Doctor of Engineering

Engineering with a Concentration in Modeling and Simulation (DEng)

The D. Eng. in Modeling and Simulation program focuses on developing the advanced skills and knowledge to enable the graduate to conduct and lead advanced technical M&S projects in an engineering environment. It affords engineering practitioners the opportunity to achieve advanced graduate education beyond the master's degree.

Admission Criteria

Consideration for admission to the Doctor of Engineering program requires the following:

1. A formal application;
2. Undergraduate and graduate transcripts;
3. Two letters of recommendation (One of the letters of recommendation should be from an agency point of contact if a sponsoring agency is involved. Sponsorship does not necessarily imply financial support, but it rather focuses on the provision of a project and access to data, information, and means to apply and test a solution.);
4. An essay describing the applicant's preparation for graduate work, personal and academic goals, and professional objectives.
5. A personal or telephone interview of the applicant with the graduate program director will be required;
6. Engineering experience of at least two years within the last five years;
7. Master's degree with a grade point average of 3.5 out of 4.0 in an appropriate STEM field from an accredited institution of higher education.

Curriculum Requirements

Doctor of Engineering Curriculum

A minimum of 48 hours of graduate work beyond the master's degree is required including:

- 18 credit hours of core courses
- At least 18 credit hours of graduate coursework in the student's area of specialization as determined by the department
- At least 12 credit hours of applied doctoral project
- At least three fifths of the course work must be at 800-level.

Modeling and Simulation Concentration

The program of study for the D.Eng. in M&S program is developed with the approval of the graduate program director and the student's advisor. The program shall include a minimum of 18 credits of professional course work (http://catalog.odu.edu/graduate/frankbattencollegeofengineeringandtechnology/#doctorofengineeringprogram). Some professional courses can be substituted by other courses approved by the Graduate Program Director if these professional courses are not available.

The D.Eng. also requires 18 credits of technical core course work beyond the master's degree distributed as follows:

Technical Core Courses

Select three Advanced Simulation Course from the list below		3
MSIM 830	Simulation Formalisms	3
MSIM 842	Synthetic Environments	3
MSIM 851	Advanced Analysis for Modeling and Simulation	3
Two approved technical elective courses		6
Total Credit Hours		**18**

Advanced Simulation Course Examples (3 credits)

MSIM 811	Finite Element Analysis	3
MSIM 815	High Performance Computing Simulation and Data Analytics	3
MSIM 822	Cluster Parallel Computing	3
MSIM 825	Principles of Combat Modeling and Simulation	3
MSIM 876	Simulation Modeling in Transportation Networks	3
Other courses with Graduate Program Director's approval.		

No more than three credits from course work satisfying foundation knowledge requirements may be included in the program of study for technical elective credit. At least three-fifths of the non-project coursework must be at the 800-level.

Certain students entering the program will be required to complete additional pre-requisite leveling courses. These courses are: MSIM 510; MSIM 541; MSIM 602; and MSIM 603.

For graduation, students must complete the requirements for their final project and the Responsible Conduct of Research for Engineers training online.

Additional Requirements

Continuation and Graduation Requirements

The continuation requirements are the same as the continuation requirements for the Doctor of Philosophy programs. The graduation requirements for the Doctor of Engineering degree are as follows:

1. Satisfactory completion of a minimum of 48 credit hours of approved graduate work beyond the master's degree, including the doctoral project.
2. Satisfactory performance on a diagnostic examination at the completion of nine credit hours of coursework. The purpose of this examination is to determine if the student has adequate background to pursue a doctoral degree. The diagnostic examination may only be repeated once.
3. Satisfactory completion of a written and oral candidacy examination. The student will take the candidacy examination when he/she is within six credit hours of completing all the required coursework. The candidacy examination may only be repeated once.
4. Preparation and successful defense of a project concept proposal. The student will be required to prepare and present a concept proposal related to the work that will be undertaken for the doctoral project. The concept proposal will be defended before the doctoral committee.
5. Submission of progress reports as deemed necessary by the doctoral committee.
6. Written report of the project results. The doctoral project shall be documented in a manner consistent with advanced, professional work. The project report will follow the standard format for Old Dominion University dissertations and theses.
7. Comprehensive oral defense of the doctoral project before the student's doctoral committee and a general audience.

The applied doctoral project must successfully demonstrate the student's mastery of the subject area and his/her ability to apply advanced technical knowledge to identify, formulate, and solve novel and complex engineering problems. The project must address a complex but practical problem currently faced by the public, industry, or government, and it must provide a solution that satisfies all the technical, social, political, economic, safety, sustainability, and environmental requirements and/or constraints. The doctoral project committee will have at least three Old Dominion University faculty members certified for graduate instruction; two faculty members

must be from the major department. The committee must also have at least one non-University person with special knowledge of the project subject area.