis prepared in acceptable form and style. Upon approval of the thesis by the adviser, the student submits a copy to each member of the advisory committee. The student's advisory committee members examine the thesis and decide upon its acceptability. Each committee member reports to the student's adviser when the thesis is acceptable for defense. The thesis is approved for defense only if accepted unanimously. Upon approval of the thesis, the student appears for a final oral examination administered by the student's advisory committee. This examination of an M.S. candidate includes the subject matter of course work as well as the thesis.

### Non-thesis option

Students seeking the non-thesis M.S. degree are required to take a minimum of 30 credit hours of approved graduate courses. Each student must complete 15 credit hours in concentration course work and 15 credit hours in concentration electives.

The student's adviser must review/approve all course work in advance of enrollment. At least half the didactic credit hours required in the student's program must be designated as 600 level or above. Students need a minimum GPA of 3.0 to graduate.

## Curriculum requirements

### Thesis option

Course	Title	Hours
<b>Concentration component</b>		
EGMN 604	Mechanical and Nuclear Engineering Materials	3
EGMN 605	Mechanical and Nuclear Engineering Analysis	3
EGMN 606	Mechanical and Nuclear Engineering Continuum Mechanics	3
EGMN 607	Heat and Mass Transfer Theory and Applications	3

### Concentration electives

Engineering or science course work (including 500-level or higher courses in EGRE, ENGR, EGRB, EGMN, CMSC, CLSE, PHYS, MATH, OPER, STAT, CHEM) approved by the advisory committee: This component allows the student to take courses in either engineering or science with approval of the student's adviser.

### Directed research component

This component emphasizes research directed toward completion of degree requirements under the direction of an adviser and advisory committee.

EGMN 697	Directed Research in Mechanical and Nuclear Engineering	6
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**Total Hours** **30**

The thesis option can be tailored to meet the individual student's academic goals and research interests. Students seeking to take course work and conduct their research in the aerospace concentration should contact the graduate program coordinator for detailed information about that concentration.

**The minimum number of graduate credit hours required for this degree is 30.**

### Non-thesis option

Course	Title	Hours
<b>Concentration component</b>		
EGMN 604	Mechanical and Nuclear Engineering Materials	3
EGMN 605	Mechanical and Nuclear Engineering Analysis	3
EGMN 606	Mechanical and Nuclear Engineering Continuum Mechanics	3
EGMN 607	Heat and Mass Transfer Theory and Applications	3
EGMN 661	Computational Fluid Dynamics	3

### Concentration electives

Engineering or science course work (including 500-level or higher courses in EGRE, ENGR, EGRB, EGMN, CMSC, CLSE, PHYS, MATH, OPER, STAT, CHEM) approved by the adviser: This component allows the student to take courses in either engineering or science with approval of the student's adviser.

**Total Hours** **30**

The non-thesis option can be tailored to meet the individual student's academic goals and research interests.

**The minimum number of graduate credit hours required for this degree is 30.**

Students who complete the requirements for this degree will receive a Master of Science in Engineering.

### Contact

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**Program website:** [egr.vcu.edu/academics/grad-degrees/aerospace-engineering-masters/](https://egr.vcu.edu/academics/grad-degrees/aerospace-engineering-masters/) (<https://egr.vcu.edu/academics/grad-degrees/aerospace-engineering-masters/>)