Doctor of Philosophy in Electrical Engineering

Admission Requirements

1. A baccalaureate degree in Electrical or closely related engineering disciplines 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 Graduate School’s English Language Proficiency requirements as published in the Academic Catalog.

3. In addition to meeting the general provisions in the UND Academic Catalog and the minimum requirements in items 1-2 above, candidates are assessed using a holistic process that considers Student’s Record of Publications, transcripts of previous college work, relevant research and work experience, letters of recommendation, research interests, and English language skills. Applicant applying with BS degrees from non-ABET accredited programs/universities are strongly recommended to submit scores from the General Test of Graduate Record Examination.

4. Students admitted to an M.S.E.E. 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 by-pass the master’s degree and work directly toward the Ph.D. degree in Electrical Engineering. The recommendation of the advisory committee shall be brought to a vote by the Electrical Engineering graduate committee. A minimum of one week before such a meeting, the graduate committee shall be notified and provided with the student’s updated file which shall consist of the materials used for application into the M.S.E.E. 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 Electrical Engineering.

Residence Requirements

The Ph.D. program in Electrical Engineering provides an opportunity for sustained and concentrated intellectual efforts. In both campus and distance delivery modes, the Electrical Engineering faculty advisor and advisory committee members must maintain regular interactions with Ph.D. student. For campus delivery mode, the student is required to have residency of at least two consecutive semesters. During residency, the student must be registered for at least nine credits in a semester, or be a graduate research teaching assistant taking the appropriate credits to qualify as a full-time student. As an alternative, students utilizing the distance delivery program can meet the residency requirement by demonstrating their research activities are coordinated with their advisor and advisory committee and are being performed in an environment that provides meaningful intellectual interactions on a regular basis. This may be provided through their place of employment, through interactions with a national lab or other recognized research facility/university, by interfacing with a private of public industry, hospital, or other similar venue. The student will be responsible for including the nature of their interactions as a part of their research plan for approval as meeting residency requirements. For distance delivery mode, the student must have a minimum three campus visits and provide a presentation during each visit. One of these presentations can be the oral section (Section III) of the qualifying examination. Additionally, a Ph.D. candidate must be physically present on campus for the Ph.D. dissertation defense.

Degree Requirements

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

The following requirements are in addition to the UND graduate school 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 which must include at least one course in numerical analysis. Scholarly tools courses taken for graduate credit after a student has enrolled in a graduate program at UND may be counted to fulfill requirements listed in Item 4 below.
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 EE 570-Graduate Seminar must be taken.
7. Maximum of 9 credit hours of EE 591 Electrical Engineering Research is acceptable.
8. A minimum of 39 credit hours of coursework is 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 Academic Catalog). The coursework shall include a minimum of 27 credit hours of Electrical Engineering (or relevance courses with the consent of advisor) coursework selected from the approved list of courses. Equivalent graduate level coursework may be transferred from a master’s program.
9. Successful completion of a qualifying examination, taken no earlier than the end of their first year in residence and no later than the end of their second year of residence. The qualifying examination includes the following three sections.

Section I

It will cover four general topics of Electrical Engineering. Selection of the four topics for this examination shall require the approval of the candidate’s faculty advisor and the 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 to stipulations specified by the examiner, with approval of the 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 M.S.E.E. or M.Eng. in EE, and then reapply to the Doctoral program.

Section II

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

a. a literature review of the relevant field of research related to the project
b. proposed methods
c. preliminary results (simulation or experiment)
d. the objectives of the proposed project, and
e. tasks and the timeline of the proposed research.

The report is typically 30-50 pages. The report should be reviewed and approved by the student advisor. Then, at least three weeks prior to the next step, the report should be distributed to the student committee members for their review and grading.

Each of the five (a-e) components will be evaluated and graded on scale of 0 to 20. To pass the written exam, the student 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 report earns a passing grade, a date can be scheduled for an oral presentation (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 component of the comprehensive examination must be presented in person to the committee on the research topics described in the above section (II-a to II-e). Three results for the oral component 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 in less than 6 months 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 Master of Science in Electrical Engineering degree and then reapply to the Doctoral program.

10. Annual oral progress presentations and report forms must be presented/submitted to the committee. A part of these presentations will include details on the dissertation research progress and plan. After successful completion of the written research proposal and oral component of comprehensive exam, any deviation from the approved research objectives as stated and documented in the research proposal must be approved by the committee.

11. 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 research 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 and conferences. The candidate will submit the dissertation to the advisory committee at least four weeks prior to defense date.

12. 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 advisory 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 in Electrical Engineering degree.

13. At least two peer reviewed ISI (Institute for Scientific Information) journals (as the first author) and two peer reviewed conference papers (as the first author), submitted with the consent of advisor, must be published or accepted.