# Software and Security Engineering Doctorate

Department Information

- **Department Location:**
  258 Quentin Burdick Center
- **Department Phone:**
  (701) 231-8562
- **Department Email:**
  gradinfo@cs.ndsu.edu
- **Department Web Site:**
  ndsu.edu/cs/ (http://ndsu.edu/cs/)
- **Application Deadline:**
  February 1 priority deadline for fall admission; September 1 for spring admission* No summer admission for any Software Engineering Program
- **Credential Offered:**
  Ph.D.
- **English Proficiency Requirements:**
  TOEFL ibt 79; IELTS 6.5; Duolingo 105

## Apply Now (https://ndsugrad.my.site.com/Application/TX_SiteLogin/?startURL=/Application/TargetX_Portal__PB)

**Bachelor's to Doctor of Philosophy in Software and Security Engineering**

| Code | Title | Credits |
|---|---|---|
| **Core courses:** | | **12** |
| CSCI 702 | Survey of Cybersecurity | |
| CSCI 706 | Data-Driven Security | |
| CSCI 713 | Software Development Processes | |
| CSCI 716 | Software Design | |
| **Additional required courses** | | **6** |
| CSCI 790 | Graduate Seminar | |
| CSCI 848 | Empirical Methods in Software Engineering | |
| **Software engineering focus select from:** | | **9** |
| CSCI Courses in the ranges of 611-619 and 711-719 | | |
| CSCI 765 | Introduction to Database Systems | |
| **Cybersecurity focus - select from:** | | **9** |
| CSCI Courses in range 601-610 excluding 603 and 605 | | |
| CSCI Courses in range 701-710, excluding core courses | | |
| CSCI 765 | Introduction to Database Systems | |
| CSCI 773 | Foundations of the Digital Enterprise | |
| **All Students:** | | |
| Software engineering & cybersecurity courses approved by the student's Supervisory Committee. (15-27 credits) | | |
| CSCI 899 | Doctoral Dissertation (36-48 credits) | |
| Total Credits | | 90 |

**Master's to Doctor of Philosophy in Software and Security Engineering**

| Code | Title | Credits |
|---|---|---|
| **Core courses:** | | **12** |
| CSCI 702 | Survey of Cybersecurity | |
| CSCI 706 | Data-Driven Security | |

| | | |
|---|---|---|
| CSCI 713 | Software Development Processes | |
| CSCI 716 | Software Design | |
| **Additional required courses** | | **6** |
| CSCI 848 | Empirical Methods in Software Engineering | |
| CSCI 790 | Graduate Seminar | |
| **Software engineering focus select from:** | | **9** |
| CSCI Courses in the ranges of 611-619 and 711-719 | | |
| CSCI 765 | Introduction to Database Systems | |
| **Cybersecurity focus - select from:** | | **9** |
| CSCI Courses in range 601-610 excluding 603 and 605 | | |
| CSCI Courses in range 701-710, excluding core courses | | |
| CSCI 773 | Foundations of the Digital Enterprise | |
| CSCI 765 - Introduction to Database Systems | | |
| **All Students:** | | |
| Software engineering & cybersecurity courses approved by the student's Supervisory Committee. (0-3 credits) | | |
| CSCI 899 | Doctoral Dissertation (30-33 credits) | |
| Total Credits | | 60 |

**Doctor of Philosophy + Master of Science in Software and Security Engineering**

| Code | Title | Credits |
|---|---|---|
| **Core courses:** | | **12** |
| CSCI 702 | Survey of Cybersecurity | |
| CSCI 706 | Data-Driven Security | |
| CSCI 713 | Software Development Processes | |
| CSCI 716 | Software Design | |
| **Additional required courses** | | **6** |
| CSCI 790 | Graduate Seminar | |
| CSCI 848 | Empirical Methods in Software Engineering | |
| **Software engineering focus select from:** | | **9** |
| CSCI Courses in the ranges of 611-619 and 711-719 | | |
| CSCI 765 | Introduction to Database Systems | |
| **Cybersecurity focus - select from:** | | **9** |
| CSCI Courses in range 601-610 excluding 603 and 605 | | |
| CSCI Courses in range 701-710, excluding core courses | | |
| CSCI 765 | Introduction to Database Systems | |
| CSCI 773 | Foundations of the Digital Enterprise | |
| **All Students:** | | |
| Software engineering & cybersecurity courses approved by the student's Supervisory Committee. (15-27 credits) | | |
| CSCI 899 | Doctoral Dissertation (36-48 credits) | |
| Total Credits | | 90 |

### Additional requirements for the Bachelor's to Doctor of Philosophy and Master's to Doctor of Philosophy options:

- Research adviser should be selected by the second semester at NDSU.
- A minimum of 15 didactic credits numbered 700 -789 or 800-898, of which at least 9 are not included in the Software and Security Engineering Core Courses listed above; none of these can be individual study course credits.
- A maximum of two courses at the 600 level. Field Experience/Practicum credits do not count.
- Students who took core courses as part of their M.S. studies at NDSU should discuss replacement courses with the adviser and the Graduate program coordinator.
- Courses on topics that are typically considered to be part of computer science, such as AI, machine learning, software engineering, etc. should be taken in the Computer Science Department. Outside courses (courses without a CSCI prefix) need prior approval by the graduate coordinator and the research advisor and should only be approved if a course with similar content is not already offered by our department. A syllabus might need to be submitted by the student wanting to take a particular course from another department to ensure adequate coverage of computer science content.

- 30-48 credit hours of research – The Ph.D. requires a research contribution to be made under the supervision of one of the Computer Science department's graduate faculty members.
- Students who applied the listed core courses towards a M.S. degree obtained from NDSU can take up to 42 research credits.

**Additional requirements for the Doctor of Philosophy + Master of Science option:**

- Ph.D. students in this option will earn a Master of Science degree after they pass the preliminary oral examination (Qualifying Exam).
- Students will need to submit a Ph.D. Plan of Study indicating "Ph.D. + Master's" as the degree.
- Before a student can apply to take the preliminary oral examination (Qualifying Exam), they must have
  - passed the comprehensive exam.
  - completed 30 credits, of which 21 credits need to be didactic credits at the graduate level at NDSU.
  - submitted a paper as first author to a high-quality journal or conference on a topic related to their Ph.D. dissertation.
- After students have passed the preliminary examination, they must complete the Graduate School Graduation Application (http://catalog.ndsu.edu/curriculum/graduate/software-and-security-engineering-doctorate/ndsu.edu/onestop/forms/instructions/) in order for their M.S. degree to be posted to their academic record.
- Students will be eligible to participate in commencement of their M.S. degree the term they pass the preliminary oral examination (Qualifying Exam).
- Research advisor should be selected by the second semester at NDSU.
- A minimum of 15 didactic credits numbered 700 -789 or 800-898, of which at least 9 are not included in the Software and Security Engineering core courses listed above; none of these can be individual study course credits.
- A maximum of two courses at the 600 level.
- 30-48 credit hours of research – The Ph.D. requires a research contribution to be made under the supervision of one of the Computer Science department's graduate faculty members.

## Admission and Application Requirements

Graduate School admission and application requirements are found on the Admission Information (http://catalog.ndsu.edu/graduate/admission-information/#admissionrequirementstext) page.

In addition to the Graduate School admission requirements, the program has the requirements below.

- Four year or longer B.S. or equivalent degree from an educational institution of recognized standing with at least a 3.25 grade point average (GPA) on a 4.0 grade point scale.
- Significant full-time professional software development experience may offset this GPA requirement at the rate of 0.1 in GPA for each 2 years of such experience to a maximum of 0.4 in GPA.
- If the applicant has an M.S. or equivalent degree from an educational institution of recognized standing, the GPA in that degree should be at least 3.35 on a 4.0 scale.
- 18 semester hours or equivalent in Computer Science from an educational institution of recognized standing, or at least 3 years of full-time professional software engineering experience.
- GRE score is not required for admission. However, a GRE score above the median (50th percentile) for the quantitative reasoning portion is strongly recommended for gaining priority in assistantships.
- Programming skill in at least 1 higher level programming language, preferably C++, C#, or Java.