

# Ph.D. in Engineering Science

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The School of Applied Engineering & Technology's (SAET's) Doctor of Philosophy (Ph.D.) in Engineering Science is a graduate program whose objective is to provide students with an opportunity for multidisciplinary, interdisciplinary, and trans-disciplinary study. The program is intended for students whose graduate study in engineering is best supported by a collection of courses from various departments and/or whose research area does not meet the scope of other engineering departments. The nature of this degree provides flexibility in designing programs of study that are tailored to the specialized needs of the student. The Ph.D. degree program complements the existing Master of Science (M.S.) in Engineering Science (NJIT M.S. in Eng. Sci.), including the specialization in Engineering Education.

The focus is on applied work with graduate study informed by the needs of industry, education, and government organizations. This applied research area involves identifying a real-world problem in a field, researching it thoroughly, and developing new comprehension towards novel solutions.

The knowledge and skills students will acquire in their field of interest includes:

- Developing research methods that expands a professional body of knowledge.
- Applying current research approaches to practical problems.
- Assessing the relevance of existing/emerging theories and practices.
- Developing solutions to complex real-world problems.

This program is in alignment with NJIT's Collaborative Doctorate Program (Collaborative doctorate program), where:

- The candidate will be allowed to use the employer's facilities to carry out the research.
- The student's main advisor is an NJIT faculty member.

## Degree Requirements

To ensure academic success in their graduate studies, students may be required to take additional undergraduate or graduate courses before beginning graduate curricula. This program of bridge courses will be individually-designed in consultation with the student's graduate advisor. Such courses are not counted toward degree requirements.

Coursework registration requirements:

- Ph.D. students with a recognized Master's degree or equivalent are required to take four 700-level 3-credit courses (12 credits).
- Ph.D. students with a recognized Baccalaureate degree are required to take eight 600 and 700-level 3-credit courses (24 credits) of coursework beyond the Baccalaureate degree as well as four additional 700-level 3-credit courses (12 credits), for a total of twelve 3-credit courses (36 credits).
- Master's project, Master's thesis, or more than two independent study courses cannot be used to satisfy these coursework requirements.

The coursework must include at minimum:

- Two 600-level math courses
- One 600-level physics, chemistry, or biology course.
- Two 600-level engineering courses.

A Ph.D. student may substitute a 600-level course for a 700-level course only after the academic advisor appeals on behalf of the student to the Office of Graduate Studies and receives approval.

The program or the student's dissertation committee may ask the student to take additional courses above the aforementioned minimum requirements.

Dissertation registration requirements:

- Ph.D. students who pass the Qualifying Examination (QE) must then register for 3 credits of pre-doctoral research per semester until they defend successfully the dissertation proposal.
- Specific dissertation topics are approved by the department on an individual basis.
- Ph.D. students who defend the dissertation proposal successfully must then register for the 1-credit dissertation course each semester until they complete all degree requirements.
- Students may take courses simultaneously with the predoctoral or dissertation course as per Ph.D. program guidelines or dissertation committee recommendation.

Program deadlines for full-time students:

- The required coursework for the Ph.D. program and the Qualifying Exam (QE) must be completed successfully by the end of the second year in the program.
- The dissertation proposal must be defended successfully either by the end of the third year in the Ph.D. program or four semesters after registering for the first time in the pre-doctoral research course, whichever occurs earlier.
- The dissertation must be defended successfully by the end of the sixth year in the Ph.D. program.

Seminar: In addition to the degree credits, all students who receive departmental or research-based awards must enroll each semester in a graduate seminar. The seminar is selected in consultation with the graduate advisor.

## Qualifying Examination

- Before becoming a doctoral candidate, a student must demonstrate his/her ability to integrate the knowledge acquired studies in the Qualifying Examination (QE).
- The QE will evaluate the students' knowledge in selected areas of engineering and science.
- The research potential will also be evaluated based on the student's formal research prospectus submitted in written form.
- After receiving the research prospectus, SAET will form a committee of 3 or more members to conduct an oral examination.
- The format of the research prospectus will be available from SAET.

## Dissertation Proposal Examination

- After passing the QE, Doctoral students must conduct preliminary research under the guidance of their faculty advisors in a specific topic, and prepare a written research proposal.
- The dissertation topic should represent original work and reflect a student's ability to critically understand the significance of a problem.
- The proposal must provide approaches for developing potential solutions to the problem.
- Doctoral students must make an oral presentation of the dissertation topic for approval by their dissertation committees.
- The dissertation proposal should follow the format required for the final dissertation document.

## Dissertation Defense

- The doctoral student will conduct novel and independent dissertation work.
- The student (in consultation with his/her dissertation committee) will prepare for the completion of the dissertation; when the dissertation work produces sufficient and significant results.
- An oral defense of the dissertation is required after submission of the final document to SAET for approval.
- Signatures of all members of the dissertation committee must be received for final approval to be granted.

Refer to Catalog Description