Majoring in Computer Science at The University of Memphis can open up countless job opportunities upon graduation. Our program provides excellent preparation at the undergraduate level either for entry into the workforce or for graduate work. Many of our students can easily take a minor or even a second major in a related field in another department, and are extremely attractive to employers upon graduation. The median pay for Software Developers exceeded $100K in 2015 with job growth rated “much faster than average” according to The United States Department of Labor.

Every student will receive personalized advising to guide their course of study. Our curriculum meets or exceeds the guidelines of the top associations for computing machinery in the world (ACM, IEEE Computer Society). There is flexibility for you to select courses that will fulfill your particular needs and goals, and we’ll make sure you make the right choices. Core courses can be enhanced by electives in areas such as:

- Artificial Intelligence
- Data Mining
- Machine Learning
- Programming Languages
- Security
- System Administration
- Web Services
- Wireless and Mobile Computing

What other opportunities can you enjoy as a member of the University of Memphis Computer Science Department?

- Getting close mentoring from faculty advisors, to help you develop a program that meets your needs and goals, and to help you navigate your schedule and requirements properly;
- Working with state-of-the-art lab facilities;
- Working with top-flight research faculty with expertise in such diverse areas as artificial intelligence, big data, bioinformatics, biomolecular computing, cyber security, evolutionary computation, mobile health, natural language processing, networking, software engineering, theory, and more;
- Meeting renowned computer scientists from around the world who visit our campus for invited lectures or for conferences;
- Participating in the local student chapters of the ACM (Association for Computing Machinery) and the IEEE (Institute of Electrical and Electronic Engineers);
- Participating in industrial or research projects as part of an internship;
- Joining a diverse and intellectually challenging community of young scholars and scientists!
# COMPUTER SCIENCE
## SAMPLE FOUR-YEAR PLAN

### Freshman Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 1010</td>
<td>3</td>
</tr>
<tr>
<td>GE MATH- MATH 1910</td>
<td>4</td>
</tr>
<tr>
<td>COMP 1900</td>
<td>4</td>
</tr>
<tr>
<td>COMP 1950</td>
<td>3</td>
</tr>
</tbody>
</table>

Semester Totals: **14 hrs.**

### Sophomore Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP 3410</td>
<td>4</td>
</tr>
<tr>
<td>GE Natural Science w/lab*</td>
<td>4</td>
</tr>
<tr>
<td>MATH 1920</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 2201 or 2202</td>
<td>3</td>
</tr>
</tbody>
</table>

Semester Totals: **15 hrs.**

### Junior Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP 3825</td>
<td>3</td>
</tr>
<tr>
<td>GE Humanities/Fine Arts</td>
<td>3</td>
</tr>
<tr>
<td>COMP 4030</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>COMM 2381</td>
<td>3</td>
</tr>
</tbody>
</table>

Semester Totals: **15 hrs.**

### Senior Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP 4081</td>
<td>3</td>
</tr>
<tr>
<td>COMP 4601</td>
<td>3</td>
</tr>
<tr>
<td>GE History</td>
<td>3</td>
</tr>
<tr>
<td>COMP Elective</td>
<td>3</td>
</tr>
<tr>
<td>UD Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

Semester Totals: **15 hrs.**

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* Natural Science – One sequence and one additional course/lab from this list: PHYS 2110/2111, 2120/2121; or CHEM 1110/1111, 1120/1121; or BIOL 1110/1111, BIOL 1120/1121

**ECON 2020 is strongly recommended for the Social Science requirement.

COMP 1000, 1100, 1800, 3050, 4001, 4005, and 4014 cannot be used for courses in the major.

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GE = General Education Requirements  
BS = Bachelor of Science college requirements  
UD = Upper division

Foreign Language Requirement – See the Undergraduate Catalog: [http://catalog.memphis.edu](http://catalog.memphis.edu)

Degree hours = 120  
42 Upper Division hours required for graduation

No more than 2 hours of physical education courses may be counted toward a degree.

Residence – 30 of the last 60 hours must be taken at University of Memphis; at least 60 hours must be at a four-year institution; transfer students must earn at least 6 hours of a major at UM and at least 3 hours of a minor at UM.
COMPUTER SCIENCE COURSE DESCRIPTIONS

COMP 1000. Computing for All. Introduction to computational thinking and computing applications.

COMP 1100. Intro to Video Game Programming. Introduction to basic programming in the context of building two-dimensional (2D) games using the GameMaker 2D game engine.

COMP 1800. Problem Solving with Computers. Fundamental aspects of problem solving within the context of computer programming.

COMP 1900. CS1: Introduction to Computer Science. Fundamental concepts of programming, with a focus on algorithmic thinking.

COMP 1950. Ethics and Professional Development. Ethical and leadership issues for computing professionals.

COMP 2150. CS2: Object-Oriented Programming and Data Structures. Principles of object-oriented programming and software development; basic data structures including lists, stacks, queues, trees, and hash tables.

COMP 2700. Discrete Structures. Elementary logic, sets, relations, functions, equivalence relations, permutation, combinations, mathematical induction, recurrence relations, graph algorithms.

COMP 3115. Database Processing and Design. Database processing and architecture; conceptual data modeling and data design.

COMP 3150. Programming in C/C++. 

COMP 3160. CS3: Advanced Data Structures and Algorithms. Advanced data structures including trees and hash tables; sorting algorithms.


COMP 3825. Networking and Information Assurance. Communication, networking; security; etiquette and cyberethics.

COMP 4001. Intro to Python Programming. Basic concepts in computer programming.

COMP 4030. Design and Analysis of Algorithms. Asymptotic behavior of programs, basic paradigms in algorithm design.

COMP 4040. Programming Languages. Comparative features, syntax and applicability of high-level programming languages. COMP 4041. Introduction to Compilers. Finite state recognizers, lexical scanners, symbol tables, context free methods such as recursive descent.


COMP 4118. Introduction to Data Mining. Topics include data preparation, preprocessing; association rules.

COMP 4242. Introduction to Computer Graphics. Characteristics of graphics I/O devices. Computer graphics using an API such as OpenGL.

COMP 4270. Operating Systems. Internal elements of operating systems including hierarchy of storage devices, I/O buffering, interrupts, channels, multiprogramming, processor and job scheduling, memory management.

COMP 4272. System Administration and UNIX Programming. Fundamentals of UNIX and operating systems principles; principles and practices of systems administration and management.


COMP 4430. Digital Forensics. Acquisition and investigation of evidence from all devices capable of storing digital data related to the prosecution of cybercrime and fraud.

COMP 4432. Secure Coding and Testing. Covers secure programming practices necessary to develop application against attacks and exploits.

COMP 4601. Models of Computation. Computer models as a basis for the understanding and analysis of programming, computation and complexity.


COMP 4731. Data Visualization. Terminology, methodology, and applications of data visualization.


COMP 4882. Capstone Software Project. Development of a significant team project.


COMP 4911. Internship in Computer Science. Practical experience in computer science.

Please consult the Undergraduate Catalog at http://catalog.memphis.edu for complete descriptions.
COMPUTER SCIENCE PROGRAM REQUIREMENTS

Program objectives for a B.S. in Computer Science are that within a few years after graduation, graduates are expected to: demonstrate an ability to solve complex problems through the use of computer science, as evidenced by successful entrance into and advancement in the computer science profession; and demonstrate an appreciation for lifelong learning and for the value of continuing professional development by pursuing graduate education, professional education or continuing education opportunities, attainment of professional licensure, and/or membership in professional societies.

A. University General Education Program (41 hours) See the Undergraduate Catalog for the University General Education Program requirements. Note the following requirements specified for the Computer Science major: MATH 1910; PHYS 2110/2111, 2120/2121 or CHEM 1110/1111, 1120/1121, or BIOL 1110/1111, 1120/1121; ECON 2120 is strongly recommended for the Social Science requirement.

B. The Major (63 hours in addition to University General Education Program and B.S. degree requirements)
1) Completion of MATH 1910, 1920, 3242, 4614; three Natural Science courses and labs (one sequence as mentioned above in part A and a third course from part A); COMP 1900 (4), 1950, 2150 (4), 2700 (4), 3115, 3410 (4), 3825, 4030, 4081, 4270, 4882. Seniors are required to take the Computer Science Field Test in the last semester before they graduate.
2) Concentration (12 hours)
(i) General: completion of 4040, 4601, and two COMP electives, which may not be any of 4001, 4005, or 4014.
(ii) Cybersecurity: completion of 4410, 4420, 4430, and one of the following- 4302, 4310, or 4432.
4 year plan for Cybersecurity Concentration - http://www.memphis.edu/cas/advising/4-year-plans/comp-cyber.pdf

C. Electives
Electives may be chosen to bring the total number of semester hours to 120.

Accelerated B.S./M.S. Program in Computer Science
This program allows outstanding undergraduates to begin the coursework for the Master of Science in Computer Science during their senior year. Students are encouraged to begin planning to enter the Accelerated B.S./M.S. program early in their undergraduate career, in consultation with their advisor in the Department of Computer Science. Please consult the Undergraduate Catalog for further information.

Honors Designation: Students may also earn the designation “with honors in Computer Science.” Please consult the Undergraduate Catalog for more information.

Computer Science Minor: Completion of 21 semester hours in computer science courses, including COMP 1900 (4), 2150 (4), 2700 (4), 3115 and 6 additional upper division semester hours. COMP 1000, 1100, 1800, 3050, 4001, 4005, and 4014 may not be used to fulfill any of these requirements. Coursework must be chosen in consultation with approval of an advisor in the Department of Computer Science.

For more information, please contact:
The Department of Computer Science
http://www.memphis.edu/cs/
Dunn Hall 375
901-678-5465

Undergraduate Advising Contact:
Mr. Kriangsri “Top” Malasri
901-678-5689; kmalasri@memphis.edu
Chair: Dr. Lan Wang
lwang@memphis.edu

The University of Memphis
http://www.memphis.edu

The College of Arts and Sciences
http://www.memphis.edu/cas

UM Career Services: http://www.memphis.edu/careerservices

The University of Memphis is an Equal Opportunity/Affirmative Action University. It is committed to education of a non-racially identifiable student body.

11/18