



Engineering Systems for Social Good Minor (ESE)

The minor in Engineering Systems for Social Good will equip and create space for students to engage with nuanced questions about the complex systems they will encounter in professional engineering contexts. The program provides grounding and practice in designing and analyzing systems relevant to other engineering programs with a view towards fairness, bias, and, ultimately, social good. Its key objectives are to do the following:

- Build common language for students to thrive in nuanced, interdisciplinary contexts.
- Develop key ideas for engineering and analyzing systems toward social good.
- Support the technically robust application of design practices in domain-specific settings.

This minor program requires the completion of 19 units selected from the following courses. McKelvey Engineering students of all disciplines as well as students from related majors in other schools are ideal candidates for this minor. All courses must be taken with a credit option to qualify for the minor.

Probability, Statistics, and Data Foundations

Students must complete one course from the following list:

Code	Title	Units
ENGR 3280	Engineering Statistics With Probability	3
ESE 3260	Probability and Statistics for Engineering	3
SDS 3020	Elementary to Intermediate Statistics and Data Analysis	3

Systems Design Foundations

Students must complete all courses from the following list:

Code	Title	Units
ESE 3590	Signals, Data and Equity	3
ESE 4090	Systems Design for Social Good *	1

- Four courses equaling 12 units must be taken across the two categories of elective courses: either three technical and one contextual or two technical and two contextual.

Technical Electives**

Code	Title	Units
BME 4062	Grand Challenges for Biomedical Engineering	3
BME 5190	Advanced Cognitive, Computational, and Systems Neuroscience	3
CSE 3106	Social Network Analysis	3
CSE 4101	AI and Society	3
CSE 5205	Computation in Economics and Social Choice	3
EECE 3110	Green Engineering	3
EECE 5090	Atmospheric Science and Climate	3
ESE 3090	Special Topics in Systems Engineering: Modeling and Design of Social Choice Systems	3
ESE 4031	Optimization for Engineered Planning, Decisions and Operations	3
MEMS 5423	Sustainable Environmental Building Systems	3
PSYCH 4631	Introduction to Computational Cognitive Science	3
SWPM 6077	System Dynamics Modeling for Strategic Design	3

Contextual Electives**

Code	Title	Units
AFAS 4160	Engineering Authority: Design, Architecture, and Power in Africa	3
AMCS 3705	Topics in Gender and American Culture	3
ANTHRO 3275	Introduction to GIS for Anthropologists	3
ARCH 3404	Community Building	3
ARCH 4477	Segregation By Design: A Historical Analysis of the Impact of Planning and Policy in St. Louis	3
COMPLITHT 3120	Introduction to Digital Humanities	3
ENST 3530	Sustainable Cities	3
ENST 3540	Environmental Justice	3
PHIL 2060	Biomedical Ethics	3
PHIL 2080	Introduction to Environmental Ethics	3
WGSS 1500	Introduction to Women, Gender, and Sexuality Studies	3

Additional courses may be added to these lists in the future. Questions about the program can be addressed to Dr. Ben Wormleighton (benw@wustl.edu).

* ESE 4090 Systems Design for Social Good is a 1-credit seminar or workshop course to accompany a capstone or undergraduate thesis project in a major program.



**Students may petition for one course outside of those listed to be included as a Domain Elective or as a Contextual Elective (one course in total). The criteria for selecting Domain Electives is that they need to clearly demonstrate the following: 1) a meaningful social good narrative; 2) an emphasis on system design; and 3) training in technical engineering skills.