APPROVED
COMMISSION ON UNDERGRADUATE STUDIES AND POLICIES

VirginiaTech
Invent the Future

College of Engineering
GREEN ENGINEERING MINOR
FOR STUDENTS GRADUATING IN CALENDAR YEAR 2017

To complete a minor in Green Engineering, a student must take the 6 credit hours of required courses, 6 credit hours of engineering elective courses, and 6 credit hours of interdisciplinary elective courses from the approved courses below.

	REQUIRED COURSES	HOURS
ENGR 3124	Introduction to Green Engineering[3]	3
ENGR 4134	Environmental Life Cycle Assessment[3]	3
		6

ENGINEERING ELECTIVE COURSES (Choose 6 credit hours)

AOE 4064	Fluid Flows in Nature[3]	3
BSE 3324	Small Watershed Hydrology	3
BSE 3334	Nonpoint Source Pollution Assessment and Control[3]	3
BSE 4304	Nonpoint Source Pollution Modeling & Management[3]	3
BSE 4394	Water Supply & Sanitation in Developing Countries[3]	3
BSE 4504	Bioprocess Engineering[3]	3
BSE 4524	Biological Process Plant Design[3]	3
CHE 3134	Separation Processes[3]	3
CHE 3184	Chemical Reactor Analysis & Design[3]	3
CEE 3104	Introduction to Environmental Engineering[3]	3
CEE 4064	Design for Hazard Control in Construction[3]	3
CEE 4104	Water and Wastewater Treatment Design[3]	3
CEE 4114	Fundamentals of Public Health Engineering[3]	3
CEE 4134	Environmental Sustainability	3
CEE 4144	Air Resources Engineering[3]	3
CEE 4154	Indoor Environmental Quality and Sustainable Facilities[3]	3
CEE 4164	Environmental Microbiology[3]	3
CEE 4174	Solid and Hazardous Waste Management[3]	3
CEE 4264	Sustainable Land Development[3]	3
CEE 4304	Hydrology[3]	3
CEE 4344	Water Resources Planning[3]	3
CEE 4354	Environmental Hydrology[3]	3
CEE 4384	Coastal Engineering	3
CEE 4554	Natural Disaster Mitigation[3]	3
ECE 4304	Design in Power Engineering[3]	3
ECE 4364	Alternate Energy Systems (*online course*) [3]	3
ISE 2204	Manufacturing Processes[3]	3
ISE 2214	Manufacturing Processes Laboratory[3]	1
ISE 4644	Occupational Safety and Hazard Control[3]	3
ISE 4304	Global Issues in Industrial Management[3]	3
MSE 2044	Fundamentals of Materials Engineering[1, 3]	4
MSE 3344	Governmental Regulation of the Metal Casting Industry[3]	3
MSE 4055	Material Selection and Design[3]	3
ME 4034	Bio-Inspired Technology[3]	3
ME 4154	Industrial Energy Systems[3]	3
ME 4164	Energy Systems for Buildings[3]	3
ME/ESM 4194	Sustainable Energy Solutions for a Global Society[3]	3
ME 4204	Internal Combustion Engines[3]	3
ME 4554	Advanced Technology for Motor Vehicles[3]	3
ME 4724	Engineering Acoustics[3]	3
MINE 3544	Mineral Processing Laboratory[3]	1
MINE 3554	Resource Recovery[3]	2
MINE 4544	Mine Reclamation and Environmental Management[3]	3
NSEG 3145	Fundamentals of Nuclear Engineering[3]	3
NSEG 3146	Fundamentals of Nuclear Engineering[3]	3
NSEG 3604	Radiation Detection, Protection, and Shielding[3]	3
		6

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	INTERDISCIPLINARY ELECTIVE COURSES (6 credit hours)	HOURS
AAEC 3314	Environmental Law[6]	3
AAEC 4304	Environmental & Sustainable Development Economics	3
AAEC 4314	Environmental Economic Analysis and Management	3
AAEC 4344	Sustainable Development Economics	3
AHRM 4604	Housing, Energy, and the Environment[6]	3
ALS 3134	Livestock and the Environment	3
ARCH 4055	Environment and Building Systems[3]	3
ARCH 4056	Environment and Building Systems[3]	3
BIOL 2804	Ecology[3]	3
BIOL 4004	Freshwater Ecology[3]	4
BIOL 4014	Environmental Toxicology[3]	2
BSE 2384	Soil and Water Resources Management[5]	3
CHEM 4514	Green Chemistry	3
CSES 3644	Plant Materials for Environmental Restoration	3
CSES/BIOL/CEE/ENSC 4164	Environmental Microbiology[4]	3
CSES 4644	Land-Based Systems for Waste Treatment	3
CSES/CHEM/ENSC 4734	Environmental Soil Chemistry	3
CSES/ENSC 4764	Bioremediation	3
ECON 4014	Environmental Economics[3]	3
ENGL 3534	Literature and Ecology[2,6]	3
ENSC/CSES 3604	Fundamentals of Environmental Science	3
ENSC 3634	Physics of Pollution	3
ENSC/CSES 4774	Reclamation of Drastically Disturbed Lands	3
ENSC/CSES 4854	Wetland Soils and Mitigation	3
ENT 2004	Insects and Human Society	3
ENT 4264	Pesticide Usage	3
FIW 2114	Principles of Fisheries and Wildlife Sciences[6]	3
FIW 4614	Fish Ecology	3
FOR 2124	Forests, Society and Climate	
FOR 2554	Nature and American Values[2]	3
GEOG 3104	Environmental Problems, Population, & Development[6]	3
GEOG/GEOS 3114	Introduction to Meteorology	3
GEOG 4204	Geography of Resources[6]	3
GEOS 2104	Elements of Geology	3
GEOS 3014	Environmental Geosciences	3
GEOS 3034	Oceanography	3
GEOS 4634	Environmental Geochemistry	3
HIST 3144	American Environmental History	3
HORT/FOR 2134	Plants & Green Space in Urban Communities	3
LAR 4034	Evolution of the American Landscape[2]	3
PHIL 2304	Global Ethics[2, 6]	3
PSYC 3024	Environmental Psychology	3
SBIO/FOR 2784	World Forests and Forest Products6	3
SBIO 3004	Sustainable Nature-Based Enterprise	3
SBIO 3114	Biodeterioration, Bioconversion, and Bioenergy	3
SBIO 3324	Green Building Systems	3
SBIO 3434	Chemistry and Conversion of Sustainable Biomaterials	3
SBIO 3444	Sustainable Biomaterials and Bioenergy	3
SBIO 3454	Society, Sustainability Biomaterials and Energy	3
SBIO 3554	Sustainable Biomaterials Enterprises	3
SBIO 4444	Sustainable Biomaterial Composites	3
STS 3334	Energy and Society	3
UAP/PSCI 3344	Global Environmental Issues[6]	3
UAP 3354	Introduction to Environmental Policy and Planning	3
UAP 4264	Environmental Ethics and Policy[2]	3
UAP 4374	Land Use & the Environment: Planning and Policy	3
UAP 4384	Pollution Control Planning	3
UAP 4394	Community Renewable Energy Systems	3
		6

- Senior capstone design projects and undergraduate research in all engineering departments are eligible as engineering electives if the project focuses on the environmental impacts of engineering. See the program advisor for **advance** approval of such projects.

- Many courses in the minor requirements listed above have prerequisites, be sure to consult the University Catalog or check with your advisor. Prerequisites are controlled by individual departments, not Green Engineering, if you have questions.

- In planning your schedule, also consider carefully when the class(es) you plan to take is(are) offered. Not all courses are offered every semester or academic year.

FOOTNOTES:

[1]MSE 2034 does not have the same environmental content as MSE 2044 and is not approved for the minor
[2]Area 2 course
[3]Prerequisites and non-major enrollment restrictions are particularly limiting for these courses for non-majors
[4]Cross-listed courses cannot be double-counted as both an engineering and non-engineering course
[5]BSE students cannot use BSE 2384 as an engineering elective since this class is specifically for non-engineering students. This class is eligible, however, as an interdisciplinary elective for all other engineering disciplines.
[6]Area 7 course

GENERAL NOTES:

- Check prerequisites for each course carefully as these are determined by each department individually
- All courses must be taken on the letter grade (A/F) option. A minor GPA of 2.00 for the 18 credits of the minor is required.
- Other courses, including study abroad, may be substituted on a case-by-case basis with approval from the Green Engineering Director and College of Engineering Associate Dean of Academic Affairs. For instance, NR 3954 Study Abroad may be substituted when concerned directly with the environment and sustainability.
- 1xxx level courses will **not** be considered for substitution for the minor.
- Dr. Sean McGinnis, Director of Green Engineering (2090 Torgersen Hall), will act as an advisor for all students pursuing a Green Engineering minor. (Email – *smcginn@vt.edu*, Website – *www.eng.vt.edu/green*)