

SFEPHD - Software Engineering

Overview

Program Type

Doctor of Philosophy

College

College of Engineering

Career

Graduate

Total Units

63

Program Description

The Software Engineering PhD program has a firm engineering foundation that encompasses discovery-based education utilizing an experiential learning approach. As part of the curriculum, students will complete projects in areas that emphasize software engineering, communication, teamwork, critical thinking, and engineering professionalism. Which focuses on the application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software. In the PhD program, students will also conduct novel research in many diverse software engineering related areas. The program's flexibility allows students to design their course of study / research from a diverse pool of courses and research opportunities in software and computer engineering domains such as web and mobile applications, embedded systems, cybersecurity, machine learning, systems, and other interdisciplinary areas.

Program Requirements

Simple Requisites

Program Requirements

Minimum Credit Units

Type

Completion Requirement

Additional Comments:

63

Core Coursework Requirements

Type

Completion Requirement

Additional Comments:

SFWE 513 (3) – Software Engineering Research Methods

SFWE 507 (3) – Foundations of Software Engineering

Complete 9 units of additional core coursework:

SFWE 502 (3) - Software DevSecOps

SFWE 503 (3) - Software Project Management

SFWE 504 (3) - Software Requirements Analysis and Test

SFWE 505 (3) - Software Architecture and Design

SFWE 506 (3) - Distributed Computing

Students that have a BS in Software Engineering and have demonstrated a given Core course's competencies **must** consult/work with their faculty advisor to substitute the course with one of the SFWE 5xx level courses listed below.

- Choose 16 units non-dissertation coursework which must be approved by the faculty advisor and the Director of Graduate Studies:

o Any SFWE core courses not used to meet the Core coursework requirement can also be used as technical electives

o SFWE 501 (3) - SW Assurance

o SFWE 508 (3) – Data Mining

o SFWE 509 (3) – Cloud Computing Principles and Practices

o SFWE 510 (3) – Cloud Native Software Engineering

o SFWE 511 (3) – Software for Industrial Control Systems

- o SFWE 512 (3) – Robotics
- o SFWE 513 (3) – Software Engineering Research Methods
- o CSE 501 (3) – Operating Systems
- o ECE 503 (3) - Probability and Random Processes for Engineering Applications
- o ECE 509 (3) – Cybersecurity Concept, Theory, Practice
- o ECE 513 (3) – Web Development and the IoT
- o ECE 523 (3) – Engineering Applications of Machine Learning and Data Analytics
- o ECE 562 (3) – Computer Architecture and Design
- o ECE 576A (3) - Engineering of Computer Based Systems
- o ECE 576B (3) - Embedded System Design and Optimization
- o ECE 579 (3) – Principles of Artificial Intelligence
- o SIE 533 (3) – Fundamentals of Data Science for Engineers
- o SIE 558 (3) – Model Based Systems Engineering
- o SIE 577 (3) – Introduction to Biomedical Informatics

Colloquium and Dissertation Research (20 units)

- SFWE 695A - Colloquium (2)
- SFWE 920 - Dissertation Research (18)

Elective Coursework

Type

Completion Requirement

Additional Comments:

None

Additional Requirements

Type

Completion Requirement

Additional Comments:

Specific requirements will be included in the SFWE Graduate Handbook.

Doctoral Qualifying Exam (DQE)

The purpose of the Doctoral Qualifying Examination (DQE) is to assess students' fundamental knowledge in specific SFWE domains and whether students have an integrated understanding in those domains as well as their readiness of a student to undertake advanced graduate work.

Doctoral Comprehensive Exam

The purpose of the DQE is to determine whether the student has developed sufficient background and expertise for research in the field of their planned dissertation. Successful completion of the examination leads to formal admission to PhD candidacy.

Doctoral Final Written Dissertation

The candidate should develop a written document that demonstrates all aspects of their research including significance of the work, a detailed review of relevant literature, methodologies employed and/or developed, significant findings from the work, a critical discussion of the findings, limitations, and the impact, and potential for future research. Note: The faculty advisor defines the specific format of the written dissertation. The Graduate College provides general formatting guidelines: <https://grad.arizona.edu/gsas/dissertationstheses/dissertation-and-thesisformatting-guides>

Final Oral Defense

When the doctoral candidate has met the rigor and standards of scholarship and has documented the research in a dissertation, the candidate will publicly defend the dissertation and answer any general questions related to their work. The exact time and place of the oral defense must be announced publicly at least two weeks in advance of the oral defense. The oral defense is facilitated by a faculty committee appointed by the Dean of

the Graduate College in consultation with the major department and chaired by the faculty advisor. The presentation portion of the oral defense is open to the public. Following the public presentation and discussion, the candidate will participate in a closed meeting with the committee for further evaluation

Minor Requirements for Doctoral Students in this Program

Type

Completion Requirement

Additional Comments:

All minor coursework (12 units) can come from a single discipline or split between two disciplines (6 units from each discipline).

Student Handbook

Type

Completion Requirement

Additional Comments:

Subplan

No Requirement Level