REQUIREMENTS FOR BACHELOR OF SCIENCE IN COMPUTER SCIENCE
for students matriculated Fall 2012 or after

To receive the BS degree in computer science, the student must earn a minimum of 127 credit hours, including transfer credits, with an average of at least C (2.0 GPA), and a minimum of a C average in the major program.

A. Credit Requirements - A minimum of 127 semester credits of which:
   1. a minimum of 60 credits must be in liberal arts and sciences courses
   2. a minimum of 30 credits must be earned in Watson School courses

B. Area Requirements

1. Communications ................................................................................. 4 credits
   - One course that meets the Binghamton University General Education Composition requirement.
   - CS 301. Ethical, Social and Global Issues in Computing (included in the CS credits below)

2. Humanities/social science electives ................................................... 20 credits

3. Science .................................................................................................. 12 credits
   - Two course science sequence: BIOL 117 and BIOL 118 or CHEM 107 and CHEM 108 or PHYS 131 and PHYS 132
   - One science elective: chosen from courses that meet the General Education Laboratory Science requirement.

4. Mathematics .......................................................................................... 20 credits
   - MATH 221. Calculus I
   - MATH 314. Discrete Mathematics (or MATH 330)
   - One elective chosen from:
     MATH 304. Linear Algebra
     MATH 356. Mathematical Modeling
     MATH 381. Graph Theory
   - MATH 222. Calculus II
   - MATH 327. Probability with Statistical Methods
   - MATH 371. Ordinary Differential Equations
   - MATH 407. Introduction to the Theory of Numbers

5. Free electives
   Four credits must be in humanities, social sciences, engineering, arts and other disciplines, excluding computer science, that provide breadth of background. At most 2 credits of activity/wellness may be used as free elective credit.

6. Computer Science .................................................................................. 571 credits
   - CS 101. Introductory Topics in Computer Science
   - CS 120. Computer Systems I: Machine Organization
   - CS 140. Programming with Objects
   - CS 220. Computer Systems II: Arch. and Prog.
   - CS 240. Data Structures and Algorithms
   - CS 328. Internet Programming
   - CS 345. Software Engineering
   - CS 422. Web-Based Programming
   - CS 440. Adv. Topics in OO Programming
   - CS 329. Operating Systems
   - CS 373. Automata Theory and Formal Languages
   - CS 375. Design and Analysis of Algorithms
   - CS 471. Programming Languages
   - Four electives chosen from at least two of the following four areas:
     Software Design
     CS 328. Internet Programming
     CS 345. Software Engineering
     CS 422. Web-Based Programming
     CS 440. Adv. Topics in OO Programming
     Programming Languages
     CS 328. Internet Programming
     CS 422. Web-Based Programming
     CS 424. Microcontrollers and Robotics
     CS 440. Adv. Topics in OO Programming
     Computer Elements and Architecture
     CS 338. Introduction to Multimedia Systems
     CS 346. Enterprise Systems
     CS 423. Design and Impl. of Embedded Systems
     CS 424. Microcontrollers and Robotics
     CS 426. Wireless Sensor Networks
     CS 428. Computer Networks
     CS 431. Enterprise Network Security
     CS 446. Enterprise Systems Management
     Database and Information Systems
     CS 338. Introduction to Multimedia Systems
     CS 432. Database Systems
     CS 433. Information Retrieval
     CS 435. Introduction to Data Mining
   - One of the following courses may be used as a CS elective, if taken for 4 credits. It does not count in any of the above areas:
     CS 395. Computer Science Internship
     CS 396. Computer Science Co-op

C. General Education Requirements—see the General Education and Your Watson School Major handout available in the Watson School Student Services Office.

1 Credits include the Communications course CS 301
2 Students with limited programming experience are recommended to first take CS 110 Programming Concepts and Applications
Supplemental information regarding the BSCS Degree Requirements

The following information supplements that provided in the University Bulletin. It applies to students who matriculated Fall 2011 or after.

All required Computer Science courses, except CS 101, are offered every semester.

Humanities/Social Science – May be filled by courses offered by the Division of Humanities, the Division of Social Sciences, the Psychology Department and HDEV courses offered by the College of Community and Public Affairs. Many of the courses taken to meet the General Education requirements will fulfill the Humanities/Social Science requirement.

Mathematics - Students who are strong in math are encouraged to take MATH 330 (Number Systems) instead of MATH 314 (Discrete Mathematics). Students with a strong math background may take MATH 381 (Graph Theory) as their Math elective, even though they have not taken MATH 304 (Linear Algebra). The following Binghamton University course can be substituted for MATH 327: MATH 448 (Introduction to Probability and Statistics II).

Free Electives – May be filled by extra courses from any of the areas listed above, SOM courses, or additional Computer Science courses. A maximum of 2 PE credits may be counted as Free Elective credits. At least four of these credits must be in humanities, social sciences, arts and other disciplines (excluding computer science) that provide breadth of background. CS 110 counts as a free elective.
# Sample Schedule of Our Flexible Four Year Program (Entering in 2012)

**Undergraduate Computer Science Program**

## Freshman Year

### Fall Semester
- CS 101 Topics in Computer Science: 1 credit
- CS 120 Computer Systems I: Machine Organization**: 4 credits
- MATH 221 Calculus I: 4 credits
- WRIT 111 Coming to Voice: 4 credits
- Social Science/Humanities Elective**: 4 credits

**TOTAL**: 17 credits

### Spring Semester
- CS 140 Programming with Objects**: 4 credits
- MATH 222 Calculus II: 4 credits
- Social Sciences/Humanities Elective**: 4 credits
- Science**: 4 credits

**TOTAL**: 16 credits

## Sophomore Year

### Fall Semester
- CS 220 Computer Systems II: Arch and Programming: 4 credits
- Social Sciences/Humanities Elective**: 4 credits
- MATH 304 or 371 or 381: 4 credits
- Science**: 4 credits

**TOTAL**: 16 credits

### Spring Semester
- CS 240 Data Structures and Algorithms: 4 credits
- CS 301 Ethical, Social and Global Issues in Computing: 4 credits
- MATH 314 Discrete Mathematics: 4 credits
- Science**: 4 credits

**TOTAL**: 16 credits

## Junior Year

### Fall Semester
- CS 375 Design and Analysis of Algorithms: 4 credits
- MATH 327 Probability with Stat Methods: 4 credits
- Social Sciences/Humanities Elective**: 4 credits

**TOTAL**: 16 credits

### Spring Semester
- CS 350 Operating Systems: 4 credits
- CS 373 Automata Theory & Formal Language: 4 credits
- Social Sciences/Humanities Elective**: 4 credits
- Free Elective: 4 credits

**TOTAL**: 16 credits

## Senior Year

### Fall Semester
- CS 471 Programming Languages: 4 credits
- Computer Science Elective: 4 credits
- Computer Science Elective: 4 credits
- Free Elective: 4 credits

**TOTAL**: 16 credits

### Spring Semester
- Computer Science Elective: 4 credits
- Computer Science Elective: 4 credits
- Free Elective: 4 credits
- Free Elective*** (Physical Activity/Wellness): 2 credits

**TOTAL**: 14 credits

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*Your schedule over four years may vary considerably from this sample but you must observe course prerequisites. The flowchart for required courses in CS shows which courses must precede others. Students are encouraged to vary this schedule depending on their interests and the CS advisor will be happy to discuss alternatives.

** Students with AP credit for Gened courses and a strong CS background may take CS 120 and CS 140 in the first semester. Students without prior programming experience should take CS 110 in Fall and either CS 120 or CS 140 in the Spring. Please consult a CS advisor before attempting CS 120 and CS 140 together.

*** These courses should be selected to fulfill the General Education Composition (C), Global Interdependencies (G), Pluralism (P), Aesthetics (A), Humanities (H), Social Science (N) and Physical Activity/Wellness (Y, S or B) requirements. Students who have not earned an 85 or higher in a NYS foreign language Regents exam must complete one semester of a foreign language. At most 2 credits of Physical Activity/Wellness can be counted as free elective credit.

**** Must have a science sequence and one other L course, see Bulletin for details.

(02/11)
# SAMPLE SCHEDULE* OF OUR FLEXIBLE FOUR YEAR PROGRAM (ENTERING IN 2012)
## UNDERGRADUATE COMPUTER SCIENCE PROGRAM (with CS 110)

### Freshman Year

#### Fall Semester
- CS 101 Topics in Computer Science: 1 credit
- CS 110 Programming Concepts and Applications**: 4 credits
- MATH 221 Calculus I: 4 credits
- WRT 111 Coming to Voice: 4 credits
- Social Science/Humanities Elective***: 4 credits
- **TOTAL**: 17 credits

#### Spring Semester
- CS 120 Computer Systems I: Machine Organization**: 4 credits
- MATH 222 Calculus II: 4 credits
- Social Sciences/Humanities Elective***: 4 credits
- Science ****: 4 credits
- **TOTAL**: 16 credits

### Sophomore Year

#### Fall Semester
- CS 140 Programming with Objects**: 4 credits
- Social Sciences/Humanities Elective***: 4 credits
- MATH 304 or 371 or 381: 4 credits
- Science ****: 4 credits
- **TOTAL**: 16 credits

#### Spring Semester
- CS 240 Data Structures and Algorithms: 4 credits
- CS 301 Ethical, Social and Global Issues in Computing: 4 credits
- MATH 314 Discrete Mathematics: 4 credits
- Science ****: 4 credits
- **TOTAL**: 16 credits

### Junior Year

#### Fall Semester
- CS 220 Computer Systems II: Arch and Programming: 4 credits
- CS 375 Design and Analysis of Algorithms: 4 credits
- MATH 327 Probability with Stat Methods: 4 credits
- Social Science/Humanities Elective***: 4 credits
- **TOTAL**: 16 credits

#### Spring Semester
- CS 350 Operating Systems: 4 credits
- CS 373 Automata Theory & Formal Language: 4 credits
- Social Sciences/Humanities Elective***: 4 credits
- **TOTAL**: 14 credits

### Senior Year

#### Fall Semester
- CS 471 Programming Languages: 4 credits
- Computer Science Elective: 4 credits
- Computer Science Elective: 4 credits
- Free Elective: 4 credits
- **TOTAL**: 16 credits

#### Spring Semester
- Computer Science Elective: 4 credits
- Computer Science Elective: 4 credits
- Free Elective: 4 credits
- Free Elective*** (Physical Activity/Wellness): 2 credits
- **TOTAL**: 14 credits

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* Your schedule over four years may vary considerably from this sample but you must observe course prerequisites. The flowchart for required courses in CS shows which courses must precede others. Students are encouraged to vary this schedule depending on their interests and the CS advisor will be happy to discuss alternatives.

** Students without prior programming experience should take CS 110 in Fall and either CS 120 or CS 140 in the Spring—visit the CS advisor before attempting CS 120 and CS 140 together. (CS 110 counts as a free elective)

*** These courses should be selected to fulfill the General Education Composition (C), Global Interdependencies (G), Pluralism (P), Aesthetics (A), Humanities (H), Social Science (N) and Physical Activity/Wellness (Y, S or B) requirements. Students who have not earned an 85 or higher in a NYS foreign language Regents exam must complete one semester of a foreign language. At most 2 credits of Physical Activity/Wellness can be counted as free elective credit.

**** Must have a science sequence and one other L course, see Bulletin for details.

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