Software Engineering

Degrees Offered

• Masters of Science, Software Engineering (M.S.S.E.)

Program Description

The Lane Department of Computer Science and Electrical Engineering offers the professionally oriented Masters of Science in Software Engineering (M.S.S.E.) degree program, as well as a graduate Certificate in Software Engineering. The M.S.S.E. provides graduate educational opportunities to working professionals. The M.S.S.E. degree is a unique fully-online program which provides graduate level software engineering expertise to individuals who are currently working in the software engineering and information technology industry. The program aspires to serve both the full-time software engineer from any industry and the computer science or similar graduate seeking an applied masters program with the flexibility of taking courses online from where they are located. Typical M.S.S.E. students are full time software engineering professionals who wish to augment their work experience with additional academic background.

Program Educational Objectives & Outcomes

The objective of the program is to produce graduates who have the knowledge, skills, and attitudes that will ensure success in professional positions in business, industry, research, or governmental service.

More specifically, after completing five core courses, students will achieve the following outcomes:

• Achieve proficiency in the area of Software Project Management.
• Achieve proficiency in Software Analysis and Design.
• Understand the process of software Validation and Verification.
• Understand the process of Software Evolution.
• Achieve proficiency in Object-Oriented Design of software.

Students will complete their degree requirements with six advanced elective courses with the course work only option that will deepen their understanding of aspects of software engineering relevant to their careers. Problem Report and Thesis Options are also available.

Admissions

Students seeking admission to the M.S.S.E. program must fall into one of two categories to be considered for admission. The categories are:

TRADITIONAL STUDENTS WITH RELATED UNDERGRADUATE DEGREE

Students who have recently completed a Bachelor's degree in Computer Science, Computer Engineering, Software Engineering, or a closely related field will be considered for admission with regular status if they satisfy the following requirements:

• Cumulative GPA of 3.0 (on a 4-point scale) or better within the major. Official transcripts showing completion of the Bachelor's degree must be provided in all cases.
• Submission of satisfactory scores in quantitative reasoning for the GRE General Test or Revised General Test. Official scores must be submitted prior to acceptance.

NONTRADITIONAL STUDENTS

Students who do not meet the above requirements but have work experience related to software development will be considered for admission if they meet the following requirements:

• Hold a four-year Bachelor's degree in any field from an accredited University, with a GPA of at least 2.75. Official transcripts showing degree completion must be provided in all cases.
• Submit a resume documenting at least one year of software development experience.
• The GRE is not required for this option.

Nontraditional students are initially admitted as Provisional Graduate students. Students desiring to initially earn the Certificate in Software Engineering are initially admitted as non-degree students. They may enroll in core courses in the M.S.S.E. program. Upon meeting this requirement, these students may apply for transfer to the regular M.S.S.E. program. At the time of transfer, they must meet the following additional requirements:

• Earn a grade of at least B in each of the first four courses taken (any of the five core)
• Submit a resume documenting at least three years of software development experience.
• Submit three letters of reference from persons familiar with the student’s professional software development work.
• Request a transfer to Regular Status from the program coordinator upon completion of above and prior to completing 18 credit hours in the M.S.S.E. program.

Curriculum in Master of Science in Software Engineering

A candidate for the M.S. degree in software engineering must comply with the rules and regulations as outlined in the WVU Graduate Catalog and the specific requirements of the Statler College and the Lane Department of Computer Science and Electrical Engineering.

Program Requirements

All M.S. degree candidates are required to perform research (thesis or problem report option) and follow a planned program of study. The student’s faculty advisor, in conjunction with the student’s Advising and Examining Committee (AEC) will be responsible for determining the plan of study appropriate to the student’s needs. The underlying principle of the planned program is to provide the student with the necessary support to complete their degree and prepare them for their career.

Curriculum Requirements

A minimum cumulative GPA of 3.0 is required in all courses.

Course Requirements

A minimum of 60% of courses must be from 500 level or above

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SENG 510</td>
<td>Software Project Management</td>
<td>3</td>
</tr>
<tr>
<td>SENG 520</td>
<td>Software Analysis and Design</td>
<td>3</td>
</tr>
<tr>
<td>SENG 530</td>
<td>Validation and Verification</td>
<td>3</td>
</tr>
<tr>
<td>SENG 540</td>
<td>Software Evolution</td>
<td>3</td>
</tr>
<tr>
<td>SENG 550</td>
<td>Object Oriented Design</td>
<td>3</td>
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Advanced Elective Course

Select from the following:

- Any SENG Courses 400-799
- CPE 538 Intro Computer Security Management

Complete 1 of the following options:

- Thesis Option - 6 hours
  - SENG 697 Research (6 hours)
  - Written Research Proposal
  - Thesis
  - Final Oral or Written Examination

- Problem Report Option - 9 hours
  - Complete 6 additional hours of coursework
  - SENG 697 Research (3 hours)
  - Written Research Proposal
  - Formal written report or professional report/paper
  - Final Oral or Written Examination

- Coursework Option - 9 hours
  - Complete 9 additional hours of coursework

Total Hours 30-33

* Students who do not hold a baccalaureate degree in software engineering, computer science, or computer engineering may be required to take a set of undergraduate courses above and beyond the minimum coursework requirements.

Final Examination

M.S. students following the thesis or problem report option must prepare a written research proposal. The proposal must be approved by the student’s AEC at least one semester prior to the final oral examination.

All students, except for the coursework option, are required to pass a final oral or written examination, administered by their AEC, covering the thesis or problem report and/or related course material.
Suggested Plan of Study

The plan below illustrates the Coursework Option. It is important for students to take courses in the order specified as much as possible; all prerequisites and concurrent requirements must be observed. A typical M.S.S.E degree program that completes degree requirements in two years is as follows.

**First Year**

<table>
<thead>
<tr>
<th>Course</th>
<th>Fall Hours</th>
<th>Spring Hours</th>
<th>Summer Hours</th>
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</thead>
<tbody>
<tr>
<td>SENG 520</td>
<td>3</td>
<td>SENG 510</td>
<td>3</td>
</tr>
<tr>
<td>SENG 550</td>
<td>3</td>
<td>SENG 530</td>
<td>3</td>
</tr>
</tbody>
</table>

**Second Year**

<table>
<thead>
<tr>
<th>Course</th>
<th>Fall Hours</th>
<th>Spring Hours</th>
<th>Summer Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adv Elective Course</td>
<td>3</td>
<td>Adv Elective Course</td>
<td>3</td>
</tr>
</tbody>
</table>

Total credit hours: 33

Certificate in Software Engineering

**CERTIFICATE CODE - CG10**

The certificate in software engineering program provides further education to individuals who are currently working in the computer and information technology industry. This program is offered online at evening times convenient for the working professional.

Students may apply for admission as non-degree students to complete the certificate requirements. These students may then optionally apply for transfer to the M.S.S.E. program. In addition, students already admitted to the M.S.S.E. may elect to receive the certificate after completing the necessary requirements.

**ADMISSION REQUIREMENTS**

Applicants for the certificate in software engineering must meet the following requirements:

- Hold a bachelor's degree in any field from an accredited University.
- Submit a resume documenting at least one year of software development experience.
- By the semester in which the certificate is to be awarded, students must meet the following additional requirements:
  - Submit a resume documenting at least three years of software development experience.
  - Submit three letters of reference from persons familiar with the student's professional work.

Students working toward the certificate in software engineering are not degree candidates and are admitted as non-degree students. However, they may apply for admission to the M.S.S.E. program (see below) after satisfactory completion of most of the certificate requirements.

Students initially admitted to the M.S.S.E. program may elect to receive the certificate after satisfactory completion of the five core courses and the certificate paper (see below). In this case the resume and letters of reference are not required.

**PROGRAM REQUIREMENTS**

The certificate program consists of completing five approved courses and a certificate term paper. Students who achieve a B- or higher in each of the first four courses of the certificate program may qualify to enter the M.S.S.E. program, as described below.

**Major Learning Goals**

**SOFTWARE ENGINEERING**

It is our goal that in the first five years after graduation our students will:

1. achieve success and proficiency in the Software Engineering profession,
2. be recognized as leaders,
3. and contribute to the well-being of society.