

Background Information

Provide a detailed description of the proposed modification, including its nature and purpose and centrality to institutional mission. (1500 characters)

The University of South Carolina requests approval to modify the Master of Software Engineering program and rename it as Master of Science in Software Engineering. The proposed modifications to the program are as follows:

- 1) There will not be a preset list of approved electives for this program. Instead, student can choose any of the CSCE courses numbered above 500 as electives. A maximum of six hours in non-CSCE courses may be applied toward the degree. Overall, there is no change in the set of core courses and the total number of hours required for the degree.
- 2) There will be a new thesis option for students. Students who choose the thesis option may substitute 6 hours of thesis preparation (CSCE 799) for electives.
- 3) The program is being renamed as Master of Science in Software Engineering.

Software engineering program is central to the mission of USC as this program is concerned with the development and evolution of safe and reliable software systems, as well as the cost and schedule of the development process. Students in this program will have access to cutting-edge research and the instructors and professionals who are engaged in it, and will find a wealth of resources and ideas to enhance their education and practice.

List the objectives of the modified program. (1500 characters)

The graduates of this program should be able to:

- 1) Elicit precise and accurate functional specifications of software systems.
- 2) Incorporate techniques for the assurance of quality attributes (non-functional requirements) of software systems.
- 3) Develop and implement plans for testing both functional requirements and quality attributes of software systems.
- 4) Give a professional specification of a software system.
- 5) Work effectively in teams to develop quality software systems.

Assessment of Need

Provide an assessment of the need for the program modification for the institution, the state, the region, and beyond, if applicable. (1500 characters)

There are several reasons for the proposed modification, which are enumerated below.

- Eliminating the preset list of approved electives for this program, which may get outdated quickly, provides additional flexibility for students to tailor the program of study to suit their professional interests. Again, there is no change in the required number of hours.
- With the new thesis option, students will have the opportunity to conduct research with an advisor and make their own contributions to the field of software engineering.
- The program is being renamed as Master of Science in Software Engineering to be consistent with other Masters programs that also have a thesis option.

Will the proposed modification impact any existing programs and services at the institution?

- Yes
 No

If yes, explain. (1000 characters)

List of Similar Programs in South Carolina

While there are departments that offer courses in related topics, there is no other Masters program in Software Engineering in South Carolina.

Program Name	Institution	Similarities	Differences

Description of the Program

Projected New Enrollment						
Year	Fall		Spring		Summer	
	Headcount	Credit Hours	Headcount	Credit Hours	Headcount	Credit Hours
2016-2017	18	162	18	162	18	54
2017-2018	18	162	18	162	18	54
2018-2019	18	162	18	162	18	54
2019-2020	18	162	18	162	18	54
2020-2021	18	162	18	162	18	54

These estimates are based on the current total of 18 students in the existing M.S.E program. We expect the enrollment to be steady around this number in future too.

Curriculum

Attach a curriculum sheet identifying the courses required for the program.

Curriculum Changes

Note: Complete this table only if there are changes to the curriculum.

Courses Eliminated from Program	Courses Added to Program

Degree Requirements for Master of Science in Software Engineering

The Master of Science in Software Engineering degree requires 30 credit hours beyond the B.S. Students in this program may elect either the Thesis or the Non-Thesis option. The course work must include the following.

Core (15 hours):

- CSCE 740 – Software Engineering
- CSCE 741 – Software Process
- CSCE 742 – Software Architectures
- CSCE 743 – Software Requirements
- CSCE 747 – Software Testing and Quality Assurance

Electives (15 hours):

A maximum of six hours in non-CSCE courses and at most three hours of CSCE 798 may be applied toward the degree. CSCE 797 may not be applied toward the degree.

Thesis Option:

Students who choose the Thesis option may substitute 6 hours of Thesis Preparation (CSCE 799) for electives and must defend the thesis in a public presentation.

Non-Thesis Option:

Students who choose the Non-Thesis option must pass a written comprehensive examination offered at the end of Fall and Spring semesters.

List of Graduate Level Courses in Computer Science and Engineering at USC

- CSCE 510 - System Programming
- CSCE 512 - System Performance Evaluation
- CSCE 513 - Computer Architecture
- CSCE 515 - Computer Network Programming
- CSCE 516 - Computer Networks
- CSCE 517 - Computer Crime and Forensics
- CSCE 520 - Database System Design
- CSCE 522 - Information Security Principles
- CSCE 526 - Service Oriented Computing
- CSCE 531 - Compiler Construction
- CSCE 547 - Windows Programming
- CSCE 548 - Building Secure Software
- CSCE 551 - Theory of Computation
- CSCE 552 - Computer Game Development
- CSCE 555 - Algorithms in Bioinformatics
- CSCE 557 - Introduction to Cryptography
- CSCE 561 - Numerical Analysis
- CSCE 563 - Systems Simulation
- CSCE 564 - Computational Science

- CSCE 565 - Introduction to Computer Graphics
- CSCE 567 - Visualization Tools
- CSCE 569 - Parallel Computing
- CSCE 571 - Critical Interactives
- CSCE 572 - Human-Computer Interaction
- CSCE 574 - Robotics
- CSCE 578 - Text Processing
- CSCE 580 - Artificial Intelligence
- CSCE 582 - Bayesian Networks and Decision Graphs
- CSCE 587 - Big Data Analytics
- CSCE 590 - Topics in Information Technology
- CSCE 611 - Advanced Digital Design
- CSCE 612 - VLSI System Design
- CSCE 613 - Fundamentals of VLSI Chip Design
- CSCE 711 - Advanced Operating Systems
- CSCE 713 - Advanced Computer Architecture
- CSCE 715 - Network Systems Security
- CSCE 716 - Design for Reliability
- CSCE 717 - Computer System Performance and Reliability Analysis
- CSCE 718 - Real-Time Computer Applications
- CSCE 719 - Security and Privacy for Wireless Networks
- CSCE 721 - Physical Database Design
- CSCE 723 - Advanced Database Design
- CSCE 725 - Information Retrieval: Algorithms and Models
- CSCE 727 - Information Warfare
- CSCE 730 - Programming Language Semantics
- CSCE 740 - Software Engineering
- CSCE 741 - Software Process
- CSCE 742 - Software Architectures
- CSCE 743 - Software Requirements
- CSCE 744 - Object-Oriented Analysis and Design
- CSCE 745 - Object-Oriented Programming Methods
- CSCE 747 - Software Testing and Quality Assurance
- CSCE 750 - Analysis of Algorithms
- CSCE 755 - Computability, Automata, and Formal Languages
- CSCE 758 - Probabilistic System Analysis
- CSCE 760 - Numerical Analysis I
- CSCE 761 - Numerical Analysis II
- CSCE 763 - Digital Image Processing
- CSCE 765 - Computer Graphics System Design
- CSCE 766 - Scientific Visualization
- CSCE 767 - Interactive Computer Systems
- CSCE 768 - Pattern Recognition and Classification
- CSCE 769 - Computational Structural Biology
- CSCE 771 - Computer Processing of Natural Language
- CSCE 772 - Computer Speech Processing
- CSCE 774 - Robotics Systems
- CSCE 780 - Knowledge Representation
- CSCE 781 - Knowledge Systems
- CSCE 782 - Multiagent systems
- CSCE 784 - Neural Information Processing

- CSCE 787 - Introduction to Fuzzy Logic
- CSCE 790 - Topics in Information Technology
- CSCE 791 - Seminar in Advances in Computing
- CSCE 793 - Internship in Software Engineering
- CSCE 797 - Individual Study and Research
- CSCE 798 - Directed Study and Research
- CSCE 799 - Thesis Preparation
- CSCE 813 - Internet Security
- CSCE 814 - Distributed Systems Security
- CSCE 815 - Computer Communications
- CSCE 818 - Top-Down VLSI Design
- CSCE 819 - Custom VLSI Design
- CSCE 821 - Distributed Database Design
- CSCE 822 - Data Mining and Warehousing
- CSCE 824 - Secure Database Systems
- CSCE 826 - Cooperative Information Systems
- CSCE 846 - Software Reliability and Safety
- CSCE 850 - Advanced Analysis of Algorithms
- CSCE 853 - Formal Methods in Computer Security
- CSCE 865 - Advanced Computer Graphics
- CSCE 867 - Computer Vision
- CSCE 868 - Advanced Pattern Recognition
- CSCE 883 - Machine Learning
- CSCE 895 - Ph.D. Seminar
- CSCE 899 - Dissertation Preparation

Faculty

Provide a brief explanation of any additional institutional changes in faculty and/or administrative assignment that may result from implementing the proposed program modification. (1000 characters)

This modification, which essentially provides a thesis option and renames the program, does not entail additional teaching or administrative responsibilities beyond the current workload for faculty and staff. All of the courses required for this program are already offered regularly. Administration of this program will not differ from that of the existing M.S.E program.

Resources

Identify any new library/learning resources, new instructional equipment, and new facilities or modifications to existing facilities needed to support the modified program. (2000 characters)

Financial Support

Estimated New Costs by Year						
Category	1st	2nd	3rd	4th	5th	Total
Program Administration A 3% increase/year is calculated after the 1 st year	1,271	1,309	1,348	1,388	1,430	6,746
Faculty Salaries (AVG. salary \$104340)	93,906	96,723	99,625	102,614	105,692	498,560
Staff Salaries	4,750	4,893	5,040	5,191	5,347	25,221
Library Resources	2,000	2,000	2,000	2,000	2,000	10,000
Other*						
Total	101,927	104,925	108,013	111,193	114,469	540,527
Sources of Financing						
Category	1st	2nd	3rd	4th	5th	Total
Tuition Funding (21 credits/student/year)	269,325	277,405	285,727	294,298	303,127	1,429,882
# of students enrolled	Instate: 12 Out-of-state: 6					
Net Total (i.e., Sources of Financing Minus Estimated New Costs)	167,398	172,480	177,714	183,105	188,658	889,355

*Provide an explanation for these costs and sources of financing in the budget justification.

Budget Justification

Provide a brief explanation for the other new costs and any special sources of financing (state funding, reallocation of existing funds, federal funding, or other funding) identified in the Financial Support table. (1000 characters)

Note: Institutions need to complete this budget justification *only* if any other new costs, state funding, reallocation of existing funds, federal funding, or other funding are included in the Financial Support table.

There are no other new costs, state funding, reallocation of existing funds, federal funding, or other funding included in the financial support table. The revenue from tuition is estimated at \$516 per credit hour for in-state tuition and \$1,105.5 for out-of-state tuition. The total tuition revenue was calculated based on the credit hours shown under the projected enrollment.

Evaluation and Assessment

Will any the proposed modification impact the way the program is evaluated and assessed?

Yes

No

If yes, explain. (1000 characters)

Will the proposed modification affect or result in program-specific accreditation?

Yes

No

If yes, explain; if the modification will result in the program seeking program-specific accreditation, provide the institution's plans to seek accreditation, including the expected timeline for accreditation. (500 characters)

Will the proposed modification affect or lead to licensure or certification?

Yes

No

If yes, explain how the program will prepare students for licensure or certification. (500 characters)

Teacher or School Professional Preparation Programs

Is the proposed modified program a teacher or school professional preparation program?

Yes

No

If yes, complete the following components.

Area of Certification

Attach a document addressing the South Carolina Department of Education Requirements and SPA or Other National Specialized and/or Professional Association Standards.