SOFTWARE ENGINEERING

Graduate Program Head	Raghu Sangwan
Program Code	SWENG
Campus(es)	Great Valley (M.S.E.)
	World Campus (M.S.E.)
Degrees Conferred	Master of Software Engineering (M.S.E.)
	Integrated B.S. in Computer Science and M.S.E. in Software Engineering
The Graduate Faculty	View (https://secure.gradsch.psu.edu/gpms/?searchType=fac&prog=SWENG)

The Master of Software Engineering program at Penn State Great Valley prepares computer professionals to develop software products and services for industry and government through software analysis, design and architecture; system verification; data storage and retrieval; and managing globally distributed development. This program is STEM designated.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (https://gradschool.psu.edu/graduate-admissions/how-to-apply/). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 Admissions Policies (https://gradschool.psu.edu/graduate-education-policies/).

Admission to the Master of Software Engineering program will be based on baccalaureate academic records, applicable work experience, and two letters of recommendation from a previous professor or supervisor who can attest to the applicant's academic potential. Applicants with an undergraduate degree in software engineering, computer science, information systems, or similar quantitative disciplines such as science or engineering may apply. Students from other disciplines will be considered based on prior course work and/or standardized test scores. Normal admission requirements include background in operating systems, programming languages, data structures and algorithm analysis. Applications must include a statement of professional goals and a curriculum vitae or resume. Test scores from the GMAT or GRE exams are not required. An undergraduate cumulative grade-point average of 3.0 or better on a 4.0 scale is required prior to admission to the IUG program.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/gcac-305-admission-requirements-international-students/) for more information.

Degree Requirements
Master of Software Engineering (M.S.E.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Policies (https://gradschool.psu.edu/graduate-education-policies/).

The Master of Software Engineering degree is conferred upon students who earn a minimum of 36 credits of course work while maintaining an average grade-point average of 3.0 or better in all course work, including

at least 18 credits at the 500 or 800 level (with at least 6 credits at the 500 level). The program curriculum includes 18 credits of core courses, 12 credits of electives, and 6 credits of capstone experience.

Code	Title	Credits
Required Courses		
SWENG 505	Software Project Management	3
SWENG 581	Software Testing	3
SWENG 586	Requirements Engineering	3
SWENG 587	Software Systems Architecture	3
SWENG 837	Software System Design	3
SWENG 861	Software Construction	3
Electives		
An additional 12 credits of elective courses must be selected from a list of approved elective courses maintained by the graduate program office.		12
Culminating Experience		
SWENG 894	Capstone Experience	6
Total Credits		**36**

All students will complete their program of study with a capstone project that provides students with an opportunity to apply their knowledge of the software engineering theories, methods, processes, and tools learned throughout their program, in a culminating and summative experience. Students complete the capstone project while enrolled in SWENG 894.

Integrated Undergrad-Grad Programs
Integrated B.S. in Computer Science and M.S.E. in Software Engineering

This Integrated Undergraduate/Graduate (IUG) degree program combines the B.S. in Computer Science with the M.S.E. in Software Engineering offered at the following campuses:

Undergraduate Degree

- Abington
- Capital

Graduate Degree

- Great Valley
- World Campus

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/gcac-210-integrated-undergraduate-graduate-degree-programs/).

This Integrated Undergraduate Graduate (IUG) degree program will combine the Master of Software Engineering at the Penn State Great Valley, School of Professional Graduate Studies, with the Bachelor of Science in Computer Science at Penn State Abington into a seamless five-year B.S. to Master's degree program. The IUG concluding in a Master of Software Engineering degree prepares computer professionals to develop software products and services for industry and government through software analysis, design and architecture; system verification; data storage and retrieval; and managing globally distributed development. This program is STEM designated.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply/). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 Admissions Policies (http://gradschool.psu.edu/graduate-education-policies/).

Students must apply to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply/), and must meet all the admission requirements of the Graduate School. Before applying to the Graduate School, students must have completed entrance to their undergraduate major and have completed no less than 60 credits. Students must be admitted no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree. Transfer students must have completed at least 15 credits at Penn State to enroll in an IUG.

Admission to the IUG Master of Software Engineering program will be based on baccalaureate academic records, applicable work experience, and one CMPSCI faculty recommendation who can attest to the applicant's academic potential. Normal admission requirements include background in operating systems, programming languages, data structures and algorithm analysis. Applications must include a statement of professional goals and a curriculum vitae or resume. Test scores from the GMAT or GRE exams are not required. An undergraduate cumulative grade-point average of 3.0 or better on a 4.0 scale is required prior to admission to the IUG program.

In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program, and must present their plan of study to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.S. in Computer Science are listed in theUndergraduate Bulletin. Degree requirements for the M.S.E. degree are listed on the Degree Requirements tab.

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted credits must be at the 500 or 800 level.Independent study courses and credits associated with the culminating experience for the graduate degree cannot be double-counted. IUG students must meet the Graduate School's GPA requirements and maintain a 3.5 GPA in the double counted courses for successful completion of the degree.

Code	Title	Credits
Courses Eligible to Double Count for Both Degrees		
CMPSC 430	Database Design	3
CMPSC 487W	Software Engineering and Design	3
SWENG 581	Software Testing	3
SWENG 837	Software System Design	3

Students must sequence their courses so all undergraduate degree requirements are fulfilled before taking courses to count solely towards the graduate degree. Students are expected to complete the undergraduate degree requirements within the typical time to degree for the undergraduate major. In the semester in which the undergraduate degree requirements will be completed, IUG students must apply to graduate, and the undergraduate degree should be conferred at the next appropriate Commencement. If students accepted into the IUG program are unable to complete the M.S.E. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Minor

A graduate minor is available in any approved graduate major or dual-title program. The default requirements for a graduate minor are stated in Graduate Council policies listed under GCAC-600 Research Degree Policies (https://gradschool.psu.edu/graduate-education-policies/) and GCAC-700 Professional Degree Policies (https://gradschool.psu.edu/graduate-education-policies/), depending on the type of degree the student is pursuing:

- GCAC-611 Minor - Research Doctorate (https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/gcac-611-minor-research-doctorate/)
- GCAC-641 Minor - Research Master's (https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/gcac-641-minor-research-masters/)
- GCAC-709 Minor - Professional Doctorate (https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-700/gcac-709-professional-doctoral-minor/)
- GCAC-741 Minor - Professional Master's (https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-700/gcac-741-masters-minor-professional/)

Student Aid

Refer to the Tuition & Funding (https://gradschool.psu.edu/graduate-funding/) section of The Graduate School's website. Students in this program are not eligible for graduate assistantships.

Financial aid for students in on-campus programs is in the form of student loans and a limited number of small scholarships, as described on the Penn State Great Valley website (https://greatvalley.psu.edu/tuition-and-financial-aid/).

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (https://www.worldcampus.psu.edu/tuition-and-financial-aid/) of the World Campus website for more information.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Software Engineering (SWENG) Course List (https://bulletins.psu.edu/university-course-descriptions/graduate/sweng/)

Learning Outcomes

1. KNOW. Graduates will be able to demonstrate mastery of concepts and methods for modeling, designing, developing and testing software solutions using legacy and contemporary environments.

2. CRITICAL THINKING. Graduates will be able to critically and creatively plan and manage development of software intensive systems using project management methods and tools.
3. PROBLEM SOLVING. Graduates will be able to demonstrate proficiency in exploring the trade space within a given set of internal and external constraints for a system under development.
4. COMMUNICATE. Graduates will be able to effectively communicate their ideas within their organization, to other practicing professionals and the general public.
5. TEAMWORK. Graduates will be able to work collaboratively within and with project teams including those that are geographically distributed.

Contact

Campus	Great Valley
Graduate Program Head	Raghu Sangwan
Director of Graduate Studies (DGS) or Professor-in-Charge (PIC)	Raghu Sangwan
Program Contact	MICHELLE WHALEN Penn State Great Valley 30 East Swedesford Road Malvern PA 19355 mmw6441@psu.edu
Program Website	View (http://greatvalley.psu.edu/academics/masters-degrees/software-engineering/)
Campus	World Campus
Graduate Program Head	Raghu Sangwan
Director of Graduate Studies (DGS) or Professor-in-Charge (PIC)	Raghu Sangwan
Program Contact	MICHELLE WHALEN Penn State Great Valley 30 East Swedesford Road Malvern PA 19355 mmw6441@psu.edu
Program Website	View (http://www.worldcampus.psu.edu/degrees-and-certificates/software-engineering-masters/overview/)