
Computer Science

The field of computing enables much of the on-going revolution in information technology and communications. Its techniques, tools and problem-solving approaches have proven most powerful and effective. Computing professionals define and provide the new information infrastructure thereby changing society and culture by extending and enhancing everyone's abilities. SUNYIT recognizes the need for trained professionals in the computer field. Three undergraduate programs provide the flexibility that allows students to position themselves in the field according to their own strengths and interests.

B.S. in Computer & Information Science

The Bachelor of Science program in computer and information science provides a broad education in major areas of the field. The program, which closely follows the Association of Computing Machinery (ACM) recommendations, gives students the flexibility to concentrate studies according to their interests.

The general educative goal of the undergraduate program is to ensure that each graduate has a solid background in all the fundamental areas of computer science and to provide a sufficiently wide spectrum of advanced electives to allow each student to fashion a specialization (or concentration) suited to their strengths and interests. Some concentrations that could be constructed from current and recent offerings are:

- Information Assurance/Data Security
- Entertainment Computing (*including game design and game programming*)
- System Administration
- Scientific and Engineering Computing
- Network and Grid Programming
- System Modelling and Simulation
- Information Technology

B.S. in Computer Information Systems

The Bachelor of Science program in computer information systems places an emphasis on business applications of computing. Students acquire basic skills in computer systems areas, including programming, database management, and other business-oriented areas. The program is designed to follow the curricular guidelines of the ACM, which are endorsed by the Association for Information Technology Professionals (AITP). Many graduates who pursue advanced study enter graduate programs in management or business administration. Also, with appropriate course selection, a student in computer/information systems may be prepared to continue on into the M.S. program in computer and information science.

B.S. in Applied Computing

The Bachelor of Science program in applied computing prepares the graduate to apply the analytic and programming skills of the science of computing to a cognate intellectual domain. The degree combines the core of the baccalaureate program in computer information systems or computer and information science with strong academic preparation in another area of study. The capstone project requires the student to apply the tools and techniques of science of computing to the cognate area through the design and implementation of a project. The cognate area requirement may be fulfilled by

an associate degree in the cognate area, completion of an approved SUNYIT minor, or courses in another area approved by an advisor. With appropriate course selection, the applied computing graduate may continue into the M.S. program in computer and information science.

BS/MS in Computer and Information Science

The joint BS/MS program is a well-integrated program that permits students to complete both a bachelor's degree and a master's degree in computer and information science in a reduced time frame with a reduced total number of credits.

Requirements

Completion of the joint BS/MS program requires a minimum of 145 semester hours, including a minimum of 33 semester hours of graduate study. All specific requirements for both the BS and the MS degrees must be met. Students in the joint program may apply up to twelve credits of graduate coursework to both the undergraduate and graduate degrees simultaneously. Students in the joint program may register for CSC 500 - Discrete Structures - which will satisfy the undergraduate Finite or Discrete Math requirement and will simultaneously be applied as a general graduate elective. Two graduate courses may be applied as undergraduate "Advanced" computer science electives. One or two other graduate courses (depending on whether students earned credit for CSC 500) may be applied as undergraduate unrestricted electives. Graduate bridge courses, other than CSC 500, may not be applied simultaneously to both degrees.

Status

A student enrolled in the joint program will be considered to remain in undergraduate status until the completion of 124 semester hours, and thereafter tuition and fees will be charged at the graduate level. The BS degree will be awarded at such time as all the requirements for that degree are satisfactorily met. Students are expected to complete their BS program requirements prior to pursuit of the MS degree except where those two programs overlap.

Academic Standing

Continued matriculation in the joint program requires maintenance of a GPA of 3.0 for courses taken at SUNYIT in each of the following categories: (a) all courses applicable to the undergraduate degree; (b) computer science courses applicable to the undergraduate degree; (c) all graduate courses. Students with a GPA of less than 3.0 in any of these categories will be placed on academic probation in the program. Students who are on academic probation for any two semesters or who have a GPA of less than 2.50 in any of these categories will be academically dismissed from the joint program. Students who are academically dismissed but have not yet completed the baccalaureate program but whose performance constitutes satisfactory performance in the undergraduate program will automatically be placed in that program.

Admission to the BS/MS Program

Admission to the BS/MS program may be achieved, and enrollment maintained, in one of the following ways:

- A. As an entering freshman; continued enrollment in the joint program requires achievement of grades of B or better in CS 108, CS 240, CS 249, MAT 115 (or MAT 413), and a mathematics elective (calculus, linear algebra, or statistics). In addition, students must have an overall GPA of at least 3.0 at the end of the semester in which the first 60 credits have been completed.
- B. Upon initial transfer to SUNYIT; students must have earned grades of B or better in CS 108, CS 240, CS 249, MAT 115 (or MAT 413), and in a mathematics elective (or in their transfer equivalents), and must have a transfer GPA of at least 3.0.
- C. Subsequent to initial enrollment at SUNYIT; students must receive grades of B or better in those courses (or their transfer equivalents) listed in A) and B) above, have an overall GPA of at least 3.0 for all courses taken at SUNYIT, and have a GPA of at least 3.2 for courses in their major.

Students entering the joint BS/MS program must not have completed more than 94 credit hours toward their Bachelor's degree, and must be able to complete all requirements for the Bachelor's degree within the first 124 semester hours earned.

Academic Minors

CS and CIS students are encouraged to select an academic minor and to use the minor's course of study as a means of satisfying open electives requirements and upper-division electives requirements. Academic minors enable students to pursue in-depth education in a second discipline that supports or enhances the use and application of their computing and information systems education. Attaining an academic minor in addition to a B.S. may require a student to take more than 124 total credits to graduate. Students who declare a minor are strongly encouraged to consult with their advisors for guidance prior to course selection and registration.

UNIX Proficiency

Undergraduate majors in Computer and Information Science, Computer Information Systems, and Applied Computing are expected to be familiar with the UNIX (LINUX) operating system. This may be achieved through prior coursework, self-study, or enrollment in CS 307 - The UNIX Programming Environment.

Computer Science Laboratories

The Department of Computer and Information Sciences maintains six labs containing a mix of operating systems and software in support of the Computer and Information Science and the Computer Information Systems programs. These labs are interconnected on a modern high speed network and supported by multiple file servers for central data storage and is accessible both on and off campus. Students are strongly

encouraged to view the CS website (www.cs.sunyit.edu) and access the large quantity of software and services available. This includes remote access, databases (mySQL, PostgreSQL, and Oracle), software repositories, streaming video, and many other services. The Computer Science network is maintained by full time staff with the assistance of student administrators.

DogNET UNIX Lab (Kunsela C-012) provides access to UNIX workstations (named after dogs). Twenty-five workstations (currently Pentium IV/3.4GHz with 17" flat panel monitors). These machines run the Gentoo Linux operating system and provide access to many programs for internet access, multimedia applications, publishing, language compilers, etc. Used for computer science courses in programming languages, operating systems, networking, web development, and system administration, the lab has open access during building hours when not occupied by a class.

Microsoft Windows Labs (Kunsela C-014 and Kunsela C-109) provide access to the MS Windows operating system and software. The C-014 lab contains twenty-five workstations (currently Core 2 Duo/3.0 GHz, 2 GB RAM with 17" flat panel monitors and DVD/RW) and has open access during building hours when not occupied by a class. The C-109 special purpose lab contains six workstations and is ideal for small groups working collaboratively on projects. These labs support instruction and experimentation in object-oriented programming, client-server and distributed computing (networking, systems administration and interoperability with other platforms), collaborative computing (web development, videoconferencing, multimedia). Programming environments supported include SUNJava, Visual Studio (C#, J#, C++), Visual Basic), FORTRAN 90, Prolog, LISP, ML-Object-Caml, APL. Application software includes Microsoft Office, Sharepoint, Publisher, Visio, Matlab, Maple, and several Adobe titles.



B.S. in Computer and Information Science

I. General Education

Composition/Communication

Humanities

Arts

Social/Behavioral Sciences

Laboratory Science

Science Elective

Foreign Language

Requirement waived if the student attained a score of 85 or higher on a third year Regents examination in a foreign language. Consult with an advisor for other means of satisfying this requirement.

American History

Western Civilization

Other Civilizations

Mathematics

Two courses; must include one course in Finite or Discrete Mathematics (MAT 115 or MAT 413) with a grade of C or better, and one course selected from Calculus, Linear Algebra, or Statistics.

Upper-Division Writing Course

II. Computer Science

A. Introductory Courses

Computing Fundamentals (CS 108)*

Computer Organization (CS 220)

Data Structures and Algorithms (CS 240)*

**Minimum grade of C required in CS 108 and CS 240 or their transferred equivalents.*

B. Intermediate Courses

CS 249 Object-Oriented Programming

CS 330 Operating Systems and Networking

CS 350 Information and Knowledge Management

CS 370 Software Engineering

C. Advanced Electives

Three courses to be selected from electives listed below or from graduate courses. Courses must be taken at SUNYIT; cannot be transferred in.

CS 345 Logic Design

CS 381 Principles of Computer Security and Cryptography

CS 407 UNIX System Administration

CS 420 Numerical Computing

CS 421 Computational Linear Algebra

CS 431 Principles of Programming Languages

CS 441 Computer Architecture

CS 445 UNIX Network Programming

CS 446 Local Area Network Architecture

CS 450 Computer Graphics

CS 451 Distributed Systems

CS 454 System Simulation

CS 477 Algorithms

CS 480 Compiler Design

CS 490 Special Topics in Computer Science*

CS 491 Independent Study

CS 495 Artificial Intelligence

CS 5xx Graduate Computer Science Courses**

From time to time the department may permit students to apply other courses in the department as advanced electives by petition and by completing additional assignments in the course not required of students who are not applying the course as an advanced elective. Where available, this option will be published in the schedule of courses.

**May be repeated with different topics*

***Up to two graduate CS courses (other than bridge courses) may be used to fulfill this requirement. Enrollment in graduate courses is restricted by grade point average. See the graduate catalog for descriptions of graduate courses.*

D. Capstone

CS 498 Project in Computer Science

III. Open Electives

Open Upper-division Computing Electives

The following courses are available to CS majors for open elective credit:

CS 307 The UNIX Programming Environment

CS 311 Data Analysis

CS 324 Internet Tools in Windows

CS 351 Web Development and Internet Programming

CS 409 Software Project Management

CS 489 Cooperative Work Study in Computer Science

CS 491 Independent Study

IS 305 Applications Programming with COBOL

IS 310 Hardware and Network Infrastructure

IS 315 Networking of Information Systems

IS 320 Systems Analysis and Design

IS 325 Database Management Systems

IS 330 Decision Support and Intelligent Systems

IS 340 E-Commerce

IS 470 Database Programming

IS 490 Special Topics in Information Systems

124 Total Credits

B.S. in Computer Information Systems

I. General Education

Composition/Communication

Humanities

Arts

Social/Behavioral Sciences

Laboratory Science

Science Elective

Foreign Language

Requirement waived if the student attained a score of 85 or higher on a third year Regents examination in a foreign language. Consult with an advisor for other means of satisfying this requirement.

American History

Western Civilization

Other Civilizations

Mathematics

Two courses; must include one course in Finite or Discrete Mathematics (MAT 115 or MAT 413) with a grade of C or better, and one course selected from Calculus, Linear Algebra, or Statistics.

Upper-Division Writing Course

II. Computer Information Systems

A. Introductory Courses

CS 108 Computing Fundamentals

CS 240 Data Structures and Algorithms

Minimum grade of C required in CS 108 and CS 240 or their transferred equivalents.

B. Intermediate Courses

IS 310 Hardware and Network Infrastructure

IS 320 Systems Analysis and Design

IS 325 Database Management Systems

IS 330 Decision Support and Intelligent Systems

C. Business and Management Courses

Any two courses (minimum of six credits), one of which must be 300 level or higher, chosen from courses with the following prefixes: ACC, BUS, ECO, FIN, MGT, MKT.

D. Upper Division Electives

(Courses must be taken at SUNYIT; cannot be transferred in)

A minimum of 12 credits of coursework at the 300 level or above. The list below is not comprehensive; it represents CS and IS courses taught on a regular basis. Each student's career goals should influence courses selected. For example, a student interested in a career in banking or insurance is well advised to take IS 305 -Application Programming with COBOL. Note that many CS courses require a level of knowledge in computer science that is not provided by the introductory courses in the discipline; to facilitate effective course selection and ensure that prerequisites are met, students should consult with their advisor prior to course selection.

IS 305 Application Programming with COBOL
 IS 315 Networking of Information Systems
 IS 340 E-Commerce
 IS 470 Database Programming
 IS 490 Special Topics in Information Systems
 IS 491 Independent Study
 CS 307 The Unix Programming Environment
 CS 350 Information and Knowledge Management
 CS 351 Web Development and Internet Programming
 CS 370 Software Engineering
 CS 407 Unix System Administration
 CS 409 Software Project Management
 CS 489 Cooperative Work Study in Computer Science
 CS 5xx Graduate Computer Science Courses *

* Up to two graduate CS courses (other than bridge courses) may be used to fulfill this requirement. Enrollment in graduate courses is restricted by grade point average.

E. Capstone

CS 498 Project in Computer Science

III. Unrestricted Electives

Additional coursework as required to total 124 credits.

124 Total Credits

B.S. in Applied Computing**I. General Education**

Composition/Communication
 Humanities
 Arts
 Social/Behavioral Sciences
 Laboratory Science
 Science Elective
 Foreign Language

Requirement waived if the student attained a score of 85 or higher on a third year Regents examination in a foreign language. Consult with an advisor for other means of satisfying this requirement.

American History
 Western Civilization
 Other Civilizations
 Mathematics

Two courses; must include one course in Finite or Discrete Mathematics (MAT 115 or MAT 413) with a grade of C or better, and one course selected from Calculus, Linear Algebra, or Statistics.

Upper-Division Writing Course

II. Select one of two tracks**Computer and Information Science Track****A. Core Requirements**

Computing Fundamentals (CS 108)*

Data Structures (CS 240)*

**Minimum grade of C required in CS 108 and CS 240 or their transferred equivalents.*

B. Intermediate Requirements

Computer Organization (CS 220)

Object Oriented Programming (CS 249)

C. Advanced Requirements

Select two of the three course options

Operating Systems & Networking (CS 330)*

Information Knowledge & Management (CS 350) *

Software Engineering (CS 370) *

D. Advanced Electives

Two of the following courses (must be taken at SUNYIT; cannot be transferred in)

CS 345 Logic Design

CS 381 Principles of Computer Security and Cryptography

CS 407 UNIX System Administration

CS 420 Numerical Computing

CS 421 Computational Linear Algebra

CS 431 Principles of Programming Languages

CS 441 Computer Architecture

CS 445 UNIX Network Programming

CS 446 Local Area Network Architecture

CS 450 Computer Graphics

CS 451 Distributed Systems

CS 454 System Simulation

CS 477 Algorithms

CS 480 Compiler Design

CS 490 Special Topics in Computer Science*

CS 491 Independent Study

CS 495 Artificial Intelligence

CS 5xx Graduate Computer Science Courses**

From time to time the department may permit students to apply other courses in the department as advanced electives by petition and by completing additional assignments in the course not required of students who are not applying the course as an advanced elective. Where available, this option will be published in the schedule of courses.

**May be repeated with different topics*

***Up to two graduate CS courses (other than bridge courses) may be used to fulfill this requirement. Enrollment in graduate courses is restricted by grade point average. See the graduate catalog for descriptions of graduate courses.*

E. Capstone

CS 498 Project in Computer Science

Computer Information Systems Track**A. Core Requirements**

Computing Fundamentals (CS 108)

Data Structures (CS 240)

Minimum C grade required in CS 108 and CS 240 or their transferred equivalents.

B. Intermediate Requirements

Hardware and Network Infrastructure (IS 310)

System Analysis & Design (IS 320)

Data Base Management (IS 325)
Decision Support & Intelligent Systems (IS 330)

C. Advanced Electives

Two of the following courses, no less than 8 credits (must be taken at SUNYIT; cannot be transferred in)

CS 345 Logic Design
CS 381 Principles of Computer Security and Cryptography
CS 407 UNIX System Administration
CS 420 Numerical Computing
CS 421 Computational Linear Algebra
CS 431 Principles of Programming Languages
CS 441 Computer Architecture
CS 445 UNIX Network Programming
CS 446 Local Area Network Architecture
CS 450 Computer Graphics
CS 451 Distributed Systems
CS 454 System Simulation
CS 477 Algorithms
CS 480 Compiler Design
CS 490 Special Topics in Computer Science*
CS 491 Independent Study
CS 495 Artificial Intelligence
CS 5xx Graduate Computer Science Courses*

From time to time the department may permit students to apply other courses in the department as advanced electives by petition and by completing additional assignments in the course not required of students who are not applying the course as an advanced elective. Where available, this option will be published in the schedule of courses.

**May be repeated with different topics*

***Up to two graduate CS courses (other than bridge courses) may be used to fulfill this requirement. Enrollment in graduate courses is restricted by grade point average. See the graduate catalog for descriptions of graduate courses.*

D. Capstone

IS 495 Computer Information Systems Practicum

III. Cognate Area Requirements

A minimum of 20 credits satisfied in one of the following ways:

- any approved SUNYIT minor except Computer Information Science or Computer Information Systems.
- an associate degree in any area other than computer science, data processing, information technology, information systems, or similar titles, or in individual studies, general studies, or similar titles lacking a substantial focus.
- a minimum of twenty credits in a single discipline or interrelated disciplines subject to the approval of the department chair who shall consult with a faculty member in the pertinent discipline.

IV. Unrestricted Electives

Additional coursework as required to total 124 credits.

124 Total Credits

