CIVIL ENGINEERING (ENGINEERING)

Graduate Program Head	Patrick J. Fox
Program Code	CE
Campus(es)	University Park (Ph.D., M.S., M.Eng.)
Degrees Conferred	Doctor of Philosophy (Ph.D.) Master of Science (M.S.) Master of Engineering (M.Eng.) Dual-Title Ph.D. in Climate Science Dual-Title Ph.D. and M.S. in International Agriculture and Development Dual-Title Ph.D., M.S., and M.Eng. in Operations Research
The Graduate Faculty	View (https://secure.gradsch.psu.edu/gpms/?searchType=fac&prog=CE)

Students may specialize in:

- Geotechnical and materials engineering
- Structural engineering
- Transportation engineering
- Water resources engineering

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply/). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 Admissions Policies (http://gradschool.psu.edu/graduate-education-policies/).

Students in engineering, physical sciences, or mathematics with a 3.00 grade-point average (on a 4.00 scale) may be considered for admission. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests. Students without a baccalaureate degree in engineering would be admitted on a provisional basis (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission/) pending successful completion of entrance requirements (completed concurrently with degree requirements).

Applicants will upload official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission/), a statement of objectives, and three references for letters of recommendation when applying to the program. In addition, all applicants must submit scores from the GRE General Test (verbal, quantitative, and analytical). For the M.Eng. degree, the GRE requirement will be waived for students who have graduated with a degree from the College of Engineering at The Pennsylvania State University with a cumulative grade-point average of greater than 3.30.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/gcac-305-admission-requirements-international-students/) for more information.

Application Deadlines

M.Eng.: Complete applications including required supplementary materials (e.g., official transcripts, reference letters) should be submitted by March 15th of the calendar year for admission in Fall semester. International students are strongly encouraged to submit complete applications early to allow sufficient time for visa processing.

M.S. and Ph.D.: Complete applications including required supplementary materials (e.g., official transcripts, reference letters) should be submitted by September 15th for admission in Spring semester and by December 15th for admission in Fall semester. International students are strongly encouraged to submit complete applications early to allow sufficient time for visa processing.

Degree Requirements

Master of Engineering (M.Eng.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Policies (http://gradschool.psu.edu/graduate-education-policies/).

The M.Eng. degree is a non-thesis professional master's degree. The program provides training for advanced professional practice. A minimum of 30 credits (400, 500, or 800) of course work is required. At least 18 credits must be earned in 500-level or 800-level courses, with at least 6 credits at the 500 level. At least 12 credits must be earned in courses with the CE prefix. At least 20 credits must be earned at the campus where the program is approved to be offered. All students are required to take the capstone course CE 835 to fulfill the requirement for a culminating experience. The M.Eng. degree is designed as a one-year master's degree program and students are expected to start their degree in the Fall semester. The preferred plan of study is as follows:

- Fall semester: Fifteen credits of course work
- Spring semester: Fifteen credits of course work, including CE 835

Students entering the M.Eng. degree must select and declare an area of specialization, with a number of courses to be selected from the selected area. The three areas of specialization are:

1. Infrastructure
2. Transportation Systems
3. Water and Environment

Continuous registration is required for all M.Eng. students until the course requirements have been satisfied, but students may reapply if studies are interrupted per GCAC-514 Continuity of Registration and Resume Study (https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-500/gcac-514-continuity-registration-resume-study/).

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Policies. (http://gradschool.psu.edu/graduate-education-policies/)

The M.S. degree program is strongly oriented toward research. A thesis is required, and at least 6 credits of thesis research (CE 600 or CE 610) must be included in the candidate's academic course plan. A minimum of 30 credits at the 400, 500, 600, or 800 level are required, of which 20 must be earned at the campus where the program is approved to

be offered. A minimum of 24 credits of course work are required. A minimum of 12 credits of course work (400 and 500 level) must be completed in the major (courses prefixed CE). At least 18 credits in the 500 and 600 levels, combined, must be included in the program. Specific courses are expected to be included in the plan of study depending on the specialization within the department. The thesis must be accepted by the adviser and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

Continuous registration is required for all M.S. students until the thesis has been approved, but students may reapply if studies are interrupted per GCAC-514 Continuity of Registration and Resume Study (https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-500/gcac-514-continuity-registration-resume-study/).

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Policies. (http://gradschool.psu.edu/graduate-education-policies/)

Ph.D. students must pass the English proficiency and qualifying examinations, prepare and defend the dissertation proposal as part of the oral comprehensive examination, and pass the final oral examination (dissertation defense). The dissertation must be accepted by the Ph.D. committee, the head of the graduate program, and the Graduate School.

Continuous registration is required for all Ph.D. students until the dissertation has been approved, but students may reapply if studies are interrupted per GCAC-514 Continuity of Registration and Resume Study (https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-500/gcac-514-continuity-registration-resume-study/).

Dual-Titles

Dual-title Ph.D. in Civil Engineering and Climate Science

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/gcac-208-dual-title-graduate-degree-programs/).

Admission Requirements

Students must apply and be admitted to the graduate program in Civil Engineering and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Climate Science dual-title program. Refer to the Admission Requirements section of the Climate Science Bulletin page (https://bulletins.psu.edu/graduate/programs/majors/climate-science/). Doctoral students must be admitted into the dual-title degree program in Climate Science no later than the end of fourth semester (not counting summer semesters) of entry into the graduate major program and before taking the comprehensive exam.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Civil Engineering, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title in Climate Science, listed on the Climate Science Bulletin page (https://bulletins.psu.edu/graduate/programs/majors/climate-science/).

The qualifying examination for Civil Engineering will satisfy the qualifying exam requirement for the dual-title degree program in Climate Science.

In addition to the general Graduate Council requirements for Ph.D. committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/gcac-602-phd-committee-formation/), the Ph.D. committee of a Civil Engineering and Climate Science dual-title Ph.D. student must include at least one member of the Climate Science Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the Ph.D. committee is not also a member of the Graduate Faculty in Climate Science, the member of the committee representing Climate Science must be appointed as co-chair. The Climate Science representative on the student's Ph.D. committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their Ph.D. committee and reflects their original research and education in Civil Engineering and Climate Science. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the Ph.D. committee, the head of the graduate program, and the Graduate School.

Dual-title M.S. and Ph.D. in Civil Engineering and International Agriculture and Development

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/gcac-208-dual-title-graduate-degree-programs/).

Admission Requirements

Students must apply and be admitted to the graduate program in Civil Engineering and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the INTAD dual-title program. Refer to the Admission Requirements section of the INTAD Bulletin page (https://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development/). Doctoral students must be admitted into the dual-title degree program in INTAD prior to taking the qualifying examination in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Civil Engineering, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title in INTAD, listed on the INTAD Bulletin page (https://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development/).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Civil Engineering and must include at least one Graduate Faculty member from the INTAD program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Civil Engineering and INTAD. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for Ph.D. committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/gcac-602-phd-committee-formation/), the Ph.D.

committee of a Civil Engineering and INTAD dual-title Ph.D. student must include at least one member of the INTAD Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the Ph.D. committee is not also a member of the Graduate Faculty in INTAD, the member of the committee representing INTAD must be appointed as co-chair. The INTAD representative on the student's Ph.D. committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their Ph.D. committee and reflects their original research and education in Civil Engineering and INTAD. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the Ph.D. committee, the head of the graduate program, and the Graduate School.

Dual-Title M.Eng., M.S., and Ph.D. in Civil Engineering and Operations Research

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/gcac-208-dual-title-graduate-degree-programs/).

Admission Requirements

Students must apply and be admitted to the graduate program in Civil Engineering and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Operations Research dual-title program. Refer to the Admission Requirements section of the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research/). Doctoral students must be admitted into the dual-title degree program in Operations Research prior to taking the qualifying examination in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Civil Engineering, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title in Operations Research, listed on the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research/).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Civil Engineering and must include at least one Graduate Faculty member from the Operations Research program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Civil Engineering and Operations Research. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for Ph.D. committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation/), the Ph.D. committee of a Civil Engineering and Operations Research dual-title Ph.D. student must include at least one member of the Operations Research Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the Ph.D. committee is not also a member of the Graduate Faculty in Operations Research, the member of the committee representing Operations Research must be appointed as co-chair. The Operations Research representative on the student's Ph.D. committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their Ph.D. committee and reflects their original research and education in Civil Engineering and Operations Research. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the Ph.D. committee, the head of the graduate program, and the Graduate School.

Minor

A graduate minor is available in any approved graduate major or dual-title program. The default requirements for a graduate minor are stated in Graduate Council policies listed under GCAC-600 Research Degree Policies (http://gradschool.psu.edu/graduate-education-policies/) and GCAC-700 Professional Degree Policies (http://gradschool.psu.edu/graduate-education-policies/), depending on the type of degree the student is pursuing:

- GCAC-611 Minor - Research Doctorate (https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/gcac-611-minor-research-doctorate/)
- GCAC-641 Minor - Research Master's (https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/gcac-641-minor-research-masters/)
- GCAC-709 Minor - Professional Doctorate (https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-700/gcac-709-professional-doctoral-minor/)
- GCAC-741 Minor - Professional Master's (https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-700/gcac-741-masters-minor-professional/)

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding/) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/gsad-900/gsad-901-graduate-assistants/) set by The Graduate School.

International applicants who wish to be considered for a teaching assistantship must present an acceptable score (250-300 or 55-60) on the Test of Spoken English (TSE). The TSE can be taken in many countries, or at Penn State after arrival. The Department offers a number of graduate fellowships.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Civil Engineering (CE) Course List (https://bulletins.psu.edu/university-course-descriptions/graduate/ce/)

Learning Outcomes

Master of Engineering (M.Eng.)

1. Graduates will be able to demonstrate understanding of advanced core principles and methods from selected sub-fields of Civil Engineering at a depth consistent with their course of study.
2. Graduates will be able to apply their knowledge of selected sub-fields of Civil Engineering to formulate and solve engineering problems.
3. Graduates will be able to analyze and synthesize knowledge within the field of Civil Engineering to address a complex problem of practical relevance.
4. Graduates will be able to demonstrate proficiency in oral and written communication appropriate to their discipline.
5. Graduates will be able to demonstrate an understanding of, and a commitment to, academic integrity and the standards for professional practice within Civil Engineering.

Master of Science (M.S.)

1. Graduates will be able to demonstrate understanding of advanced core principles and methods from selected sub-fields of Civil Engineering at a depth consistent with their course of study.
2. Graduates will be able to apply their knowledge of selected sub-fields of Civil Engineering to formulate and solve engineering problems.
3. Graduates will be able to analyze and synthesize knowledge within the field of Civil Engineering to extend existing knowledge through a research experience or a course-based culminating experience.
4. Graduates will be able to demonstrate proficiency in oral and written communication appropriate to their discipline.
5. Graduates will be able to demonstrate an understanding of, and a commitment to, the standards for scholarship and research integrity within Civil Engineering.

Doctor of Philosophy (Ph.D.)

1. Graduates will be able to demonstrate an understanding of advanced core principles and methods as well as modern research findings from selected sub-fields of Civil Engineering at a depth appropriate for a Ph.D. candidate.
2. Graduates will be able to apply their knowledge of selected sub-fields of Civil Engineering in formulating and executing a research plan.
3. Graduates will be able to demonstrate the ability to analyze and synthesize appropriate literature, to critically review their work in the context of the literature, and to formulate and defend conclusions based on their research that represent new scholarly contributions.
4. Graduates will be able to demonstrate high levels of proficiency in oral and written communication.
5. Graduates will be able to demonstrate an understanding of, and a commitment to, the standards for scholarship and research integrity.

Contact

Campus	University Park
Graduate Program Head	Patrick Joseph Fox
Director of Graduate Studies (DGS) or Professor-in-Charge (PIC)	John Michael Regan
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Program Website	View (http://www.engr.psu.edu/ce/)