

PhD in Information Systems (IS)

Department of Information Systems
College of Computing Sciences
New Jersey Institute of Technology

is.njit.edu

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Administration

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Faculty

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Professors Emeriti	S. Roxanne Hiltz, Julian Scher, Murray Turoff, Marilyn Tremaine

The Information Systems (IS) PhD program is designed to produce scholars with a commanding knowledge of both theory and practice of IS for complex applications and environments. The program encourages an interdisciplinary approach to the exploration of information systems, and the evaluation of its effectiveness and consequences.

IS PhD dissertations must make a substantial scientific contribution to their particular area of research. PhD students can do research in two research tracks: Information Integration and Informatics (III), i.e., information science and data intensive research, and Human-Centered Computing (HCC).

Entrance Requirements

- Applicants from varying academic backgrounds may apply. Applicants without sufficient Information Systems, computing or mathematics/statistics background, however, will be assigned additional foundation coursework.
- Typically applicants are required to have a Master's degree with a demonstrated record of academic achievement and show promise of being able to excel in the program, but we make exceptions for outstanding students with a Bachelor's degree.
- GPA should be 3.5 or better on a 4.0 scale.
- To ensure that each student finds a dissertation advisor and committee with proper expertise, the PhD director will inform applicants who pass the first round of screening to contact and

secure a faculty advocate with the proper expertise to assess and champion their applications. Once admitted, students will be mentored by their faculty advocate. Applicants should explore faculty web sites (is.njit.edu, look for those listed among our core faculty—assistant professors, associate professors and professors) and are encouraged to consult with the PhD director regarding research interests and contacting faculty.

Application Materials

The IS PhD application requires several items *in addition to* those required by NJIT. Therefore applicants must submit both (1) department-specific materials and (2) general NJIT-required materials. For complete details see is.njit.edu/academics.

Financial Support and Application Deadlines

Application deadlines are as follows:

- For Fall semester:
 - For those seeking financial support: December 15
 - For those not seeking financial support: February 15
- For Spring semester:
 - For those seeking financial support: September 1
 - For those not seeking financial support: October 1

Part-Time Students

The IS PhD program welcomes part-time students, under the following conditions. Part-time students should arrange their work schedules to participate in research group meetings, seminars and other research activities as often as possible. These activities often take place during the day. Part-time students are required to obtain a leave from work obligations for at least one year in order to focus on their research proposition and dissertation research on a full-time basis.

Distance Students

The IS PhD is an on-campus program; we cannot accommodate distance learning students.

Overall Course Requirements

Students must maintain a grade average of 3.5 (B+) or better in core courses. No course with a grade less than B will count. Up to 2 courses may be independent study. At least 4 courses must be at the 700 level.

PhD Program Goals

Students in the PhD program will be able to demonstrate the ability to:

1. understand the state of the art of IS practice
2. understand fundamental knowledge of Human-Centered Computing (HCC) and data intensive research
3. understand and apply research methods in HCC and data intensive research
4. critically examine research in the student's chosen research area
5. develop a fundable research proposal
6. develop research questions, design research methodologies, implement systems, interpret results, and discuss implications for a research project in the student's chosen research area, and
7. teach effectively in one IS course

PhD Program Overview and Credits

The PhD program has 4 stages. Full-time students entering with an IS Master's degree are expected to complete within 4 years. Those entering with only a BS or a non-IS background are expected to complete within 5 years. Per NJIT policy, the maximum duration for the entire doctoral study is 7 years for both full-time and part-time students. The following table shows the expected and maximum time allowed for each stage.

Table 1: PhD Program Stages and Durations

Stage	Description	Main Activities	Maximum Duration (Full-time)	Maximum Duration (Part-time)
1	Foundation <i>(If entering with only a BS degree.)</i>	<ul style="list-style-type: none"> • Foundation courses 	1 year	2 years
2	Core Knowledge Acquisition	<ul style="list-style-type: none"> • Core courses • Qualifying exam 	1 year	2 years
3	Research and Teaching Apprenticeship	<ul style="list-style-type: none"> • Core courses, cont. • Coursework in specialty area • Article reviews • Publishing • Reviewing • Teaching apprenticeship • Research proposition 	1 year	2 years
4	Dissertation Process and fulfilling teaching requirement	<ul style="list-style-type: none"> • Proposal • Teaching practicum • Dissertation • Publishing 	3 years	4 years

PhD Program Stage Details

Stage 1: Foundation

Students will consult with the PhD Director to develop an appropriate set of foundation courses, which must include the following if not previously studied.

Table 2: Required Foundation Courses

Area	Courses	Description	Comments
IS Foundation	IS 677	Information System Principles	required
Programming	CS 602	Java Programming	required
Networking & Security	CS 652 CS 656 CS 696	Computer Networks-Architectures, Protocols and Standards Internet and Higher-Layer Protocols Network Management and Security	optional

Stage 2: Core Knowledge Acquisition

In this stage, students will focus on core courses, article reviews and the qualifying exam. Students may be required to take a different set of core courses or in a different sequence, depending on their educational background. Students additionally should participate in research activities.

Table 3. Standard Core Courses

Year 1	
Fall	IS631 Enterprise Database Management
	IS661 User eXperience Design (UXD)
	IS665 Data Analytics
	IS7XX Usability
	ENG503 Spoken English for TA's (international students only)
Spring	IS663 Systems Analysis and Design
	834:562 Research Design (Rutgers-Newark)
	IS765 Quantitative Research Methods, or 834:607 Quantitative Methods I (Rutgers-Newark)
	IS7XX User Experience Evaluation

Year 2	
Fall	Data Intensive Research, select one from: <ul style="list-style-type: none"> • IS634 Information Retrieval • IS687 Transaction Mining and Fraud Detection • IS688 Web Mining
	IS684 Business Process Innovation
	834:575 Grant Writing and Grants Management (Rutgers-Newark)
	IS725 Independent Study
Spring	IS726 Independent Study
	IS776 Research Proposition
	PTC698 Research Writing
	2 courses in specialty area
Year 3	
Fall/Spring	More specialty courses (if needed)

Participation in Research Activities

IS research group meetings present an important opportunity for faculty and PhD students to immerse themselves in IS research paradigms, learn about research interests, present ideas, and find collaborators.

Full-time funded students must register for

IS 791 Graduate Seminar (Non-credit)

and attend research group meetings, research talks, and serve on research proposition panels every semester. Part-time students also must register for this Seminar and actively participate for at least 2 semesters, and are strongly encouraged to attend additional sessions as often as they can remotely via video conferencing. Exit requirements for IS 791 include presentations in research group meetings, and satisfactory reviewing performance on research proposition panels.

Article Reviews

Critically reviewing articles is an important research skill and service to the community. Students must review at least 6 articles (3 conference papers and 3 journal papers, either before or after publication) to the satisfaction of faculty members from the IS Department, or other faculty approved by the PhD director. Faculty members must sign off on the quality of the reviews, and may require several revisions. Students are responsible for finding faculty to pick papers and evaluate reviews, and students can work with several different faculty members to fulfill this requirement. Guidelines for article reviews are posted on the Department’s PhD web pages. (Full-time students may complete this requirement within 2 years; and part-time students may complete this requirement within 3 years.)

Qualifying Exam

The qualifying exam is given each year in May. The exam has two sections:

- Quantitative research methods
- Qualitative research methods

These topics will be covered in part through coursework, and in part through studying additional materials we make available.

A student failing both sections the first time or any part twice will be dismissed from the program. If a student fails only one section, one opportunity to retake that section will be offered in the following May. No other options besides retaking the exam will be considered.

Stage 3: Research & Teaching Apprenticeship

This stage includes:

- finding a dissertation advisor,
- completing coursework,
- completing required article reviews,
- regular publishing,
- apprenticing teaching, and
- developing a research proposition and presentation.

Dissertation Advisor

Students must select a dissertation advisor by the end of the first year of entering Stage 3. This presumably was the student's faculty advocate during the admissions process, though this is a period for students to explore one or more areas of research as part of finding an exciting dissertation topic. Students may switch advisors as their research interests evolve.

Coursework

Students must complete their coursework by the end of this stage. Courses fall into three categories:

1. *Core courses*: Completing the courses listed in Stage 2.
2. *Specific Knowledge for Research and Dissertation*: Students and their advisors are responsible for choosing courses that will provide appropriate knowledge to complete the student's dissertation, and to be considered knowledgeable in the student's chosen field. The advisor can recommend courses in excess of the official number of credits required for graduation if the additional knowledge is critical.
3. *General Knowledge for Teaching*: If necessary, students and their advisors are responsible for choosing additional courses providing enough knowledge to teach general undergraduate courses in Information Systems and/or in the student's chosen specialty.

Research Proposition and Presentation

Once a student has sufficient knowledge in a research area, the student will prepare a research proposition. The research proposition proposes a research project following an established grant proposal format. The research proposition is meant to demonstrate research readiness in preparation for dissertation work. The topic does not have to become the student's dissertation, but the ideal case will and also would yield an actual grant proposal that gains funding for the student's research. Propositions will be reviewed by faculty and peers in a fashion similar to the National Science Foundation review process. During this process, students will present their proposition in the IS Research Seminar once when developing the proposition to gain feedback, and again in the semester after passing the proposition. Finally, students must complete necessary revisions to the proposition no later than the end of the following semester.

Regular Publishing

Students must submit one conference or journal paper every year. Students are strongly encouraged to co-author papers with faculty and other doctoral students.

Teaching Apprenticeship

Students apprentice with a faculty member for a semester in preparation for a teaching practicum. During the apprenticeship, students typically will serve as a teaching assistant or grader.

Stage 4: Dissertation Process and Teaching Practicum

This stage includes:

- writing and defending a dissertation proposal,
- conducting the main study,
- writing and defending the full dissertation thesis,
- submitting publications based both on the proposal and final thesis, and
- independent teaching practicum

Dissertation Proposal

The dissertation proposal is a binding contract between the dissertation committee and the student. If a student successfully defends a proposal, the research plan in the dissertation proposal is to be followed.

A dissertation proposal must show motivation, appropriate coverage of literature, a sound research framework, a prototype system (where appropriate), a pilot study (where appropriate), data analysis, expected contributions, and the detailed steps for completing the full dissertation.

Dissertation

The dissertation completes the research proposed, including a formal study, and descriptions of contributions and limitations.

Publishing

Before defending the dissertation proposal, a student must submit a paper based upon some aspect of it. Before defending the final dissertation, a student must submit a paper based on the results from its formal study (not just the pilot study from the proposal).

Independent Teaching Practicum

During the practicum a degree candidate will teach at least one previously apprenticed course under the course coordinator's direct supervision. Students must receive a satisfactory evaluation to pass this requirement.