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 and applied 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:

• Proficiency in Software Project Management.
• Proficiency in Software Analysis and Design.
• Proficiency in Object-Oriented Design of software.
• Proficiency in Software Verification and Validation.
• Proficiency in Software Evolution.

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 meet requirements under one of two ways to be considered for admission. Generally applicants whose first language is not English must submit adequate (TOEFL) or (IELTS) results before an application can be considered for admission to the WVU: TOEFL Internet-Based = 79, TOEFL Paper-Based = 550, IELTS = 6.5

1. PROSPECTIVE STUDENTS FOR M.S.S.E. WITH RELATED SOFTWARE ENGINEERING UNDERGRADUATE DEGREE

Students who have recently completed a Bachelor's degree in Computer Science, Computer Engineering, Software Engineering, or a closely related field from an accredited University will be considered for admission as a Regular Graduate Status student 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.

Students meeting these requirements are admitted as Regular Graduate Students.

2. PROSPECTIVE STUDENTS FOR M.S.S.E. WITH AN UNDERGRADUATE DEGREE AND AT LEAST 1 YEAR OF SOFTWARE EXPERIENCE

Students who 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 3.00 (on a 4-point scale). Official transcripts showing degree completion must be provided in all cases.
• Submit a resume documenting at least one year of software development experience within any industry.
• Submit three letters of reference from persons familiar with the student's professional software development work.
• The GRE is not required.
Students meeting these requirements are initially admitted as Provisional Graduate students and required to meet the provisions stated at admission before transferring to Regular Graduate status. 

At the time of transfer, the student must meet the following additional requirements:

- Earn a grade of at least a B in each of the first four core courses taken (any of the five core)
- Submit a resume documenting at least two years of software development experience if not already done so during admissions.
- Request a transfer to Regular Status from the program coordinator prior to completing 18 credit hours in the M.S.S.E. program.

**PROSPECTIVE STUDENTS FOR THE CERTIFICATE IN SOFTWARE ENGINEERING**

Students desiring to earn the Certificate in Software Engineering will be admitted as non-degree students and meet the following requirements:

- Hold a four-year Bachelor's degree in Computer Science, Computer Engineering, Software Engineering or a closely related field from an accredited University, with a GPA of at least 3.00 (on a 4-point scale). Official transcripts showing degree completion must be provided in all cases.
- Three professional/academic letters of recommendations.
- Generally applicants whose first language is not English must submit adequate (TOEFL) or (IELTS) results before an application can be considered for admission to the WVU: TOEFL Internet-Based = 79, TOEFL Paper-Based = 550, IELTS = 6.5
- The GRE is not required.

The student may enroll in core courses in the M.S.S.E. program to complete the certificate. The student may apply to the M.S.S.E. program after completion of the certificate. University policy allows up to 12 credit hours to be transferred from the Certificate program into 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

<table>
<thead>
<tr>
<th>Course Requirements</th>
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<tbody>
<tr>
<td>A minimum of 60% of courses must be from 500 level or above</td>
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<tr>
<td>SENG 510 Software Project Management 3</td>
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<tr>
<td>SENG 520 Software Analysis and Design 3</td>
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<td>SENG 530 Validation and Verification 3</td>
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<td>SENG 540 Software Evolution 3</td>
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<td>SENG 550 Object Oriented Design 3</td>
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<tr>
<td>Advanced Elective Course 9</td>
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<td>Select from the following:</td>
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<tr>
<td>Any SENG Courses 400-799</td>
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<tr>
<td>CPE 538 Intro Computer Security Management</td>
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<td>Complete 1 of the following options: 6-9</td>
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<tr>
<td>Thesis Option - 6 hours</td>
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<tr>
<td>SENG 697 Research (6 hours)</td>
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<td>Written Research Proposal</td>
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<td>Thesis</td>
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<td>Final Oral or Written Examination</td>
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<td>Problem Report Option - 9 hours</td>
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<td>Complete 6 additional hours of coursework</td>
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<tr>
<td>SENG 697 Research (3 hours)</td>
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<tr>
<td>Written Research Proposal</td>
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<td>Formal written report or professional report/paper</td>
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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

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<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
<th>Summer</th>
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<tr>
<td>SENG 520</td>
<td>3</td>
<td>SENG 510</td>
<td>3</td>
<td>SENG 540</td>
<td>3</td>
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<td>SENG 550</td>
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<td>SENG 530</td>
<td>3 Adv Elective Course</td>
<td>3</td>
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Second Year

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<th>Fall</th>
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<td>Adv Elective Course</td>
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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:
  a. Submit a resume documenting at least three years of software development experience.
  b. 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 Outcomes
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. Contribute to the well-being of society.