

# ENGINEERING SYSTEMS

## Degree Requirements

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

The Ph.D. program in Engineering Systems requires a minimum of 36 credits at the 500, 600, or 800 level post-master's degree. The 36 credits are divided into required course work (minimum of 21 credits) and dissertation research credits (minimum of 15). The 15 dissertation research credits must include a minimum of 12 credits of ENGR 600. Students may take ENGR 600 or ENGR 610 after achieving candidacy to fulfill the requirement for 15 dissertation research credits.

The 21 credits of required course work are divided into the following three categories:

Code	Title	Credits
<b>Required Courses</b>		
<i>Common Core</i>		
ENGR 502	The Smart City	3
ENGR 503	Interdisciplinary Research Methods in Engineering	3
SYSEN 507	Systems Thinking	3
<i>Courses within the Student's Specialty (minimum of 6 credits)</i>		
Students must take a minimum of 6 credits at the 500 or 800 level in the following areas: electrical engineering (EE), mechanical engineering (ME), civil engineering (CE), environmental engineering (ENVE), engineering mechanics (EMCH), engineering design (EDSGN), industrial engineering (IE), material science (MATSE), mathematics (MATH), or computer science (COMP). Additional credits (i.e., courses taken above 6 credits) may be at the 400 level. The courses that will satisfy this requirement can be chosen from a list of approved courses maintained by the graduate program office.		6
<i>Cognate Courses (minimum of 6 credits)</i>		
Students will take a minimum of 6 credits at the 500 or 800 level of interdisciplinary cognate courses. Cognate courses must be complementary to a student's chosen dissertation research area. Interdisciplinary cognate courses play a crucial role in helping this Ph.D. program achieve its objective of offering an interdisciplinary education. Advisers will also be responsible for determining whether a given course contains sufficient complementary content and prepares the students for their chosen dissertation topic to qualify as a cognate course.		6
<i>Dissertation Research</i>		
ENGR 600	Thesis Research	15
<b>Total Credits</b>		<b>36</b>

A student must pass the Ph.D. qualifying examination prior to the start of the third regular semester after entering the program. After completion of most of the course work and meeting the English competency requirement, students must pass the Ph.D. comprehensive examination.

A dissertation must be completed under the direction of the Ph.D. committee and the results must be successfully defended in the final oral examination. To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the Ph.D. committee, the head of the graduate program, and the Graduate School.