COMPUTER SCIENCE

THE GEORGE R. BROWN SCHOOL OF ENGINEERING

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Edward Knightly
Peter Varman

ASSISTANT PROFESSORS
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Yehia Massoud
Kartik Mohanram

WITH MECHANICAL ENGINEERING

ASSITANT PROFESSOR
Marcia K. O'Malley

WITH CHEMISTRY

PROFESSOR
James Tour

RESEARCH PROFESSOR
Peter Druschel

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 2 undergraduate degrees: the Bachelor of Arts degree (BA) and the Bachelor of Science in Computer Science degree (BSCS). The department offers 2 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 (pages 14–15). 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 core courses, which are introductory courses covering material required of all majors; required breadth courses, which are upper-level courses ensuring knowledge in a broad range of areas; and electives, which give students the freedom to explore specific interests. Students majoring in computer science must complete between 58 and 60 semester hours of courses in these 3 categories. Students graduating with a BA in computer science must have at least 120 semester hours.

Core Courses

Eight courses for a total of 28 hours, required for all majors, usually taken in the freshman and sophomore years.

MATH 101/102 *Single Variable Calculus I* and *II*
COMP 210 *Introduction to Principles of Scientific Computation*
COMP 212 *Intermediate Programming*
COMP 280 *Mathematics of Computer Science*
COMP 314 *Applied Algorithms and Data Structures*
COMP 320 *Introduction to Computer Organization*

One course from the following:

MATH 211 *Ordinary Differential Equations and Linear Algebra*
MATH 221 *Honors Calculus III*
 *Preferred choice

Breadth Courses

Seven courses for a total of 24 hours, required for all majors, usually taken in the junior and senior years.

STAT 331* or 310 *Probability*
CAAM 353 *Numerical Analysis*
MATH 355* or CAAM 335 *Linear Algebra*
COMP 311 or 412 *Programming Languages*

COMP 481 or 482 *Theory*
COMP 421 *Operating Systems*
ELEC 220 *Computer Engineering Fundamentals*
* Preferred Choice

Electives

Two courses for a total of 6 to 8 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 careerin the computing industry. To receive a BS degree, a student mus tcomplete all the requirements of the BA degree (i.e., core, breadth, and electives), with the addition of PHYS 101/102 (or PHYS 111/112) (7 hours) to ensure a strong scientific background. In addition, the student must complete the depth component. This component consists of a coherent set of 4 or 5 courses specializing in some area of computer science. The same course cannot satisfy both the breadth requirement and the depth requirement. Students can adopt a preset depth component or design their own components, consisting of at least 15 hours. BS degree plans have to be approved by departmental advisors by no later than the end of the junior year. Sample curricula are listed on the department's website; more information is available from department advisors. The computer science requirements of the BS degree total 80 to 82 semester hours. For a BS degree in computer science, a total of 128 semester hours is required.

Degree Requirements for MCS and MS in Computer Science

For general university requirements, see Graduate Degrees (pages 57–58). 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 4 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 4 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 4 to 6 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 3rd semester
- Complete a master's thesis by the end of the 5th 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 7 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 1st 3 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.