

# MS in Computer Science

Computer science is the body of knowledge dealing with the design, analysis, implementation, efficiency, and application of algorithmic processes that transform information. It deals with software, operating systems, programming languages, and other related areas.

The Master of Science in Computer Science requires 30 credits of graduate work, consisting of 12 credits of core courses, 12 credits of specialization courses, and six credits of elective courses. The curriculum features a substantial choice of specialization and elective courses, thereby enabling students to tailor the program to meet their specific needs and fulfill their particular aspirations. The advanced portion of the curriculum remains open-ended to encourage students to take advantage of new courses that concentrate on the latest developments in the field.

Completion of the curriculum requires approximately one-and-a-half years of full-time graduate study. Part-time students enrolled through NTU, whose work schedules preclude full-time study, should expect to fulfill the requirements within five years by registering for at least two three-credit courses each academic year.

## Admissions Requirements

Students must meet all of the following eligibility requirements for regular admission into the Computer Science program:

- BS degree in computer science.
- Cumulative undergraduate G.P.A. of at least 2.9 on a 4.0 scale.

Students who do not meet these requirements may be granted provisional admission into the program, depending on academic background and experience. For additional information about provisional admission status, see the Admission section of this bulletin.

## Curriculum Overview

Students must complete a minimum of 30 credits for graduation. These courses must satisfy the following distribution requirement:

### Core Curriculum (12 credits)

The core curriculum consists of 12 credits and allows students to develop knowledge across a broad spectrum of topics related to computer science. Students select courses from a specified set of courses covering data structures, algorithms, programming languages, databases, and software engineering. Students should complete the core courses prior to pursuing specialization and elective courses.

### Specializations (12 credits)

Students select at least four courses from an area of specialization that represents the technical emphasis most compatible with their educational and career goals. Areas of specialization for Computer Science include Algorithms and Complexity, Artificial Intelligence, Data Management, and Web Applications. Students should consult an advisor or visit the NTU Web site for information about currently offered specialization areas and courses available in those areas.

### Electives (6 credits)

Students may select six elective credits from any of NTU's graduate-level courses to meet the elective requirement and bring their total credits to a minimum of 30. Elective credits are designed to give students the opportunity to tailor the program to their individual and organizational goals and needs. Students are encouraged to consult with an NTU advisor to select appropriate elective courses.

### Thesis Option

Most students are expected to pursue a non-thesis Master of Science degree program. However, when desirable and appropriate, as determined by the student in consultation with his or her academic NTU advisor, a thesis option, constituting a maximum of six credits, is available and may be substituted for the elective courses. For additional information about the thesis option and guidelines, see the Academic Information section of this bulletin.

## Program of Study Plan

Admitted students should submit a Program of Study Plan (PSP) to NTU prior to completion of six semester credit hours. Failure to submit a PSP increases the possibility of students completing duplicate courses or courses that are not applicable to their degree programs. Although NTU cannot guarantee preferred course availability in any given term, the PSP documents do guide course selection from partner universities. It may be necessary for a student to revise an approved PSP when

course availability does not comply with the student's needs. The PSP form should be submitted through the NTU Web site.

The following list of courses illustrates the choice of academic material available to students who want to obtain an MS in Computer Science. Individual course descriptions may be found on the NTU Web site at [www.ntu.edu](http://www.ntu.edu). *Specific courses and course requirements may change. Updates will be posted on the NTU Web site.*

### Core Courses (12 credits)

Students must select four of the following courses to satisfy the core requirement:

AD 711	Advanced Data Structures
AD 720	Analysis of Algorithms
CS 720	Programming Language Principles
CS 750	Database Management Systems
SE 710	Software Engineering

### Specialization Courses (12 credits)

Students select 12 credits from one specialization area to satisfy this requirement. Courses for several specialization areas are listed below. Please consult an advisor or visit the NTU Web site for information about other specialization areas and courses available in those areas.

#### Algorithms and Complexity

AD 721	Sequential and Parallel Algorithms
AD 726	Genetic Algorithms
CA 710	Introduction to Parallel Processing
CM 710	Formal Languages and Computation Theory
CS 758	Data Mining
IS 794	Machine Learning
IS 773	Neural Computation
ST 741	Advanced Computer Graphics and Computer-Aided Design

#### Artificial Intelligence

AD 726	Genetic Algorithms
CS 758	Data Mining
CT 780	Robotics
IS 710	Artificial Intelligence Concepts
IS 720	Knowledge System Engineering
IS 755	Artificial Agents
IS 773	Neural Computation
IS 794	Machine Learning

#### Data Management

CS 755	Distributed Database Design
CS 758	Data Mining
CS 760	Client/Server Computing
CS 765	Distributed Computing Systems
CS 780	Advanced WWW Technologies
ST 760	Information System Security

#### Web Applications

CS 760	Client/Server Computing
CS 761	Network Computing
CS 765	Distributed Computing Systems
CS 780	Advanced WWW Technologies
SE 531	Advanced Java Programming
SE 538	XML, Java, and the Enterprise
SE 540	Java Distributed Enterprise Computing
SE 735	Design of Interface Systems
SE 736	Enterprise Software Development
SE 750	Software Testing and Verification
SE 754	Object-Oriented Testing and Reliability
ST 760	Information System Security

### Elective Courses (6 credits)

Students may select elective courses from any of NTU's graduate-level courses, provided they have the appropriate prerequisite knowledge.

### Foundation Courses

Foundation courses are available for those students who do not have an adequate preparation to begin a master's program in Computer Science. Undergraduate Foundation courses for students entering graduate study in Computer Science are available in the topical areas given below. Foundation courses cannot be taken for graduate credit. Please see the NTU Web site for a current set of Foundation courses.

AD 310-319	Data Structures (formerly BC 30-39 Data Structures)
CM 310-319	Mathematical Logic and Automata Theory (formerly BC 80-89 Discrete Structures)
SE 330-339	Analysis and Design Techniques (formerly BC 10-19 Fundamentals of Computer Engineering)