INTEGRATED DESIGN, ENGINEERING, ARTS & SOCIETY MAJOR

MAJOR DESCRIPTION

The Integrated Design, Engineering, Arts & Society (IDEAS) linked major challenges students to think broadly, make responsibly, and respond critically to the complex social, technological, cultural, and environmental conditions that surround them. Through a curriculum that brings together iterative creation, experimentation, and critique, IDEAS majors will gain proficiency in making as a form of inquiry and research. Hands-on, collaborative, project-based courses form the core of the major. Drawing on Wesleyan's strong liberal arts tradition, students will complete courses across all three academic divisions before establishing an area of focus. The IDEAS major culminates with a supervised capstone project.

ADMISSION TO THE MAJOR

The linked major in Integrated Design, Engineering, Arts & Society (IDEAS) is the secondary major to a primary, companion major (e.g. art studio, biology, computer science, physics, theater, etc.). Students cannot obtain the BA degree with IDEAS as their only major. Students must complete all the requirements for graduation from their primary major in addition to those of IDEAS as their linked major. Each student will work closely with an IDEAS advisor to develop an individual course of study within an established major track. Students are encouraged to declare the IDEAS linked major in the spring of their sophomore year.

MAJOR REQUIREMENTS

IDEAS Core (4 Courses)

Comprised of four courses, the IDEAS major Core is designed to introduce students to hands-on, project-based studio, laboratory, and critical coursework in design and engineering. There are multiple possible introductory courses to fulfill three of the four core course requirements. The fourth course within the core (IDEA 292: Interdisciplinary Project Lab) acts as the gateway to the major.

1. Introductory Design Studio (ARST220, ARST235, or ARST270)
2. Engineering Foundations Lab (IDEA170 or IDEA175)
3. Design & Technology Seminar (IDEA180) or another approved Social Science course
4. Major Gateway (IDEA292). All students intending to major must enroll in the Interdisciplinary IDEAS Project Lab after completing a foundations lab or introductory design studio course (1 or 2 above). Completion of the gateway courses is recommended prior to completion of sophomore year, but not required.

Range (4 Courses)

Building on the interdisciplinary foundation of the Core, the second set of course requirements collectively enhance students' design and engineering range. Like the Core, the Range consists of four courses:

1. Design Studio elective
2. Engineering/Quantitative elective
3. History/Theory elective
4. Programming elective (COMP112, IDEA285 or approved alternate)

Except where explicitly excluded by course prerequisites, the Range courses may be taken simultaneously with Core courses to increase the flexibility of student scheduling. Some of these courses may also overlap with the linked major.

Focus (4 Courses)

These four upper-level elective courses are specific to each major track, constitute the focus area of the student's major, and must be at the 200-level or higher. Students are strongly encouraged to select from pre-approved listings of courses for their chosen track, detailed below. At least two of these elective courses should be listed (or cross-listed) by the IDEAS program. Students may develop an alternate sequence with approval from their IDEAS advisor and program director.

Senior Capstone Project (1-2 Credits)

A team-based or independent original project culminating in a public presentation, exhibition, or publication. The capstone may be one to two credits, depending on scope of project. In many cases, this project will take the form of a senior thesis, and may be advised in coordination with the student's primary major. More details are provided in Section I below. Seniors will participate in colloquium lunches where they will make a brief presentation of their project, followed by discussion with students and participating faculty. Students will distribute a summary of their findings in the week prior to presenting to facilitate discussion. All declared IDEAS majors will be invited to the colloquium luncheons to build community and encourage them to plan future projects.

Student Portfolio:

Students will assemble a portfolio of their work. An initial portfolio will be developed in the required IDEAS Project Lab (IDEA292). The portfolio should document the student's work from IDEAS project-based courses, and may include appropriate work from a student's primary major. The portfolio may incorporate both physical and digital forms, as appropriate. Students are strongly advised to add to this portfolio each semester, based on their ongoing work. The portfolio will be reviewed by the student's advisor as one of the major requirements. Students are encouraged to create a portfolio that can be used to present their work for future employment or graduate studies.

Major Tracks:

<u>Bachelor of Engineering Track</u>
(linked to the Dartmouth Dual-degree program)

For students wishing to combine the study of engineering with a broad background in liberal arts, Wesleyan maintains a dual-degree program with Dartmouth College that allows students to earn two degrees in five years combined (three years at Wesleyan, two at Dartmouth). This 2-1-1-1 program places Wesleyan students at Dartmouth for their junior year and a fifth year. Students completing this track earn two bachelor degrees, a BA from Wesleyan and a BE from Dartmouth. This track has a larger number of requirements in

order to fulfill the ABET accredited BE degree obtained through the dual-degree program with Dartmouth.

In addition to the Core and Range requirements listed for the IDEAS major the following five courses are required pre-requisites for the dual-degree program with Dartmouth. **Students must apply to the Dartmouth 2-1-1-1 program in their sophomore year.**

Code	Title	Hours
MATH121	Calculus I	1
MATH122	Calculus II	1
PHYS113	General Physics I	1
PHYS116	General Physics II	1
CHEM141	General Chemistry I	1
or CHEM143	Honors General Chemistry I	

The required courses taken at Dartmouth (ENGS 22: Systems, ENGS 23: Distributed Systems & Fields, and two Engineering electives) fulfill the Focus requirement for the IDEAS major.

The Bachelor of Engineering track is an External Special Study Program (https://catalog.wesleyan.edu/academic-regulations/external-special-study/).

Biomedical Engineering (linked with Biology)

Code	Title	Hours
Core Courses (Recommended)		
ARST270	Product Design I	1
IDEA170	Introduction to Mechanical Design and Engineering	1
IDEA180	Design Studies	1
IDEA292	Interdisciplinary Project Lab	1
Range Courses (Recommended)		
IDEA175	Introduction to Electrical Design & Engineering	1
ARST370	Product Design II	1
Focus Courses (Electives)		
BIOL212	Principles and Mechanisms of Cell Biology	1
BIOL213	Behavioral Neurobiology	1
BIOL265	Bioinformatics Programming	1
BIOL267	Engineering Biology: Cells and Tissues	1
BIOL270	Systems Biology with Programming	1
BIOL368	Ecological Resilience: The Good, the Bad, and the Mindful	1

Computation (linked with Computer Science)

Code	Title	Hours
Core Courses (Recommended)		
ARST270	Product Design I	1
IDEA175	Introduction to Electrical Design & Engineering	1
IDEA180	Design Studies	1
IDEA292	Interdisciplinary Project Lab	1
Range Courses (Recommended)		
COMP211	Computer Science I	1
IDEA185	Form and Code	1
Focus Electives		
COMP321	Design of Programming Languages	1
COMP323	Programming Language Implementation	1
COMP331	Computer Structure and Organization	1
COMP332	Computer Networks	1
COMP333	Software Engineering	1
COMP341	Artificial Intelligence	1
COMP343	Machine Learning	1
IDEA350	Computational Media: Videogame Development	2
QAC307	Experimental Design and Causal Inference	1
QAC312	Hierarchical Linear Models	.5
QAC320	Applied Time Series Analysis	1
QAC356	Advanced R: Building Open-Source Tools for Data Science	1

Electrical Engineering (linked with Physics)

Code	Title	Hours
Core Courses (Recommended)		
ARST270	Product Design I	1
IDEA175	Introduction to Electrical Design & Engineering	1
IDEA180	Design Studies	1
IDEA292	Interdisciplinary Project Lab	1
Range Courses (Recommended)		
COMP211	Computer Science I	1
PHYS342	Experimental Optics	.5
PHYS345	Electronics Lab	
Focus Courses (Electives)		
COMP212	Computer Science II	1
COMP312	Algorithms and Complexity	1
COMP301	Automata Theory and Formal Languages	1
COMP331	Computer Structure and Organization	1
PHYS315	Quantum Mechanics II	1
PHYS358	Condensed Matter	1
PHYS566	Electrodynamics	1

Mechanical & Materials Engineering (linked with Physics)

Code	Title	Hours
Core Courses (Recommended)		
ARST270	Product Design I	1
IDEA170	Introduction to Mechanical Design and Engineering	1
IDEA180	Design Studies	1
IDEA292	Interdisciplinary Project Lab	1
Range Courses (Recommended)		
IDEA210	How Things Fail: Mechanics and Materials	1
Focus Courses (Electives)		
CHEM373	Polymer Chemistry	1
CHEM377	Chemistry of Materials and Nanomaterials	1
CHEM379	Nanomaterials Lab	1
PHYS313	Classical Dynamics	1
PHYS358	Condensed Matter	1

Object Design (linked with Art Studio)

Code	Title	Hours
Core Courses (Recommended)		
ARST270	Product Design I	1
IDEA170	Introduction to Mechanical Design and Engineering	1
IDEA180	Design Studies	1
IDEA292	Interdisciplinary Project Lab	1
Range Courses (Recommended)		
ARST220	Ecological Design I: Being at Home in the World	1
IDEA175	Introduction to Electrical Design & Engineering	1
Focus Courses (Electives)		
ARST243	Introduction to Graphic Design	1
THEA359	Space Design for Performance	1
THEA383	Introduction to Costume Design for Performance	1
ARST221	A Thousand Years of Iteration: Design for an Uncertain Future	1
ARST271	Biodegradable Design: Soft and Hairy	1
ARST370	Product Design II	1
ARST320	Ecological Design II: Worn Out/Broken In	1

Spatial Design (linked with Theater)

Code	Title	Hours
Core Courses (Recommended)		
IDEA170	Introduction to Mechanical Design and Engineering	1
ARST235	Architecture I	1
IDEA180	Design Studies	1
IDEA292	Interdisciplinary Project Lab	1
Range Courses (Recommended)		
IDEA210	How Things Fail: Mechanics and Materials	1
ANTH230	Anthropology of Cities	1
THEA185	Text & Visual Imagination: Introduction to Eco Design for Performance	1
Focus Courses (Electives)		
ARST220	Ecological Design I: Being at Home in the World	1
ARST270	Product Design I	1
ARST336	Architecture II	1.5
THEA305	Lighting Design for the Theater	1
THEA359	Space Design for Performance	1
THEA360	Media for Performance	1
THEA384	Advanced Costume Design & Construction	1

STUDENT LEARNING GOALS

- Building a foundation of knowledge that includes the technical, aesthetic, and social aspects of design and engineering.
- Learning how to apply theoretical knowledge to the creation of objects, systems, or methods.
- Understanding how design and engineering choices are influenced by social structures and pressure, and vice-versa.
- Learning how to use the design process as a framework for creative exploration and problem solving.
- Learning how to effectively work in group settings and how to harness complementary skills of group members.

STUDY ABROAD

Study abroad is encouraged for IDEAS major students. Students should consider programs that offer courses in the areas of design and/or engineering. Students should request approval for any courses they wish to transfer for credit prior to study abroad.

LANGUAGE REQUIREMENT

There is no language requirement for IDEAS.

TRANSFER CREDIT

IDEAS Core courses must be taken at Wesleyan. Up to three course requirements for the IDEAS major can be fulfilled with transfer credits, subject to approval from an IDEAS advisor and program chair.

HONORS

Student honors projects may be pursued with an IDEAS Core faculty member or through a project with a mentor from the student's companion major that has prior approval from the student's IDEAS advisor. Such honors projects would fulfill the capstone described above. Projects completed in the companion department are not evaluated by IDEAS. For Departmental Honors in IDEAS, a student must have a minimum GPA of 85.0 and complete both Stage I and Stage II general education expectations. Depending on the focus area, an IDEAS mentored thesis may be a written thesis, exhibition, or body of work, and must be evaluated by the thesis advisor and two additional faculty members to meet the standards for honors or high honors.

CAPSTONE EXPERIENCE

Students will complete a team-based or independent original project culminating in a public presentation, exhibition, or publication. The capstone may be one to two credits, depending on scope of project. There are several ways to fulfill the capstone requirement.

1. The project may take the form accepted by the companion department as a senior project (e.g., senior thesis, senior essay, senior performance, senior exhibition, senior film thesis). The final project is submitted to the companion department and is not evaluated by IDEAS.
2. The student may register for and complete a senior thesis in the IDEAS major. The mentor can be any Wesleyan faculty member, but the topic must be approved by the student's IDEAS advisor. The thesis material may take the form of a written publication, public presentation, or exhibition, with the form approved by the student's IDEAS advisor and the College of Design & Engineering Studies chair.