This document describes the requirements for an undergraduate major in CIS. It applies to students entering in the Fall 2000 term and thereafter.

**Disclaimer:** The Syracuse University Bulletin: Undergraduate Course Catalog has the official description of the program. This document is intended to contain a restatement and an elaboration on what is in the catalog. However, if on some point this document and the catalog are in conflict, the catalog always wins.
1 Summary

The EECS Programs in Computer and Information Science include two baccalaureate degrees: Computer Science and Systems and Information Science.

The current undergraduate curriculum was approved by the faculty of the department of Electrical Engineering and Computer Science in the Fall of 1999.

The requirements for the program of study are divided into three categories: general education, mathematics and major. The general education category has requirements in writing, English, natural science and engineering as well as a requirement for courses offered by the College of Arts and Sciences or the College of Visual and Performing Arts. The major category has two parts—the computer science core, and the upper-division options. The upper-division options are Computer Science (CS) and Systems and Information Science (SIS).

The CS upper-division option allows students to complete the technical electives with upper-level CIS courses and selected courses from Computer Engineering, Philosophy, Mathematics, and Industrial Engineering and Operations Research. This option leads to a Bachelor of Science degree with a major in Computer Science.

The SIS option is offered for those students whose primary interest in computer science lies in its application to another discipline. For example, concentrations in engineering, art, and the sciences may be designed into an SIS program, subject to approval by the CIS curriculum committee. This option leads to a Bachelor of Science degree with a major in Systems and Information Science. A summary of the necessary credits appears below. More details appear in subsequent sections.
1.1 Credit Hours Required

**GENERAL EDUCATION**

- 6 Writing (WRT 105, WRT 205)
- 6 English Electives
- 18 Natural Science and Engineering (including ECS 101, 102 and PHY 211, 221)
- 18 Arts, Humanities, and Social Sciences (including PHI 251, ECS 392)
- 12 free electives

**MATHEMATICS**

- 11 Mathematics

**MAJOR**

- 34 Computer and Information Science core courses
- 18 upper-division courses (CS/SIS)

123 Credit hours total

2 Important Notes on Course Restrictions

The restrictions on courses listed below are not comprehensive. Students unclear about the appropriateness of courses for meeting a distribution requirement must petition for acceptance of the course(s) through the CIS curriculum committee before taking the course.

Prior to registration each semester, students must meet with their faculty advisors for assistance in choosing appropriate courses.

3 General-Education Requirements

The intent of the general-education requirement is that students take courses in the fine arts, humanities, and/or social sciences. Courses not meeting this criterion may be appropriate for other distribution requirements.

3.1 Writing Requirements

The following two courses are required:

- WRT 105  Writing Studio 1
- WRT 205  Writing Studio 2
3.2 English Requirements

Six credits of English courses are required. Courses that may be used include:

ETS 115  
*British Literary History*

ETS 116  
*U.S. Literary History*

ETS 121  
*Intro to Shakespeare*

ETS 141  
*Reading and Interpretation*

ETS 145  
*Reading Popular Culture*

ETS 151  
*Interpretation of Poetry*

ETS 152  
*Interpretation of Drama*

ETS 153  
*Interpretation of Fiction*

ETS 181  
*Class and Literary Texts*

ETS 182  
*Race and Literary Texts*

ETS 192  
*Gender and Literary Texts*

ETS 211  
*Early European Literary History*

ETS 215  
*Sophomore Poetry Workshop*

ETS 220  
*Themes in Literature*

ETS 246  
*Myth, Symbol and Archetype*

ETS 252  
*Drama Theory on Film*

ETS 279  
*American Self-Definitions*

ETS 295  
*American Literature and Culture: Nineteenth Century*

ETS 296  
*American Literature and Culture: Twentieth Century*

Other courses may be used to satisfy this requirement with the permission of the CIS Curriculum Committee.

Courses that may **not** be used include:

ETS 200  
*Selected Topics in English*

ENG 201  
*English as a Second Language*

ENG 202  
*English as a Second Language*

ENG 203  
*Remedial Phonology for Speakers of English as a Second Language*

ENG 207  
*Rapid Review of English as a Second Language*

ENG 210  
*Special Problems in English as a Second Language*

ENG 211  
*Composition for Speakers of English as a Second Language*

ENG 213  
*Advanced Composition for Speakers of English as a Second Language*

ENG 505  
*Methodology of Teaching English as a Second Language*

EDU 505  
*Methodology of Teaching English as a Second Language*

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3.3 Natural Science and Engineering Requirements

Eighteen credits of natural science and engineering courses are required. These courses must include:

- ECS 101 *Introduction to Engineering and Computer Science*
- ECS 102 *Introduction to Computing*
- PHY 211 *General Physics*
- PHY 221 *General Physics Lab*

A two-semester sequence in a laboratory science

For example, a student may take the second physics course (PHY 212) and its associated lab (PHY 222) to satisfy the two-semester requirement. For another example, after completing PHY 211 and 221, a student may take a two-semester sequence in astronomy (AST 101 and 104) to satisfy the two-semester requirement.

Courses that may be used include those in the following departments, except those courses whose content relates primarily to computing and/or mathematics, or to social and historical issues. Such courses may be appropriate for other distribution requirements.

- Aerospace Engineering (AEE)
- Anthropology, Physical (ANT 131, 331, 431, 432, 433)
- Astronomy (AST)
- Bioengineering (BEN)
- Biology (BIO)
- Chemical Engineering (CEN)
- Chemistry (CHE)
- Civil Engineering (CIE)
- Electrical Engineering (ELE)
- Geology (GOL)
- Industrial Engr. and Operations Research (IOR)
- Mechanical Engineering (MEE)
- Materials Science (MTS)
- Physics (PHY)

Courses that may **not** be used include:

- Social, Cultural Anthropology (ANT)
- BIO 215
- CEN 122
- CHE 103, 113
- CIE 272
- Computer Engineering (CSE)
- Engineering (EGR)
- Geography (GEO)
3.4 Arts, Humanities, and Social Sciences Requirements

Students are required to take PHI 251 (Logic), ECS 392 (Ethical Aspects of Engineering and Computer Science), and twelve additional credit hours of courses in fine arts, humanities, and/or social sciences. These courses (A/H/SS) are to be drawn from the offerings of the College of Arts and Sciences and the College of Visual and Performing Arts. Courses from the following departments may be used:

- Art Photography (APH)
- Applied Music (AMC)
- Anthropology–Social and Cultural (ANT)
- Bulgarian (BGR)
- Chinese (CHI)
- Comparative Literature (CLT)
- Economics (ECN)
- English and Textual Studies (ETS)
- Fiber Arts (FIB)
- Foundation (FND)
- Fashion Illustration (FSH)
- German (GER)
- Hebrew (HEB)
- History (HIS)
- Illustration (ILL)
- Interior Design (ISD)
- Latin (LAT)
- Literature in English Translation (LIT)
- Music History & Literature (MHL)
- Public Affairs & Citizenship (PAF)
- Polish (POL)
- Psychology (PSY)
- Painting (PTG)
- Romance Languages (ROL)
- Sculpture (SCU)
- Speech Communication (SPC)

African American Studies (AAS)
American Studies (AMS)
Art (ART)
Ceramics (CER)
Commun. Design (CMD)
Drama (DRA)
English (ENG)
Fine Arts (FIA)
Film (FIL)
French (FRE)
Geography (GEO)
Greek (GRE)
Hindi (HIN)
Humanities (HUM)
International Relations (IRP)
Italian (ITA)
Linguistics (LIN)
Metalsmithing (MET)
Museum Studies (MUS)
Philosophy (PHI)
Political Science (PSC)
Printmaking (PRT)
Religion (REL)
Russian (RUS)
Slavic (SLA)
Sociology (SOC)
Social Science (SOS)  Spanish (SPA)
Surface Pattern Design (SPD)  Studio Research (STR)
Swahili (SWA)  Art Video (VID)
Writing (WRT)  Women’s Studies (WSP)

The following courses/departments may **not** be used:

- Art Education (AED)
- Astronomy (AST)
- Advertising Design (ADD)  Anthropology–Physical (see above)
- Biology (BIO)  Chemistry (CHE)
- Geology (GOL)  Industrial Design (IND)
- Mathematics (MAT)  Music Education (MUE)
- Nondepartmental AS (NAS)  Physics (PHY)
- PSY 273  Science Teaching (SCI)
- Speech Education (SHE)  Undergraduate Research Program (URP)
- WRT 105, WRT 205

Also excluded are any courses cross-listed in the College of Arts and Sciences and the School of Education.

### 3.5 Free Elective

Any and all courses may be taken as free electives.

### 4 Mathematics Requirements

Eleven credit hours of Mathematics courses are required. No grade below C– is acceptable.

Students *must* take both:

- MAT 295  *Calculus I*
- MAT 296  *Calculus II*

Students *must* also take at least one of:

- MAT 397  *Calculus III*
- MAT 331  *Linear Algebra*

MAT 295, 296, and 397 are four-hour courses. MAT 331 is three hours.
5 Course Requirements for the Major

No grade below C– is acceptable for a course in the major category.

5.1 CIS Core Course Requirements

The following ten courses (34 credit hours) are required. These courses must be completed with a core GPA of at least 3.0. No grade below C– is acceptable for a course in the major category.

- CIS 252 Intro to Computer Science
- CIS 275 Intro to Abstract Mathematics
- CIS 321 Intro to Probability and Statistics
- CIS 341 Computer Organization and Programming Systems
- CIS 351 Data Structures
- CIS 352 Programming Languages: Theory and Practice
- CIS 453 Software Specification and Design
- CIS 454 Software Implementation
- CIS 473 Computability Theory
- CIS 575 Introduction to Analysis of Algorithms

5.2 Upper-Division Course Restrictions

Eighteen credit hours of upper-division courses are required. At least 9 of the 18 credits must be computer science or computer engineering courses. Course selection depends on the choice of the CS or the SIS option.

5.2.1 Computer Science Upper-Division Option

Upper-division courses for the CS option include the following:

- CIS 373 Introduction to Automata Theory
- CIS 390 Honors Seminar in Computer and Information Science
- CIS 400 Selected Topics
- CIS/CPS 412 Data Parallel Computing
- CIS 425 Introduction to Computer Graphics
- CIS/CPS 430 Topics in Computational Science
- CIS 467 Introduction to Artificial Intelligence
- CIS 475 Logic and Automated Reasoning
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>CIS/CPS 530</td>
<td>Topics in Computational Science</td>
</tr>
<tr>
<td>CIS 531</td>
<td>Compiler Construction</td>
</tr>
<tr>
<td>CIS 541</td>
<td>Fault Detection in Digital Circuits</td>
</tr>
<tr>
<td>CIS/MAT 545</td>
<td>Finite Mathematics</td>
</tr>
<tr>
<td>CIS 553</td>
<td>Software Systems Implementation</td>
</tr>
<tr>
<td>CIS 554</td>
<td>Object Oriented Programming in C++</td>
</tr>
<tr>
<td>CIS/IST 563</td>
<td>Natural Language Processing</td>
</tr>
<tr>
<td>CIS 565</td>
<td>Introduction to Artificial Neural Networks</td>
</tr>
<tr>
<td>CIS 567</td>
<td>Knowledge Representation and Reasoning</td>
</tr>
<tr>
<td>CIS 581</td>
<td>Concurrent Programming</td>
</tr>
<tr>
<td>CIS 586</td>
<td>Operating Systems *</td>
</tr>
<tr>
<td>CPS 311</td>
<td>Introduction to Computational Science I</td>
</tr>
<tr>
<td>CPS 312</td>
<td>Introduction to Computational Science II</td>
</tr>
<tr>
<td>CPS 313</td>
<td>Scientific Programming I</td>
</tr>
<tr>
<td>CPS 314</td>
<td>Scientific Programming II</td>
</tr>
<tr>
<td>CPS 406</td>
<td>Computational Methods for Distributed Information Systems</td>
</tr>
<tr>
<td>CPS 451</td>
<td>Senior Computational Science Project</td>
</tr>
<tr>
<td>CPS 490</td>
<td>Independent Study</td>
</tr>
<tr>
<td>CSE 397</td>
<td>Computer Laboratory I</td>
</tr>
<tr>
<td>CSE 398</td>
<td>Computer Laboratory II</td>
</tr>
<tr>
<td>CSE 482</td>
<td>Principles of Software Engineering</td>
</tr>
<tr>
<td>CSE 483</td>
<td>Windows Programming</td>
</tr>
<tr>
<td>CSE 561</td>
<td>Digital Machine Design</td>
</tr>
<tr>
<td>CSE 566</td>
<td>Information Display Devices and Techniques</td>
</tr>
<tr>
<td>CSE 572</td>
<td>Switching Theory and Sequential Machine Design</td>
</tr>
<tr>
<td>CSE 581</td>
<td>Introduction to Data-Base Management Systems</td>
</tr>
<tr>
<td>CSE 585</td>
<td>Engineering Design of Operating Systems *</td>
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<td>ELE 558</td>
<td>Data Networks: Basic Principles</td>
</tr>
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<td>IOR 365</td>
<td>Introduction to System Simulation</td>
</tr>
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<td>MAT 512</td>
<td>Introduction to Real Analysis</td>
</tr>
<tr>
<td>MAT 532</td>
<td>Applied Linear Algebra</td>
</tr>
<tr>
<td>MAT 572</td>
<td>Introduction to Set Theory</td>
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<tr>
<td>PHI 378</td>
<td>Minds and Machines</td>
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<tr>
<td>PHI 551</td>
<td>Symbolic Logic</td>
</tr>
<tr>
<td>PHI 552</td>
<td>Modal Logic</td>
</tr>
</tbody>
</table>

* Students cannot include both CIS 586 and CSE 585 in a program of study.

Other courses offered on an irregular basis may be applied. Students may choose any other CIS course numbered above 300, except those not intended for undergraduate CS majors or that carry no credit hours. Courses which do not qualify include:
CS students may also choose any MAT courses numbered above 400, except for the following:

MAT 485  *Differential Equations and Matrix Algebra for Engineers*
MAT 487  *Abstract Mathematics for Engineers*

CS students may also choose topics courses (e.g., PHI 460 *Logic and Foundations of Mathematics*); however, they must petition the CIS curriculum committee to have the specific course accepted before taking the course.

### 5.2.2 Systems and Information Upper-Division Option

In addition to the distribution and core requirements already described, students must earn a grade of C– or better in each course while completing a minimum of 18 hours of advanced courses in one of many recognized academic disciplines. The program of courses must be approved by the curriculum committee of CIS, in consultation with the academic department overseeing the chosen discipline.
# 6 Representative CIS Undergraduate Programs

The following shows a fairly typical CIS undergraduate program for a student who initially places into MAT 295.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall</th>
<th>Spring</th>
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<tbody>
<tr>
<td>ECS 101</td>
<td>CIS 252</td>
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</tr>
<tr>
<td>ECS 102</td>
<td>MAT 296</td>
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<tr>
<td>MAT 295</td>
<td>PHY 211, PHY 221</td>
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</tr>
<tr>
<td>WRT 105</td>
<td>PHI 251</td>
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</tr>
<tr>
<td>A/H/SS elective *</td>
<td>English elective</td>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Fall</th>
<th>Spring</th>
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<tbody>
<tr>
<td>CIS 275</td>
<td>CIS 321</td>
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<tr>
<td>CIS 341</td>
<td>CIS 352</td>
<td></td>
</tr>
<tr>
<td>CIS 351</td>
<td>WRT 205</td>
<td></td>
</tr>
<tr>
<td>MAT 397 or MAT 331</td>
<td>A/H/SS elective</td>
<td>free elective</td>
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<thead>
<tr>
<th>Third Year</th>
<th>Fall</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>CIS 453</td>
<td>CIS 454</td>
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<tr>
<td>CIS 575</td>
<td>CIS 473</td>
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<tr>
<td>upper-division course</td>
<td>upper-division course</td>
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<tr>
<td>English elective</td>
<td>English elective</td>
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<tr>
<td>science elective</td>
<td>science elective</td>
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<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Fall</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>upper-division course</td>
<td>upper-division course</td>
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<tr>
<td>upper-division course</td>
<td>upper-division course</td>
<td></td>
</tr>
<tr>
<td>A/H/SS elective</td>
<td>A/H/SS elective</td>
<td></td>
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<tr>
<td>ECS 392</td>
<td>free elective</td>
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<tr>
<td>free elective</td>
<td>free elective</td>
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</table>

* Students wishing to preserve the option of transferring to an engineering major at the end of the first semester should take CHE 106/107 in place of the A/H/SS elective.
The following shows a fairly typical CIS undergraduate program for a student who initially places into MAT 194.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>ECS 101</td>
<td>CIS 252</td>
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</tr>
<tr>
<td>ECS 102</td>
<td>MAT 295</td>
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<td>MAT 194</td>
<td>PHI 251</td>
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<td>WRT 105</td>
<td>English elective</td>
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</tr>
<tr>
<td>A/H/SS elective *</td>
<td>A/H/SS elective</td>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Fall</th>
<th>Spring</th>
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<tbody>
<tr>
<td>CIS 275</td>
<td>CIS 321</td>
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<tr>
<td>CIS 351</td>
<td>CIS 352</td>
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</tr>
<tr>
<td>MAT 296</td>
<td>MAT 397 or MAT 331</td>
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</tr>
<tr>
<td>WRT 205</td>
<td>PHY 211/221</td>
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<table>
<thead>
<tr>
<th>Third Year</th>
<th>Fall</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>CIS 341</td>
<td>CIS 454</td>
<td></td>
</tr>
<tr>
<td>CIS 453</td>
<td>CIS 473</td>
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<tr>
<td>CIS 575</td>
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<td>upper-division course</td>
<td>English elective</td>
<td></td>
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<tr>
<td>science elective</td>
<td>science elective</td>
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<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Fall</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>upper-division course</td>
<td>upper-division course</td>
<td></td>
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<tr>
<td>upper-division course</td>
<td>upper-division course</td>
<td></td>
</tr>
<tr>
<td>A/H/SS elective</td>
<td>A/H/SS elective</td>
<td></td>
</tr>
<tr>
<td>ECS 392</td>
<td>free elective</td>
<td></td>
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<tr>
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</tr>
</tbody>
</table>

* Students wishing to preserve the option of transferring to an engineering major at the end of the first semester should take CHE 106/107 in place of the A/H/SS elective.