

# ENGINEERING DESIGN

<b>Graduate Program Head</b>	David Mazyck
<b>Program Code</b>	EDSGN
<b>Campus(es)</b>	University Park (M.S., M.Eng.)
<b>Degrees Conferred</b>	Master of Science (M.S.) Master of Engineering (M.Eng.)
<b>The Graduate Faculty</b>	View ( <a href="https://secure.gradsch.psu.edu/gpms/?searchType=fac&amp;prog=EDSGN">https://secure.gradsch.psu.edu/gpms/?searchType=fac&amp;prog=EDSGN</a> )

The Engineering Design (DESIGN) program prepares the innovators of the future. Students may specialize in Design Computing, Product Realization, Human-Centered Design, and Humanitarian Engineering Design. Design Computing applies advanced computing to supercharge designers' abilities to create personalized products and services. Product Realization focuses on designing adaptive, flexible, and innovative products that challenge traditional product design and manufacturing approaches in support of growing markets. Human-Centered Design focuses on starting with empathy and applying rigorous processes and tools to transform user needs into viable engineered solutions. Humanitarian Engineering Design focuses on developing scalable and sustainable solutions for products, processes, and services that have the potential to change lives for millions of people in resource-constrained communities around the world.

## Admission Requirements

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

Applicants with at least a 3.00 junior/senior grade-point average (on a 4.00 scale) and appropriate course backgrounds 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.

All applicants must submit official transcripts from all post-secondary institutions attended (<http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission/>); international applicants must submit official transcripts, degree, and diploma certificates in both English and their native language. Photocopies will not be accepted. Applicants must also submit a statement of objectives, resume, and three letters of recommendation. GRE scores will not be accepted.

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 (<https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/gcac-305-admission-requirements-international-students/>) for more information.

Applicants for fall admission who wish to be considered for financial aid should complete the application process prior to December 15 of the preceding year.

## Degree Requirements

### Master of Engineering (M.Eng.)

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

The M.Eng. degree is a non-thesis professional master's degree that provides training for advanced professional practice. To receive the Master of Engineering degree in Engineering Design, a student must complete at least 32 credits beyond the baccalaureate degree, and a scholarly report based on an independent studies course (EDSGN 596), or a domestic (ENGR 595A) or international (ENGR 595I) internship experience, and an engineering design portfolio (EDSGN 585). A minimum of 18 credits must be in the 500 series.

A minimum of 32 graduate credits is required as follows:

Code	Title	Credits
<b>Required Courses</b>		
EDSGN 581	Engineering Design Studio I	3
EDSGN 582	Multi-disciplinary Studio	3
EDSGN 585	Engineering Design Portfolio	1
EDSGN 590	Colloquium	1
<b>Focus Area Electives</b>		
Students must select a minimum 12 credits of focus area electives from the following:		12
EDSGN 401	Engineering Systems Design	
EDSGN 479	Human Centered Product Design and Innovation	
EDSGN 547	Designing for Human Variability	
EDSGN 548	Interaction Design	
EDSGN 549	Design Decision Making	
EDSGN 558	Systems Design	
<b>General Electives</b>		
Students must select 9 credits of general electives from the following: <sup>1</sup>		9
IE 418	Human/Computer Interface Design	
IE 460	Service Systems Engineering	
IE 470	Manufacturing System Design and Analysis	
IE 520	Multiple Criteria Optimization	
IE 557	Human-in-the-Loop Simulation	
IE 563	Computer-Aided Design for Manufacturing	
IST 413	Usability Engineering	
IST 520	Foundations in Human-Centered Design	
IST 521	Human-Computer Interaction: The User and Technology	
ME 561	Structural Optimization Using Variational and Numerical Methods	
ME 565	Optimal Design of Mechanical and Structural Systems	
MANGT 510	Project Management	
SYSEN 550		
SYSEN 555	Invention and Creative Design	
<b>Culminating Experience</b>		
Students must select one of the following:		3
EDSGN 596	Individual Studies	

ENGR 595A	Engineering Internship	
ENGR 595I	International Engineering Internship	
<b>Total Credits</b>		<b>32</b>

<sup>1</sup> Or from a list of approved courses maintained by the program.

The M.Eng. in Engineering Design requires the completion of a scholarly paper and the Engineering Design Portfolio.

## Master of Science (M.S.)

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 M.S. degree is an academic degree, which is strongly oriented toward research. To receive the Master of Science degree in Engineering Design, a student must complete at least 32 credits beyond the baccalaureate degree. At least 18 credits in the 500 and 600 series, combined, must be included in the program. A minimum of 12 credits in course work (400 and 500 series), as contrasted with research, must be completed in the major program. A thesis is required and at least 6 credits of thesis research (EDSGN 600/EDSGN 610) must be included in the program.

A minimum of 32 graduate credits is required as follows:

Code	Title	Credits
<b>Required Courses</b>		
EDSGN 581	Engineering Design Studio I	3
EDSGN 582	Multi-disciplinary Studio	3
EDSGN 585	Engineering Design Portfolio	1
EDSGN 590	Colloquium	1
<b>Focus Area Electives</b>		
Students must select a minimum 12 credits of focus area electives from the following:		12
EDSGN 401	Engineering Systems Design	
EDSGN 479	Human Centered Product Design and Innovation	
EDSGN 547	Designing for Human Variability	
EDSGN 548	Interaction Design	
EDSGN 549	Design Decision Making	
EDSGN 558	Systems Design	
<b>General Electives</b>		
Students must select 6 credits of general electives from the following: <sup>1</sup>		6
IE 418	Human/Computer Interface Design	
IE 460	Service Systems Engineering	
IE 470	Manufacturing System Design and Analysis	
IE 520	Multiple Criteria Optimization	
IE 557	Human-in-the-Loop Simulation	
IE 563	Computer-Aided Design for Manufacturing	
IST 413	Usability Engineering	
IST 520	Foundations in Human-Centered Design	
IST 521	Human-Computer Interaction: The User and Technology	
ME 561	Structural Optimization Using Variational and Numerical Methods	
ME 565	Optimal Design of Mechanical and Structural Systems	

MANGT 510	Project Management	
SYSEN 550		
SYSEN 555	Invention and Creative Design	
<b>Culminating Experience</b>		
EDSGN 600	Thesis Research	6
	or EDSGN 610 Thesis Research Off Campus	
<b>Total Credits</b>		<b>32</b>

<sup>1</sup> Or from a list of approved courses maintained by the program.

The M.S. in Engineering Design requires the completion of an M.S. thesis and the Engineering Design Portfolio.

## 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 (<https://gradschool.psu.edu/graduate-education-policies/>) and GCAC-700 Professional Degree Policies (<https://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 (<https://gradschool.psu.edu/graduate-funding/>) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (<https://gradschool.psu.edu/graduate-education-policies/gsad/gsad-900/gsad-901-graduate-assistants/>) set by The Graduate School.

International students must take AEOCPT and score between 250 and 300 in order to begin a teaching assistantship; students who require remediation may be assigned a teaching assistantship only after addressing the deficiencies identified by the test.

## 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.

Engineering Design (EDSGN) Course List (<https://bulletins.psu.edu/university-course-descriptions/graduate/edsgn/>)

## Contact

<b>Campus</b>	University Park
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<b>Program Website</b>	View ( <a href="https://www.sedtapp.psu.edu/design/graduate-program/">https:// www.sedtapp.psu.edu/design/ graduate-program/</a> )