



SOFTWARE ENGINEERING MSCS PROGRAM

**COMPUTER SCIENCE
SUBSPECIALTY OPTION (368)**

HANDBOOK
March 2002

NAVAL POSTGRADUATE SCHOOL



Monterey, California

PROGRAM OBJECTIVE

The Software Engineering program at the U.S. Naval Postgraduate School provides military and government graduate students with an opportunity to learn all relevant aspects of software development and the skills needed to efficiently and reliably plan and create large-scale software intensive systems using the best available science and technology. These skills are essential for officers and civilians responsible for acquisition, development or maintenance of military software.

The program includes in-residence and distance learning M.S. and Ph.D. degree programs, certificate programs, short courses, and laboratory support. The Ph.D. program is the first-ever doctoral program in Software Engineering. Both the M.S. and Ph.D. degree programs may be completed either on campus by students carrying a full-time course load, or part-time through the distance learning option.

MASTER OF SCIENCE IN COMPUTER SCIENCE, SOFTWARE ENGINEERING TRACK (368)

The Computer Science curriculum is designed to provide the officer with the technical knowledge and skills necessary to specify, evaluate and manage computer system design; to provide technical guidance in applications ranging from data processing to tactical embedded systems; to educate the officer in the analysis and design methodologies appropriate for hardware, software and firmware; and to provide the officer with practical experience in applying modern computer equipment and research techniques to solve military problems.

The purposes of the Software Engineering Track are to provide knowledge of all aspects of software development and to develop skills needed to efficiently and reliably implement military systems and application software using the best available tools and techniques.

The MSCS is an six-quarter course of study with entry dates in April and October. Those requiring the six or twelve week refresher will begin study prior to those entry dates. If further information is needed, contact the Academic Associate or Curricular Officer.

For more information, visit our website at <http://seac.nps.navy.mil/> or email your inquiries to se@cs.nps.navy.mil, or contact the Curricular Officer, CDR Chris Lapacik, at clapacik@nps.navy.mil

ADMISSION PROCEDURES

The point of contact to request Naval Postgraduate School catalogs and admission to all degree programs is:

Director of Admissions
Code 01B3, Naval Postgraduate School,
589 Dyer Rd., RM 103C
Monterey, CA 93943-5100
Telephone (831) 656-3093, DSN 878-3093
FAX (831) 656-2891

Application information for the M.S. degree in Software Engineering can be found at:
<http://seac.nps.navy.mil/Masters.htm>

THE COMPUTER SCIENCE, SOFTWARE ENGINEERING TRACK PROGRAM

Students enrolled in the MSCS/Software Engineering track must successfully complete the 17 general Computer Science courses plus 5 advanced Software Engineering courses. Completion of research leading to a master's thesis is required.

THESIS GUIDELINES

The Master's thesis is the capstone achievement of the student's academic endeavor at NPS. A challenging research thesis, requiring students to apply their focused graduate education, is one of the most effective methods for both solving Fleet/Joint Force problems and instilling the life-long capability for applying basic principles to the creative solution of complex problems.

A Software Engineering thesis should either demonstrate the use of Software Engineering principles and techniques in solving existing software problems, or develop new theory, models, methods, or tools for building/maintaining software systems. A thesis must have some kind of scientific contribution, not just manufacturing of a lot of source code. This is why students must specify their expected scientific contributions in their thesis proposal.

It is very important for a student to pick the right project and define the scope of the thesis work. The student's thesis advisor will help him/her define the scope of the thesis work and identify its scientific contributions.

Additionally, the thesis advisor will:

- help a student to lay out a schedule of milestones.
- suggest initial references to read and people to contact.
- meet with the student regularly to monitor progress and provide consultation and direction.
- review and critique the thesis outline.
- review and critique the work, offer suggestions for necessary revisions, and check for accuracy and completeness.

The thesis advisor can help with topics in one of the following two ways:

- (1) The advisor has a list of thesis topics in mind. He/she already knows how much work each topic involves and its scientific contributions. A student simply has to follow the direction of his/her advisor to complete the thesis work.
- (2) A student has a project from work, and he/she finds it beneficial to use results of the project to write the thesis.

If a student chooses option 2, then the thesis advisor will have to spend time to understand the project in order to help the student define the scope of the thesis and identify its scientific contributions. In many cases, the advisor may have to suggest work in addition to that done in the project to generate enough scientific contribution from the thesis work. Depending on the labor involved, the advisor may need reimbursable research funding support to allow him/her to work on the project.

STEPS FOR COMPLETING THE THESIS PROPOSALS

- (i) Submit drafts of the thesis proposal to the advisor(s) and second reader (if applicable) for review.

- (ii) Ask the advisor(s), second reader (if applicable), and the CS Chairman to sign the final thesis proposal.
- (iii) Submit the signed proposal to Curricular Officer.

THE THESIS PROCESS

An on-line thesis handbook is available at:

<http://vislab-www.nps.navy.mil/~code36/THESISGUIDE.html>

THESIS PROPOSAL

The thesis proposal is the key document in preparing for the thesis process. It performs several important functions in the process of communicating thesis activities. The proposal focuses the research effort for the student. It requires the student to develop a specific research question and subsidiary research questions, and to identify the methodologies to be employed in the research and the particular scope and limitations of the thesis work; it forces the student to give serious thought to the items that might become major problems later on. For a proposal example, refer to:

<http://vislab-www.nps.navy.mil/~code36/THESISGUIDE.html#proposalexample>

and

<http://vislab-www.nps.navy.mil/~code36/THESISGUIDE.html#appendixA>

THESIS FORMAT APPROVAL

When determining format in terms of pagination, titles, headers, etc., follow the guidelines in the NPS Thesis Preparation Manual. The most current edition of this manual is available from the Thesis Processor.

Ms. Elaine Christian, Code 91EC
Research Office
Naval Postgraduate School
Bldg. 234 Halligan Hall, Room 236
Monterey, CA 93943-5138
DSN: 878-2762, Comm: (831) 656-2762

The Thesis Processor will become very important to the student as the student prepares the final draft of the thesis. She will provide the student formatting information and other such information needed to get the thesis published.

The student should send the Thesis Processor a copy of their thesis for format check as soon as a complete draft of the thesis is completed. This can be done while waiting for comments from advisors and second readers.

FINAL THESIS SUBMISSION

- (i) The student notifies the curricular office by the first Friday of the quarter that he/she plans to graduate.
- (ii) The thesis is signed by the advisor(s), second reader, and the CS Chairman.
- (iii) Submit thesis to the Thesis Processor.

THE COMPUTER SCIENCE, SOFTWARE ENGINEERING TRACK PROGRAM (368)

A baccalaureate degree or the equivalent, with above-average grades in mathematics, (including differential and integral calculus) resulting in an APC of at least 325 is required for direct entry. Undergraduate degrees in applied science or engineering are highly desirable. Students lacking these prerequisites may be acceptable for the program, through a six or twelve week refresher, providing their undergraduate records and/or other indicators of success, such as the GRE (Graduate Record Examination), indicate an ability to work in quantitative subjects. While previous academic or practical experience in computer science is certainly helpful and can enhance the applicant's potential for admission, such experience is not a prerequisite.

18-MONTH CURRICULUM FOR URL STUDENTS (CS UNDERGRADUATE) FALL INPUT

QUARTER 1 FALL	CS377X (4-2) SECOND LANGUAGE	CS3502 (4-0) COMPUTER COMMS & NETWORKS	SW3460 (3-1) SOFTWARE METHODOLOGY	NW3230 STRATEGY & POLICY
QUARTER 2 WINTER	SW4500 (3-1) SOFTWARE ENGINEERING	SW4580 (3-0) DESIGN OF EMBEDDED REAL-TIME SYSTEMS	SW4591 (3-1) REQUIREMENTS ENGINEERING	NW3210 NSDM: DIRECTED STUDY PART I
QUARTER 3 SPRING	CS3310 (4-1) ARTIFICIAL INTELLIGENCE	SW4520 (3-0) ADVANCED SOFTWARE ENGINEERING	SW4590 (3-1) SOFTWARE ARCHITECTURE	NW3211 NSDM: DIRECTED STUDY PART II
QUARTER 4 SUMMER	SW4510 (3-0) COMPUTER-AIDED PROTOTYPING/ SW4530 (3-1) SOFTWARE R&D IN DOD	SW4540 (3-1) SOFTWARE TESTING/ SW4581 (3-1) SOFTWARE RELIABILITY & QUALITY METRICS	CS3320 (3-1) DATABASE SYSTEMS	NW3220 JMO: DIRECTED STUDY PART I
QUARTER 5 FALL	CS0810 THESIS RESEARCH	CS0810 THESIS RESEARCH	CS3600 (4-2) INTRO TO COMPUTER SECURITY	NW3221 JMO: DIRECTED STUDY PART II
QUARTER 6 WINTER	CS0810 THESIS RESEARCH	CS0810 THESIS RESEARCH	CS4203 (3-2) INTERACTIVE COMPUTATION SYSTEMS	NW3223 JMO: DIRECTED STUDY PART I

IN BOLD PRINT: This track is notional. Please see the Track Chair regarding possible substitutions for track-specific classes to accommodate focus areas pertinent to your thesis research.

**18-MONTH CURRICULUM FOR URL STUDENTS (CS UNDERGRADUATE)
SPRING INPUT**

QUARTER 1 SPRING	CS377X (4-2) SECOND LANGUAGE	CS3502 (4-0) COMPUTER COMMS & NETWORKS	SW3460 (3-1) SOFTWARE METHODOLOGY	NW3230 STRATEGY & POLICY
QUARTER 2 SUMMER	SW4500 (3-1) SOFTWARE ENGINEERING	SW 4510 (3-0) COMPUTER-AIDED PROTOTYPING/ SW4530 (3-1) SOFTWARE R&D IN DOD	SW4540 (3-1) SOFTWARE TESTING/ SW4581 (3-1) SOFTWARE RELIABILITY & QUALITY METRICS	NW3210 NSDM: DIRECTED STUDY PART I
QUARTER 3 FALL	CS3310 (4-1) ARTIFICIAL INTELLIGENCE	SW 4570 SOFTWARE REUSE/ SW4592 (3-1) SOFTWARE RISK ASSESSMENT	SW4582 (3-1) SOFTWARE SAFETY	NW3211 NSDM: DIRECTED STUDY PART II
QUARTER 4 WINTER	CS0810 THESIS RESEARCH	SW4580 (3-0) DESIGN OF EMBEDDED REAL-TIME SYSTEMS/ SW4591 (3-1) REQUIREMENTS ENGINEERING	CS3320 (3-1) DATABASE SYSTEMS	NW3220 JMO: DIRECTED STUDY PART I
QUARTER 5 SPRING	CS0810 THESIS RESEARCH	SW4520 (3-0) ADVANCED SOFTWARE ENGINEERING	CS3600 (4-2) INTRO. TO COMPUTER SECURITY	NW3221 JMO: DIRECTED STUDY PART II
QUARTER 6 SUMMER	CS0810 THESIS RESEARCH	CS0810 THESIS RESEARCH	MV4202/3/4 (3-2)	NW3223 JMO: DIRECTED STUDY PART I

IN BOLD PRINT: This track is notional. Please see the Track Chair regarding possible substitutions for track-specific classes to accommodate focus areas pertinent to your thesis research.