ERE496: ENGINEERING SUSTAINABLE FOOD SYSTEMS (ESFS)

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Office Hours: To be announced. In general, will be during the 2 days before a homework assignment is due, and by appointment.

Mailboxes: The course mailbox is located in the hallway outside of Baker 402.

Lectures: Monday and Wednesdays   3:45 – 5:05 pm, 437 Baker Lab

Text: *Introduction to the US Food System: Public Health, Environment, and Equity,* by R. Neff, 2014. <= Required

        Civil and Environmental Systems Engineering, by Revelle, Whitlatch, and Wright. <= Reference (copy on reserve at library)

Prerequisites: None (though Calculus 1 may help)

Course Objectives:
By the end of the course, students should have achieved the following outcomes:
a) A broad understanding and appreciation of the complexities of modern food systems;
b) Knowledge of a wide variety of diverse food systems, agricultural practices, and the diets they support; and
c) An ability to critically analyze and assess the sustainability of these systems.

Program Learning Outcomes:
The following engineering outcomes related to food systems should be achieve by all students:
a) An ability to analyze and interpret data (ABET Outcome b);
b) An ability to communicate effectively (ABET Outcome g);
c) The broad education necessary to understand the impact of engineering/science solutions in a global, economic, environmental, and societal context (ABET Outcome h);
d) A knowledge of contemporary issues (ABET Outcome j); and
e) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice (ABET Outcome k).

College Learning Outcomes:
This course will contribute to students achieving the following College-wide learning outcomes:

a) Quantitative Reasoning: Students will be able to effectively describe, interpret, apply, and evaluate quantitative information.

b) Communication: Students will be able to formulate and present ideas that reflect critical thinking skills and show awareness of audience, context, and purpose, and present a well-developed argument

c) Technological and Information Literacy: Students will be able to: use critical thinking skills to determine the information needed to solve a problem, access information using appropriate technologies, and effectively and appropriately use information to accomplish a specific purpose.

d) Values, Ethics and Diverse Perspectives: Students will be able to: demonstrate awareness of diverse cultures and values, recognize ethical issues in contemporary society, and apply ethical concepts in addressing diverse personal, professional, and societal settings.

e) Critical Thinking: Students will be able to: identify, analyze, evaluate, and develop well-reasoned arguments.

Instructional Methods:

- Class lectures, readings, and weekly discussions will allow students to engage a diverse literature on a variety of food system topics.
- Field trips to local food markets and systems to explore the diversity of food culture in Central New York.
- Student presentations on food related issues to develop communication skills and teamwork, and facilitate peer learning.
- Introduction to the computing package R, and the development of data analysis and optimization skills to design and assess complex, interrelated food systems.
- Hands-on instruction in basic culinary techniques.

Grading:		
	Homework	20%
	Class Presentations	15%
	Classroom Participation	15%
	Midterm, Oct 17 (tentative)	25%
	Final Exam/Project/Paper	25%

Academic Dishonesty:
Academic dishonesty is a breach of trust between a student, one's fellow students, or the instructor(s). By registering for courses at ESF you acknowledge your awareness of the ESF Code of Student Conduct (http://www.esf.edu/students/ handbook/StudentHB.05.pdf), in particular academic dishonesty includes but is not limited to plagiarism and cheating, and other forms of academic misconduct. The Academic Integrity Handbook contains further information and guidance (http://www.esf.edu/students/integrity/). Infractions of the academic integrity code may lead to academic penalties as per the ESF Grading Policy (http://www.esf.edu/provost/policies/documents/GradingPolicy. 11.12.2013.pdf).

Sources of Support and Class Absence:
> If you experience academic or personal difficulties that affect your studies or life, there are people and resources that will help you. There is a website that serves to answer many student questions: http://www.esf.edu/students/success. In addition, the ESF Office of Student Life, 110 Bray Hall (470-6660) will provide academic support, career guidance, personal counseling, or direct you to the proper source of help. If you encounter a situation beyond your control in which you will be missing 3 or more days of classes, you should contact the Office of Student Life and they will get in touch with all your instructors for you. Supportive documentation may be required.

Accommodations for Students with Learning and Physical Disabilities:
> SUNY-ESF works with the Office of Disability Services (ODS) at Syracuse University, who is responsible for coordinating disability-related accommodations. Students can contact ODS at 804 University Avenue- Room 309, 315-443-4498 to schedule an appointment and discuss their needs and the process for requesting accommodations. Students may also contact the ESF Office of Student Affairs, 110 Bray Hall, 315-470-6660 for assistance with the process. To learn more about ODS, visit http://disabilityservices.syr.edu. Authorized accommodation forms must be in the instructor's possession one week prior to any anticipated accommodation. Since accommodations may require early planning and generally are not provided retroactively, please contact ODS as soon as possible.

Inclusive Excellence Statement:
> As an institution, we embrace inclusive excellence and the strengths of a diverse and inclusive community. During classroom discussions, we may be challenged by different ideas. Understanding individual differences and broader social differences will deepen our understanding of each other and the world around us. In this course, all people are strongly encouraged to respectfully share their unique perspectives and experiences. This statement is intended to help cultivate a respectful environment, and it should not be used in a way that limits expression or restricts academic freedom at ESF.

Religious Observance:
> ESF protects the rights of students to observe religious holy days according to their tradition. Students will be provided an opportunity to make up any exam or work requirements that may be missed due to a religious observance provided they give the instructor reasonable advance notification.

Tentative Course Schedule:

Week of:	Topics:	Sections in Text:
August 29	Introduction to Food Systems,	Ch 1
	Course Overview	
	Introduction to Systems Engineering and	
	Linear Programming (LP),	
	Graphical Solutions to LPs	
September 5	Public Health	Ch 2
	Numerical Solutions to LPs (Solver)	
September 12	Nutrition	Ch 16
	LP Sensitivity Analyses	
	LP Applications	
September 19	Student Cultural Food System Presentations	
	Field Trip (Good Food Collective)	
	Food Consumption in the US	Ch 15
September 26	Economics of Food Systems	Ch 7
	Food Environments	Ch 17
	Sustainability	
	Mixed Integer Programming	
September 26	Crop Production	Ch 11
	Network/Distribution Problems	
	Linearization of LPs	
October 3	Student Food Nutrient Presentations	
	Food Animal Production	Ch 12
	Multiobjective Optimization	
	Introduction to nonlinear optimization	
October 10	Food Processing and Packaging	Ch 13
	Food Distribution	Ch 14
	Introduction to R	
October 17	Midterm	
October 24	Student Run Discussions:	
	Ecological Threats	Ch 3
	Health Inequities	Ch 4
	Culinary Exploration: Part 1	

Week of:	Topics:	Sections in Text:
October 31	Student Run Discussions:	
	Food Insecurity	Ch 5
	Food Security	Ch 6
	Halloween Party(?)	
	Data analyses in R	
November 7	Student Run Discussions:	
	Food Policies	Ch 8
	Food Marketing	Ch 10
	Culinary Exploration: Part 2	
November 14	Resource use and recovery	
	Sustainability measures in food systems	
November 21	Thanksgiving Break	
November 28	Class project discussions	
	Sustainability evaluations of food systems	
December 5	Final Presentations/Class Wrap-up	