

The Application procedure is:

- Obtain a complete application packet from Graduate Admissions or our website.
 - Have two official transcripts from each institution you have attended mailed directly to Graduate Admissions.
 - Complete the software engineering applicant information form.
 - Distribute the provided recommendation forms and envelopes to two individuals who will serve as professional references.
 - Complete a professional autobiographical statement describing the relevance of your experiences to the MSE program and your career objectives in completing the program.
 - Request that official GRE scores be sent directly to Graduate Admissions.
- Assemble the completed graduate application, application fee, and supporting documentation and send them in one large envelope to Graduate Admissions.

Degree Requirements

Minimum requirements for the degree are 45 graduate credits. These include 27 hours of required courses, nine hours of elective courses, and nine hours of software engineering project. Required courses in computing (CSSE 501 and 503) may be waived for students passing a waiver exam and replaced by additional electives. A maximum of 12 credits taken in non-matriculated status may be applied to this program. All degree requirements must be completed within six years after course work has begun.



Required Core Courses

Nine core courses are required for the MSE degree. They are organized into three streams: computing, software design, and project management. The computing stream may be waived for students passing a waiver exam, and replaced by additional electives.

Computing

Six CSSE Credits Required
 CSSE 501 Object-Oriented Concepts 3 credits
 CSSE 503 Data Structures & Algorithms 3 credits
 Electives:
 CSSE 543 Applied Formal Methods 3 credits
 CSSE 553 Artificial Intelligence 3 credits

Software Design & Development

Required:
 CSSE 522 Software Modeling 3 credits
 CSSE 523 Human-Computer Interaction 3 credits
 CSSE 524 Software Construction 3 credits
 CSSE 525 Data Modeling 3 credits
 CSSE 532 Software Architecture 3 credits
 Electives:
 CSSE 534 Software Testing 3 credits
 CSSE 550 Distributed Computing 3 credits
 CSSE 551 Embedded Systems 3 credits
 CSSE 572 Software Security 3 credits

III. Project Management

Six CSSE Credits required:
 CSSE 520 Software Requirements 3 credits
 CSSE 550 Software Project Planning 3 credits
 Electives:
 CSSE 530 Software Economics 3 credits
 CSSE 536 Software Project Management 3 credits
 CSSE 537 Software Quality Assurance 3 credits
 CSSE 538 Configuration Management 3 credits

IV. Required Project Courses

Nine CSSE Credits Required:
 CSSE 585 Software Engineering Project 1 3 credits
 CSSE 586 Software Engineering Project 2 3 credits
 CSSE 587 Software Engineering Project 3 3 credits

V. Electives

Nine CSSE Electives 9 credits

Other Courses

CSSE 591-3 Special Topics 3 credits
 CSSE 596-98 Independent Study 3 credits

MINIMUM CREDITS REQUIRED FOR DEGREE 45

Elective Courses

Unless otherwise indicated at the time of offering, any regularly scheduled graduate course in software engineering other than the required courses and the project courses may be used to satisfy the elective course requirement. Students may also take Special Topics (CSSE 591, 592, 593) and/or Independent Study (CSSE 596, 597, 598) for elective credit.

Elective Courses from other departments

Up to two courses from other graduate programs, in particular the MBA program, may be taken as MSE electives with departmental approval. Approved MBA courses include such topics as leadership, entrepreneurship, high tech marketing, management of change, and business ethics.

Required Project Courses

CSSE 585 Software Engineering Project 1 3 credits
 CSSE 586 Software Engineering Project 2 3 credits
 CSSE 587 Software Engineering Project 3 3 credits

Three-quarter sequence in which students are grouped into teams, and each team completes a year-long software project. The sequence begins in the fall and ends spring quarter. Students wishing to take other courses concurrently with CSSE 587 must obtain departmental approval. All participants in the Project sequence will be required to sign a Seattle University intellectual property (IP) and computer project room agreement, and may be required to sign an IP agreement with the Project Sponsor.

Typical Program Schedule

Three -year track with CSSE 501 and 503 required

	Fall	Winter	Spring
Year 1	CSSE 501 CSSE 520	CSSE 503 CSSE 522	CSSE 523 Elective
Year 2	CSSE 526 CSSE 532	CSSE 525 Elective	CSSE 524 Elective
Year 3	CSSE 585	CSSE 586	CSSE 587

Three-year track with CSSE 501 and 503 waived

	Fall	Winter	Spring
Year 1	CSSE 520 CSSE 526	CSSE 522 CSSE 525	CSSE 523 CSSE 524
Year 2	CSSE 532 Elective	Elective Elective	Elective Elective
Year 3	CSSE 585	CSSE 586	CSSE 587

Two-year track for full-time students

	Fall	Winter	Spring
Year 1	CSSE 501 CSSE 520 CSSE 526	CSSE 503 CSSE 522 CSSE 525	CSSE 523 Elective CSSE 524
Year 2*	CSSE 532 CSSE 585	Elective CSSE 586	Elective CSSE 587

*International students may need to take an additional three credits each term to remain eligible for student visa status.

Faculty

Richard LeBlanc, PhD, University of Wisconsin, Chair
 Rashanak Roshandel, PhD, University of Southern California
 Lirong (Annie) Dai, PhD, University of Texas at Dallas
 Adair Dingle, PhD, University of Texas at Dallas
 Eric Larson, PhD, University of Michigan
 Yingwu Zhu, PhD, University of Cincinnati
 Jeff Gilles, MS, University of Iowa

Our Adjunct faculty are working industry professionals drawn from many of the corporations in the Seattle area, such as Microsoft and Boeing.

Seattle University

Seattle University was founded in 1891 by Jesuit priests. As one of 28 Jesuit colleges in the United States, we are dedicated to teaching and educating for leadership and service. While we have grown to be the largest independent institution in the Pacific Northwest, we still enjoy a small-college atmosphere that balances academic challenges with personal, individual attention. We offer a diverse and quality curriculum to students of every religion and culture, and our faculty members are committed to a strong student-teacher relationship.

For Additional Information

• MSE Program:

Department of Computer Science/Software Engineering,
 Seattle University,
 901 12th Ave, P.O. Box 222000, EGRN 526,
 Seattle, WA 98122-1090
 206-296-5428, Fax 206-296-5518
 Email: mse@seattleu.edu
 Web: www.seattleu.edu/scieng/mse

• Graduate Admissions:

Seattle University
 901 12th Ave, P.O. Box 222000
 Seattle, WA 98122.
 206-296-2000, Fax 206-296-5656.
 Email: grad-admissions@seattleu.edu.
 Web: www.seattleu.edu

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Course Descriptions

CSSE 501 Object-Oriented Development

Introduction to principles and techniques of object-oriented development. In-depth understanding of object-oriented concepts, including abstraction, encapsulation, inheritance, subtypes, subclasses, polymorphism and support for re-use.

CSSE 503 Data Structures & Algorithms

Basic strategies of algorithm design: top-down design, divide and conquer, average and worst-case complexity, asymptotic costs, simple recurrence relations. Choice of appropriate data structures such as arrays, stacks, queues, trees, heaps, graphs, hash tables, etc. Applications to sorting and searching. Introduction to discrete optimization algorithm: dynamic programming, greedy algorithms. Prerequisite: CSSE 501

CSSE 520 Software Requirements

Definition of types of requirements; elicitation processes; analysis techniques; documentation methods; validation methods and security issues.

CSSE 522 Software Modeling

Design principles; design approaches; use of architectures and frameworks; applying design patterns; documentation standards; quality analysis and security issues. Prerequisites: CSSE 501

CSSE 523 Human-Computer Interaction

Relationship of user interface design to human-computer interaction. Interface quality and methods of evaluation; dimensions of interface variability; dialogue genre, tools and techniques; user-centered design, task analysis and implementation.

CSSE 524 Software Construction

High-quality life cycle practices; key programming decisions; design practices; classes; defensive programming; using variables and types; collaborative work; developer testing; re-factoring, code-tuning and system considerations; layout; style and documentation. Prerequisite: CSSE 522 & 525

CSSE 525 Data Modeling

Data design and modeling for transactional and analytical systems; the use of relational and object databases; database security issues; database performance issues; and data access. Pre or co-requisites: CSSE 503

CSSE 526 Software Project Planning

Initiation and scope definition; software project planning process; deliverables; effort, schedule and cost estimation; resource allocation; risk management; quality management; and management; project planning and estimating tools.

CSSE 530 Software Economics

Business decision-making process; time value of money; comparing proposals; for-profit decisions; not-for-profit decisions; estimation; risk and uncertainty; buy vs. build decisions, outsourcing costs and return. Prerequisite: CSSE 520 and CSSE 526

CSSE 532 Software Architecture

Concepts and methodologies for state-of-the-art methods in software architectures, including domain specific software architectures (DSSA), architectural styles, architecture description languages (ADL), component-based software development, software connectors, dynamism in architectures. Evaluation of software architectures and design alternatives based on three non-functional properties, architecture-based testing and analysis, and current trends in software architecture. Prerequisites: CSSE 522.

CSSE 534 Software Testing

Test levels (unit, integration and system); objectives (acceptance, installation, alpha and beta, functional, regression, performance, stress); techniques of testing, measures and process (planning, test case generation and defect tracking). Prerequisite CSSE 524.

CSSE 536 Software Project Management

Management of software projects (implementation of plans, supplier and subcontractor contract management, implementation of measurement process, monitoring and controlling process, and reporting); review and evaluation (determining satisfaction of requirements, reviewing and evaluating performance); project closure; software engineering measurement; process improvement. Prerequisite: CSSE 526

CSSE 537 Software Quality Assurance

Software engineering process (implementation and change, definition and measurement); software quality (fundamentals, process and practical considerations); Capability Maturity Model (CMM) for software. Evaluate current projects. Prerequisite: CSSE 520 and CSSE 526

CSSE 543 Applied Formal Methods

Foundations of symbolic systems. Programming applications which support rigor and proof. Logic synthesis, programming languages with functional, declarative and mathematical semantics, satisfiability and proof of correctness, formal modeling. Prerequisite: CSSE 503

CSSE 550 Distributed Computing

Design and analysis of software distributed across multiple platforms. Examination of parallel computing, client-server software, distributed objects, and hardware architectures. Prerequisite: CSSE 522

CSSE 551 Embedded Systems

Design and analysis of real-time systems. Examination of embedded applications. Hardware and software standards and performance. Prerequisite: CSSE 522

CSSE 553 Artificial Intelligence

Survey of artificial intelligence as it applies to software engineering. Acquisition and representation of knowledge. Search strategies. Selected applications, such as natural language processing, image recognition, planning, neural nets, and expert systems. Prerequisite: CSSE 503

CSSE 572 Software Security

Coding practices that mitigate threats of cyber attack. Secure coding techniques that will make the software engineering a better developer. Security principles, threat modeling, buffer overflow, least privilege, appropriate techniques, data protection issues and database and web input issues. Prerequisite: CSSE 522

CSSE 591, 592, 593 Special Topics

May include such topics as artificial intelligence, data privacy, embedded systems, ethics of computing, programming languages, real-time systems, software metrics, and other software engineering topics. A maximum of three credits of 59x courses may be taken toward the MSE degree without department approval. Prerequisite: instructor permission.

CSSE 594 Software Engineering Seminar

Examination of advanced current topics and issues in software engineering using a seminar approach. Course may be taken up to three times. A maximum of three credits of 59x courses may be taken toward the MSE degree without the department approval. Prerequisite: instructor permission.

CSSE 595 Internship

By permission only. Supervised practical training combined with academic studies in which students apply and develop their software engineering knowledge and skills working for a business or non-profit institution. Students are required to conduct related academic studies under the supervision of a faculty advisor. A maximum of three credits of 59x courses may be taken toward the MSE degree without department approval.

CSSE 596, 597, 598 Independent Study

Independent research and in-depth study of topics under the supervision of a faculty advisor. A maximum of three credits of 59x courses may be taken toward the MSE degree without department approval. Prerequisite: instructor permission.

Required Project Courses

CSSE 585 Software Engineering Project 1

CSSE 586 Software Engineering Project 2

CSSE 587 Software Engineering Project 3

Three-quarter sequence in which students are grouped into teams, and each team completes a year-long software project. The sequence begins in the fall and ends spring quarter. Students wishing to take other courses concurrently with CSSE 587 must obtain departmental approval. Prerequisites to CSSE 585: Completion of core courses and departmental approval. Prerequisites to CSSE 586: successful completion of CSSE 585 and departmental approval. Prerequisite to CSSE 587: successful completion of CSSE 586 and departmental approval. All participants in the Project sequence will be required to sign a Seattle University intellectual property (IP) and computer project room agreement, and may be required to sign an IP agreement with the Project Sponsor.

04/29/09

SEATTLE UNIVERSITY

Master's of Software Engineering

Why Graduate Study in Software Engineering?

The software industry requires highly skilled people to develop and maintain the computer programs that support our society: programs that do everything from managing financial systems to controlling high-performance aircraft.

Graduate study in software engineering offers the software professional the mix of managerial and technical education necessary to understand and apply advanced software engineering principles vital to industry.

Students enter the master of software engineering (MSE) program with a variety of interests and experiences, but they share a common goal: to improve their mastery of software development and maintenance. By studying a comprehensive range of topics, MSE students acquire the practical and theoretical skills to confidently address difficult software issues. Our graduates enjoy the increased financial rewards, heightened responsibilities, and enhanced job challenges that accompany an MSE degree.

Our Students

The typical MSE student is a software professional with at least two years of software development or maintenance experience. Many MSE students have a traditional computer science education; other students come to the program from diverse backgrounds, including various engineering disciplines, mathematics, the physical and biological sciences, and business. This combination of experience and diversity promotes a cross-pollination of issues and ideas throughout the program.

Our Tradition

Seattle University has long been a leader in software engineering education. It established its pioneering MSE program in 1979, and awarded the world's first MSE degree in 1982.

Our graduate faculty have extensive industrial experience as well as strong academic credentials. Our curriculum has been shaped by close contacts with local industry, ensuring that courses are relevant to the workplace and that projects are tailored to the professional needs of our students.



Our Program

The MSE program at Seattle University is designed for working professionals. All classes are typically offered in the evenings. The courses are aligned with the Guide to the Software Engineering Body of Knowledge, (SWEBOOK), a project of the IEEE Computer Society Professional Practices Committee. The program builds on the computing experience of its students by providing course work on a variety of software engineering and computer science topics, with an emphasis on team work and disciplined approach to problem solving.

We offer a balanced core curriculum of technical and managerial courses, and a choice of elective streams to address areas of personal interest. Principles and techniques learned throughout the program are integrated into a year-long software project as the capstone experience.

Admission Requirements

- A four-year Bachelor's degree, in computer science or a related discipline, earned at a regionally accredited school.
- Minimum GPA of 3.00 calculated with coursework from all post-secondary educational institutions attended in the last 90 quarter/60 semester credits of your bachelor's degree and any post-baccalaureate coursework.
- Two years of professional experience in software development or maintenance.
- Completed Software Engineering Applicant Information form noting working knowledge of at least one programming language, such as C++, Java, or C#.
- Professional autobiography.
- Two professional recommendations using the MSE recommendation forms.
- Official Graduate Record Exam (GRE) General Test scores from within the past five years. The Subject Test in Computer Science is optional.
- If English is not applicant's native language, official TOEFL paper-based score of 580 (92 internet-based or 237 computer-based) required. Equivalent MELAB and IELTS scores also accepted to determine English Proficiency.

Application Procedures

Applications for Software Engineering are considered for every quarter. All application materials should be sent to Graduate Admissions by the stated deadline for that quarter. Late applicants can only be considered as non-matriculating students and on a space available basis