BACHELOR OF SCIENCE IN COMPUTER SCIENCE - THREAD: THEORY & SYSTEMS AND ARCHITECTURE

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 Systems and Architecture thread is where many of the practical skills of computing are learned. Like Theory, Systems and Architecture lies at the center of computing. It prepares students to create and evaluate paradigms and approaches.

The Theory thread is where computing meets itself. Theory teaches students the theoretical and mathematical foundations underlying a wide range of computational disciplines. Early preparation includes discrete mathematics, algorithms, and complexity. Knowledge goals are for students to mature in development and analysis of abstract models for applications ranging from theoretical computer science to computational systems. Students are not forced to make Thread decisions very early in their academic careers; however, 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.

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Wellness

APPH 1040 Scientific Foundations of Health 2
or APPH 10 The Science of Physical Activity and Health

Core A - Essential Skills

ENGL 1101 English Composition I 3
ENGL 1102 English Composition II 3
MATH 1552 Integral Calculus 4

Core B - Institutional Options

CS 1301 Introduction to Computing 1 3

Core C - Humanities

Any HUM (http://www.catalog.gatech.edu/academics/undergraduate/core-curriculum/core-area-c) 6

Core D - Science, Math, & Technology

PHYS 2211 Introductory Physics I 2 4
Lab Science 2 4
MATH 1551 Differential Calculus 2
MATH 1554 Linear Algebra 4 4

Core E - Social Sciences

Choose one of the following: 3

HIST 2111 The United States to 1877
HIST 2112 The United States since 1877
INTA 1200 American Government in Comparative Perspective
POL 1101 Government of the United States
PUBP 3000 American Constitutional Issues

Any SS (http://www.catalog.gatech.edu/academics/undergraduate/core-curriculum/core-area-e) 9

Core F - Courses Related to Major

Lab Science 2 4
CS 1100 Freshman Leap Seminar 1 1
CS 1331 Introduction to Object Oriented Programming 1 3
CS 1332 Data Structures and Algorithms for Applications 1 3
CS 2050 Introduction to Discrete Mathematics for Computer Science 1 3
or CS 2051 Honors - Introduction to Discrete Mathematics for Computer Science

MATH 2550 Introduction to Multivariable Calculus 4 2

Major Requirements

CS 2340 Objects and Design 1 3
CS 4001 Computing, Society, and Professionalism 1 3
or CS 4002 Robots and Society

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 3510 Design and Analysis of Algorithms 1 3
or CS 3511 Design and Analysis of Algorithms, Honors
ECE 2031 Digital Design Laboratory 1 2
CS 4510 Automata and Complexity Theory 1 3
CS 4540 Advanced Algorithms 1 3
Select one of the following for Systems Software Tools: 1 3
CS 3300 Introduction to Software Engineering
CS 4240 Compilers, Interpreters, and Program Analyzers
Select one of the following for Advanced Systems Architectures: 1 3

CS 4210 Advanced Operating Systems
CS 4220 Programming Embedded Systems
CS 4290 Advanced Computer Organization

MATH 3406 A Second Course in Linear Algebra 1 3
Select one of the following for Advanced Mathematics: 1 3
MATH 4022 Introduction to Graph Theory
MATH 4032 Combinatorial Analysis
MATH 4150 Introduction to Number Theory

Other Required Courses

MATH 3012 Applied Combinatorics 3
Select one of the following: 3
MATH 3215 Introduction to Probability and Statistics
MATH 3670 Probability and Statistics with Applications
CEE 3770 Statistics and Applications
ISYE 3770 Statistics and Applications
or ISYE 2030 Probability with Applications
or ISYE 2031 Basic Statistical Methods

Free Electives

Bachelor of Science in Computer Science - Thread: Theory & Systems and Architecture
Bachelor of Science in Computer Science - Thread: Theory & Systems and Architecture

Free Electives 8
Total Credit Hours 126

Pass-fail only allowed for Free Electives (max 6 credit hours), CS 1100, and CS 1171 (if required)

1. Minimum grade of a C required.
2. Two of three lab sciences MUST be a sequence.
3. Junior Design Options are as follows (students must pick one option and may not change):
   - Option 1 - LMC 3432, LMC 3431, CS 3311, CS 3312.
   - Option 2 - ECE VIP courses and LMC 3403.
   - Option 3 - Satisfy Georgia Tech Research Option

Six credits of the Junior Design option are used as Major Requirements and the average of credits of research/VIP (5 credit hours/2 credit hours) may be used as free electives. Students completing VIP for their junior design requirement will be required to complete at least three semesters of VIP. (VIP 1 + VIP 2 + VIP 3) for a total of 5 credit hours + LMC 3403 = 8 hours of VIP credit.

4. Two credit hours of MATH 1554 may count along with MATH 2550 to give Area F 18 credit hours.

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)

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).

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 (http://www.urop.gatech.edu).