Master’s Admission Information

Master of Engineering Management/Master of Science in Engineering Management
Admission to graduate programs in Engineering Management is in accordance with the general requirements for graduate degrees as specified in this Catalog. Applicants must have an undergraduate degree from an ABET-accredited program in engineering or engineering technology or from an accredited program in applied science with a GPA of 3.00 (out of 4.00) or better. Students with an undergraduate GPA between 2.70 and 3.00 may be admitted provisionally based on their academic preparation and GRE scores. The Department requires university-level TOEFL scores for all international students when English is not their first language.

Master of Engineering—Systems Engineering
Admission to the graduate program in Systems Engineering is in accordance with the general requirements for graduate degrees as specified in this Catalog. Specific requirements for systems engineering include a bachelor’s degree in science, engineering, mathematics, computer science, or other related field. Applicants with a bachelor’s degree in a non-technical discipline with approved college-level calculus and five years experience are eligible for admission to the program. An undergraduate grade point average of 3.00 (out of 4.00) in both the major and overall is required. Students with a GPA between 2.70 and 3.00 may be admitted provisionally based upon their work record, academic preparation, and GRE scores. Students with a GPA below 2.70 must complete additional academic course work so their overall GPA is raised to the appropriate level for admission. A minimum TOEFL score of 550 is required for all international students when English is not their first language.

Master’s Degree Requirements

Master of Engineering Management/Master of Science in Engineering Management
The M.E.M and M.S. programs are oriented toward the design and management of technical projects, complex operations, and technology-based organizations. The Master of Science (M.S.) program requires thesis research, and the student is expected to identify an advisor and work with him/her starting from the first semester. Courses are scheduled in the evenings and at off-campus sites, including the Peninsula Higher Education Center in Hampton and the Virginia Beach Higher Education Center. A complete M.E.M. program is available through Old Dominion University’s TELETECHNET distance learning program and through the Commonwealth Graduate Engineering Program. Both systems transmit courses to educational, industrial, and government locations throughout Virginia.

The master’s degree programs in the Department of Engineering Management and Systems Engineering are in accordance with the general requirements for master’s degrees as specified in the Requirements for Graduate Degrees section of this Catalog. Specific requirements for the Master of Engineering Management and Master of Science in engineering management are as follows:

The Engineering Management and Systems Engineering Department requires 31 credit hours of course work (10 three-credit courses plus one credit capstone course) for the M.E.M. The M.S. degree requires 24 credit hours of course work and six credit hours of thesis research for a total of 30 credit hours.

M.E.M. Courses:
Prerequisite *
Core 15
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>ENMA 600</td>
<td>Cost Estimating and Financial Analysis</td>
</tr>
<tr>
<td>ENMA 601</td>
<td>Analysis of Organizational Systems</td>
</tr>
<tr>
<td>ENMA 603</td>
<td>Operations Research</td>
</tr>
<tr>
<td>ENMA 604</td>
<td>Project Management</td>
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</tbody>
</table>

Old Dominion University
The Master of Engineering degree program in systems engineering is in accordance with the general requirements for graduate degrees as specified in the Graduate Admission section of this catalog. Specific requirements for the Master in Engineering are as follows:

The Master of Engineering degree program in systems engineering is in accordance with the general requirements for graduate degrees as specified in the Graduate Admission section of this catalog. Specific requirements for the Master in Engineering are as follows:

**Prerequisite/Corequisite:**

**Core**

- ENMA 602 Systems Engineering Management
- ENMA 640 Integrated Systems Engineering I

**Electives**

Select one of the following:

- ENMA 614 Quality Systems Design
- ENMA 640 Integrated Systems Engineering I
- ENMA 715 Systems Analysis
- ENMA 724 Risk Analysis

**Capstone**

- ENMA 605 Program Capstone (required final semester)

**Total Hours: 31**

**M.S. Courses:**

**Prerequisite:**

- ENMA 600 Cost Estimating and Financial Analysis
- ENMA 601 Analysis of Organizational Systems
- ENMA 603 Operations Research
- ENMA 604 Project Management
- ENMA 614 Quality Systems Design
- ENMA 715 Systems Analysis
- ENMA 721 Foundations of Research

**Electives**

Select four of the following:

- ENMA 702 Methods for Rational Decision Making
- ENMA 703 Optimization Methods
- ENMA 710 Modeling and Analysis of Systems
- ENMA 712 Multi-Criteria Decision Analysis and Decision Support Systems
- ENMA 716 Complex-Criteria Decision Analysis and Decision Support Systems
- ENMA 717 Cost Engineering
- ENMA 723 Enterprise and Complex System Dynamics
- ENMA 750 System of Systems Engineering
- ENMA 751 Complexity, Engineering and Management
- ENMA 763 Robust Engineering Design

**Total Hours: 30**

**Exceptions to these requirements must be approved by the Graduate Program Director.**

**Doctor of Philosophy in Engineering Management**

The Doctor of Philosophy (Ph.D.) program focuses on developing the necessary skills to perform and evaluate rigorous research in areas related to the design and management of projects, programs, and complex human-technological systems. The goal of the Ph.D. program is to prepare graduates for careers in teaching and research at academic institutions as well as in other public and private organizations characterized by innovation and technological leadership.

**Ph.D. Admission Requirements**

Admission to graduate programs in engineering management and systems engineering is in accordance with the general requirements for graduate degrees as specified in the Graduate Admission section of this catalog. Specific requirements for the Department of Engineering Management and Systems Engineering include the following: applicants for the Ph.D. must have a bachelor’s or master’s degree from an accredited institution in engineering, engineering technology, applied science or applied mathematics, and at least 24 semester hours of graduate study approved by the graduate program director. An undergraduate GPA of at least 3.00 and a graduate GPA of at least 3.50 (on a 4.00 basis) and GRE general aptitude scores are required. Students lacking adequate academic preparation may be required to complete coursework in addition to the graduate admission requirements. A minimum TOEFL score of 550 is required for all international students when English is not their first language. As part of
the admission process, all applicants will go through an interview process. The applicant will be contacted by the Graduate Program Director once the application and credentials are received to initiate the interview process. Students must also secure a faculty advisor prior to admission.

**Ph.D. Degree Requirements**

Curriculum requirements in engineering management are in accordance with the general requirements for Ph.D. degrees as specified in the Requirements for Graduate Degrees section of this catalog.

Requirements in preparing for the Ph.D. program in engineering management include:

1. Satisfactory completion of 51 credit hours of postmaster’s degree credit or equivalent level of performance course work, including 24 credit hours of dissertation credit, and a minimum of 27 credit hours of course work.
2. Passing a written and oral candidacy examination at the end of the program of study course work.
3. The successful defense of a written dissertation proposal before the completion of nine hours of dissertation research.
4. The completion of a dissertation representing independent original research worthy of publication in a refereed scholarly journal.
5. The successful public defense of the dissertation before an audience which includes an appropriately selected committee of faculty knowledgeable in the field of the project.

**Master’s-Level Courses:** As part of master’s-level course work, all students must have completed the following engineering management leveling courses or their equivalent: ENMA 600, ENMA 603, and ENMA 604. Students may be admitted to the Ph.D. program deficient in these leveling courses, but as part of their plan of study, the student must take and successfully complete these courses at the earliest possible opportunity.

**Plan of Study:** The Ph.D. program is governed by a Plan of Study that is established by the student in conjunction with his/her advisor and guidance committee within the first nine credit hours of course work and will follow the established course requirements (below) unless a substitution to one or more courses is agreed upon between the advisor and student and approved by the Graduate Program Director.

**Prequisite **

**Master’s-Level **

**Plan of Study **

**Core **

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<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>ENMA 711</td>
<td>Methodology for Advanced Engineering Projects (required)</td>
</tr>
<tr>
<td>ENMA 821</td>
<td>Foundations of Research (required)</td>
</tr>
</tbody>
</table>

**Select one from the each of the following methods**

**Empirical Methods **

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<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>ENMA 863</td>
<td>Robust Engineering Design</td>
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**Equivalent Course (with GPD authorization)**

**Analytic Methods **

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<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>ENMA 803</td>
<td>Optimization Methods</td>
</tr>
<tr>
<td>ENMA 823</td>
<td>Enterprise and Complex System Dynamics</td>
</tr>
<tr>
<td>ENMA 810</td>
<td>Modeling and Analysis of Systems</td>
</tr>
<tr>
<td>ENMA 802</td>
<td>Methods for Rational Decision Making</td>
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**Social Research Methods **

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<tbody>
<tr>
<td>ENMA 815</td>
<td>Systems Analysis</td>
</tr>
<tr>
<td>ENMA 816</td>
<td>Complex Adaptive Situations Environment</td>
</tr>
</tbody>
</table>

**Equivalent course (with GPD authorization)**

**Electives **

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**Dissertation Research **

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**Exams **

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
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<tbody>
<tr>
<td>Total</td>
<td>51</td>
</tr>
</tbody>
</table>

* All students must have mathematics course work through the level of integral calculus matrix algebra or differential equations and a course in statistics (ENMA 420/ENMA 520 or equivalent).
** As part of master’s-level course work, all students must have completed the following engineering management leveling courses or their equivalent: ENMA 600, ENMA 603, and ENMA 604. Students may be admitted to the Ph.D. program deficient in these leveling courses, but as part of their plan of study, the student must take and successfully complete these courses at the earliest possible opportunity.
*** The Ph.D. program is governed by a Plan of Study that is established by the student in conjunction with his/her advisor and guidance committee within the first nine credit hours of course work and will follow the established course requirements (below) unless a substitution to one or more courses is agreed upon between the advisor and student and approved by the Graduate Program Director.
**** At least three-fifths (3/5) of course work must be at the 800 level for the Ph.D. and D.Eng. degrees.
+ Statistical techniques and research approaches. The course should cover statistical techniques up to (at least) multivariate statistics including techniques such as multivariate regression analysis, principal component factor analysis, cluster analysis, and canonical correlation analysis. If possible an introduction to structural equation modeling and non-parametric statistical analysis should be included.
++ Mathematical and other quantitative analytic techniques including modeling, analysis, and simulation approaches, and how they are applied within research. Methods such as system dynamics, agent based modeling, formal logic, and optimization methods should be addressed.
+++ Approaches common in the social sciences and humanities. Methods may include ground theory (as used in social sciences), coding techniques, social (quasi-) experimentation, and fuzzy logic. Diverse data collection methods should be addressed including focus groups, interviews, surveys and questionnaires.
# Engineering Management courses or courses form other departments in the Colleges of Engineering and Technology, Sciences, and Business and Public Administration. All electives must be at the graduate level and must be approved by the Ph.D. Guidance Committee and Graduate Program Director as part of the student’s plan of study.
## Minimum of 24 credit hours
### A candidacy exam, dissertation proposal defense, and a public dissertation defense are required after completing all course work.

**Doctor of Engineering**

The Department offers a Doctor of Engineering (D.Eng.) program with concentration in Engineering Management and Systems Engineering in accordance with the D.Eng. program requirements specified for the Batten College of Engineering and Technology in this catalog. Additional information on the admission procedure and criteria can be found at [http://eng.odu.edu/enma/academics/dengapply.shtml](http://eng.odu.edu/enma/academics/dengapply.shtml).

**Certificate Programs**

**Advanced Engineering Certificate**

The Advanced Engineering Certificate Program consists of 12 credit hours of graduate level course work. The four courses comprising the certificate program are offered on a regular schedule to enable the completion of the program in two years. The program provides the opportunity for practicing engineers to further their knowledge and become more competent in their profession.
Program Requirements
Admission to the program requires a Bachelor of Science degree in engineering (or equivalent). The certificate consists of four pre-approved graduate level courses contributing to an emphasis area that can be interdisciplinary. A grade point average of 3.0 or better is required to earn the certificate. Please refer to Frank Batten College of Engineering and Technology (http://catalog.odu.edu/graduate/frankbattencollegeofengineeringandtechnology) for more information.