

PhD in Information Systems (IS)

**Department of Informatics
Ying Wu College of Computing
New Jersey Institute of Technology**

is.njit.edu

Administration

Chair	Brook Wu
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PhD Program Director	Brook Wu

Faculty

Distinguished Professor	Fadi Deek
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Associate Professors	Quentin Jones, Brook Wu
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The Information Systems (IS) PhD program is designed to produce scholars with a commanding knowledge of both theory and practice for their area of research. The program encourages an interdisciplinary approach to the exploration of informatics, 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 applicants 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.

PhD Program Goals

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

1. understand fundamental knowledge of and apply research methods within the student's chosen focus of Human-Centered Computing (HCC) or data intensive research
2. critically examine research in the student's chosen research area
3. 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
4. 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.

Ongoing Activities

As future researchers, throughout their studies PhD students are expected to work with faculty and fellow students to:

- publish regularly in quality conferences and journals, including co-authoring,
- attend conferences relevant to the student’s research area,
- regularly review conference and journal submissions, and
- participate in authoring grant submissions and working on grant-funded projects.

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. Students entering with an MS degree must take a minimum of 4 courses (12 credits) at the 700 level. Students entering without an MS degree must take a minimum of 12 courses (36 credits), where at least 4 courses must be at the 700 level.

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 • Coursework in specialty area 	1 year	2 years
3	Research and Teaching Apprenticeship	<ul style="list-style-type: none"> • Coursework in specialty area • Qualifying Exam: research study • Publishing • Teaching apprenticeship 	1 year	2 years
4	Dissertation Process and fulfilling teaching requirement	<ul style="list-style-type: none"> • Proposal • Teaching practicum • Dissertation 	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	Course s	Description	Comments
Programming	IS 601	Web Systems Development	required
IS Foundation	IS 677	Information System Principles	recommended

Stage 2: Core Knowledge Acquisition

In this stage, students will focus on core and specialty courses. 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. Students must take four 700-level courses to graduate.

Table 3. Standard Core Courses

Year 1	
Fall	IS631 Enterprise Database Management
	<i>Students with the Human-Centered Computing focus must take both of the following courses. Students with the Data-Intensive Research focus must take 1 of the following courses.</i>
	IS661 User eXperience Design (UXD) or IS664 Customer Discovery
	IS665 Data Analytics
	ENG503 Spoken English for TA's (international students only)
Spring	IS663 Systems Analysis and Design
	IS 765 Quantitative Methods in Information Systems Research
	<i>Students with the Human-Centered Computing focus must take the second of the following courses.</i>
	IS661 User eXperience Design (UXD) or IS664 Customer Discovery
	<i>Students with the Data-Intensive Research focus take a specialty course in this focus in consultation (as recommended by the advisor)</i>

Year 2	
Fall	IS776 Research Study
	0-2 specialty courses (as recommended by the advisor and required for full-time status)
Spring	IS725 Independent Study or a 700-level specialty course (if needed to fulfill 700-level course requirements)
	0-2 specialty courses (if recommended by the advisor and required for full-time status)
Year 3	
Fall/Spring	More specialty courses (if recommended by the advisor)
	IS726 Independent Study (if needed to fulfill 700-level course requirements)

Additional Course Information

- Students should choose specialty courses in conjunction with their advisor.
- Advisors may require that students take additional specialization courses to prepare for their dissertation research.
- Students who intend to work in an academic department focusing on business or information systems are highly recommended to take additional information systems (IS) electives to prepare for teaching in this field. For these students we highly recommend:
 - IS 684 Business Process Innovation
 - IS 677 Information Systems Principles (as a foundation course)
- Students focusing on Human-Centered Computing are highly recommended to take a second course in data-intensive research (in addition to IS 665).
- After fulfilling regular coursework, students must register for IS 792 Pre-Doctoral Research each semester until presenting their dissertation proposal.
- After presenting the dissertation proposal, students register for IS 790A Doctoral Dissertation and Research each semester until graduating.

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:

and attend research group meetings, and research talks. Part-time students also must register for the 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. Requirements for IS 791 Graduate Seminar include presentations in research group meetings.

Stage 3: Research & Teaching Apprenticeship

This stage includes:

- finding a dissertation advisor,
- completing coursework,
- completing a qualifying exam (research study),
- publishing, and
- apprenticing teaching

Dissertation Advisor

Students must select a dissertation advisor by the end of the first semester 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. Starting this stage, including when switching advisors, no student may be without an approved advisor for more than 4 calendar months.

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.

Qualifying Exam: Research Study

See is.njit.edu/academics for further procedural details of the research study.

The Research Study (RS) serves as the PhD qualifying exam and demonstrates research readiness. Each student works with a faculty member to identify the topic of a research study, and then takes the lead in designing and conducting the study, and analyzing the results, and writing a paper of publishable quality. The student will register for IS 776 under this faculty advisor to conduct this research study. Normally, students should attempt this requirement in the Fall of their second year. A Qualifier Exam Committee (QEC) of three faculty members excluding the faculty advisor evaluates the RS. The PhD program director and the adviser jointly appoint the three-person committee, with majority of the members holding primary, joint, emeritus, or research faculty appointments in the Department of Informatics. The faculty advisor will not be a member of the QEC.

Defense: A public defense will be held at the start of the following semester. The defense consists of three parts: 1) a presentation open to the public, 2) a follow-up Q&A session where both the student's QEC and the public can ask questions regarding any aspect of or related to the presented research, 3) a closed-door oral exam with the student and the QEC, and open to the student's advisor and department tenured/tenure-track faculty (both as observers only), where only the student's QEC will ask more detailed questions. Oral exam questions will focus on the state of the art within the RS's topical area, the study itself, and justification for the research method and analysis chosen versus other possible research methods and analysis approaches.

Outcomes of the Public Defense: After completing all three parts of the defense, the QEC will meet alone and conduct a closed-door discussion. Each QEC member will vote (pass-fail) on the RS as a whole and the oral exam. The student must receive a unanimous pass vote from the QEC to pass the Qualifying Exam. Possible outcomes include: 1) passing the student immediately, 2) requesting the student to revise and resubmit the written work produced in the RS, with or without the need to re-defend the research, 3) failing the student immediately. If the committee fails the student in the defense, the student will have a second chance only to defend his/her RS by the end of the semester. A student failing to address all requested revisions or to pass the defense within one calendar year after initial registration for the RS will be dismissed from the program.

Publishing

Students must have one paper accepted for publication in a quality conference or journal as lead author by the end of their third year. Students are strongly encouraged to start on this requirement during this stage and over time submit multiple papers to ensure that it is met. Students also are 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 a publication based on the 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 Dissertation Research

Before defending the final dissertation, a student must finalize for submission a quality paper approved by his or her advisor based upon a substantial aspect of the thesis work to a recognized conference or journal in the field.

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.