PH.D. IN INFORMATION TECHNOLOGY
HANDBOOK

MULTIDISCIPLINARY EMPHASIS, COMPETITIVE, RESEARCH INTENSIVE

Last Updated 4-2018

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The PhD program is to prepare students with the following abilities:

• Strong understanding of the theory and application of information technology focused around the core areas of computer science, management information systems and interdisciplinary informatics.

• Knowledge of the analysis, design, development, and implementation of current and future information technologies;

• Excellence in conducting and managing high-quality, basic and applied research;

• Solid grounding in the fundamentals of academic teaching;

• Strong foundation in multidisciplinary and emergent areas in information technology

Program Contact Information

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Program Website: https://www.unomaha.edu/college-of-information-science-and-technology/phd-it/index.php

Application Deadlines:

- Fall: February 15
- Spring: September 15

Program-Specific Requirements:

Students with an undergraduate or graduate degree in computer science, management information systems, bioinformatics, cybersecurity or a closely related discipline can apply for admission to the Ph.D. program. Admission decisions are based on the review of application material by the College of IS&T's Doctoral Program Committee (DPC).

1. For applicants that are required to take the TOEFL: must score at least 577 paper-based; 233 computer-based; 90 iBT, 7 IELTS, or 61 PTE.
2. Graduate Record Examination (GRE): GRE scores must be submitted but are only one component of a holistic admission decision. Successful applicants have typically have GRE score of 150 verbal and 160 quantitative or better.
3. Proficiency in English communication, both written and verbal. The ability to read, comprehend and write academic papers is a key criterion in assessing proficiency in English.
4. Demonstrated superior performance in mathematics, including calculus, discrete mathematics and statistics, and a sequence of courses in the theory and practice of one or more areas of computer science, information systems, or a closely related field.
5. Publications in scholarly journals and/or conferences, graduate theses and/or projects. These offer documentation of interest and commitment to scholarly activities and research.
6. Three (3) Letters of Recommendation
7. From references who are able to give an in-depth evaluation of your strengths and weaknesses with respect to academic work, and who are competent to judge your probability of success in graduate school.
8. Statement of Purpose is required (not to exceed two pages) which address the following questions:
   a. What do you hope to accomplish with a Ph.D. in Information Technology? Please describe the area in Information Technology that you would like to contribute to.
   b. Why are you applying to this specific program? Please offer details as to why you feel you are a good fit for this program.
   c. What background or qualifications do you have that you believe are essential to success in this program? Please provide specific academic accomplishments as evidence of your ability to conduct research.

       d. What general area or topics do you hope to study? Please offer names of IS&T Faculty with whom you would like to work and/or Labs in which you would like to conduct your proposed research.

       e. What do you expect to be doing five to ten years after finishing the Ph.D. program?

9. Writing Sample: Evidence of graduate potential in the form of academic papers, publications, theses or project reports done in an academic or industrial setting. Group project reports <u>do not</u> constitute evidence of an applicant's writing ability.

10. Resume

In addition to an applicant's past academic record and scholarly potential mentioned above, the doctoral program committee will consider the match between the applicant's research interests and ongoing research by the IS&T graduate faculty while making admission decisions.

The committee will no longer offer "conditional" admission option for international graduate students. To be officially admitted into the Graduate College, an international applicant must have a qualifying English Language Proficiency score (TOEFL, IELTS, etc.) on file with the Office of Graduate Studies. Applicants who do not have a qualifying English Language Proficiency score must fulfill the English proficiency requirement prior to being admitted to a graduate program.

DEGREE REQUIREMENTS

The PhD in IT program requires 90 credit hours of graduate-level studies. Undergraduate course credits taken at UNO or another institution cannot be counted toward the PhD degree in IT. Dual-listed undergraduate courses ending in 8**5 cannot be counted as course credits in the PhD program. Only three courses ending in 8xx6 are allowed in the 45 hours of doctoral-only coursework.

The coursework taken by a student is entered into a plan of study that must be approved by the doctoral program committee before the beginning of the PhD student's second year of studies.

The coursework consists of foundation courses, doctoral seminar and colloquia, a major field of study, an optional minor field of study, and the dissertation. Incoming PhD students are placed into one of three tracks (computer science, information systems, or integrated informatics) based on their backgrounds and research interests. The different categories of credit-hour requirements for the program are outlined below.

Foundation Courses 24 credit hours: Foundation courses constitute any of the courses offered in the Master's Degree in IT-related field (i.e.: Computer Science, Management Information Systems, Cybersecurity, IT Innovation). In order to complete the breadth requirement, students must successfully complete a course in an area that is not their major field of study.

Core Courses 12 credit hours as follows:

CIST 9080 RESEARCH DIRECTIONS IN IT	(3 Credit hours)
CIST 9040 COLLOQUIUM ON IT RESEARCH	(1 Credit Hour)
CIST 9050 COLLOQUIUM ON IT TEACHING	(1 Credit Hour)
CIST 9060 COLLOQUIUM ON IT PROFESSION AND ETHICS	(1 Credit Hour)
ISQA 9150 or a Doctoral Program Committee approved graduate research methods course	(3 Credit hours)
A statistics course approved by the Doctoral Program Committee	(3 Credit hours)

Major Field of Study 18 credit hours: Coursework in the major field of study provides students the advanced study needed to develop an in-depth knowledge of their chosen field of research. For students who have indicated a concentration within their PhD in IT plan of study, this comprises the concentration credit hours. At least 3 courses (9 hours) must be in 9000-level courses. The remaining courses should include at least one 8000-level graduate-only course.

Electives 12 credit hours: Selected in consultation with your advisor.

Dissertation 24 **credit hours:** The coursework taken by a student is entered into a plan of study that must be approved by the doctoral program committee before the beginning of the PhD student's second year of studies. Undergraduate courses, either taken at UNO or at other universities, are NOT allowed to be counted as credits toward the PhD degree.

Total 90 credit hours

Comprehensive exams will typically be scheduled around the middle of the Fall and Spring semester, as needed. The student intending to take the exam should inform the DPC chair about the intent to appear in the examination in writing preferably over email at least one semester before the semester during which they plan to take the exam. The comprehensive exam is a research readiness examination – that means that students should take it only when they are confident that they have a mature understanding of research, both broadly and in the specifics of their major field of study

The comprehensive examination is taken after the student has completed all coursework according to his or her plan of study and formed a supervisory committee. Comprehensive exams comprise of three parts: Part 1 of the comprehensive exam is set by the Doctoral Program Committee which comprises faculty who are not on the candidate's supervisory committee.   Part 2 of the comprehensive exam is set by the candidate's supervisory committee. Part 3 is the dissertation proposal defense. The comprehensive exam consists of a written part (1 and 2) and an oral part (3). The written part of the exam is divided into two sub-parts that will be scheduled over two consecutive days in the following order.

1. Written Part I Examination Format and Procedure: The Doctoral Program Committee is responsible for examining the candidate's knowledge and ability to conduct academic research in the Breadth area.   Before taking the written part of the exam, students will provide a selection of 4-5 topics from the areas covered in the CIST 9080 course. The selected topics should not have significant overlap within the major or minor area of study given in the student's plan of study. The topics should be selected so that they express a breadth in the areas in the core disciplines of the program in computer science, information systems and integrated informatics. The Doctoral Program Committee will select two topics from the set of 4-5 topics and inform the student in advance of the exam. The material related to the topic for preparing for the comprehensive exam (e.g., paper reading list) will already have been provided to the student when the student took the CIST 9080 course. Questions on the selected topics will be set by the faculty presenter(s) of the topic in CIST 9080. The answers will also be evaluated by the topic's presenter(s), either individually or by a group of faculty members selected by the topic's presenter(s).

2. Written Part II Examination Format and Procedure: Depth exam is set and graded by the candidate's supervisory committee. The questions for the second part of the written comprehensive exam evaluate the student's understanding of his or her major field of study.

Once the student has successfully passed both written portions of the comprehensive exam, they may proceed to the oral exam.

1. Oral Examination Procedure: The oral component of the comprehensive exam is the defense of the student's dissertation proposal. The oral portion cannot be taken without successfully passing both written parts of the exam.

The faculty grading the candidates' exams will be responsible for communicating the pass/fail grade to the Doctoral Program Committee. A PhD student advances to candidacy after successfully passing all parts of the comprehensive examination. Should the student fail the

comprehensive examination or a part thereof, he/she may be allowed to re-take it during the following academic term upon specific recommendation by the Doctoral Program Committee (DPC). Students may appeal their comprehensive exam grade if they believe that their grade was assigned in an arbitrary or capricious manner.

The Outcome of taking a comprehensive exam is Pass or Fail. There is no option to revise a comprehensive exam, especially one that has received a Fail grade. If a student fails any part of their comprehensive exam, they have the option to retake the entire exam upon the permission of the DPC.

For Grade Appeals, students may refer to the Graduate College Grade Appeals policy https://www.unomaha.edu/graduate-studies/current-students/quality-standards.php#k**Dissertation**

Dissertation Credits

The dissertation of a PhD candidate is supervised by the chair or co-chairs of the student's supervisory committee in consultation with other members of the supervisory committee. While doing his or her dissertation, the candidate should take hours for the course CIST 9990. A minimum of 24 hours of this course is required for graduation. Dissertation course credits should be taken only after the PhD student advances to candidacy. PhD students may take dissertation credits during the semester they apply for candidacy if they have completed all their other courses, but the dissertation credits taken under these circumstances should be kept to a minimum. Dissertation credits cannot be taken if the student does not pass the written part of the comprehensive exam.

IMPORTANT NOTE: A minimum of seven months must elapse between the date of the PhD student's advancement to candidacy and the date of his or her dissertation defense.

Scheduling Dissertation Defense

When the supervisory committee deems it appropriate for the PhD candidate to defend his or her dissertation, the PhD candidate should prepare a dissertation thesis and submit it to the supervisory committee members. While submitting the dissertation thesis to the supervisory committee, the candidate should also submit a final oral exam form to the Office of Graduate Studies. The final oral exam form requires the signatures of the supervisory committee members and the doctoral program committee chair, and should be submitted at least four weeks before the desired date of the dissertation defense. Supervisory committee members should sign this form after receiving the final draft of the dissertation.

IMPORTANT NOTE: Before scheduling his or her dissertation defense, the student should refer to the Office of Graduate Studies website and/or the current Graduate Catalog for the graduation checklist, thesis filing deadlines and commencement dates for the semester in which he or she plans to graduate.

Exit Requirements

- Completing Graduation Requirements

- After successfully defending his or her dissertation, the student should complete a Report on Completion of Degree form and contact the Office of Graduate Studies to apply for graduation.

Teaching Requirements

- The DPC committee recommends that students teach in their area of interest. It is recommended that doctoral students teach at least a course while studying in the program.

- Students who are assigned to teach a course will be designated as the instructor for a section of the course to which they are deemed qualified to teach. They will be trained and evaluated by a mentor prior to and while teaching the course.

Method of Allocation

The steps for a student being allocated as a teaching assistant for a course are outlined below:

- The student will inform the DPC chair about the plan to teach a course along with a list of preferred courses

- If the student is teaching a course for the first time, this information should be sent TWO semesters before the semester in which the planned course is intended to be offered

- If the student has taught the course in the past, this information should be sent ONE semester before the semester in which the planned course is intended to be offered

- The DPC chair will consult with the unit chairs responsible for course scheduling to determine the need of instructors for different courses to make a suitable allocation

- The student will undergo mentorship under the faculty member responsible for teaching the course by attending the lectures and doing additional duties as determined by the mentor, ONE semester BEFORE the semester in which the planned course will be offered

- The student will be assigned as an instructor for the planned course, if, after undergoing the mentorship, the mentor determines the student is suitable for teaching the course

Timing of Teaching Activities

Teaching a course is an intense activity and can usually consume considerable time and effort. To avoid interference with his or her research work, a student should plan to teach a course, especially if teaching it for the first time, toward the beginning or mid-point of their Ph.D. studies. Students should plan to teach a course usually in the second or third year of studies.

Residency Requirements

All full-time doctoral students must complete 24 hours within 18 months in order to meet the residency requirement of the University. Part-time students must complete 18 hours during the same period. The residency requirement ensures that progress toward the degree occurs within a reasonably compact time frame, enabling the doctoral student to integrate his or her course work with the dissertation.

Progress Report

At the end of each semester, every doctoral student (full-time or part-time) must complete the Progress Report form and submit it to the Director of the Doctoral Committee. An electronic copy of this form is available on the PhD website under the "Current Students/Forms" link.

Student progress reports assess Student Learning Outcomes. They are a representation of student quality of work standards as maintained by the student. If student progress reports are not completed and handed in to the DPC Chair with supervisory reflection by January 1st of every year, the student will be contacted and given an opportunity to submit the progress report within five days of being notified. If no progress report is received, the student's progress will be considered unsatisfactory and they may lose their funding and be counseled out of the Ph.D. program.

The DPC will review the Student Learning Outcomes from the progress reports at the end of the the calendar year. If the progress is not satisfactory, the student will be placed on probationary status and they will lose their funding. After one semester, if their performance has not improved the DPC will recommend administrative removal from the program to the Graduate College.

Satisfactory Progress

A minimum of three years of full-time graduate study is normally required to complete a doctoral program. The maximum time allowed by the Graduate School is eight years from the filing of the student's program of study in the Office of Graduate Studies. Students not making satisfactory progress will be counseled out of the program. This timeline applies as long as the quality of work standards are maintained by the student.

Leave of Absence

Under extraordinary circumstances, e.g., medical problems, a student may request a leave of absence from the program for a period of no more than one year. The request must be submitted to and approved by the student's supervisory committee and/or Doctoral Program Committee. The request should include necessary modifications to the Plan of Study as a result of the leave.

The leave of absence stops the clock for the total time required for the program and the time required to meet the residency requirement. If a student withdraws in mid-semester and is approved for a leave of absence, the clock starts at the beginning of the following semester. A student does not have to have met the residency requirement in order to apply for a leave of absence.

If a student does not return to the program within the one year approved for the leave of absence, then the student must submit an application to re-apply to the program. Re-admission to the program is not guaranteed at that point. Please refer to the Graduate Catalog for the complete policy on a leave of absence.

Grade Appeal Policy

The Grade Appeal Policy for UNO Graduate Courses policy will be followed in determining the course grades that are eligible for appeal. In the event that a doctoral student would like to appeal their grade, the PhD in IT program grade appeal policy and process will be

followed. According, to the PhD in IT program grade appeal policy, doctoral students may initiate a grade appeal when they believe their grade for a doctoral course or exam has been arbitrary or capricious (see the Grade Appeal Policy for UNO Graduate College Courses). An "arbitrary or capricious action" is an action taken without regard for the facts or circumstances. The Student Grade Appeal Committee will be assembled by the chair of the Doctoral Program Committee (DPC) and will comprise up of eligible representatives or those with no conflict of interest from the DPC and specialization advisory committee. The Student Grade Appeal Committee will adopt the UNO Graduate Council's criteria for determining whether a grade has been assigned in an arbitrary or capricious manner.

The Outcome of taking a comprehensive exam is Pass or Fail. There is no option to revise a comprehensive exam, especially one that has received a Fail grade. If a student fails any part of their comprehensive exam, they have the option to retake the entire exam upon the permission of the DPC. If the student would like to appeal their grade on a comprehensive exam, they may follow the above procedures. Please refer to Graduate College Grade Appeals policy https://www.unomaha.edu/graduate-studies/current-students/quality-standards.php#k

The following table gives a template of the various activities that a full-time Ph.D. student would be performing during his/her Ph.D. studies:

Note:

1. This path assumes that you entered the program with all the foundation courses completed. If not, then more time in coursework would be needed.
2. This is a path for a full-time student. Part-timers should adjust accordingly.

	Coursework	Examinations	Dissertation	Teaching	Miscellaneous
Year 1	9 credits each Fall and Spring semester		Identify potential dissertation topic	In the second semester, prepare for teaching next year's course, e.g., sit in, teach labs, guest lecture, do grading.	Start preparing plan of study for approval by the end of the first year,
Year 2	9 credits each Fall and Spring semester		Begin to refine ideas for dissertation research, e.g., begin to write a topic analysis that might lead to dissertation proposal	Teach a course	Begin to attend conferences as appropriate and familiarize yourself with people in the field.
Year 3	Supplemental course if needed for specific research requirements. Register for diss. credits.	Pass comprehensive exam early in the year	Defend dissertation proposal early in the year,	Teaching will vary.	Apply to relevant doctoral consortia.
Year 4	Supplemental course if needed for specific research or analysis techniques. Register for diss. credits.	By the end of the year, pass the final defense of your dissertation	Write papers and submit to conferences or journals to the extent feasible. Complete dissertation.	Teaching will vary.	Carry out job-seeking strategy.

CIST 9080 RESEARCH DIRECTIONS IN IT (3 credits)

The purpose of this core course is to connect doctoral students and faculty on research topics in Information Technology through assignments, presentations and a final term paper/project with their chosen faculty mentor. Topics covered include but are not limited to nature of research in information technology; research problem selection, development, and presentation with special emphasis on the doctoral dissertation; dissertation process; development and crafting of papers for journals; collaboration on research projects; and the review process for journal papers. Upon completion of this course, students should be able to: 1) demonstrate knowledge of research in information technology, including its reference disciplines and 2) develop a proposal for a significant and interesting research problem as a potential dissertation topic. Their understanding of the field and ability to identify research problems in any of these areas will be examined in their Part 1 comprehensive exam.

Prerequisite(s)/Corequisite(s): Admission to PhD program in Information Technology or permission of instructor. Not open to non-degree graduate students.

CIST 9040 COLLOQUIUM ON IT RESEARCH (1 credit)

The purpose of this core course is to provide a forum for interaction among doctoral students and faculty on topics of relevance to professional success as researchers. Topics to be discussed include: nature of research in information technology; research problem selection, development, and presentation with special emphasis on the doctoral dissertation; dissertation process; development and crafting of papers for journals; collaboration on research projects; and review process for journal papers.

Prerequisite(s)/Corequisite(s): Admission to PhD program in Information Technology or permission of instructor. Not open to non-degree graduate students.

CIST 9050 COLLOQUIUM ON IT TEACHING (1 credit)

The purpose of this core course is to provide a forum for interaction among doctoral students and faculty on topics of relevance to professional success as teachers/educators in university settings. Students identify teaching areas and faculty mentors to help them gain teaching skills.

Prerequisite(s)/Corequisite(s): Admission to PhD program in Information Technology or permission of instructor. Not open to non-degree graduate students.

CIST 9060 COLLOQUIUM ON IT PROFESSION AND ETHICS (1 credit)

The purpose of this course is to provide a forum for interaction among doctoral students and faculty on topics of relevance to professional success as members of the academy.

Prerequisite(s)/Corequisite(s): Admission to PhD program in Information Technology or permission of instructor. Not open to non-degree graduate students.

ISQA 9150 RESEARCH IN INFORMATION TECHNOLOGY

This core course is intended for students pursuing an advanced graduate degree who have had basic experience with using Information Technology. Research methods in Information Technology involves an overview of the research process specific to problems in IT. Students learn about theories in IT relevant to their areas of research. They identify key components of research problems in IT, understand different types of research processes, develop research questions, and design research projects. They learn to construct research instruments that enable them to collect data. They also learn about the different data collection and analysis tools and techniques. As part of this course, students take the CITI training and achieve the research readiness they need to succeed in the PhD in IT program.

Prerequisite(s)/Corequisite(s): Admission to PhD program in Information Technology or permission of instructor. Not open to non-degree graduate students.

CIST 9900 SPECIAL TOPICS IN INFORMATION TECHNOLOGY (1-3 credits)

This course is designed to acquaint students with issues which are current to the field or emerging trends in the information technology area. Topics will vary across terms. This course may be repeated, but no topic may be taken more than once.

Prerequisite(s)/Corequisite(s): Permission of the instructor. Additional prerequisite courses may be required for particular topic offerings.

CIST 9980 INDEPENDENT STUDY IN INFORMATION TECHNOLOGY (1-3 credits)

This course allows students to research a topic of their interest that is not available in a formal course. The topic to be studied must be agreed upon by the student and the instructor.

Prerequisite(s)/Corequisite(s): Permission of the instructor. Not open to non-degree graduate students.

CIST 9990 DISSERTATION (1-12 credits)

The dissertation is an original research project conducted and written under the direction of a faculty dissertation committee "supervisory committee". The dissertation provides the student with an opportunity to do original research that contributes to advancing the body of knowledge in information systems and/or information technology.

Prerequisite(s)/Corequisite(s): Admission to the Ph.D. program in Information Technology. Admission to candidacy for the Ph.D. degree. Prior to enrolling for dissertation hours, the students must have permission of the supervisory committee. Not open to non-degree graduate students.