

Ph.D. in Engineering

Materials and Infrastructure Systems Concentration

Recommended Curriculum for students admitted for or after

Spring 2016¹

Last Revised: 03/2016

Degree Codes: ES PhD ENGR

PhD coordinator: Dr. Jay X. Wang

General Core Courses

Take the following 3 courses (9 SCH)

ENGR 641	Formulation of Solutions to Engineering Problems (<i>Fall</i>)
STAT 505	Statistics for Engineering and Science (<i>Winter</i>)
MATH 574	Numerical Solutions to PDEs (<i>Spring</i>)

Disciplinary (Materials and Infrastructure Systems) Core Courses

Choose any 4 of the following courses: (12 SCH)

CVEN 459	Introduction to Infrastructure Management
CVEN 580	Introduction to Trenchless Technology
ENGR 530	Engineering Experimentation and Research
MEMT 508	Finite Element Analysis
MEMT 511	Modern Engineering Materials
MEMT 563	Theory of Elasticity
MEMT 577	Advanced Strength of Materials

Qualifying Examinations (No credit)

ENGR 685	Written Qualifying Examination
ENGR 686	Oral Comprehensive Examination (Preq. or coreq., ENGR 685)

In order to take ENGR 685, a PhD student may contact the PhD program coordinator and at least 4 instructors who taught those core courses or electives. One or two exam questions are requested from each instructor, and the coordinator collects all the questions and selects four or five for the exam. The exam is usually open-book or take-home. For take-home exam, question(s) are handed out, answers are attempted without help from others, and the exam is returned within a specified period of time.

Dissertation Enhancement Seminar in Engineering ENGR 611 (Section 4): (1 SCH)

A PhD student must complete three one-SCH ENGR 611 seminar courses. ENGR 611 is typically offered each Fall quarter, and ENGR 611-004 is applicable for the emphasis area of Materials and Infrastructure Systems. For students admitted to the program before Spring 2016, they can either take one three-SCH ENGR 610 course or three one-SCH ENGR 611 courses.

Independent Study and Special Topics: (12 SCH total)

At least two Doctoral Level Special Topics courses (ENGR 657) are part of the required course work for the degree, for a total of 6 SCH.

A PhD student must participate in 6 SCH of Doctoral Independent Study (ENGR 650) under

¹ Optional for students admitted to the program for Winter 2015-16 quarter or before.

the supervision of a faculty member. Independent Study can be a preparation for the research leading to the dissertation.

Recommended Elective courses²

Choose 4 of the following courses (12 SCH): (or from the courses not included in the student's program from the above core course lists. Note: No more than two other graduate courses may be substituted for the courses in Materials and Infrastructure Systems course lists. Also, such substitution courses must be applicable to the area of thesis research and be approved by the student's committee.)

CMEN 513	Transport Phenomena
CVEN 509	Dynamic Analysis of Structures
CVEN 510	Advanced Soil Mechanics
CVEN 517	Advanced Pavement Design
ENGR 566	Quality in Engineering
ENGR 590	Applications of Artificial Intelligence
ENGR 592	Engineering Computational Methods
ENGR 631	Global Competitiveness & Mgmt of Science and Technology
INEN 504	Systems Simulation
INEN 506	Dynamic Programming
INEN 509	Advanced Engineering Economy
MEMT 565	Continuum Mechanics
MEMT 588	Inelastic Deformations
STAT 506	Regression Analysis
STAT 511	Design of Experiments
STAT 620	Theory of Probability
STAT 621	Theory of Statistics
STAT 651	Discrete Markov Processes

Research and Dissertation Minimum 18 hours (ENGR 651 & ENGR 751)

ENGR 651	Pre-candidacy Dissertation Research
ENGR 751	Post-candidacy Dissertation Research (Preq., ENGR 686)

Complete 9 SCH of ENGR 651 prior to ENGR 686. After successful completion of ENGR 686, the student will become a PhD Candidate and will complete at least 9 SCH of ENGR 751. For ENGR 651 or ENGR 751, registration in any quarter is for 1 to 3 semester hours or multiples thereof, up to a maximum of 9 semester hours per quarter.

Total: 45 SCH of coursework + 3 SCH of doctoral seminar courses + 9 SCH of Pre-candidacy Doctoral Research + 9 SCH of Post-candidacy Dissertation Research = 66 SCH

² Courses not listed are also acceptable, provided they are approved by the Advisory Committee.