The Threads™ represent partial paths through the curriculum. Thus, a student weaves a degree from these Threads. Students are not forced to make Thread decisions very early in their academic careers; however, they may if they want. We define the Threads so they are flexible enough to allow for a variety of technical and creative experiences. Threads are coherent enough that students develop computing skills even if their focus shifts as they go along.

The Devices thread is concerned with embedded computational artifacts that interact with people or the physical world. In this thread, one learns how to create and evaluate devices that operate under physical constraints such as size, power, and bandwidth. Examples include PDAs, cell phones, robots, jet engines, and intelligent appliances.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 1100</td>
<td>Freshman Leap Seminar</td>
<td>1</td>
</tr>
<tr>
<td>CS 1331</td>
<td>Introduction to Object Oriented Programming ¹</td>
<td>3</td>
</tr>
<tr>
<td>CS 1332</td>
<td>Data Structures and Algorithms for Applications ¹</td>
<td>3</td>
</tr>
<tr>
<td>CS 2050</td>
<td>Introduction to Discrete Mathematics for Computer Science ¹</td>
<td>3</td>
</tr>
<tr>
<td>or CS 2051</td>
<td>Honors - Induction to Discrete Mathematics for Computer Science ¹</td>
<td>3</td>
</tr>
<tr>
<td>MATH 2550</td>
<td>Introduction to Multivariable Calculus ⁴</td>
<td>2</td>
</tr>
</tbody>
</table>

**Major Requirements**

- CS 2340 | Objects and Design ¹ | 3 |
- CS 4001 | Computing, Society, and Professionalism ¹ | 3 |
- or CS 4002 | Robots and Society | 3 |
- or CS 4726 | Privacy, Technology, Policy, and Law | 3 |
- or SLS 3110 | Technology and Sustainable Community Development | 3 |

**Junior Design Options (Capstone)**

| Junior Design Option ¹,³ | 6 |

**Concentration**

- CS 2110 | Computer Organization and Programming ¹ | 4 |
- CS 2200 | Computer Systems and Networks ¹ | 4 |
- CS 3210 | Design of Operating Systems ¹ | 3 |
- CS 3220 | Computer Structures: Hardware/Software Codesign of a Processor ¹ | 3 |
- CS 3251 | Computer Networking ¹ | 3 |
- CS 3510 | Design and Analysis of Algorithms ¹ | 3 |
- or CS 3511 | Design and Analysis of Algorithms, Honors | 3 |
- ECE 2031 | Digital Design Laboratory ¹ | 2 |
- Select one of the following for Building Devices: ¹ | 4 |
- CS 3651 | Prototyping Intelligence Appliances | 4 |
- ECE 4180 | Embedded Systems Design | 4 |
- Select one of the following for Devices in the Real World: ¹ | 3 |
- CS 3630 | Introduction to Perception and Robotics | 3 |
- CS 4261 | Mobile Applications and Services for Converged Networks | 3 |
- CS 4605 | Mobile and Ubiquitous Computing | 3 |
- CS 4476 | Introduction to Computer Vision | 3 |

**Select one of the following for Systems Software Tools: ¹** | 3 |

- CS 3300 | Introduction to Software Engineering | 3 |
- CS 4240 | Compilers, Interpreters, and Program Analyzers | 3 |

**Select one of the following for Advanced Systems Architectures: ¹** | 3 |

- CS 4210 | Advanced Operating Systems | 3 |
- CS 4220 | Programming Embedded Systems | 3 |
- CS 4290 | Advanced Computer Organization | 3 |

**Other Required Courses**

- MATH 3012 | Applied Combinatorics | 3 |
- Select one of the following: ³ | 3 |
- MATH 3215 | Introduction to Probability and Statistics | 3 |
- MATH 3670 | Probability and Statistics with Applications | 3 |
- CEE 3770 | Statistics and Applications | 3 |
- ISYE 3770 | Statistics and Applications | 3 |
- or ISYE 2708 | Basic Statistical Methods | 3 |
To complete the Research Option in the College of Computing, students must:

1. Complete at least nine units of undergraduate research
   a. Over at least two, preferably three terms
   b. Research may be for either pay or credit;
2. Write an undergraduate thesis/report of research on their findings;
3. Take
   a. LMC 4701: Undergraduate Research Proposal Writing (taken during the first or second semester of research)
   b. LMC 4702: Undergraduate Research Thesis Writing (taken during the thesis writing semester).

### Research Classes

The following classes count toward fulfillment of the Research Option:

#### Research for Credit

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 2699</td>
<td>Undergraduate Research (Freshman and Sophomore)</td>
<td>1-12</td>
</tr>
<tr>
<td>CS 4699</td>
<td>Undergraduate Research (Junior and Senior)</td>
<td>1-12</td>
</tr>
<tr>
<td>CS 4980</td>
<td>Research Capstone Project</td>
<td>1-21</td>
</tr>
</tbody>
</table>

#### Research for Pay (Audit only)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 2698</td>
<td>Undergraduate Research Assistantship (Freshman and Sophomore)</td>
<td>1-12</td>
</tr>
<tr>
<td>CS 4698</td>
<td>Undergraduate Research Assistantship (Junior and Senior)</td>
<td>1-12</td>
</tr>
</tbody>
</table>

To get credit toward completion of the Research Option for research for pay, students must be registered for the appropriate audit-only, research for pay class (CS 2698 or 4698). If work on research for pay begins after the close of registration and the student has not signed up for the appropriate class, unfortunately it is not possible to get credit toward the Research Option for work that term.

A research project will also fulfill the capstone design requirement if the student registers for CS 4980 for one of the research terms. This is typically done the last semester of research, while taking LMC 4702.

Completion of the Research Option is noted on the student’s transcript. For more information, see www.urop.gatech.edu.

### International Plan

The College of Computing (http://www.cc.gatech.edu) has an approved BS CS International Plan that accommodates the unique requirements of this option discussed in the International Plan section of the catalog (http://www.catalog.gatech.edu/academics/special-academic-programs/international-plan).

However, due to the flexible nature of the Threads curriculum, the International Plan designation may not be available with all of the Thread combinations. Efforts will be made to work with interested students to accommodate their individual circumstances with regard to the International Plan designator for the Bachelor of Science in Computer Science.

### Research Option

To complete the Research Option in the College of Computing, students must:

1. Complete at least nine units of undergraduate research
   a. Over at least two, preferably three terms
   b. Research may be for either pay or credit;
2. Write an undergraduate thesis/report of research on their findings;
3. Take
   a. LMC 4701: Undergraduate Research Proposal Writing (taken during the first or second semester of research)
   b. LMC 4702: Undergraduate Research Thesis Writing (taken during the thesis writing semester).

### Cooperative Programs

The College of Computing participates in the undergraduate and graduate Cooperative Programs. See links below for further information:

- Undergraduate Cooperative Plan (http://catalog.gatech.edu/academics/special-academic-programs/experiential-education/center-career-discovery-development)
- Graduate Cooperative Plan (http://catalog.gatech.edu/academics/special-academic-programs/experiential-education/graduate-cooperative-plan)

### BS/MS in Computer Science

Students who want to pursue the BS/MS option must apply to the MSCS program after completing at least 60 hours of work towards the BSCS degree. Applicants should have a cumulative GPA of at least 3.4. This GPA must be maintained for the student to take graduate level courses.

Students admitted to the program will take 6 hours during their final undergraduate year to double count in both their BSCS and MSCS degrees; they should choose 3 hours of MS Core or Elective hours their...
fall semester and 3 hours of MS Core or Elective hours their spring semester that can count toward their thread hours and CS Specialization hours.

Visit College of Computing (https://www.cc.gatech.edu) for more information.