Software Engineering M.S.

The graduate plan in software engineering leads to the Master of Science (M.S.) degree. The plan prepares students for key software positions in industry, government and institutions where software engineering has become a key activity. It prepares students for jobs such as system analyst, requirements engineer, software architect, software project manager or software process designer, etc. The M.S. plan requires a total of 30 hours of study. The plan allows for one of four optional specializations:

- Gaming
- Robotics Software
- Software Project Management
- Data Mining

Students may also participate in internships with appropriate approval. Internship are worth three hours of credit toward the degree and will substitute for a three hour elective.

Credit earned before acceptance

No more than six hours of graduate-level software engineering classes may be applied to the SWEN degree if taken without admission into the program. No more than six hours graduate credit may be transferred to the software engineering degree.

Students accepted in the software engineering program must file a Candidate Plan of Study (CPS) with their assigned faculty adviser within the first semester of study. Specializations in one of the areas listed above may be selected. If a specialization is chosen electives must be chosen from within the specialization. A student is not required to select a specialization. The CPS, once completed, will list all courses the student must take to fulfill the degree requirements.

Requirements

Students seeking admission into the degree plan in Software Engineering should hold a bachelor's degree in computer science, computer engineering or other computing or engineering related discipline and have a grade point average (GPA) of 3.0 or greater on the last 60 hours of course work. The GRE is waived if one of the following conditions is met: (i) Applicants with a GPA 3.0 or above; (ii) Applicants with at least one year of post-graduate full-time work experience in a computing field. For those applicants not meeting these waiver requirements a minimum GRE score (verbal + quantitative) of 290 points with a minimum quantitative score of 145, a verbal score of 140 is required. It is also possible for an applicant with significant software development work experience to apply this work experience as an offset to a borderline GPA or to demonstrate competency in computing in the case of a non-related degree. If an applicant is applying with the intention of having their work experience considered in lieu of GPA or GRE or a degree outside of the listed related degree areas, then the application materials should include both a letter from the student and a resume summarizing the candidate's professional experience in the area of software development. Once admitted, the student must file a candidate plan of study (CPS) in the first semester of enrollment.

If applicants have a bachelor's degree from a non-computing related discipline they can be
expected to be assigned one or more foundation courses in computing unless the student has relevant computing classes on their transcript or can demonstrate proficiency by virtue of work experience. These courses may include programming in C, programming in Java and a course in data structures.

All applicants must have had courses in programming though data structures or their equivalent. A degree in Computer Science will suffice and no foundation courses will be required of those students holding a BS in Computer Science. For students holding other degrees, one or more courses may be added as foundation courses for those students found to be lacking in one or more of these areas. Foundation courses may be taken at UHCL or any other accredited university.

Foundation courses assigned will be added to the CPS and must be completed in the first year of enrollment or before. Alternately, students may enroll in the Software Engineering Certificate program to gain foundation knowledge and then apply to the SWEN MS. Certificate courses with grades of C or better will apply to the SWEN MS degree.

Online Option

The software engineering M.S. Online program can be completed fully online. The degree plan for the M.S. online has the same curriculum requirements, same core and elective requirements and entry requirements as the traditional M.S. program. All core courses are offered fully online. Students needing foundation work for entry may consider choosing the SWEN online certificate as preparation for entry into the SWEN MS program.

Degree Requirements

Software Engineering Core Requirements (18 hours)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>SWEN 5236</td>
<td>Engineering Software I</td>
<td>3</td>
</tr>
<tr>
<td>SWEN 5237</td>
<td>Engineering Software II</td>
<td>3</td>
</tr>
<tr>
<td>SWEN 5239</td>
<td>Agile Software Development</td>
<td>3</td>
</tr>
<tr>
<td>SWEN 5233</td>
<td>Software Architecture</td>
<td>3</td>
</tr>
<tr>
<td>SWEN 5432</td>
<td>Software Engineering Life Cycle</td>
<td>3</td>
</tr>
<tr>
<td>SWEN 5534</td>
<td>Reuse and Reengineering</td>
<td>3</td>
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Software Engineering Internship Option

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<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>SWEN 5739</td>
<td>Internship in Software Engineering</td>
<td>3</td>
</tr>
<tr>
<td>SWEN 6837</td>
<td>Software Engineering Capstone Project</td>
<td>3</td>
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Additional Information

Internship option requires approval from SWEN internship committee as well as permission of the faculty adviser.

Software Engineering Capstone Option

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>SWEN 6837</td>
<td>Software Engineering Capstone Project</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Information

Capstone enrollment is limited to students who are in their graduating semester (last 9 hours of study)
including capstone) and have completed any required foundation courses identified on their CPS.

- Courses taken as electives in SWEN require permission of the faculty adviser before enrolling. Non-SWEN courses may be taken as electives but require permission of the faculty adviser and must be in an area of study that is beneficial to the SWEN degree.

Software Engineering Thesis Option

Software Engineering Thesis Option (6 hours of thesis + 6 hours of electives)

6-hours SWEN technical electives 4000–6000 level

SWEN 6939  
Master’s Thesis Research  
Credit Hours: 3

Additional Information

- Thesis: Students must form a thesis committee and prepare a thesis proposal in the semester prior to enrollment into thesis.
- Independent Study courses to prepare a thesis topic require permission of the SWEN thesis chair as well as the program chair before enrolling. Only three such hours of Independent Study are allowed.
- Contact the CSE advising office for instructions.
- Courses taken as electives require permission of the faculty adviser before enrolling.

Software Engineering Specializations

Students interested in a specialization in software engineering such as gaming, robotics, data mining or project management should choose electives from the specializations listed below. Any course within a specialization is an allowable elective in SWEN.

Gaming Specialization

DMST 5131  
Game Design and Theory  
Credit Hours: 3

DMST 5132  
3D Modeling  
Credit Hours: 3

Robotic Software Specialization

CENG 5437  
Mobile Robots  
Credit Hours: 3

CENG 5435  
Robotics and ROS  
Credit Hours: 3

Software Project Management Specialization

Pick 2 courses from below

SWEN 4320  
Introduction to Software Process and Project Management  
Credit Hours: 3

SWEN 5230  
Software Project Management  
Credit Hours: 3

SWEN 5435  
Personal Software Process  
Credit Hours: 3

EMGT 5230  
Negotiation Strategies  
Credit Hours: 3

Data Mining Specialization

Pick 2 courses from below

SWEN 5139  
Data Science and R in Software Engineering  
Credit Hours: 3

CSCI 5832  
Financial Data Mining

CSCI 5833  
Data Mining: Tools and Techniques