**Software Engineering M.S.**

The graduate plan in Software Engineering leads to the Master of Science (M.S.) degree. The software engineering degree is designed to prepare students for jobs such as system analyst, requirements engineer, software architect, software project manager or software designer. Students are best prepared for this program by having an undergraduate degree in Computer Science Studies in this degree address the foundations, methodologies and tools used in the management, planning, design and engineering of software systems. By providing a careful balance between theory and practice, the plan prepares students for key software positions in industry, government and institutions where software engineering has become a key activity. Students may choose the extended course work option or thesis option. The plan requires core areas of software engineering to be mastered. Each of these areas is covered by a dedicated core course. The plan also allows for further expansion into one of three areas (sub-plans): Software Project Management, Gaming and Robotics Software, Software Development.

**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. The CPS will list the core courses and all electives and indicate if the student is choosing capstone or thesis option. If a sub-plan is chosen all electives will be chosen from the sub-plan. A student is not required to select a sub-plan. Once completed the CPS details all courses the student must take to fulfill the degree requirements.

**Requirements**

Students seeking admission into the degree plan in Software Engineering must have a bachlor’s degree in computer science or a very closely related area which excludes an extensive background in computer science and computer programming at the undergraduate level., The GRE scores must be a minimum of 290 (verbal + quantitative) with a minimum quantitative score of 150, and have a GPA of 3.00 or higher. The faculty graduate admissions committee will decide acceptance into the program based upon program need, the requirements stated herein and university admission requirements. Once admitted, the student must file a candidate plan of study (CPS) in the first semester of enrollment. Foundation (preparatory) courses and other courses that may be deemed necessary may be added to the CPS and must be completed in or before the first year of enrollment. These preparatory requirements include, but are not limited to: proficiency in at least two modular programming languages, including C or C++, data structures , advanced data structures, operating systems, object oriented programming and design, computer organization and assembly language, software engineering, as well as a course in probability and statistics, and discrete math or its equivalent.

Core Requirements (21 hours)

|  |  |  |  |
| --- | --- | --- | --- |
| SWEN 5130 |  | Requirements Engineering |  |
| SWEN 5232 |  | Software Construction |  |
| SWEN 5233 |  | Software Architecture |  |
| SWEN 5430  |  | Software Metrics |  |
| SWEN 5534 |  | Reuse and Reengineering |  |
| SWEN 5432 |  | Software Engineering Life Cycle |  |
| SWEN 5234 |  | Software Processes  |  |

Capstone Option

(3 hours of capstone + 12 hours of electives\*)

|  |  |  |  |
| --- | --- | --- | --- |
| SWEN 6837 or SWEN 6838 |  | Software Engineering Capstone Project |  |
|  |  |  |  |
|  |  | 3-hour SENG/CSCI/SWEN technical elective 4000-6000 level  |  |
|  |  | 6-hour SWEN technical elective 4000-6000 level |  |
|  |  | 6-hour SWEN technical elective 5100-6000 level |  |

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

\*Courses taken as electives in SWEN require permission of the faculty adviser before enrolling. Independent Study courses are only allowed for thesis students and require permission of the SWEN thesis chair as well as the program chair before enrolling. Only 3 hours of Independent Study are allowed under these conditions.

Thesis Option

(6 hours of thesis + 9 hours of electives\*)

|  |  |  |
| --- | --- | --- |
| SWEN 6939 | Master's Thesis Research |  |
|  | 3-hour SENG/CSCI/SWEN technical elective 5100-6000 level |  |
|  | 6-hour SWEN technical elective 5100-6000 level |  |

Thesis: Students must form a thesis committee and prepare a thesis proposal in the semester prior to enrollment into thesis. Contact the SCE advising office for instructions. Only full time tenure track faculty members may chair a SWEN thesis. Independent Study courses are only allowed for thesis students and require permission of the SWEN thesis chair as well as the program chair before enrolling. Only 3 hours of Independent Study are allowed under these conditions.

\*Courses taken as electives require permission of the faculty adviser before enrolling.

**Software Engineering Sub-plans**

Students interested in concentrating their study in a sub-area of software engineering such as Gaming, Software Development or Project Management should choose as electives those courses listed under the respective sub-plans listed below.  Any courses within a sub-plan are allowable electives in SWEN.

Gaming and Robotics Software Sub-plan (Pick 4 courses from below)

|  |  |  |
| --- | --- | --- |
| DMST 5235 | Animation |  |
| DMST 5131 | Game Theory and Design |  |
| DMST 5132SWEN 5134SWEN 5136 | 3D ModelingGaming with Service Oriented ArchitectureSoftware For Robotics |  |
| SWEN 5137SWEN 5138 | Gaming with Service Oriented ArchitectureDesign and Development of Virtual Worlds, Sims and Animation Scripting |  |

Software Project Management Sub-plan (Pick 4 from below)

|  |  |  |
| --- | --- | --- |
| SENG 5330 | Risk Management |  |
| SWEN 5230 | Software Project Management |  |
| SWEN 5435 | Personal Software Process |  |
| SWEN 5431 | Testing Validation and Verification |  |

Software Development Sub-plan

|  |  |  |
| --- | --- | --- |
| SWEN 5133 | Aspect Oriented Development |  |
| SWEN 5132 | Software Design Patterns |  |
| SWEN 5131 | Software Tools |  |
| SWEN 5435 | Personal Software Process |  |

Web Based Electives (Electives that are periodically offered online as well as face to face)

|  |  |  |
| --- | --- | --- |
| SENG 5330SWEN 5534 | Risk ManagementReuse and Reengineering |  |
|  |  |  |
| SWEN 5133 | Aspect-Oriented Development |  |
| SWEN 5134 | Gaming Software Development with Service Oriented Architecture |  |
| SWEN 5230 | Software Project Management |  |
| SWEN 5430 | Software Metrics |  |
| SWEN 5431 | Testing, Validation and Verification |  |
| SWEN 5435 | Personal Software Process |  |

**Software Engineering via Distance Education (Online)**

The Software Engineering program may be taken as a partially online degree. Foundation courses are only offered as traditional on campus face to face classes. These courses must be taken either at UHCL or at another university before entry into the SWEN distance option. For more information about the software engineering degree see http://prtl.uhcl.edu/portal/page/portal/SCE/Engineering/Software\_EngineeringMS/swen\_degree.

**Software Engineering Certificate**

The admission requirements for the certificate program are as follows:

• bachelor’s degree in Computer Science, or related field with an extensive background in computer science and computer programming.

• undergraduate grade point average (GPA) of 3.0

The GRE is not required for the certificate since the certificate program is considered a non-degree seeking program. A student pursuing the certificate could possibly transfer the certificate courses to the SWEN degree after completion of the certificate. To do this the student must take the GRE, apply and be accepted to the SWEN program. The certificate cannot be pursued at the same time as the SWEN degree since students pursuing a certificate are considered non-degree seeking and therefore cannot be enrolled in a degree seeking program at the same time.

The Software Engineering certificate is designed to prepare students to address important aspects of software development including: developing the student’s ability to communicate ideas; develop and manage software products; and to understand the complexities of building quality into a software product. To earn the certificate the four course set below must be completed within a four year time limit.

**Requirements**

Certificate - Software Engineering (4 courses)

|  |  |  |
| --- | --- | --- |
| SWEN 5130 | Requirements Engineering |  |
| SWEN 5232 | Software Construction |  |
| SWEN 5234 | Software Processes or SWEN 5132 Software Design Patterns |  |
| SWEN 5432 | Software Engineering Life Cycle |  |