BACHELOR OF SCIENCE IN COMPUTATIONAL MEDIA - INTELLIGENCE - GAME STUDIES

The Bachelor of Science in Computational Media is a collaborative effort by the College of Computing and the School of Literature, Media, and Communication (LMC). The program offers a thorough education in all aspects of the computer as a medium: the technical, the historical-critical, and the applied. Program graduates will have both significant hands-on and theoretical knowledge of computing and an understanding of visual design and the history of media. Graduates will be uniquely positioned to plan, create, and critique new digital media forms for entertainment, education, and business communication.

The program requires 36 credit hours of courses in computer science and 30 credit hours of courses in LMC (in addition to the humanities requirement). A substantial number of required courses in each unit ensures that every student has basic competence in:

- computational principles;
- the representation and manipulation of digital media, including graphics and sound;
- software design;
- visual and interactive design;
- digital arts; and
- media theory and history.

After completing required courses, students specialize in a specific area of media computing. Typical specialty areas include:

- Interactive games design: This is one of the fastest growing areas of digital media production and is already a $7 billion industry.
- Special effects: As special effects become more complex and focused on computer-generated imagery, employment in this area will increasingly require expertise in both media and computer science.
- Culturally informed program design: As programming work is increasingly outsourced to nations offering lower labor costs, programming that adds value through a sophisticated response to the needs of specific corporate and group cultures will offer job security to American programmers.

Depending on their coursework within the BS program, students will also be qualified to enter graduate studies in computer science, digital arts, digital media studies, and human-computer interface.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core A - Essential Skills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 1101</td>
<td>English Composition I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 1102</td>
<td>English Composition II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 1552</td>
<td>Integral Calculus</td>
<td></td>
</tr>
<tr>
<td>Core B - Institutional Options</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 1301</td>
<td>Introduction to Computing (^{1})</td>
<td>3</td>
</tr>
<tr>
<td>or CS 1315</td>
<td>Introduction to Media Computation</td>
<td></td>
</tr>
</tbody>
</table>

Core C - Humanities

Any HUM (http://www.catalog.gatech.edu/academics/undergraduate/core-curriculum/core-area-c) 3
Any LMC HUM 3

Core D - Science, Math, & Technology

Lab Science 8

MATH 1551 Differential Calculus 2
MATH 1554 Linear Algebra \(^{4}\) 4
or MATH 1564 Linear Algebra with Abstract Vector Spaces 4

Core E - Social Sciences

Select one of the following: 3

HIST 2111 The United States to 1877 3
HIST 2112 The United States since 1877 3
INTA 1200 American Government in Comparative Perspective 3
POL 1101 Government of the United States 3
PUBP 3000 American Constitutional Issues 3
PSYC 1101 General Psychology 3
Any SS (http://www.catalog.gatech.edu/academics/undergraduate/core-curriculum/core-area-e) 6

Core F - Courses Related to Major

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
CS 2340 Objects and Design \(^{1}\) 3
LMC 2700 Introduction to Computational Media \(^{1,2}\) 3
MATH 2550 Introduction to Multivariable Calculus \(^{4}\) 2

Major Requirements

CS 2110 Computer Organization and Programming 4
CS 4001 Computing, Society, and Professionalism 3
or CS 4726 Privacy, Technology, Policy, and Law 3
or SLS 311 (Technology and Sustainable Community Development) 3

Junior Design Options (Capstone)

Junior Design Option \(^{1,3}\) 6

Intelligence Requirements

CS 3510 Design and Analysis of Algorithms \(^{1}\) 3
CS 3600 Introduction to Artificial Intelligence \(^{1}\) 3
CS 4510 Automata and Complexity Theory \(^{1}\) 3
Select one of the following: \(^{1}\) 3

CS 3630 Introduction to Perception and Robotics 3
CS 3790 Introduction to Cognitive Science 3
PSYC 3040 Sensation and Perception 3

Select two of the following: \(^{1}\) 6

<table>
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<th>Code</th>
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<tbody>
<tr>
<td>CS 4495</td>
<td>Computer Vision</td>
</tr>
<tr>
<td>CS 4635</td>
<td>Knowledge-Based Artificial Intelligence</td>
</tr>
<tr>
<td>CS 4641</td>
<td>Machine Learning</td>
</tr>
<tr>
<td>CS 4646</td>
<td>Machine Learning for Trading</td>
</tr>
<tr>
<td>CS 4649</td>
<td>Robot Intell Planning</td>
</tr>
<tr>
<td>CS 4650</td>
<td>Natural Language Understanding</td>
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</tbody>
</table>
Bachelor of Science in Computational Media - Intelligence - Game Studies

**Game Studies Requirements**

Select three of following:  

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<tr>
<th>Code</th>
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<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>LMC 4725</td>
<td>Games Design as a Cultural Practice</td>
<td>3</td>
</tr>
<tr>
<td>LMC 4720</td>
<td>Interactive Narrative</td>
<td>3</td>
</tr>
<tr>
<td>LMC 4731</td>
<td>Game AI</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credit Hours 18

1. Minimum grade of C required.
2. CM or LMC courses include 2700-, 3700-, and 4700-level courses, as well as 3250-level courses, and LMC 2400, LMC 2500, LMC 3206, LMC 3314, LMC 3362, LMC 3402, LMC 3406, and LMC 3853
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 - CS 4980 or LMC 4699 (4 credit hours), LMC 4701, LMC 4702.
   - Option 3 - ECE VIP courses and LMC 3403.

Six credits of the Junior Design option are used as Major Requirements and the average 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 four semesters of VIP. (VIP 1 + VIP 2 + VIP 3) (for a total of 5 credit hours) + VIP 4 (3 credit hours) = 8 hours of VIP credit. VIP 4 must be taken after 90 credit hours at the 4000 level and be on the same project as 2 of VIP 1-3s.

4. Two credits 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://www.catalog.gatech.edu/academics/special-academic-programs/experiential-education/center-career-discovery-development)

Graduate Cooperative Plan (http://www.catalog.gatech.edu/academics/special-academic-programs/experiential-education/graduate-cooperative-plan)

**International Plan**

The Computational Media (CM) International Plan follows the Institute model to develop a global competence within the student’s major program of study. It thus integrates international studies and experiences with work in all aspects of the computer as a medium, preparing graduates to plan, create, and critique new digital media forms within an international professional environment.

As in the basic CM program, students following the International Plan will take credit 36 hours of courses in CS and 30 credit hours of courses in LMC (in addition to the basic humanities requirement). Students will also:

1. take three international courses, including one from each of the following categories: International Relations, Global Economics, and a course on a specific country or region;
2. spend two terms abroad engaged in any combination of study abroad, research, or internship;
3. demonstrate language proficiency equivalent to two years of college-level language study (to be determined by testing); and
4. complete a CM capstone course that links international studies with the major.

**Research Option**

The CM Research Plan follows the Institute model to allow students to incorporate research experiences into the major program of study. Students will complete nine hours of credit research work on various aspects of the computer as a medium, working in such areas as computational principles, the representation and manipulation of digital media, software design, visual and interactive design, digital art, and media theory and history.

As in the basic CM program, students following the Research Plan will take 36 credit hours of courses in CS and 30 credit hours of courses in LMC (in addition to the basic humanities requirement). CM students can complete the Research Option with nine CS or LMC research hours. Students cannot have a mix of both count towards the Research Option. The breakdown of hours is as follows:

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Undergraduate Research</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>LMC 4701</td>
<td>Undergraduate Research Proposal Writing</td>
<td>1</td>
</tr>
<tr>
<td>LMC 4702</td>
<td>Undergraduate Research Thesis Writing</td>
<td>1</td>
</tr>
</tbody>
</table>

Total Credit Hours 11

**BS/MS Computational Media and Digital Media**

Students who want to pursue the five-year BS/MS combination in CM and DM must apply to the school of LMC after completing at least 75 hours of work towards the CM degree. Applicants should have a cumulative GPA of at least 3.5. This GPA must be maintained for the student to take graduate level courses. Students must start the program in the Fall to be on track with other MS students.

Students admitted to the program will take a total of twelve credit hours of graduate course work during their final undergraduate year; six credit hours of that work, in DM courses, will count towards two 4000 level LMC courses (6 hours) and will count for both undergraduate and graduate credit. During the summer term after their fourth year, students will participate in an approved internship program. During their fifth year, students will take a total of 24 credit hours, including either LMC 6800 or LMC 7000, and with no more than three courses taken outside of the DM program.