

CIVIL AND ENVIRONMENTAL ENGINEERING, DOCTOR OF PHILOSOPHY (PH.D.)

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| ENCE899 | Doctoral Dissertation Research |
| Total Credits | 42 |

The requirements for the Ph.D. degree are also the same as those of the Graduate School. The student will work closely with an adviser to develop an approved program of study suited to his or her individual needs. Before admission to candidacy, the student must pass a qualifying examination, which is normally taken after the coursework is at least 75 percent completed. There is no language requirement for the Ph.D.

Advance to Candidacy: Doctoral students are required to complete 36 credits beyond the Bachelor's degree, which would include the credits earned in the completion of a Master's degree. A qualifying examination is required in order to advance to candidacy.

Post-Candidacy: A doctoral student who passes the qualifying exam is admitted to candidacy will automatically be registered for 6 credits of ENCE899. A minimum of 12 credits must be taken in ENCE899.

| Course | Title | Credits |
|-------------------------------------------------|-----------------------------------------------------------------------------|-----------|
| Specialization Requirements (select one) | | 30 |
| 1. Environmental | | |
| ENCE650 | Process Dynamics in Environmental Systems | |
| ENCE651 | Chemistry of Natural Waters | |
| ENCE652 | Microbiological Principles of Environmental Engineering | |
| 2. Civil Systems | | |
| ENSE621 | Systems Engineering Concepts and Processes: A Model-Based Approach | |
| | or ENSE622 System Trade-off Analysis, Modeling, and Simulation | |
| ENCE603 | Bayesian Data Analytics for Engineering | |
| | or ENCE677 OR Models for Transportation Systems Analysis | |
| ENCE688 | Advanced Topics in Civil Engineering (ENCE688A Sensing and Systems Control) | |
| 3. Geotechnical | | |
| All courses approved by advisor | | |
| 4. Project Management | | |
| ENCE661 | Project Cost Accounting and Finance | |
| ENCE662 | Introduction to Project Management | |
| ENCE664 | Legal Aspects of Engineering Design and Construction | |
| ENCE665 | Management of Project Teams | |
| ENCE627 | Project Risk Management | |
| 5. Structures | | |
| All courses approved by advisor | | |
| 6. Transportation | | |
| All courses approved by advisor | | |
| 7. Water Resources | | |
| ENCE431 | Hydrologic Engineering | |
| ENCE630 | Environmental and Water Resource Systems I | |
| Dissertation Research Requirements | | 12 |