COMPUTING & INFORMATION SCIENCE, PHD

The PhD program in computing and information science at the University of Nebraska Omaha (UNO) is a research-intensive, multidisciplinary program focused around the core areas of computer science, management information systems and interdisciplinary informatics.

Program Related Information

Program Contact

Emily Wiemers, Graduate Advisor
402.554.3819
ewiemers@unomaha.edu

Program Website (http://phd.ist.unomaha.edu/)

Other Program Related Information

Student Learning Outcomes

Upon completion of a PhD in computing and information science:

- Students will be able to interpret and synthesize research literature from multiple areas of the discipline.
- Students will be able to identify open research questions and design appropriate approaches to investigate them.
- Students will demonstrate the ability to contribute to scholarly literature.
- Students will be able to effectively engage in learning about computing and information science content.

Admissions

Applicants with an earned undergraduate or graduate degree in a computing discipline (e.g., computer science, management information systems, bioinformatics, cybersecurity or a closely related discipline) can apply for admission to the PhD program. Applicants whose prior degrees are outside of a computing discipline are encouraged to discuss their interests with the program director prior to application.

Admission decisions are based on a holistic review of application materials by the College of IS&T's Doctoral Program Committee (DPC). During this review process the committee is looking for candidates that demonstrate:

- **Technical Interest**. Our program is a PhD in computing & information science. As such, you will be expected to demonstrate an interest and aptitude in computing that fits with the nature of our program.
- **Prior Experience with Research.** A PhD is fundamentally a research degree. Highlight your involvement in existing research projects, thesis work, and/or publications. Be specific about the roles you played in various projects in your statement of purpose and seek reference letters from those who can speak to your research experience and potential.
- **Alignment with UNO Faculty Expertise.** Alignment of your research interests with the expertise of graduate faculty in the College of IS&T is an important consideration during admissions in order to ensure successful applicants will have access to appropriate research mentors from the start of the program. Review IS&T faculty profiles on the web, identify specific research areas that interest you in your statement of purpose, and explicitly mention faculty names with whom you see a good match. Feel free to reach out via email to our faculty prior to submitting your application to discuss your interest.
- **Independence and Initiative**. A PhD is largely self-motivated and self-directed work. As such, successful PhD applicants should demonstrate a history of taking the initiative to perform beyond expectations and work independently.
- **Proficiency in written and verbal English communication.** The ability to read, comprehend and write scholarly papers is key to success as a doctoral student.

General Application Requirements and Admission Criteria (http://catalog.unomaha.edu/graduate/admission/)

Application Deadlines

- Spring 2026: September 15 (Limited availability)
- Fall 2026: January 15

NOTE: All materials, including recommendation letters, transcripts, and applicable test scores, must be received by the application deadline. Applications which are incomplete after the published deadline will not be reviewed.

Other Requirements

- **Entrance Exam:** Graduate Record Examination (GRE) scores are required for most applicants but are only one component of a holistic admission decision. Successful applicants have typically had GRE scores of 150 verbal and 160 quantitative or better. The GRE requirement may be waived for exceptional applicants subject to the GRE waiver procedures documented below.
  - The GRE may be automatically waived for applicants holding a master's degree from an accredited US institution provided that (1) the degree is in a computing discipline and (2) that the graduate GPA for that degree is 3.3 or higher.
  - A GRE waiver may also be *requested* for candidates meeting one or more of the conditions below.
    - Those who hold a bachelor's degree in a computing discipline from an accredited US institution with a GPA of 3.6 or higher.
    - Those with a minimum of 5 years of professional experience in the IT industry in the United States.
    - Those with a history of high-quality, peer-reviewed publications in a computing field who have made significant contributions to the authorship of those papers.
    - GRE waiver requests must be submitted to the DPC chair using the form located on the program website along with supporting documentation. Requests must be received at least 1 month prior to the published application deadline for the applicable term. Note that eligibility to apply for a GRE waiver does not guarantee it will be granted, and waivers will only be approved by the DPC in cases where the candidate's record permits an evaluation of their research potential without reference to GRE scores.
- **English Language Proficiency:** Applicants are required to have a command of oral and written English. Those who do not hold a baccalaureate or other advanced degree from the U.S., **OR** a baccalaureate or other advanced degree from a predetermined country on the waiver list (https://www.unomaha.edu/office-of-graduate-studies/admissions/entrance-exams.php), must meet the minimum language proficiency score requirement in order to be considered for admission.
  - Internet-based TOEFL: 90, IELTS: 7.0, PTE: 61, Duolingo: 120
- **Statement of Purpose:** A written statement (not to exceed two single-spaced pages) which addresses the following:
  - How is a PhD in computing & information science going to advance your career?
  - Why is UNO the right place for you to pursue doctoral studies?
  - In answering the questions above the statement should:

    - Describe your research interests and how they align with the work of current IS&T faculty members.
    - Describe any relevant technical knowledge/skills or professional experiences that relate to the research you hope to conduct in computing and information science.
    - Describe your prior research experiences. If you have participated in collaborative research, what was your role on those projects?
    - Lastly, if you have included optional supporting materials as part of your application, explain them.
- **Current resume or CV:** In addition to listing prior academic accomplishments and professional positions, please include complete citations for all prior authored academic publications if applicable.
- **Letters of Recommendation:** Three letters of recommendation are required. The best recommendation letters are from those who can give an in-depth evaluation of your strengths and weaknesses with respect to academic work.
    - We strongly recommend that at least one letter writer be able to speak directly about your prior research experiences.
    - Letters must be submitted directly to the application system by the letter writers. The DPC reserves the right to verify the content of recommendation letters with their authors.
- **Transcripts:** Transcripts from all higher-education institutions previously attended are required.
- **Optional Supporting Materials:** Applicants are encouraged to include a PDF portfolio of supporting materials that may provide additional evidence of research potential. This may include:
    - Copies of academic papers, publications, theses or project reports done in an academic or industrial setting
    - Documentation of technical accomplishments like a portfolio of significant software development projects
    - Documentation of certifications or other forms of micro-credentials not otherwise reflected on transcripts
    - Other materials you would like to share with the committee
    - If you are interested in applying for a doctoral fellowship, please submit a letter stating your interest in the fellowship, why you are interested, information on your research experience and knowledge, and a brief description of the type of research area you would like to explore. For more information about the fellowship, please contact the CIS doctoral program advisor.

Admission Process and Timeline

Eligible students who request a GRE waiver must do so no later than one month prior to the published program application deadline for the term. These requests will be reviewed by the DPC, and applicants will be notified via email of the GRE waiver outcome prior to the admission deadline.

Following the admission deadline, the DPC will begin review of all complete applications. It is the applicant's responsibility to ensure all materials are available for review (including reference letters, transcripts, and others supporting materials) in the admission system by the deadline. Incomplete applications will not be considered by the committee.

Candidates identified for further consideration may be invited by the committee to take part in an interview with a small group of faculty to learn more. These interviews are usually conducted within 4-8 weeks following the application deadline. Final admission decisions are usually made within 2-3 weeks following those interviews.

Degree Requirements

Coursework

The PhD in computing & information science program requires 90 credit hours of graduate-level studies. 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, and the dissertation. General rules applying to all plans of study include:

- Undergraduate course credits taken at UNO or another institution cannot be counted toward the PhD degree in computing & information science.
- Dual-listed undergraduate courses ending in 8xx5 cannot be counted as course credits in the PhD program.
- Only nine hours ending in 8xx6 are allowed outside the Foundation Course section of a plan of study.
- A maximum of three directed study type courses (totaling nine hours) may be counted in the plan of study, including CIST 9970, CIST 9980, masters-level independent study courses, or other equivalents.

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 a computing-related field (e.g.: computer science, management information systems, cybersecurity, IT innovation).

Credit for graduate computing-related coursework in a prior degree may only be used to satisfy foundation course hours in the plan of study. A grade of B- or better is required in all coursework from a prior degree applied to foundation requirements, and thesis, thesis-equivalent project, independent study credits, or their equivalents from a prior degree may not be counted towards foundation requirements.

Core Courses 6 credit hours

Code	Title	Credits
CIST 9080	RESEARCH DIRECTIONS IN I.T.	3
CIST 9040	COLLOQUIUM ON IT RESEARCH	1
CIST 9050	COLLOQUIUM ON IT TEACHING	1
CIST 9060	COLLOQUIUM ON IT PROFESSION AND ETHICS	1
Total Credits		**6**

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 (requirements indicated on the concentrations tab above) within their PhD in computing & information science plan of study, the major of field of study courses comprise the concentration credit hours.
- If students opt to not pursue one of the approved concentrations, they may work with their doctoral program committee to create a major field of study. If this option is pursued, these courses could include independent research (six hours maximum), and doctoral level research other than dissertation (six hours maximum), and other approved 9000 level advanced research seminars. Regardless of the major field of study, at least three courses (nine hours) must be 9000 level courses. The remaining courses could include a maximum of three hours of 8xx0 level graduate only courses, with no course ending in 6.
- Only approved concentrations are noted on a student's transcript.

Electives 18 credit hours

- The goal of this category of courses is to provide greater flexibility to students so they can focus their research interests and engage in conducting research.
- The student in consultation with the doctoral program committee will develop a selection of electives for their plan of study.
- Courses (9xxx or 8xx0 levels) may include discipline specific research methods, statistical methods and tools, additional dissertation credits (maximum of 12 additional credits), research other than dissertation (maximum of 3 credits), advanced research seminars, and internship credit (one credit per semester and limited to three credits).

Dissertation 24 credit hours

A PhD dissertation is a substantial piece of independent research that is required for all students pursuing a doctorate degree. It is a piece of original work that has not been published elsewhere and, most importantly, makes a new contribution to the field. In order to provide additional flexibility and emphasis on conducting research, dissertation credits can be a maximum of 36 credit hours and a minimum of 24 credit hours.

Comprehensive Examination & Admission to Candidacy

Comprehensive exams will typically be scheduled around the middle of the fall and spring semester, as needed. Students intending to take comprehensive exams must apply to do so at least one semester prior to the term in which they plan to take the exam. Comprehensive exams may not be taken without an approved plan of study in place and the student has completed all core coursework in the plan. Typically, the comprehensive exam will be administered between the fourth and sixth semesters of study in the PhD program (not including summers).

The comprehensive exam will be a depth exam and assess the candidate's competency in the major field of study.

- Written Depth (Major Field of Study) Examination (one day)
  - When applying for the exam, students without an approved dissertation committee must name a depth examining committee. This committee shall consist of the student's faculty advisor and at least two graduate faculty members from IS&T with relevant expertise in the student's intended area of research. For students with an approved dissertation committee on file, that committee will serve in this capacity.
  - The student and their faculty advisor will prepare a personal reading list of publications aligned with the student's intended dissertation research specialization. This reading list should be finalized no later than when the student applies to take the comprehensive exam.
  - The faculty advisor, in consultation with other depth examining committee members, will prepare a minimum of two essay questions that assess the student's depth of knowledge in their individual research trajectory.
  - Responses to depth questions will be assessed by the student's depth examining committee members.
  - Students receiving a failing result on the written depth exam may not proceed to the oral examination.
- Oral Examination
  - Prior to taking the written depth exam, the student will prepare and submit a research pre-proposal about their intended dissertation focus to their depth examining committee members. Details about the structure and content of the pre-proposal can be found on the PhD in computing & information science program website.
  - Within two weeks of being notified of a passing result of the written depth comprehensive examination, the student will give a brief presentation (approximately 20 minutes) of their research pre-proposal to their depth examining committee members, followed by a question and answer period.

Faculty members assessing the different components of the exams will be responsible for communicating a strictly pass/fail result to the DPC. A student may not be asked to revise any part of their examination after submission. Should the student fail one or more parts of the comprehensive exam, they may be allowed to re-take it during the following academic term upon specific recommendation by the DPC. Students may only attempt a comprehensive exam a maximum of two times.

Upon successfully completing all three parts of the comprehensive examination and meeting the general residency requirements outlined in the Graduate Catalog, the student will advance to candidacy and should file the necessary paperwork with graduate studies.

Dissertation

Dissertation Committee

Students must establish their full dissertation committee no later than the end of the semester when they complete their comprehensive examination. Makeup of the dissertation committee is subject to general Graduate College rules governing dissertation committees. For purposes of the computing and information science program, all graduate faculty members in the College of Information Science & Technology are considered internal to the student's academic program.

Dissertation Credits

The dissertation of a PhD candidate is supervised by the chair or co-chairs of the student's dissertation committee in consultation with other members of the committee. While working on 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 has passed all elements of the comprehensive exam and advances to candidacy.

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.

Dissertation Proposal

Students must formally propose their dissertation to their approved dissertation committee. A written proposal should be prepared under the guidance of the dissertation committee, and a public oral defense of the proposal should be scheduled with the committee members allowing for sufficient time to review the written document. The result of the proposal defense should be recorded on the appropriate form by the dissertation committee and submitted to DPC. To ensure timely progress in the program, the proposal milestone should be completed no later than when students have accumulated 12 hours of CIST 9900.

Scheduling Dissertation Defense

When the dissertation committee deems it appropriate for the PhD candidate to defend their dissertation, the PhD candidate should prepare a dissertation and submit it to the dissertation committee members. While submitting the dissertation to the dissertation 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 dissertation committee members and the doctoral program committee chair, and should be submitted at least four weeks before the desired date of the public dissertation defense. Dissertation committee members should sign this form after receiving the final draft of the dissertation.

IMPORTANT NOTE: Before scheduling the dissertation defense, the student should refer to the Office of Graduate Studies website and/or the current graduate catalog for the graduation checklist, dissertation filing deadlines and commencement dates for the semester in which they plan to graduate. Be sure to apply to graduate in MavLINK prior to the deadline.

Teaching Requirement

PhD students are encouraged to teach at least one course in the College of IS&T at the undergraduate level as instructors of record during their PhD studies. Students typically will complete this requirement in their second or third year of studies. Further information about qualifications, timing, and funding related to teaching assignments can be found on the program website.

Concentrations

Artificial Intelligence Concentration

Code	Title	Credits
Required Courses *		**12**
CSCI 8456	PRINCIPLES OF ARTIFICIAL INTELLIGENCE	
CSCI 8110	ADVANCED TOPICS IN ARTIFICIAL INTELLIGENCE	
ISQA 9130	APPLIED MULTIVARIATE ANALYSIS	
CSCI 9810	RESEARCH FOUNDATIONS IN THEORETICAL COMPUTING	
Electives		**6**
CSCI 9410	ADVANCED TOPICS IN LOGIC PROGRAMMING	
ISQA 9120	APPLIED EXPERIMENTAL DESIGN AND ANALYSIS	
CSCI 8300	IMAGE PROCESSING AND COMPUTER VISION	
CSCI 8360	MACHINE LEARNING FOR TEXT	
CSCI 8450	ADVANCED TOPICS IN NATURAL LANGUAGE UNDERSTANDING	
CSCI/MATH 8480	MULTI-AGENT SYSTEMS AND GAME THEORY	
ISQA 8160	APPLIED DISTRIBUTION FREE STATISTICS	
ISQA 8340	APPLIED REGRESSION ANALYSIS	
ISQA 8720	APPLIED STATISTICAL MACHINE LEARNING	
HCC 8300	RESEARCH FOUNDATIONS	
MATH 8456	INTRODUCTION TO MACHINE LEARNING AND DATA MINING	
or STAT 8456	INTRODUCTION TO MACHINE LEARNING AND DATA MINING	
CSCI 8476	PATTERN RECOGNITION	
CSCI 8486	ALGORITHMS FOR ROBOTICS	
CSCI 8590	FUNDAMENTALS OF DEEP LEARNING	
BMI 8400	LINEAR ALGEBRA FOR ADVANCED COMPUTING AND AI	
Total Credits		**18**

* Any required course completed while pursuing a master's degree may be substituted with any of the concentration electives.

Computing Systems Concentration

Code	Title	Credits
Required Courses (select any three from the list below) *		**9**
CSCI 8150	ADVANCED COMPUTER ARCHITECTURE	
CSCI 8210	ADVANCED COMMUNICATIONS NETWORKS	
CSCI 8530	ADVANCED OPERATING SYSTEMS	
CYBR 9460	SECURITY OF EMBEDDED SYSTEMS	
Electives		**9**
CIST 9100	SEMINAR ON READINGS IN IT	
CSCI 9420	INTELLIGENT AGENT SYSTEMS	
CSCI 8160	INTRODUCTION TO VLSI DESIGN	
CSCI 8410	DISTRIBUTED SYSTEMS AND NETWORK SECURITY	
CSCI 8390	ADVANCED TOPICS IN DATA BASE MANAGEMENT	
CSCI 8430	TRUSTED SYSTEM DESIGN, ANALYSIS AND DEVELOPMENT	
CYBR 8480	SECURE MOBILE DEVELOPMENT	
CSCI 8610	FAULT TOLERANT DISTRIBUTED SYSTEMS	
CSCI 8620	MOBILE COMPUTING AND WIRELESS NETWORKS	
CYBR 8436	QUANTUM COMPUTING AND CRYPTOGRAPHY	
CSCI 8446	INTRODUCTION TO PARALLEL COMPUTING	
CSCI 9810	RESEARCH FOUNDATIONS IN THEORETICAL COMPUTING	
Courses not used in concentration requirements may also satisfy concentration electives.		
Other courses may count as electives on a case-by-case basis with approval of the concentration faculty		
Total Credits		**18**

* Any required course completed while pursuing a master's degree may be substituted with any of the concentration electives.

Human-Centered Computing Concentration

Code	Title	Credits
Required Courses *		
ISQA 9030	BEHAVIORAL AND ORGANIZATIONAL ISSUES IN INFORMATION SYSTEMS	3
CSCI 8256	HUMAN COMPUTER INTERACTION	3
CIST 9100	SEMINAR ON READINGS IN IT (3 total hours required)	1
Electives, selected from		**9**
CMST 8196	COMPUTER-MEDIATED COMMUNICATION	
CSCI/ACMP 8266	USER EXPERIENCE DESIGN	
ISQA 9010	FOUNDATIONS OF INFORMATION SYSTEMS RESEARCH	
HCC 8300	RESEARCH FOUNDATIONS	
HCC 8220	DESIGN PROCESS	
HCC 9300	SOCIAL COMPUTING AND ITS APPLICATIONS	
SOC 8060	QUALITATIVE METHODS [1]	
Other elective courses can be considered with faculty advisor, concentration, and DPC approval.		
Total Credits		**18**

[1] If not used as an HCC elective, SOC 8060 or ITIN 8300 can satisfy the IT PhD core requirement for a research methods course for students in the HCC concentration.

* Any required course completed while pursuing a master's degree may be substituted with any of the concentration electives.

IT Project Management Concentration

Code	Title	Credits
Required Courses *		
ISQA 9010	FOUNDATIONS OF INFORMATION SYSTEMS RESEARCH	3
ISQA 8810	INFORMATION TECHNOLOGY PROJECT FUNDAMENTALS	3
CIST 9100	SEMINAR ON READINGS IN IT (1 cr to be taken multiple times for 3 credits total, ITPM designated section only)	3
Electives		
Select 9 elective hours from below, with at least one elective at 9xxx level		9
CIST 9900	SPECIAL TOPICS IN INFORMATION TECHNOLOGY	
ISQA 9020	TECHNICAL AND PROCESS ISSUES IN INFORMATION SYSTEMS RESEARCH	
ISQA 9030	BEHAVIORAL AND ORGANIZATIONAL ISSUES IN INFORMATION SYSTEMS	
PSYC 9070	PROSEMINAR: COGNITIVE PSYCHOLOGY	
PSYC 9630	LEADERSHIP THEORIES AND RESEARCH	
CSCI 8710	MODERN SOFTWARE DEVELOPMENT METHODOLOGIES	
CSCI 8790	ADVANCED TOPICS IN SOFTWARE ENGINEERING	
CSCI 8700	SOFTWARE SPECIFICATIONS AND DESIGN	
ISQA 8210	MANAGEMENT OF SOFTWARE DEVELOPMENT	
ISQA 8820	PROJECT RISK MANAGEMENT	
Other elective courses may be selected with the by approval of the student's supervisory committee		

* Any required course completed while pursuing a master's degree may be substituted with any of the concentration electives.

Academic Performance

Progress Report

Every doctoral student (full time or part time) and must complete an annual progress report in consultation with their faculty advisor. These forms must be submitted for review by the Doctoral Program Committee (DPC) to assess the student's progress in the program and track program level Student Learning Outcomes. Students will report on their completion of program milestones, outcomes of teaching assignments, and publications or measures of scholarly output. An electronic copy of the current form is available on the IT PhD program website.

The DPC will review progress reports and provide the student and their faculty advisor with a written assessment of progress. Any items of concern identified in this written assessment should be addressed in a timely manner by the student and their faculty advisor to ensure continued satisfactory progress in the program. If the DPC deems progress as not satisfactory, the student will be placed on probationary status and the student will be ineligible for funding as a graduate assistant. Students placed on probation must complete an additional progress report in the next semester updating DPC of their progress. After one semester on probation, a student whose performance has not improved will be recommended for dismissal by the Graduate College.

If student progress reports are not completed by the specified deadline, an advising hold will be placed on the student record and 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 PhD program.

An individual dismissed from the PhD may petition the DPC for permission to reapply. The petition must be sent via email to the Director of the PhD in IT doctoral program. The email should include reasons for the poor academic performance. The DPC will decide each case on an individual basis. The petition must be received by April 1 for the fall or summer semester and by November 1 for the spring semester.