

# Doctor of Philosophy in Civil Engineering

## Admission Requirements

1. A baccalaureate degree in an engineering discipline with a GPA of 3.3 or higher or a Master of Science degree in an engineering discipline with a GPA of 3.0.
2. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the Graduate Catalog.
3. Graduate Record Examination scores on the General Test will be optional.
4. In addition to meeting the general provisions in the UND graduate catalog and the minimum requirements in items 1-2 above, candidates are assessed using a holistic process that considers the Student's Record of Publications, transcripts of previous college work, relevant research and work experience, letters of recommendation, research interests, and English language skills. Students must specify a track on their admission form to facilitate this evaluation.
5. A student holding a non-engineering degree or who does not meet the minimum requirements in items 1-2 above may apply to one of the Master of Science degree programs.
6. Students admitted to an MS program but meeting the minimum requirements in items 1-2 above, may after one calendar year and upon the recommendation of his/her advisory committee, request to bypass the master's degree and work directly toward the Ph.D. degree. The recommendation of the advisory committee shall be brought to a vote by the program graduate committee relevant to the degree track requested by the student. A minimum of one week before such a meeting, the program graduate committee shall be notified and provided with the student's updated file which shall consist of the materials used for application into the MS program, a transcript of all academic work completed at UND, and any additional materials the student wishes to have considered. If the recommendation is approved by the relevant graduate committee, the student will be given the qualifying exam. Passing this exam will advance the student to Approved Status in the Doctoral Program in Civil Engineering.

## Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Civil Engineering Doctoral Program.

The following requirements are in addition to the UND School of Graduate Studies general requirements for the Ph.D.:

1. Completion of 90-semester credits beyond the baccalaureate degree
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate student.
3. Scholarly Tools: Proficiency in mathematics demonstrated by completing nine approved credits of mathematics-intensive coursework (equivalent to UND 400-level or higher courses) with a grade of B or better.
4. A maximum of 30 credit hours can be transferred from a master's program.
5. A minimum of 30 credit hours must be doctoral research and dissertation.
6. Exactly 3 credit hours of the CE 562-Graduate Seminar must be taken. More can be taken at the discretion of the advisor, graduate program director, and chair.
7. A minimum of 39 credit hours of coursework are required (up to 21 credit hours of coursework may be transferred from a master's program in fulfilling this requirement subject to the credit transfer limits described in the general section of this graduate catalog). The coursework shall include a minimum of 27 credit hours of Civil Engineering (or relevant courses with the consent of the student's advisor and advisory committee) coursework selected from the approved list of CE Ph.D. track courses published in the UND Academic Catalog. Equivalent graduate-level coursework may be transferred from a master's program.

8. Successful completion of a qualifying examination, taken no later than the end of their second year. The qualifying examination includes the following three sections. Section I is at the discretion of the major advisor and advisory committee, but sections II and III are required for all Ph.D. students.

### Section I

A written qualifying examination will cover four general areas of the student's selected engineering track. Selection of the four general areas for this examination shall require the approval of the candidate's faculty advisor and the track-specific Ph.D. Graduate Director. Three results for each of the four sections of the examination can be obtained: 1) pass; 2) provisional pass; and 3) fail. Candidates obtaining a result of "provisional pass" for any section of the exam will be required to remediate the topical area in which the provisional pass was received in accordance with stipulations specified by the examiner, with approval of the track-specific Graduate Director. Candidates who fail one or more sections of the exam will be allowed one opportunity to repeat that section of the exam. The reexamination must take place no later than 13 months after the initial examination attempt. A direct admit student who fails an exam a second time may request to be reclassified as a master's student and complete a track-appropriate Master of Science degree and then reapply to the Doctoral program.

### Section II

A detailed written doctoral research proposal must be submitted to the advisory committee. The proposal should cover:

1. a literature review of the relevant field of research related to the project
2. proposed methods
3. preliminary results (simulation or experiment)
4. the objectives of the proposed project, and
5. tasks and the timeline of the proposed research in a Gantt chart.

The proposal should be reviewed and approved by the student advisor. Then, at least three weeks prior to the next step, the proposal should be distributed to the student committee members for their review and grading.

Each of the above components will be evaluated and graded (0 to 20). To pass the written proposal exam, students should earn a minimum of 16/20 in each category. All grades from student committee members will be averaged to determine a grade in each category.

If the proposal exam earns a passing grade, a date can be scheduled for an oral comprehensive examination (i.e., Section III). If failed, the student has the opportunity to revise and resubmit the report to the committee for re-evaluation.

### Section III

An oral comprehensive examination is completed when at least 30 credit hours of post-baccalaureate coursework has been completed. The oral comprehensive examination will follow a formal presentation by the student to the advisory committee on the research topics described in the above section and will be based significantly on the core of the individual student's program of study and his/her formal research presentation. Three results for the oral exam can be obtained: 1) pass; 2) provisional pass; and 3) fail. Candidates obtaining a result of "provisional pass" will be allowed to Advance to Candidacy status after completion of stipulations specified by the examining committee plus obtaining a passing result on a retest for the portion of the exam covered by the stipulations. Candidates who fail the exam will be allowed one opportunity to repeat the exam no later than 6 months after the initial examination attempt as specified by the student committee. A student who fails an exam a second time may request to be reclassified as a master's student and complete a track-appropriate Master of Science degree and then reapply to the Doctoral program.

1. After the successful completion of the written research proposal and oral presentation, an annual oral progress report should be presented to the advisory committee. A part of these presentations will include details on the dissertation research progress and plan. Any deviation from the approved research objectives as stated and documented in the research proposal must be approved and justified by the committee. CE 562 Graduate Seminar may serve as the venue for the annual oral progress reporting.

2. A candidate for the degree must complete the original basic research investigation as documented in the research proposal. Each candidate will complete the research investigation to the satisfaction of the research advisor and the advisory committee and will prepare a written dissertation covering the research. The project must represent an original and independent investigation by the student. It is expected that the results of the research will be submitted for publication in refereed research journals. The candidate will submit the dissertation to the examining committee at least four weeks prior to the defense date. The examining committee consists of the Ph.D. committee and an external examiner from outside the department. The external examiner is selected by the department's graduate committee from a list of three candidates proposed by the advisor. The external examiner should not have any common publication with the student's advisor or student and can be from academia or industry with expertise relevant to the student's research. The student and advisor should not contact the external examiner directly before or after.
3. The candidate must present and successfully defend the dissertation at the final examination (see School of Graduate Studies requirements (<https://und.edu/academics/graduate-school/>)). Four results of the examination can be obtained: 1) pass; 2) minor revision 3) major revision and 4) fail. For minor revisions, there is no need for another defense session and upon revising the dissertation the examining committee can pass the student. For major revisions, the student is asked to fundamentally revise the methodologies and schedule another defense session. If failed, the student will not be able to obtain a Ph.D. degree and may request to be reclassified as a master's student and complete a Master of Science degree.
4. At least one peer-reviewed journal article (as the first author) and one peer-reviewed conference paper (as the first author) must be submitted with the consent of the advisor.