Engineering Sustainable Systems (ESS)

A new Dual Degree with the School of Natural Resources and Environment and the College of Engineering

Technology has been the cause of many ecological problems....
sustainable technologies must be part of the solution!

ESS brings together two nationally recognized programs at Michigan to train graduate students who will create engineered systems that are **socially, environmentally, and economically sustainable**.

MichiganEngineering

- Mechanical Engineering
- Chemical Engineering
- Civil & Environmental Engineering

ESS Specializations

- **Sustainable Design & Manufacturing**
- **Sustainable Energy Systems**
- **Sustainable Water Resources**

Natural Resources and Environment
University of Michigan

- Sustainable Systems
- Aquatic Sciences

2 – 2.5 years to complete both M.S. and M.S.E. degrees
54 total credit hours
Students must be admitted to Engineering and SNRE

http://www.snre.umich.edu/degree_programs/engineering
essdualdegree@umich.edu

The ESS Education

- **The *only* engineering and environmental science dual graduate degree offered nationally.**

- You receive a **comprehensive understanding of major sustainability challenges**, including global climate change, energy scarcity, ecological degradation, environmental threats to human health, and resource scarcity.

- Curriculum include **engineering design approaches for products, processes, and services** that facilitate sustainable application of technology.

- The **scientific knowledge and methods required to evaluate the sustainability** of engineering systems is emphasized.

- Evaluation of **successful examples of sustainable technology design and opportunities to practice sustainable design** concepts are central to degree completion.

- **Analysis of market and public policy constraints** are important parts of the curriculum that help encourage patterns of **sustainable consumption**.

Typical ESS Courses
(from all 3 specializations)

ME 589
Ecodesign & Manufacturing

NRE 557/CEE 589
Industrial Ecology

NRE 571
Environmental Economics

ChE 686/CEE 686
Case Studies in Sustainable Engineering

NRE 527
Social Institutions for Energy Production

CEE 589/NRE 595
Risk-Benefit Analysis in Environmental Engineering

NRE 508
Wetland Ecology

NRE 510
Environmental Governance, Choices, Institutions, Outcomes

Employment Opportunities

- Engineering consulting firms, industry R&D labs, entrepreneurial startups
- Government agencies and labs (NREL, EPA, DOE, DOTs, DEQ)
- Non-profit and non-governmental organizations (Environmental Defense, Union of Concerned Scientists)
- Leading industry firms needing engineers with knowledge about sustainability issues, technologies, and legislation

For More Information

ESS Program Homepage: http://www.snre.umich.edu/degree_programs/engineering
College of Engineering: http://www.engin.umich.edu
Mechanical Engineering: http://www.me.engin.umich.edu
Chemical Engineering: http://www.engin.umich.edu/dept/cheme
Civil & Environmental Engineering: http://www.cee.engin.umich.edu

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