

## Graduate Interdisciplinary Specialization/Minor in Applied Software Engineering

---

Computing has become the key enabler of fabulously rapid advances that have occurred, and that will continue for the foreseeable future, across nearly all disciplines of the academy and throughout all segments of society. In order to conduct state-of-the-art research in many disciplines, especially in engineering and science, some students now must design and develop sophisticated discipline-specific software systems. The Graduate Interdisciplinary Specialization/Minor in *Applied Software Engineering* educates graduate students in state-of-the-practice industrial-strength software technologies that will help them better carry out their primary graduate work when that work entails the development of significant technical software systems.

The Applied Software Engineering Specialization/Minor is not primarily about numerical analysis or high-performance computing. Instead, it focuses on current software technologies and practices that are widely used and followed in the software industry. The courses emphasize how and why designing and developing large software systems is *different in kind* from writing small scripts and other useful but small programs of the sort that might be needed to do calculations for undergraduate engineering and science homework or lab assignments.

### Impact for the Student

Completion of the program leads to a transcript designation that can and should be advertised to prospective employers who prefer candidates with not only discipline-specific knowledge but also the knowledge and skill to develop sophisticated technical software systems in their discipline. Many engineering and science graduate students—not just those majoring in computing but often those with traditional engineering and science degrees—find employment with high-tech

companies in jobs where they are expected to help design and develop sophisticated software. Prospective employees who already have the knowledge and skills to develop advanced software systems are very attractive to these employers.

### Prerequisites

The program is academically accessible to interested graduate students throughout the university with modest prerequisites: some calculus and some prior programming experience. Graduate students in Engineering, Mathematical and Physical Sciences, and Biological Sciences are nearly certain to have the required background from their undergraduate studies, as are many students from other disciplines where the Applied Software Engineering program could be useful (e.g., Social and Behavioral Sciences such as Economics, Geography, and Psychology).

### Curriculum

The program is jointly administered by the Department of Computer Science and Engineering (CSE) and the Department of Electrical and Computer Engineering (ECE). It consists of a total of 15 cr-hrs in these departments and often can be completed in one academic year. Students with little or no background in object-oriented programming take both classes in the Fundamentals Core (see course listing on back). Students already having this background take only the second class in the Fundamentals Core. The remaining credits needed to obtain 15 total are taken in the form of technical elective courses, at least one of which is from the Elective Core.

Faculty and course information on reverse side.

For more details, please see:  
<http://www.cse.ohio-state.edu/grad/ase.shtml>

## Primary Faculty

**Paolo Bucci**, Ph.D. The Ohio State University,  
Research Scientist, CSE

**Furrukh Khan**, Ph.D. SUNY at Stony Brook,  
Associate Professor, ECE and CSE

**Robert Mathis**, Ph.D. The Ohio State University,  
Adjunct Professor, CSE

**Jayashree Ramanathan**, Ph.D. Rice University,  
Senior Research Scientist, CSE

**Rajiv Ramnath**, Ph.D. The Ohio State University,  
Assistant Professor of Practice, CSE

**Paul Sivilotti**, Ph.D. Caltech,  
Associate Professor, CSE

**Bruce W. Weide**, Ph.D. Carnegie Mellon University,  
Professor, CSE

## Getting Started

Prospective students should begin by contacting one of the program advisors, obtaining advice and approval for their technical electives, and completing paperwork indicating their course selections:

**Prof. Bruce Weide**

(614) 292-1517, weide.1@osu.edu

**Prof. Furrukh Khan**

(614) 292-4349, khan.1@osu.edu

**Note:** Graduate students majoring in CSE and ECE may not consider this program a "graduate interdisciplinary specialization". However, ECE graduate students may designate the program as a "graduate interdisciplinary minor" if they complete at least 14 cr-hrs of the coursework in CSE courses, including cross-listed courses taken under CSE course numbers. CSE graduate students may take courses in the program, but completion of the program's curriculum will not be designated on their transcripts.

## Courses

All courses are U G 3 unless otherwise noted.

### *I Fundamentals Core (502 only if needed)*

---

- **CSE 502:** Object-Oriented Programming for Engineers and Scientists (Au)
- **CSE/ECE 668:** Applied Component-Based Programming for Engineers and Scientists (Wi)

### *II Elective Core (select at least one)*

---

- **CSE/ECE 767:** Applied Use-Case-Driven Object-Oriented Analysis and Design for Engineers and Scientists (Sp, odd-numbered years)
- **CSE/ECE 794R:** Applied Enterprise Distributed Computing for Engineers and Scientists (Sp, even-numbered years)

### *III Technical Electives (rest of 15 cr-hrs)*

---

- **CSE 541:** Elementary Numerical Methods (Au, Wi, Sp, Su)
- **CSE 551:** Introduction to Information Security (Wi)
- **CSE 616:** Object-Oriented Systems Analysis (Au, Wi, Sp, Su)
- **CSE 621:** Introduction to High-Performance Computing (Au)
- **CSE 630:** Survey of Artificial Intelligence I: Basic Techniques (Au, Wi, Sp)
- **CSE 670:** Introduction to Database Systems I (Au, Wi, Sp, Su)
- **CSE 680:** Introduction to Analysis of Algorithms and Data Structures (Au, Wi, Sp, Su)
- **ECE 694Z:** Real-time and Embedded System Design Technologies (irregular)
- **ECE 753.02:** Autonomy in Vehicles (Wi, even-numbered years)

