2014 Computer Science M.S. Requirements

The Master of Science in Computer Science program includes a minimum of 30 credit hours of course work in the foundations of computer science, programming, systems, and applications.

View the [SoIC Graduate Bulletin](#) for more information about the following requirements.

**Curriculum**

Most of the Computer Science Program’s courses at the 500-level and above are classified into these areas:

- Foundations (middle digit 0 or 1, e.g., B501, B502, B503, B510)
- Programming Languages (middle digit 2, e.g., B521, B522, P523, B524)
- Systems (middle digit 3 or 4, e.g., P536, B538, B541, P542, B543)
- Applications (middle digit 5, 6, 7 or 8, e.g., B551, B552, B553, B561, P565-566, P573, B581, B582)

General courses not associated with a specific area are numbered with a middle digit 9. Courses that involve a major programming project are designated as “programming-in-the-large,” and carry a course number with letter designation P.

**Required Computer Science Courses (18 cr.)**

- 6 courses in computer science listings at the 500-level or higher
  - With prior written permission from the director of Master’s studies, one course may be selected from:
    - CSCI B401 Fundamentals of Computing Theory (3 cr.)
    - CSCI B403 Introduction to Algorithm Design and Analysis (3 cr.)
    - CSCI P436 Introduction to Operating Systems (4 cr.)
    - CSCI B443 Introduction to Computer Architecture (3 cr.)
    - MATH M471 Numerical Analysis I (3 cr.)
    - MATH M472 Numerical Analysis II (3 cr.)
  - One course must be a CSCI P-course (3 cr.)
  - One course must be a CSCI Foundations course (3 cr.)
  - Two of the three areas (Programming, Systems, Applications) must be represented

**Computer Science Electives (3-6 cr.)**

**Creativity Requirement (6-9 cr.)**

Students have a choice among five options to fulfill their creativity requirement.

C: Computer science concentration.
Three graduate-level courses (minimum of 9 credit hours) from computer science, including an additional P-level graduate course beyond the core requirements. Only 3 credit hours of these courses may be used for independent study (CSCI Y790 Graduate Independent Study).

R: Master’s research project.

Two graduate-level independent study courses (maximum of 6 credit hours), consisting of a survey or original research at a level appropriate for publication as a departmental technical report or conference presentation.

S: Master’s software project.

Two graduate-level independent study courses (maximum of 6 credit hours), consisting of substantial individual input into a major software research and development project, documented in the public domain.

TH: Master’s thesis.

Two graduate-level independent study courses (maximum of 6 credit hours), consisting of a formal master’s thesis as prescribed by the University Graduate School.

A: Interdisciplinary application of computer science.

Three or more courses (minimum of 9 credit hours) in a program that applies computer science to another discipline. These courses must be approved in advance by the graduate faculty and may affect the total number of credit hours you take in order to fulfill your computer science requirements.

Approved Specializations

- **Bioinformatics** (9 credits):
  - INFO I519: Introduction to Bioinformatics
  - INFO I529: Machine Learning in Bioinformatics
  - one of:
    - BIOL L504: Genome Biology for Physical Scientists
    - BIOL L531: Cyberinfrastructure-enabled Computational Genome Science-A Laboratory

- **Data modeling and management** (9-12 credits):
  - two or more of the following:
    - CSCI B552: Knowledge Based Artificial Intelligence
    - CSCI B561: Advanced Database Concepts
    - CSCI B565: Data Mining
    - CSCI B656: Web Mining
    - CSCI B661: Database Theory and Systems
    - CSCI B662: Database Systems and Internal Design
o at most two of the following:
  - ILS Z534: Information Retrieval Theory and Practice
  - ILS Z634: Metadata
  - ILS Z636: Semantic Web
  - ILS Z637: Information Visualization

- **Machine learning** (9 credits):
  o at least one of:
    - CSCI B554: Probabilistic Approaches to Artificial Intelligence
    - CSCI B555: Machine Learning
    - CSCI B565: Data Mining
    - CSCI B656: Web Mining
    - CSCI B652: Computer Models of Symbolic Learning
  o one or two of the following: (subject to the constraint that not both STAT S626 and PSY-P 533 are allowed)
    - PSY P533: Introduction to Bayesian Data Analysis I
    - PSY P553: Advanced Statistics in Psychology I
    - STAT S520: Introduction to Statistics
    - STAT S625: Nonparametric Theory and Data Analysis
    - STAT S626: Bayesian Theory and Data Analysis
    - STAT S670: Exploratory Data Analysis
    - STAT S675: Statistical Learning and High-Dimensional Data Analysis

- **Security** (9 credits):
  o INFO I520: Security for Networked Systems
  o INFO I533: Systems and Protocol Security and Information Assurance
  o one of:
    - CSCI B649: Advanced Topics in Privacy
    - CSCI B649: Modern Cyberfraud
    - CSCI B649: Data Privacy and Trustworthy Systems
    - INFO I521: Malware Epidemic: Threat and Defense
    - INFO I525: Organizational Informatics and Economics of Security
    - INFO I536: Foundational Mathematics of Cybersecurity