<table>
<thead>
<tr>
<th>FALL SEMESTER FIRST YEAR</th>
<th>Credits</th>
<th>SPRING SEMESTER FIRST YEAR</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 1035 General Chemistry Co: MATH 1025 or MATH 1225</td>
<td>3</td>
<td>PHYS 2305 Found of Physics I w/lab Pre: (MATH 1205 or MATH 1205H or MATH 1225) or (MATH 1206 or MATH 1206H or MATH 1226) Co: 2325 or (MATH 1206 or MATH 1206H or MATH 1226)</td>
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<td>CHEM 1045 General Chemistry Lab Co: CHEM 1035</td>
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<tr>
<td>ENGL 1105 First-Year Writing</td>
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<td>ENGL 1106 First-Year Writing Pre: ENGL 1105</td>
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<tr>
<td>MATH 1225 Calculus of a Single Variable (C) Pre: Math Ready</td>
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<td>MATH 1226 Calculus of a Single Variable Pre: Math 1225 (C-)</td>
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<td>ENGE 1215 Foundations of Engineering (C-)</td>
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<td>ENGE 1216 Foundations of Engineering (C-) Pre: ENGE 1215 (C-)</td>
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<tr>
<td>Pathways</td>
<td>3</td>
<td>CS 1114 Intro to Software Design (C) Pre: CS 1064</td>
<td>3[F, S, SI, SII]</td>
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<tr>
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<th>Credits</th>
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<tbody>
<tr>
<td>MATH 2204 Intro Multivariable Calculus Pre: MATH 1226 or CMDA 2005 Integrated Quantitative Sciences Pre: MATH 1226; Co: MATH 2114</td>
<td>3</td>
<td>Communications Elective</td>
<td>3</td>
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<tr>
<td>MATH 2534 Intro Discrete Math Pre: CS 1114 or CS 2064 or ECE 1574 or ECE 1004 (Note: Math double majors take MATH 3034)</td>
<td>3[F, S, SI]</td>
<td>MATH 2114 Introduction to Linear Algebra Pre: MATH 1225 (B) or MATH 1226</td>
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<tr>
<td>CS 2114 Software Design &amp; Data Structures (C) Pre: 1114 (C) or 2064 (C)</td>
<td>3[F, S, SI, SII]</td>
<td>CS 2505 Intro to Computer Organization I (C) Pre: 2114 (C); Co: MATH 2534 or MATH 3034</td>
<td>3[F, S, SI]</td>
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<tr>
<td>CS 1944 Computer Science 1st Yr Sem Pre: 1114 (C)</td>
<td>1[F, S]</td>
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<tr>
<td>CS 2104 Intro to Problem Solving in CS (C) Pre: 1114 (C)</td>
<td>3[F, S, SI]</td>
<td>Pathways</td>
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<tr>
<td>Natural Science Elective</td>
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<tr>
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<tbody>
<tr>
<td>MATH 3134 Applied Combinatorics Pre: (MATH 1206 or MATH 1226, MATH 2534 or MATH 3034) (Note: Math double majors take MATH 3124)</td>
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<td>Statistics Elective</td>
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<tr>
<td>CS 2506 Intro to Computer Organization II (C) Pre: 2505 (C), 2114 (C), MATH 2534 or MATH 3034</td>
<td>3[F, S]</td>
<td>CS 3214 Computer Systems Pre: 2506 (C), 2114 (C)</td>
<td>3[F, S]</td>
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<tr>
<td>CS 3114 Data Structures and Algorithms (C) Pre: 2505 (C), 2114 (C), MATH 2534 or MATH 3034</td>
<td>3[F, S, SI]</td>
<td>CS 3604 Professionalism in Computing Pre: 1944, 2114 (C), COMM 2004</td>
<td>3[F, S]</td>
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<tr>
<td>Professional Writing Elective</td>
<td>3</td>
<td>Pathways</td>
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</tr>
<tr>
<td>Pathways</td>
<td>3</td>
<td></td>
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<tr>
<th>FALL SEMESTER FOURTH YEAR</th>
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<tbody>
<tr>
<td>CS 3304 Comparative Languages Pre: 3114 (C)</td>
<td>3[F, S]</td>
<td>CS 4944 Senior Seminar Pre: 3604</td>
<td>1[F, S]</td>
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<tr>
<td>CS Theory Elective Pre: 3114 (C)</td>
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<td>CS 4XXX Capstone</td>
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<td>CS 3/4/5XXX Elective</td>
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<td>CS 4/5XXX Elective</td>
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<tr>
<td>CS Technical Elective</td>
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<td>Pathways</td>
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<td>Free elective</td>
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<td>Free Elective</td>
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<tr>
<td>TOTAL 15</td>
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Total Credits: 123
Graduation Requirements:

Most current prerequisites indicate the minimum grade students must earn in the prerequisite course. Prerequisites for satisfactory progress for Computer Science majors are as follows:

### Satisfactory Progress Towards Degree

Students must have had 2 years of a foreign language in high school or one year at the college level (6 credit hours) of the same language. College-level credits used to meet this requirement do not count towards the degree.

### Statement of Prerequisites

Prerequisites for each course are listed after the course title. The (letter grade) notation, such as (C), indicates the minimum grade students must earn in the pre-requisite course. There are no hidden pre-requisites in the program of study. Prerequisites may change from what is indicated. Be sure to consult the University Catalog or check with your advisor for the most current pre-requisites.

### Change of Major Requirements

Independent Study/Undergraduate Research

No more than a total of 6 credits of CS Independent Study (4974) and/or CS Undergraduate Research (4994) may be used to fulfill CS degree requirements. To take Independent Study (2974 or 4974), a minimum overall GPA of 2.5 is required. To take Undergraduate Research (4994), a minimum overall GPA of 2.5 and an in-major GPA of 3.0 is required. CS 4974 and 4994 also require completion of CS 3114 with a grade of C or better.

### Foreign Language Requirements

Students must have had 2 years of a foreign language in high school or one year at the college level (6 credit hours) of the same language. College-level credits used to meet this requirement do not count towards the degree.

### Graduation Requirements

To qualify for a B.S. degree in CS, a student must:

- Earn a "C" (2.0) or better in CS 1114, CS 2104, CS 2114, CS 2505, CS 2506 and CS 3114.
- Complete at least 123 semester credit hours with a minimum overall GPA of 2.00 and a minimum in-major GPA of 2.00 (the in-major GPA is calculated using all classes with a CS designator).
Computer Science Electives

Note: Some elective courses may include prerequisites not required by this checksheet. It is the student’s responsibility to be aware of prerequisites and to ensure that all prerequisites are completed prior to enrolling in the chosen course. Some courses may be restricted to majors other than CS in some semesters. Check the Undergraduate Course Catalog and consult with an academic advisor to confirm your eligibility for specific electives. Actual course offerings are subject to availability of sufficient resources, including faculty availability and student demand.

1. **Natural Science Elective.** A minimum of 12 hours of natural science is required. Of those hours, 8 hours must be in a sequence. In addition to the required CHEM 1035/45 and PHYS 2305, this requirement may be satisfied by taking (a) CHEM 1036/46, (b) PHYS 2306, or (c) an eight hour sequence in Biology: BIOL 1105-6 & 1115-6.

2. **Communications Elective.** Students must take one of the following:

   COMM 2004  Public Speaking  *Pre: Completion of 30 hours*
   COMM 2014  Speech Communication

   **Note:** COMM 2004 can be used to satisfy Pathways 1A. Students who do not take COMM 2004 as their communications elective will need to satisfy Pathways 1A through a suitable professional writing elective or free elective.

3. **Professional Writing Elective.** Students must take one of the following:

   ENGL 3764  Technical Writing  *Pre: ENGL 1106 or ENGL 1204H or COMM 1016*
   ENGL 3804  Technical Editing and Style  *Pre: ENGL 1106 or ENGL 1204H or COMM 1016*
   ENGL 3814  Creating User Documentation  *Pre: ENGL 1106 or ENGL 1204H or COMM 1016*
   ENGL 3824  Designing Documents for Print  *Pre: ENGL 1106 or ENGL 1204H or COMM 1016*
   ENGL 3834  Intercultural Issues in Professional Writing  *Pre: ENGL 1106 or ENGL 1204H or COMM 1016*
   ENGL 3844  Writing and Digital Media  *Pre: ENGL 1106 or ENGL 1204H or COMM 1016*
   ENGL 4824  Science Writing  *Pre: ENGL 1106 or ENGL 1204H or COMM 1016*

   **Note:** ENGL 3764 can be used to satisfy Pathways 1A. Students who do not take ENGL 3764 as their communications elective will need to satisfy Pathways 1A through a suitable communications elective or free elective.

4. **Statistics Elective.** Students must take one of the following:

   STAT 4705  Probability and Statistics for Engineers  *Pre: MATH 2224 or MATH 2204 or MATH 2204H or MATH 2406H*
   STAT 4105  Theoretical Statistics  *Pre: MATH 2224 or MATH 2204 or MATH 2204H or MATH 2406H*
   STAT 4714  Probability and Statistics for Electrical Engineers  *Pre: MATH 2224 or MATH 2204 or MATH 2204H or MATH 2406H*
   STAT 4604  Statistical Methods for Engineers  *Pre: MATH 1206 or MATH 1226*
   STAT 3704  Statistics for Engineering Applications  *Pre: MATH 2224 or MATH 2204 or MATH 2204H or MATH 2406H*
   CMDA 2006  Integrated Quantitative Sciences  *Pre: CMDA 2005, (MATH 2114 or MATH 2114H)*

   Note that students taking STAT 3704 must take an additional 1 free elective credit to meet the total number of credits required for the degree.

5. **CS 3/4/5XXX Electives.** Any 3-credit CS 3/4/5000-level course not otherwise used to fulfill a Computer Science requirement can be used as a CS 3/4/5XXX elective, including both Independent Study (CS 4974) and Undergraduate Research (CS 4994), except for the following: CS 5040, CS 5044, CS 5045, 5046, 5644, 5664, 5904, 5944, 5974, 5994.

6. **CS 4/5XXX Elective.** Any 3-credit CS 4/5000-level course not otherwise used to fulfill a Computer Science requirement can be used as a CS 4/5XXX elective, including both Independent Study (CS 4974) and Undergraduate Research (CS 4994), except for the following: CS 5040, CS 5044, CS 5045, 5046, 5644, 5664, 5904, 5944, 5974, 5994.
7. **CS Theory Elective.** Students must take one of the following:

- **CS 4104** Data and Algorithm Analysis  *Pre: 3114 (C), (MATH 3034 or MATH 3134)*
- **CS 4114** Introduction to Formal Languages and Automata Theory  *Pre: 3114 (C), (MATH 3034 or MATH 3134)*
- **CS 4124** Theory of Computation  *Pre: 3114 (C), (MATH 3034 or MATH 3134)*
- **CS 5104** Computability and Formal Languages
- **CS 5114** Theory of Algorithms  *Pre: 3114*

8. **Capstone Requirement.** Students must complete one 4000-level CS capstone course. Students may choose from the courses listed here, or other 4/5000-level CS courses that have received prior approval as fulfilling the capstone requirement.

- **CS 4274** Secure Computing Capstone  *Pre: 3114 (C), 4264*
- **CS 4284** Systems & Networking Capstone  *Pre: 3114, 3214*
- **CS 4624** Multimedia, Hypertext and Information Access  *Pre: 3114*
- **CS 4634** Design of Information  *Pre: 3114, 3724*
- **CS 4644** Creative Computing Studio  *Pre: 3724*
- **CS 4664** Data-Centric Computing Capstone  *Pre: 3114 (C), 3654*
- **CS 4704** Software Engineering Capstone  *Pre: 3704*
- **CS 4784** Human-Computer Interaction Capstone  *Pre: 3724, 3744*
- **CS 4884** Computational Biology & Bioinformatics Capstone  *Pre: 3824*

9. **CS Technical Elective.** Computer Science majors must satisfy a 3 credit hour technical elective requirement by taking one of:

1. Any 3-credit CS 3/4/5000-level course meeting the CS 3/4/5XXX elective requirements under (5) above.

2. Any approved 3000- or 4000-level course in another discipline that has significant technical content relevant to the science or application of computer science can be used as a technical elective.

   a. Requests to have a non-CS course approved as a technical elective are made by submitting a course syllabus to your CS advisor for review prior to enrolling in the course. This includes non-CS Independent Study (4974) and Undergraduate Research (4994) courses.

   b. Below is a listing of non-CS courses that are approved as technical electives.
Computer Science Technical Elective Courses

ACIS/BIT 4554  Networks & Telecommunications in Business  (3H, 3C) Pre: ACIS 3504 or BIT 3424
AOE 4434    Introduction to Computational Fluid Dynamics  (3H, 3C) Pre: MATH 2214
ART 3704    Topics in Computer Animation  (3H, 3C) Pre: ART 2704
BIT 4424    Business Information Visualization & Analytics  (3H, 3C) Pre: BIT 2406
BIT 4434    Computer Simulation in Business  (3H, 3C) Pre: BIT 3414
BIT 4444    Web-based Decision Support Systems  (3H, 3C) Pre: BIT 3444
BIT 4514    Database Technology for Business  (3H, 3C) Pre: BIT 3424, BIT 4524
BIT 4544    Computer Simulation in Business  (3H, 3C) Pre: BIT 3444 or ACIS 2504
BIT 4604    Data Governance, Privacy and Ethics  (3H, 3C) Pre: BIT 2405 or CMDA 2014 or CS 1114 or CS 1054 or CS 1064
BIT 4614    Information Security  (3H, 3C) Pre: BIT 4554 or ACIS 4554
BIT 4624    Cybersecurity Analytics  (3H, 3C) Pre: BIT 4614
CMDA 3606   Mathematical Modeling: Methods and Tools II
COMM 4374   New Communications Technology  (3H, 3C) Pre: COMM 2084 or COMM 4014
ECE 3544    Digital Design I  (3H, 3C) Pre: ECE 2504
ECE 3574    Applied Software Design  (3H, 3C) Pre: ECE 2574
ECE 4524    Artificial Intelligence and Engineering Applications  (3H, 3C) Pre: ECE 2574, STAT 4714
ECE 4550    Real Time Systems  (3H, 3C) Pre: ECE 4534 or CS 3214
ECE 4560    Computer and Network Security Fundamentals  (3H, 3C) Pre: CS 3214 or ECE 2504
ECE 4564    Network Application Design  (3H, 3C) Pre: ECE 2504, ECE 2574
ECE 4580    Digital Image Processing  (3H, 3C) Pre: (ME 3514, STAT 3704) or ECE 2704
GEOG/GEOS 4084  Modeling with GIS  (3H, 3C) Pre: GEOG 2084
GEOG 4314  Analysis in GIS  (3H, 3C) Pre: GEOG 4084
GEOG 4324  Algorithms in GIS  (3H, 3C) Pre: GEOG 4084, CS 1044
MATH 4175  Cryptography I  (3H, 3C) Pre: MATH 3034 or MATH 3124 or MATH 3134 or MATH 3144 or MATH 3224 or MATH 4134
MATH 4176  Cryptography II  (3H, 3C) Pre: MATH 4175 or (MATH 3034, MATH 3124) or (MATH 3034, MATH 3134) or (MATH 3034, MATH 3144) or (MATH 3034, MATH 3224) or (MATH 3034, MATH 4134) or (MATH 3124, MATH 3134) or (MATH 3124, MATH 3144) or (MATH 3124, MATH 3224) or (MATH 3124, MATH 4134) or (MATH 3134, MATH 3144) or (MATH 3134, MATH 3224) or (MATH 3134, MATH 4134) or (MATH 3144, MATH 3224) or (MATH 3144, MATH 4134) or (MATH 3224, MATH 4134)
MATH 4445  Introduction to Numerical Analysis  (3H, 3C) Pre: MATH 2406H or (CMDA 2005, CMDA 2006) or (MATH 2214 or MATH 2214H), (MATH 2224 or MATH 224H) or (MATH 2204 or MATH 2204H)
MATH 4454  Applied Mathematical Modeling  (3H, 3C) Pre: MATH 3214
ME 4524    Robotics and Automation  (3H, 3C) Pre: (ECE 2574, STAT 4714) or (ME 3514, STAT 3704)
MUS 3064    Digital Sound Manipulation  (3H, 3C) Pre: MUS 2054
MUS 3065    Computer Music & Multimedia I  (3H, 3C) Pre: MUS 2054
MUS 3066    Computer Music & Multimedia II  (3H, 3C) Pre: MUS 2054, MUS 3065
PHYS 4755  Intro to Computational Physics  (3H, 3C) Pre: PHYS 2306, CS 1044