# BACHELOR OF SCIENCE IN COMPUTER SCIENCE - THREAD: MODELING-SIMULATION & INTELLIGENCE

| Code | Title | Credit Hours |
|------|-------|--------------|
| **Wellness Requirement** | | |
| APPH 1040 | Scientific Foundations of Health | 2 |
| or APPH 10 | The Science of Physical Activity and Health | |
| or APPH 10 | Flourishing: Strategies for Well-being and Resilience | |
| **Core IMPACTS** | | |
| **Institutional Priority** | | |
| CS 1301 | Introduction to Computing [1] | 3 |
| **Mathematics and Quantitative Skills** | | |
| MATH 1552 | Integral Calculus | 4 |
| **Political Science and U.S. History** | | |
| HIST 2111 | The United States to 1877 | 3 |
| or HIST 2112 | The United States since 1877 | |
| or INTA 1200 | American Government in Comparative Perspective | |
| or POL 1101 | Government of the United States | |
| or PUBP 3000 | American Constitutional Issues | |
| **Communicating in Writing** | | |
| ENGL 1101 | English Composition I | 3 |
| ENGL 1102 | English Composition II | 3 |
| **Arts, Humanities, and Ethics** | | |
| Any HUM | | 6 |
| **Technology, Mathematics, and Sciences** | | |
| Lab Science [2] | | 8 |
| MATH 1551 | Differential Calculus | 2 |
| MATH 1554 | Linear Algebra [5] | 4 |
| or MATH 15 | Linear Algebra with Abstract Vector Spaces | |
| **Social Sciences** | | |
| Any SS [6] | | 9 |
| **Field of Study** | | |
| PHYS 2211 | Principles of Physics I [2] | 4 |
| CS 1100 | Freshman Leap Seminar | 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 - Induction to Discrete Mathematics for Computer Science | |
| MATH 2550 | Introduction to Multivariable Calculus [5] | 2 |
| **Major Requirements** | | |
| CS 2340 | Objects and Design [1] | 3 |
| Select one for Profesionalism/Ethics requirement: [1] | | 3 |
| CS 3001 | Computing, Society, and Professionalism | |
| CS 4001 | Computing, Society, and Professionalism | |
| CS 4002 | Robots and Society | |
| CS 4003 | AI, Ethics, and Society | |
| CS 4726 | Privacy, Technology, Policy, and Law | |
| SLS 3110 | Technology and Sustainable Community Development | |
| **Junior Design Options (Capstone)** | | |
| Junior Design Option [1,4] | | 6 |
| **Concentration** | | |
| CS 2110 | Computer Organization and Programming [1] | 4 |
| CS 2200 | Computer Systems and Networks [1] | 4 |
| CS 3510 | Design and Analysis of Algorithms [1] | 3 |
| or CS 3511 | Design and Analysis of Algorithms, Honors | |
| CS 3600 | Introduction to Artificial Intelligence [1] | 3 |
| MATH 2552 | Differential Equations [1] | 4 |
| Select one of the following for Embodied Intelligence: [1] | | 3 |
| CS 3630 | Introduction to Perception and Robotics | |
| CS 3790 | Introduction to Cognitive Science | |
| PSYC 3040 | Sensation and Perception | |
| Select three of the following for Approaches to Intelligence: [1,3] | | 9 |
| CS 4635 | Knowledge-Based Artificial Intelligence | |
| CS 4476 | Introduction to Computer Vision | |
| CS 4510 | Automata and Complexity Theory | |
| CS 4641 | Machine Learning | |
| CS 4644 | Deep Learning | |
| CS 4646 | Machine Learning for Trading | |
| CS 4649 | Robot Intelli Planning | |
| CS 4650 | Natural Language Understanding | |
| CS 4731 | Game AI | |
| Select six credit hours of the following for Computational Science and Engineering: [1,3] | | 6 |
| CS 4641 | Machine Learning | |
| CX 4140 | Computational Modeling Algorithms | |
| CX 4220 | Introduction to High Performance Computing | |
| CX 4230 | Computer Simulation | |
| CX 4640 | Numerical Analysis I | |
| **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 2027 | Probability with Applications | |
| & ISYE 3030 | and Basic Statistical Methods | |
| **Free Electives** | | |
| Free Electives [3] | | 9 |
| **Total Credit Hours** | | **126** |

Pass-fail only allowed for Free Electives (max 6 credit hours) and CS 1100.

[1]  Minimum grade of C required.
[2]  Two of three lab sciences MUST be a sequence.

[3]  If CS 4641 is successfully completed, it counts toward both requirements, and an addition 3 credit hours Free Elective is required.

[4]  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.
- Option 4- CS 2701 (3 hours), CS 4699-I2P (3 hours), LMC 3403 (3 hours) = 9 hours OR CS 4699- I2P (6 hours), LMC 3403 (3 hours) = 9 hours
- Option 5 - CS 4723 (3 hours), LMC 3403 (3 hours) = 6 hours

Six credits of the Junior Design option are used as Major Requirements and the overage 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.

Students using CREATE-X  (option 4) for junior design take at least 6 hours of CREATE-X Start-ip Lab and Idea 2 Prototype (I2P) and 3 of the 6 hours must be I2P.  Students take these 6 hours with LMC 3403 (3 hours) for a total of 9 hours.  Extra three hours for CREATE-X option can be used in free electives.

[5]  Two credit hours of MATH 1554 may count along with MATH 2550 to give Field of Study 18 credit hours.

[6]  PSYC 1101 is highly encouraged as this course serves as a pre-requisite to other required courses.