

# MULTIDISCIPLINARY ENGINEERING (BSE)

## Bachelor of Science in Engineering

The Multidisciplinary Engineering major requires a total of 128 credits. Multidisciplinary Engineering majors are required to complete the following:

Course	Title	Credits
<b>Required Courses</b>		
CHEG 2103	Introduction to Chemical Engineering	3
CHEM 1128Q	General Chemistry II	4
or CHEM 1148Q	Honors General Chemistry II	
CE 2110	Applied Mechanics I	3
CE 3110	Mechanics of Materials	3
CE 3120	Fluid Mechanics	4
ECE 2001	Electrical Circuits	4
ENGR 1166	Foundations of Engineering	3
ENGR 4001	Multidisciplinary Engineering Design I	3
ENGR 4002W	Multidisciplinary Engineering Design II	3
MATH 2110Q & MATH 2410Q	Multivariable Calculus and Elementary Differential Equations	7
MSE 2001	Introduction to Structure, Properties, and Processing of Materials I	3
or MSE 2101	Materials Science and Engineering I	
MSE 2002	Introduction to Structure, Properties, and Processing of Materials II	3
or MSE 2102	Materials Science and Engineering II	
STAT 3025Q	Statistical Methods <sup>1</sup>	3
or ENGR 3400	Engineering Data Analysis Techniques	
or MATH 3160	Probability	
<b>Thermal Science Elective</b>		
Select one of the following:		3-4
MSE 3001	Applied Thermodynamics of Materials	
ME 2232	Engineering Thermodynamics	
or ME 2233	Thermodynamic Principles	
CHEG 2111	Chemical Engineering Thermodynamics I	
<b>Engineering Electives</b>		
Engineering Electives		9
<b>Area Elective Credits</b>		
Area Elective Credits		24
<b>Total Credits</b>		<b>82-83</b>

<sup>1</sup> Or an equivalent approved statistics course (advisor approval required).

All multidisciplinary engineering students are required to have at least nine credits of work in engineering beyond those courses specifically required in the program. Three credits may be met by courses offered in the College of Engineering at the 2000 level or higher, and six credits must be met by courses in the College of Engineering at the 3000 level or higher.

Area Elective Credits can be used to pair the Multidisciplinary Engineering degree with other partner programs at the university. For students not seeking a paired program, consult with your academic advisor and the Guide for Multidisciplinary Engineering Majors for guidance on selecting courses based on your interests.

The Multidisciplinary Engineering Degree is overseen by faculty from the College of Engineering as well as the Engineering Undergraduate Programs Office, who strive to continuously improve our undergraduate program in Multidisciplinary Engineering. The program's educational objectives (PEOs) are that our graduates: will be gainfully employed in Engineering or related career paths including industrial, academic, governmental and non-governmental organizations, and will continue their professional development by engaging in professional activities and/or training to enhance their careers and/or pursue post-graduate studies.

### Multidisciplinary Engineering with an Individualized Specialization

Students choosing the Individualized Specialization will work with their Academic Advisor to select 24+ credits of coursework that integrate a coherent theme and represent a student's unique interests. The individualized specialization requires dedication and forethought, and can be focused in engineering or in a related field of student interest.

### Multidisciplinary Engineering with an Individualized Specialization for Pre-Medical/Pre-Dental

This individualized specialization covers all the necessary classes to obtain a well-rounded education in engineering, such as chemistry, calculus, physics, and multiple engineering disciplines, while integrating 24+ credits of preparatory coursework for professional programs such as medical or dental school. Students will be well positioned to apply for medical or dental school, as well as complete the MCATs.

Course	Title	Credits
BIOL 1107	Principles of Biology I	4
CHEM 2443	Organic Chemistry	3
CHEM 2444	Organic Chemistry	3
CHEM 2445	Organic Chemistry Laboratory	3
MCB 2000	Introduction to Biochemistry	4
MCB 2210	Cell Biology	3
MCB 2400	Human Genetics	3
or MCB 2410	Genetics	
MCB 2610	Fundamentals of Microbiology	4
or PNB 2264	Human Physiology and Anatomy	

The following additional courses are strongly recommended to align with medical or dental school admission requirements:

Course	Title	Credits
BIOL 1108	Principles of Biology II	4
Additional English Course <sup>1</sup>		3
PSYC 1100	General Psychology I	3
PSYC 1101	General Psychology II	3
Sociology/Anthropology Course <sup>2</sup>		3
PHIL 1104	Philosophy and Social Ethics <sup>3</sup>	3

<sup>1</sup> ENGL Elective/TOI

<sup>2</sup> Sociology/Anthropology Elective/TOI

<sup>3</sup> Social Ethics/TOI 1

Students are strongly encouraged to work closely with the Office of Pre-Professional Advising and College of Engineering Undergraduate Program to align the individualized specialization requirements with current professional school expectations.

## Multidisciplinary Engineering with a Specialization in Entertainment Engineering

Students choosing the Entertainment Engineering specialization will take coursework in the School of Fine Arts focused on stagecraft and technical theater, with a focus on hands-on and experiential learning in SFA dramatic productions. Students with this specialization will be well positioned to work in the theater and entertainment industries with a strong engineering background that intersects with the performing arts.

Course	Title	Credits
<b>Required Courses</b>		
DRAM 1219		3
DRAM 3201	Scene Construction	3
DRAM 3202	Rigging	3
DRAM 3203		3
DRAM 3204		3
DRAM 3199	Independent Study (three credits each, six credits total)	6
Any three credit DRAM 3000 level course not used in fulfillment of another requirement		3
<b>Total Credits</b>		<b>24</b>

## Multidisciplinary Engineering with a Specialization in Human Rights and Sustainability

The specialization in Human Rights and Sustainability is a joint program between the College of Engineering, the Human Rights Institute, and the College of Liberal Arts and Sciences. The Multidisciplinary Engineering (MDE) major with Specialization in Human Rights and Sustainability requires a student to be enrolled in the College of Engineering. In addition to providing students with a broad background in numerous engineering fields, this specialization aims to emphasize a human rights-based approach to engineering. Students will complete a minimum of 24 Human Rights credits, chosen from the courses outlined below, and will design a capstone project that follows a human-rights based approach to engineering.

Students will select 24 credits of specialization coursework according to the distribution below:

Course	Title	Credits
ENGR/HRTS 2300E	Engineering for Human Rights	3
Three Core Courses, one from each of the following areas:		9
Institutions and Laws (Area A)		
History, Philosophy, and Theory (Area B)		
Applications and Methods (Area C)		
Two Sustainability Courses (Area D)		6
Two additional courses that may be taken from any of the Core or Elective courses (A-E) on the list below.		6
<b>Total Credits</b>		<b>24</b>

<sup>1</sup> Ideally taken during the second semester of first year in the program.

**Note:** Courses solely or cross listed between ENGR and other disciplines listed below may be used to fulfill either ENGR elective credits or be counted as part of the 24 HRTS credits, but not both.

Students are encouraged, but not required, to take a W course in Human Rights as part of the 24 credits.

A capstone engineering design project (ENGR 4001 Multidisciplinary Engineering Design I and ENGR 4002W Multidisciplinary Engineering Design II) with strong Human Rights (HR) content as approved by the MDE faculty advisory board and Human Rights Institute Director, or Internship in HR (HRTS 4291 Service Learning Seminar/Internship) for students whose capstone design project does not have a significant HR theme. HRTS 4291 Service Learning Seminar/Internship would count as one for the two "additional courses" above.

- **Note:** Students can elect to do both an HR-themed capstone and an HR internship if desired but must have at least one HR-themed experiential learning experience.

The MDE advising team will be responsible for ensuring that students successfully navigate the program requirements. The Human Rights undergraduate advising team will work with the students to identify experiential learning opportunities for students in the major.

### Core Courses

#### A. Institutions and Laws

Course	Title	Credits
ANTH/HRTS 3230	Propaganda, Disinformation, and Hate Speech	3
HIST/HRTS 3202	International Human Rights	3
HRTS 3050	Approaches to Human Rights Advocacy	3
HRTS 3055	Theory and Practice of International Criminal Justice	3
HRTS 3200W	International Human Rights Law	3
HRTS 3420	Being International: Geopolitics and Human Rights	3
POLS/HRTS 3212	Comparative Perspectives on Human Rights	3
POLS 3428	The Politics of Torture	3
SOCI/HRTS 2800	Human Rights in the United States	3
SOCI/HRTS 2845	Sociology of Global Human Rights	3

#### B. History, Philosophy, and Theory

Course	Title	Credits
ANTH/HRTS 3326	Global Health and Human Rights	3
ANTH/HRTS/LLAS 3327	Power and Health in Latin America and the Caribbean	3
ENGL/HRTS 3631	Literature, Culture, and Humanitarianism	3
HIST/HRTS 3201	The History of Human Rights	3
HIST/HRTS 3207	Genocide after the Second World War	3
HIST/HRTS 3232	History of Refugees, Migration, and Statelessness	3
HRTS 2100W	Human Rights and Social Change	3
HRTS 3460	Human Rights and Armed Conflict	3
HRTS/LLAS 2450	Human Rights in Latin America	3

HRTS/POLS 3042	Theories of Human Rights	3
HRTS/PHIL 3220W	Philosophical Foundations of Human Rights	3

**C. Applications and Methods**

Course	Title	Credits
BLAW/HRTS 3252	Business and Human Rights	3
BLAW/HRTS 3254	Social Responsibility and Accountability in Business	3
DRAM/HRTS 3139	Theatre and Human Rights	3
HRTS 3149/3149W	Human Rights Through Film	3
HRTS 3250W	Human Rights and New Technologies	3
HRTS 3475	Economic Development and Human Rights	3
HRTS 3540	Topics in Human Rights Practice	3
POLS/HRTS 3256/ POLS 3256W/HRTS 3256W	Politics and Human Rights in Global Supply Chains	3
POLS/HRTS 3430	Evaluating Human Rights Practices of Countries	3

**D. Sustainability**

Course	Title	Credits
ENGR/HRTS 3257	Assessment for Human Rights and Sustainability <sup>1</sup>	3
ENVE/ENVS/EVST 3100	Climate Resilience and Adaptation: Municipal Policy and Planning <sup>1</sup>	3
ENVE 3110E	Brownfield Redevelopment <sup>1</sup>	3
GEOG 2400E	Introduction to Sustainable Cities	3
NRE 2600E	Global Sustainable Natural Resources	3
POLS/ENGR/HRTS 3209E	Sustainable Energy in the 21st Century <sup>1</sup>	3
POLS 3203	Environmental Policy and Institutions	3

<sup>1</sup> Courses that can also count as ENGR credits.

**E. Elective Courses**

Course	Title	Credits
Any HRTS course numbered 2000 level or above not already taken		3
ANTH/HRTS 3028/ ANTH 3028W/HRTS 3028W	Indigenous Rights and Aboriginal Australia	3
ANTH 3150W	Migration	3
ARTH/HRTS 3575	Human Rights, Digital Media, Visual Culture	3
ECON 3473/3473W	Economic Development	3
ECON 2445/ HRTS 3445/WGSS 3445	Economic Foundations of Gender Inequality	3
EDCI 2100	Power, Privilege, and Public Education	3
GEOG 4240	Disaster Risk, Vulnerability, and Resilience	3
HIST 2570	American Indian History	3
HIST 3418	The Holocaust	3
HIST/AAAS 3531	Japanese Americans and World War II	3
HRTS 3293	International Study (with advisor approval)	3
HRTS 3295	Special Topics (with advisor approval)	3
HRTS 3298	Variable Topics (with advisor approval)	3
HRTS 3299	Independent Study (with advisor approval)	3

PHIL/HRTS 2170W	Bioethics and Human Rights in Cross-Cultural Perspective	3
PHIL 2215/2215W	Ethics	3
POLS/HRTS 3418/ POLS 3418W	International Organizations and Law	3
POLS/HRTS 3807	Constitutional Rights and Liberties	3
AAAS 2220/2220/ HRTS 2220	Asian Indian Women: Activism and Social Change in India and the United States	3
SOCI 2220	Asian Indian Women: Activism and Social Change in India and the United States	3
SOCI/HRTS 2830	Class, Power, and Inequality	3
SOCI/HRTS 2898	Topics in Sociology and Human Rights	3
SOCI/HRTS/AFRA 2520	White Racism	3
SOCI/HRTS/AFRA 2530	African Americans and Social Protest	3
WGSS/HRTS 2263	Women, Gender, and Violence	3
WGSS 2255	LGBTQ Sexualities, Activism, and Globalization	3
WGSS 3105	The Politics of Reproduction	3
WGSS 3257	Feminist Disability Studies	3
WGSS 3269	Gender, Sexuality, and Social Movements	3

**Capstone Course****HRTS 4291 Service Learning Seminar/Internship**

This course is only required for students whose Senior Design sequence does not have a strong human rights component. Any student can complete an HRI internship and have it count for elective credit.

**Multidisciplinary Engineering with a Specialization in Industrial Design**

This specialization covers all the necessary classes to obtain a well-rounded education in engineering, such as chemistry, calculus, physics, and materials science, but leaves a significant number of courses for a solid framework in industrial design. This approach gives students a strong foundation of industrial design studio practices, and a unique understanding of fabrication methods, presentation skills, human factors, and concept development methods that will make them uniquely qualified to address new challenges in the field of engineering and design.

Course	Title	Credits
<b>Required Courses</b>		
ART 3701	Industrial Design: Materials and Techniques	3
ART 3705	Industrial Design: Form, Structure, and Space	3
ART 3710	Industrial Design: Drawing and Modeling for Design	3
ART 3720	Industrial Design: Process and Practice	3
ART 3725		3
ART/ENGR 3735	SolidWorks for Industrial Design	3
Select two Industrial Design electives from the following: <sup>1</sup>		
ART 3730	Industrial Design: Digital Fabrication	
ART/ENGR 3740		
ART/ENGR 3750	Packaging Design and Graphics	

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ART/ENGR 3760

**Total Credits**

**24**

<sup>1</sup> Taken during Fall and Spring; not all courses are available all semesters.