The graduate program in computer science offers a Master of Science (M.S.) in Computer Science and a Master of Science (M.S.) in Software Engineering. The degree requirements consist of six required courses and four elective courses. Students may concentrate in several tracks including networking and web development. The degree programs in Computer Science and Software Engineering are offered with courses alternating between Loyola's Columbia and Timonium Campuses. Qualified students with any undergraduate degree are accepted into the program; a sequence of preparatory courses is offered to prepare students for graduate study.

Designed to meet the diverse needs of computer science professionals, the M.S. in Computer Science offers a practitioner-oriented curriculum that includes the study of advanced algorithms, computer networking, web programming, software engineering, and database systems. In addition, students may elect courses from many areas of computer science including object-oriented analysis and design, network security, as well as service-oriented architecture.

Two optional focused tracks are available in Computer Science. The web programming track builds on the core study of advanced algorithms and database systems, and includes courses in advanced HTML coding and design, web development with servlets and JavaServer Pages, Java design patterns, and XML technologies. The networking track is designed to provide a detailed understanding of how computer systems communicate and exchange data. It builds on the required study of advanced algorithms, web programming, and database systems. The program includes courses concerning TCP/IP, local and wide area networks, and network security.

Designed to meet the need of professionals looking to advance into technical project management, the M.S. in Software Engineering offers advanced skills in project and personnel management, modern analysis and design methods, and contemporary quality assurance techniques. Students have many opportunities to develop these skills in project-based courses and in their respective workplaces. The process of developing and maintaining large-scale, software-based systems is complex. It involves detailed analysis, sophisticated techniques, and the knowledge of how the system interacts with other components. Software engineers are the professionals charged with this task. Besides being familiar with the fundamentals of computer science, a software engineer must know the technical and management techniques required to construct and maintain such complex software systems.

Students wishing to pursue both degrees must complete all of the degree requirements for each degree. Some courses for the first degree may satisfy requirements for the second degree. If so, they need not be repeated. However, only three common courses may be counted to satisfy the requirements of a double degree.

MASTER OF SCIENCE (M.S.) IN COMPUTER SCIENCE

The degree consists of 30 graduate credit hours.

Preparatory Courses (Computer Science)

The preparatory courses must be taken or waived without replacement based on previous college experience. These courses do not count toward the 30 required credit hours.
CS610 Discrete Mathematic and Algorithm Analysis  
CS630 Computing Fundamentals I  
CS631 Computing Fundamentals II  

Required Courses (Computer Science)  

CS712 Web Application Development with Servlets and JavaServer Pages  
CS722 Object-Oriented Programming  
CS724 Algorithm Design and Analysis  
CS730 TCP/IP Architecture  
CS762 Database Systems  
CS770 Software Engineering  

As seen in the suggested course sequence below CS722 is the expected entry point into the program. Students with limited background, but beyond that covered in the preparatory courses, may wish to start with CS700 the summer before taking CS722  

Electives (Computer Science)  

Four courses at the CS700-level or above may be chosen. One of the electives may be an approved graduate business (GB) course offered by the Sellinger School of Business and Management. Unless otherwise noted, all CS700-level courses have the CS600-level courses as prerequisites.  

CS700 Advanced Data Structures and Algorithm Design  
CS701 Principles of Programming Languages  
CS702 Operating Systems  
CS710 Fundamentals of Web Design  
CS713 Java Design Patterns and Best Practices  
CS714 XML Technologies and Applications  
CS716 Emerging Web Programming Technologies  
CS718 Graphics  
CS732 Local Area Networks  
CS734 Wide Area Networks  
CS750 Special Topics in Computer Science or Software Engineering  
CS751 Independent Study  
CS760 Advanced Operating Systems  
CS764 Network Security  
CS771 Engineering Systems Analysis  
CS772 Object-Oriented Analysis and Design  
CS773 Software System Specification  
CS774 Human-Computer Interaction  
CS780 Software Reliability and Testing  
CS790 Software Architecture and Integration  
CS791 Cost Estimation and Management  
CS792 Software Maintenance and Evolution  

Tracks (Computer Science)  

The web programming track involves taking three courses from CS712, CS713, CS714, and CS716, and the network track involves taking three courses from CS730, CS732, CS734, and CS764.
Suggested Course Sequence (Computer Science)

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Students interested in the network track should interchange CS712 and CS730. Students only interested in taking one course a semester complete the four courses of the first year in their first two years.

An interactive web page that shows the expected offerings of the required and elective courses is available at [http://www.cs.loyola.edu/MS/course-guide-applet](http://www.cs.loyola.edu/MS/course-guide-applet) to help plan a course of study.

MASTER OF SCIENCE (M.S.) IN SOFTWARE ENGINEERING

The degree consists of 30 graduate credit hours.

Preparatory Courses (Software Engineering)

It is assumed that all students starting the program have the equivalent of the following courses; however, these courses may be waived without replacement depending on the candidate's background. These courses do not count toward the 30 required credit hours.

CS702 Operating Systems
CS722 Object-Oriented Programming
CS724 Algorithm Design and Analysis

Required Courses (Software Engineering)

CS762 Database Systems
CS770 Software Engineering
CS773 Software System Specification
CS774 Human Computer Interaction
CS780 Software Reliability and Testing
CS790 Software Architecture and Integration

Electives (Software Engineering)

Four courses satisfying the following requirements:

- Two CS750-level or above courses.
• At least one and up to three approved graduate business (GB) course offered by the Sellinger School of Business and Management.

Approved CS and GB electives include non-software engineering required courses listed under the computer science electives plus:

CS712 Web Application Development with Servlets and JavaServer Pages
CS730 TCP/IP Architecture
GB700 Ethics and Social Responsibility
GB701 Risk Assessment and Process Strategies
GB705 Leadership and Management
GB754 Information Systems Security
GB895 Quality Management
GBXXX (with approval)

Suggested Course Sequence (Software Engineering)

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Students only interested in taking one course a semester complete the four courses of the first year in their first two years.

An interactive web page that shows the expected offerings of the required and elective courses is available at http://www.cs.loyola.edu/MS/course-guide-applet to help plan a course of study.

COURSE DESCRIPTIONS

[Graduate Course Descriptions with 'CS' Course Keys will appear here in the catalogue. This information will be generated automatically based on your Course Descriptions submissions.]