COMPUTER SCIENCE

THE GEORGE R. BROWN SCHOOL OF ENGINEERING

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WITH MECHANICAL ENGINEERING

ASSITANT PROFESSOR
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Degrees Offered: BA, BSCS, MCS, MS, and PhD

Computer science is concerned with the study of computers and computing, focusing on algorithms, programs and programming, and computational systems. The main goal of the discipline is to build a systematic body of knowledge, theories, and models that explain the properties of computational systems and to show how this body of knowledge can be used to produce solutions to real-world computational problems. Computer science is the intellectual discipline underlying information technology, which is widely accepted now as the ascendant technology of the next century. Students in computer science at Rice benefit from the latest in equipment and ideas as well as the flexibility of the educational programs. The research interests of the faculty include algorithms and complexity, artificial intelligence and robotics, compilers, distributed and parallel computation, graphics and visualization, operating systems, and programming languages.

The department offers two undergraduate degrees: the Bachelor of Arts degree (BA) and the Bachelor of Science in Computer Science degree (BSCS). The department offers two master's degrees: the professional Master of Computer Science degree (MCS) and the research-oriented Master of Science degree (MS). The department also offers a doctoral degree (PhD).

A joint MBA/Master of Engineering degree also is available in conjunction with the Jesse H. Jones Graduate School of Management.

Degree Requirements for BA in Computer Science

For general university requirements, see Graduation Requirements (Undergraduate Student section, pages 2–5). The undergraduate program in computer science has been designed to accommodate a wide range of student interests. The program is sufficiently flexible for a student to customize it to his or her interests. A student can develop a broad educational program that couples computer science education with a variety of other fields in engineering, natural sciences, the humanities, or social sciences. Alternatively, a program might be designed for a student preparing for graduate study in computer science or for a career in computing and information technology.

The undergraduate program consists of required math and science courses; computer science core courses, including introductory courses and upper-level courses ensuring knowledge in a broad range of areas; and computer science electives, which give students the freedom to explore specific interests. Students earning a BA in computer science must complete at least 58 semester hours of courses in the major and at least 120 semester hours in total.

Math and Science Courses

Six courses for a total of 18 hours, required for all majors, usually taken in the freshman and sophomore years.:

MATH 101 *Single Variable Calculus I*

MATH 102 *Single Variable Calculus II*

One of: MATH 211 *Ordinary Differential Equations and Linear Algebra*
or MATH 221 *Honors Calculus III*

One of: MATH 212 *Multivariable Calculus*
or MATH 222 *Honors Calculus IV*

One of: STAT 331 *Applied Probability*
or STAT 310 *Probability and Statistics*

One of: MATH 355 *Linear Algebra*
or MATH 354 *Honors Linear Algebra*
or CAAM 335 *Matrix Analysis*

Computer Science Core Courses

Nine courses for a total of 34 hours.

One of: COMP 140 *An Integrated Introduction to Computation and Problem Solving*
or COMP 160 *Introduction to Computer Gaming*
or COMP 170 *Computational Thinking in Biology*

COMP 211 *Principles of Program Design*

ELEC 220 *Fundamentals of Computer Engineering*

COMP 221 *Introduction to Computer Organization*

COMP 280 *Mathematics of Computer Science*

COMP 314 *Applied Algorithms and Data Structures*

One of: COMP 311 *Programming Languages*
or COMP 412 *Compiler Construction*

COMP 421 *Operating Systems and Concurrent Programming*

One of: COMP 481 *Automata, Formal Languages, and Computability*
or COMP 482 *Design and Analysis of Algorithms*

Computer Science Electives

Two courses for a total of at least six hours in computer science at the 300 level or higher. One of these may be an independent study project.

Degree requirements for BS in Computer Science

The BS degree is designed for students who are interested in a more in-depth study of computer science to prepare themselves for a professional career in the computing industry. To receive a BS degree, a student must complete all the previously described requirements of the BA degree, plus the following additions. Students earning a BS in computer science must complete at least 80 semester hours of courses in the major and at least 128 semester hours in total.

Additional Math and Science Courses

Two courses for a total of at least seven hours.

One of: PHYS 101 *Mechanics*
or PHYS 111 *Mechanics*
or PHYS 125 *General Physics*

One of: PHYS 102 *Electricity and Magnetism*
or PHYS 112 *Electricity and Magnetism*
or PHYS 126 *General Physics II*

Capstone Sequence

At least four courses for a total of at least 15 hours:

A coherent set of courses in some computer science specialization and including a design component (one of COMP 402 *Production Programming*, COMP 410 *Software Engineering Methodology*, COMP 460 *Advanced Computer Game Creation*). Students can adopt a preset cap or design their own, with advisor approval. Samples are listed on the department's Web site.

Degree Requirements for MCS and MS in Computer Science

For general university requirements, see Graduate Degrees (Graduate Students section, pages 3–4). The professional MCS degree is a terminal degree for students intending to pursue a technical career in the computer industry. To earn the MCS degree, students must successfully complete 30 semester hours of course work approved by the department and following the plan formulated in consultation with the department advisor. In general, the courses must be at the 400 level or above. At least four hours must be at the 500 level or above, excluding COMP 590.

Areas of concentration for the MCS include algorithms and complexity, artificial intelligence, compiler construction, distributed and parallel computing, graphics and geometric modeling, operating systems, and programming languages. The professional program normally requires three semesters of study.

The MCS degree with a concentration in bioinformatics is for students intending to pursue a technical career in the biotechnology industry. Students learn to integrate mathematical and computational methods to analyze biological, biochemical, and biophysical data. This program requires prior background in computer science, biosciences, and mathematics. To earn this degree, students must successfully complete 40 hours of approved course work meeting departmental requirements. This program normally requires four semesters of study.

The MS degree is a research degree requiring a thesis in addition to course work.

Degree Requirements for PhD in Computer Science

The PhD degree is for students planning to pursue a career in computer science research and education. The doctoral program normally requires four to six years of study. To earn a PhD in computer science, students must:

- Meet departmental course requirements
- Complete a COMP 590 project by the end of the third semester
- Complete a master's thesis by the end of the fifth semester, if a previous master's thesis has not been approved by the graduate committee
- Pass a qualifying examination in an area of specialization within seven semesters after entering the PhD program
- Conduct original research, submit an acceptable PhD thesis proposal, and successfully defend the thesis proposal
- Submit an acceptable PhD thesis that reports research results and pass a final oral defense

Students who successfully meet the first three requirements are awarded the Master of Science degree. Students successfully meeting all requirements, plus any departmental and university requirements, are awarded the PhD degree.

Financial Assistance—Fellowships and research assistantships are available to students in the PhD program. Both provide a monthly stipend for the academic year and cover all tuition expenses. More substantial monthly stipends may be available during the summer for students working on departmental research projects. In all cases, continued support is contingent on satisfactory progress in the program. PhD students also are expected to assist in the teaching and administration of undergraduate and graduate courses.

Additional Information—For further information and application materials, write the Department of Computer Science–MS 132, Rice University, P.O. Box 1892, Houston, Texas 77251-1892.

See COMP in the Courses of Instruction section.