

MASTER OF SCIENCE

DOCTOR OF PHILOSOPHY

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Computer scientists are deeply involved in activities that are essential in our modern civilization. These activities include basic research, design, development and testing of software and information systems that serve society and its many needs. Computer technology is found in every aspect of today's world. Common uses include word processors, spreadsheets, computer games and entertainment, communications and information systems, transportation, education and training, medicine, criminology, factory automation, space exploration and assistive devices for the disabled. Computers have led to significant quality of life improvements, and yet their potential is still to be fully realized. Professionals in computer science design and develop computer systems that are, insofar as possible, free from defects and protected from misuse that would harm the health or welfare of society or the environment.

The mission of Florida Tech's computer sciences department is to prepare computing professionals for success and leadership in the conception, design, implementation and operation of complex real-world systems, and to expand knowledge and understanding of computing through research, scholarship and service.

MASTER OF SCIENCE DEGREE PROGRAM

This program offers a student the opportunity to pursue advanced studies in various areas of computer science. The program is designed for students with bachelor's degrees in computer science and provides a solid preparation for those who may pursue a doctorate. Master's students are encouraged to concentrate their studies in research areas of interest to faculty in the department.

ADMISSION REQUIREMENTS

Applicants must have taken courses in differential and integral calculus, discrete mathematics, statistics and data structures and algorithms, as well as at least 12 semester credit hours of advanced course work in undergraduate computer science. Admission may be granted with the stipulation that deficiencies are made up by taking the necessary extra courses. Graduate Record Examination scores (General Test only) are required.

DEGREE REQUIREMENTS

The Master of Science in Computer Science requires a minimum of 32 credit hours of approved graduate study. Students are encouraged to complete and successfully defend a thesis. Students who decide not to write a thesis must pass a comprehensive examination.

To ensure students are exposed to a variety of areas in computer science, they must pass one course in each of three categories: applications, foundations, and software and systems, as listed below:

Applications

CSE 5260 Database Systems

CSE 5280 Computer Graphics

CSE 5290 Artificial Intelligence

Foundations

CSE 5210 Formal Languages and Automata Theory

CSE 5211 Analysis of Algorithms

Software and Systems

CSE 5231 Computer Networks

CSE 5251 Compiler Theory and Design

SWE5001 Software Engineering 1

Students are exempted from this breadth requirement only if they can show evidence that they have passed courses equivalent to all of those on the category lists. A listed course can be replaced by another appropriate course only with permission of the student's adviser and department head.

The other course requirements are:

CSE 5500 Computer Science Seminar*2

or

CSE 5501 Computer Sciences Internship*2

CSE 5999 Thesis in Computer Science or Advanced Electives
(CSE 5600 or higher)6

Electives (at least 6 credit hours must be in Computer Science,
numbered CSE 5600 or higher)12

MTH 5051 Applied Discrete Mathematics3

*One credit each in CSE 5500, CSE 5501 or two credits in either course. The internship is completed with an information technology firm or industrial organization and is provided for students with no prior experience in a practical information technology setting.

All electives that apply to the program must be approved by the student's adviser. The computer sciences department maintains an approved set of courses, including courses in other disciplines, from which electives can be selected. At most, six approved elective credits can be from other disciplines.

The department excels in several specializations of computer science, for example, computer security, computational intelligence and software testing. Students are encouraged to concentrate in one of these areas by careful selection of elective courses.

DOCTOR OF PHILOSOPHY DEGREE PROGRAM

The doctoral program is designed to provide the highest level of academic scholarship and research in the disciplines of computer science. The goal is to produce qualified professionals for research and teaching positions in the academic world, as well as equivalent positions in industry and government.

The doctoral program in computer science is designed to attract students who have the greatest potential for expanding the frontiers of knowledge and transferring this knowledge to others. The program requires a significant breadth of understanding in the fundamentals of computer science, the mastery of several specialized subjects and the creativity to extend the body of knowledge on a particular subject through significant original research.



**Florida Institute
of Technology**

High Tech with a Human Touch

**College of Engineering
Department of
Computer Sciences**

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COMPUTER SCIENCE

FINANCIAL AID

Graduate student assistantships for instruction and research are available to well-qualified master's and doctoral degree students. Assistantships carry stipends plus a tuition waiver. In some cases, a tuition waiver alone may be awarded for a limited amount of service. Assistantships for master's degree students are normally for an academic year; assistantships for doctoral students are renewable on a yearly basis.

THE UNIVERSITY

Florida Institute of Technology is a distinctive, independent university, founded in 1958 by a group of scientists and engineers to fulfill the need for specialized, advanced educational opportunities of Florida's Space Coast. Florida Tech is the only comprehensive, independent scientific and technological university in the southeast. Supported by both industry and the community, Florida Tech is the recipient of many research grants and contracts, a number of which provide financial support for graduate students.

LOCATION

Melbourne is located on the central east coast of Florida. The area offers a delightful year-round subtropical climate and is 10 minutes from the ocean and beaches. Kennedy Space Center and the massive NASA complex are just 45 minutes north of Melbourne. The city of Orlando, Walt Disney World, EPCOT and many other attractions are one hour west of Florida Tech's main campus.

FOR MORE INFORMATION

To obtain more detailed information about this Graduate Program or to obtain application materials, visit our home page at www.fit.edu/grad or the University Catalog at www.fit.edu/catalog, or contact:

Florida Institute of Technology
Office of Graduate Admissions
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Florida Institute of Technology is an independent university located in Melbourne, Florida. Florida Tech is accredited by the Southern Association of Colleges and Schools to award associate, baccalaureate, master's, education specialist and doctoral degrees. Florida Tech admits students of any race, color, national or ethnic origin, and does not discriminate on the basis of disability in admission or access to its programs.

ADMISSION REQUIREMENTS

Each potential candidate must meet the general admission requirements and follow the process for applying presented in the *Graduate Information and Regulations* section of the *University Catalog*.

To qualify for admission to the doctoral program in computer science, a candidate must demonstrate the potential for success in this program. A student may do so by one of the following means:

1. Successful completion of a bachelor of science degree in computer science from an accredited institution, with a GPA of at least 3.5.
2. Successful completion of a master of science degree in computer science or a related field from another accredited institution, with a GPA of at least 3.5.

Also required are three letters from individuals familiar with the applicant's academic and research ability recommending doctoral study. Applicants are strongly encouraged to be aware of the research interests of faculty in the department. Scores from the Graduate Record Examination General Test are required, and the Subject Test in Computer Science is recommended.

DEGREE REQUIREMENTS

The degree of doctor of philosophy is conferred in recognition of both breadth of scientific competence in computer science and technical research capabilities, as demonstrated by producing an acceptable dissertation. The required work consists of advanced studies in preparation for specialized research, and completion of an original research program resulting in a significant contribution to the body of knowledge in the subject investigated. Each student must qualify for admission, complete an approved program of study, pass a comprehensive examination, complete a program of significant original research and defend a dissertation concerning the research.

Each candidate is expected to publish major portions of the dissertation in refereed conferences and journals, and is strongly encouraged to teach while pursuing the degree. General degree requirements are presented in the *Graduate Information and Regulations* section of the *University Catalog*.

CURRICULUM

The minimum course work requirement is 56 credit hours beyond the bachelor's degree, including at least 21 credit hours of advanced course work. The minimum research and dissertation requirement is 24 credit hours beyond the master's degree or 30 credit hours if the student did not complete a master's thesis; of these, at least 15 credit hours must be dissertation.

During the first or second term, a doctoral student must prepare a program of study to be approved by the student's faculty adviser and department head. The program of study should be designed to fit the student's professional goals, the department's resources and the breadth of general computer science knowledge expected of all doctoral candidates.

Each student is required to pass comprehensive examinations that cover breadth and depth within computer science. The breadth examination is administered by computer sciences faculty and normally must be passed before the end of two years after admission into the doctoral program. This examination includes topics from the foundations of computer science, computer systems, computer software and applied software.

After completion of all course work contained in the approved program of study, the student is required to pass a depth examination administered by his or her doctoral committee.

After passing the comprehensive examination, the student prepares a dissertation proposal representing the research plan to be followed. The dissertation research is carried out under close supervision of the student's doctoral adviser and committee. After completion of the research project and with the approval of the adviser, the dissertation is submitted to the doctoral committee for critical evaluation, followed by an oral defense of the dissertation.

RESEARCH ACTIVITIES

Computer sciences faculty members and students are conducting research in the following areas:

Computational Intelligence: computer vision, constraint reasoning, data mining, machine learning, speech recognition, swarm intelligence, spatio-temporal multidimensional reasoning

Computational Science: bioinformatics, statistical computing

Computer Security Engineering: cryptology, cryptography and cryptanalysis; secure software development and testing; malicious code, network security and intrusion detection

Distributed Computing: agents and coordination, Internet computing, negotiations, peer-to-peer networks

Languages: functional language, internationalization, type systems

RESEARCH FACILITIES

Research facilities provide open access to a wide range of computing hardware, operating systems, software development applications and general purpose computing applications. Several research centers and laboratories support specialized research interests of faculty and students. Additional research activities within the department are described under "Software Engineering" in the *University Catalog*.

Center for Computation and Intelligence (CCI): The center studies how to make computers more intelligent as well as how intelligence can change the way we compute. Specifically, CCI investigates algorithms that can help computers learn (machine learning), listen (speech recognition), reason (constraint reasoning, spatio-temporal reasoning) and see (computer vision). Moreover, the center examines how distributed intelligent agents can interact (coordination, distributed constraint reasoning, cryptography). CCI also studies how simple animal behavior can provide a novel way to solve problems (swarm intelligence). Applications of techniques include computational biology, computer security, device monitoring, digital government, surveillance and Web personalization.

University Center for Information Assurance (UCIA): The center is funded by both industry and government sponsors and concentrates on all aspects of computer hardware and software security. Faculty participants are internationally recognized for their technical contributions, especially in the areas of hardware and software security testing. License agreements in place with a number of industry leaders enable the implementation of research results in commercial quality hardware and software products, focusing on assuring the integrity of computer hardware and software applications from malicious intrusion. The center performs funded hardware and software testing, vulnerability testing, security assessments and basic research in computer security and software development testing.