COMPUTER SCIENCE (PH.D.)

Overview

Computer scientists study the fundamental components of computation; develop computational applications, systems, and models; and evaluate the impact of such computational systems within society. Researchers in computer science develop groundbreaking theories, devise novel algorithms, and design innovative systems and models that advance our understanding of computer science, bringing positive change to hundreds of millions of lives on this planet.

Computing technology is pervasive and expanding rapidly. The explosive growth of data and computational power has led to a new artificial intelligence and data science revolution affecting every aspect of modern life. Concurrently, cybersecurity has been declared a critical component of the Department of Homeland Security's mission due to its importance to both the public and private sectors. The Department of Computer and Information Sciences at Fordham University offers the Ph.D. program in computer science to help meet these challenges by educating and developing the next generation of researchers, faculty, and industry leaders who will push the frontiers of computational research and innovation.

CIP Code

11.0101 - Computer and Information Sciences, General.

You can use the CIP code to learn more about career paths associated with this field of study and, for international students, possible post-graduation visa extensions. Learn more about CIP codes and other information resources.

Admissions

A student entering doctoral studies in computer science should have suitable preparation in mathematics and computer science, and a degree in computer science or the equivalent subject from an accredited college or university. In addition, ideal candidates for admission should have some previous exposure to research and development, and demonstrate through their application materials promise for success in research and teaching.

Required application materials include the following:

- Statement of interest
- CV/resume
- Official transcripts for prior undergraduate and graduate degrees
- GRE general test scores
- Copies of recent publications
- Three letters of recommendation
- Demonstrated English proficiency for non-U.S. or native English-speaker applicants (as per standing GSAS policy)

The application review process is carried out by a Faculty Review Committee, which reviews all applications for admission to the program and makes recommendations on admission to the GSAS director of admissions. While the committee is highly selective in its recommendations, it engages in holistic applicant review to achieve that goal. This includes a review of traditional "objective" measures such as GRE, GPA, and TOEFL/IELTS scores and a careful and systematic review of all submitted materials that reveal cognitive and/or affective characteristics of applicants, including their statement of interest, resume, recommendation letters, and any recent publications.

Objective admissions criteria include GRE quantitative scores of 160 or better (82nd percentile) and verbal scores of 150 or better (48th percentile). Competitive applicants requiring demonstrated English proficiency must have a minimum combined TOEFL score of 79 or a minimum overall IELTS band score of 6. The minimum required GPA is 3.5 (out of 4.0) for applicants with an M.S. in computer science or a closely related field, or 3.0 (out of 4.0) for applicants with a B.S. in computer science or a related field plus at least two years of work experience. Upon completion of an initial screening of the entire applicant pool, the committee may interview (remotely unless the applicant is already in the New York City area) applicants who are being seriously considered for a recommendation of admission.

Finally and importantly, admission recommendations take into account this entire broad base of material presented by applicants, and the program actively recruits applicants from members of communities typically underrepresented in STEM fields (e.g., women and minorities), as well as welcoming applicants across diverse religious, socioeconomic, and cultural backgrounds.

Requirements

Course	Title	Credits
Research Courses		
CISC 7070	Research Methods	3
CISC 7075	Research Project [1]	3
CISC 7076	Research Paper [1]	0
Breadth Requirements		
One qualifying course from each of Groups I, II, and III		9
Two qualifying or non-qualifying courses drawn from Groups I-III [2]		6
Depth Requirements		
Two electives from Group IV		6
Pedagogy Requirement		
CISC 7090	Doctoral Pedagogy Seminar	3
CISC 7580	Computer Science Teaching Experience (taken four times, for two credits)	8
Qualifying Exams		**0**
Students must complete three qualifying exams (see details below).		
CISC 0931	Ph.D. Qualifying Exam: Computer Science	0
Dissertation		
CISC 0950	Dissertation Proposal Preparation (taken at least two times, for four credits)	8
CISC 0960	Proposal Defense Computer Science	0
CISC 7999	Dissertation Research in Computer Science	24
Total Credits		**70**

[1] The final report for the research project in a seminar setting (CISC 7076 Research Paper) must be completed within 24 months of matriculation in the program. The report must detail research of publishable quality, as demonstrated, for example, by having the paper be accepted by a selective conference. The student must also complete a presentation

on the project, which should include a thorough review of the literature in the area.
2   Any course with the attribute CSFT (Group I), CSSS (Group II), or CSID (Group III) may fulfill this requirement.

Dissertation Progress Policies

A student may be placed on academic probation if they do not have an accepted dissertation proposal in at most 5 semesters after passing their qualifying exams, or if they have not completed their dissertation in at least 5 semesters after proposal approval.

Qualifying Exam Requirement

Each student must complete a qualifying exam before they are permitted to proceed to develop a dissertation proposal. The exam is satisfied by the student obtaining a grade of A or A- in at least one course from specific courses drawn from each of the three groups (I-III), noted below. These courses each include some coursework which focuses on ethically-informed computer science training in the subject area of the course.

Group I: Foundations & Theory

Courses in this group have the CSFT attribute.

Course	Title	Credits
CISC 5200	Computer Language Theory	3
CISC 5825	Computer Algorithms	3
CISC 6150	Programming Languages	3
CISC 6660	Applied Cryptography	3
CISC 6890	Advanced Computer Algorithms	3
CISC 7010	Formal Methods	3

Qualifying Courses

The following courses in this list are qualifying exam courses and, additionally, have the CSFQ attribute:

Course	Title	Credits
CISC 5200	Computer Language Theory	3
CISC 6890	Advanced Computer Algorithms	3
CISC 7010	Formal Methods	3

Group II: Systems & Software

Courses in this group have the CSSS attribute.

Course	Title	Credits
CISC 5550	Cloud Computing	3
CISC 5640	Nosql Database Systems	3
CISC 6100	Software Engineering	3
CISC 6110	Computer Networks: Architecture, Design, and Modeling	3
CISC 6345	Advanced Database Systems	3
CISC 6630	Wireless Security	3
CISC 6750	IOT Forensics and Security	3
CISC 6935	Advanced Distributed Systems	3
CISC 7110	Advanced Computer Networks	3

Qualifying Courses

The following courses in this list are qualifying exam courses and, additionally, have the CSSQ attribute:

Course	Title	Credits
CISC 6110	Computer Networks: Architecture, Design, and Modeling	3
CISC 6345	Advanced Database Systems	3
CISC 6935	Advanced Distributed Systems	3
CISC 7110	Advanced Computer Networks	3

Group III: Informatics & Data Analysis

Courses in this group have the CSID attribute.

Course	Title	Credits
CISC 5352	Machine Learning in Finance	3
CISC 5700	Cognitive Computing	3
CISC 5790	Data Mining	3
CISC 5800	Machine Learning	3
CISC 5950	Big Data Computing	3
CISC 6000	Deep Learning	3
CISC 6525	Artificial Intelligence	3
CISC 6910	Data and Information Fusion	3

Qualifying Courses

The following courses in this list are qualifying exam courses and, additionally, have the CSIQ attribute:

Course	Title	Credits
CISC 5800	Machine Learning	3
CISC 6525	Artificial Intelligence	3
CISC 6910	Data and Information Fusion	3

Group IV: Advanced Topics

Courses in this group have the CSAT attribute.

Course	Title	Credits
CISC 6210	Natural Language Processing	3
CISC 6352	Advanced Computational Finance	3
CISC 6376	Software Design Patterns	3
CISC 6500	Bioinformatics	3
CISC 6550	Systems Neuroscience	3
CISC 6625	Educational Data Mining and Learning Analytics	3
CISC 6640	Privacy and Security in Big Data	3
CISC 6700	Medical Informatics	3
CISC 6880	Blockchain Technology	3
CISC 7120	Robotics	3

| CISC 7510 | Computer Vision/Image Recognition | 3 |
| CISC 7650 | Cybersecurity Operations | 3 |