

Global Learning Initiatives Program Course Syllabus

Course Information

Course Name	Bioenergy
Lecturer	WANG, HSIANG-YU
Course Description	This lecture aims at establishing the student's knowledge to fundamental principles in designing bioenergy systems, to analytic and practical experiment capabilities for bioenergy, including biohydrogen, bioelectricity, and biodiesel. By learning this lecture, the students are expected to be able to conduct independent research in bioenergy, analytical chemistry, and system design.
Course Objectives	<ul style="list-style-type: none"> • Ability to apply professional engineering and science knowledge. • Apply knowledge proficiently in the fields of low-carbon green energy, nanotechnology and system technology. • Ability to conduct experiments and simulations to survey engineering problems, and solve them independently. • Be able to read and write technical papers and give technical presentations. • Be able to integrate engineering systems, devices and processes. • Enable students to plan, lead and collaborate. (10%) • Analyze engineering problems and propose innovation solutions. • Know global development trends of industries, understand how engineering techniques influence the environment, society and world, and develop the ability to continue learning. • Understand one's professional ethics and social responsibility.
Suggested Proficiencies (if any)	

Reading List (if any)	<p>References</p> <p>1. Sustainable Bioenergy Production - An Integrated Approach, Author(s): Ruppert, Hans, Kappas, Martin, Ibendorf, Jens (Eds.), Springer. 2013.</p> <p>2. Biofuels By Ashok Pandey, Christian Larroche, Steven C. Ricke, Claude-Gilles Dussap and Edgard Gnansounou, Elsevier Inc. 2011.</p>
Grading Criteria	<p>Teaching method:</p> <p>Two hours lecture and one hour discussion per week, power point slides, tutorials, group discussions</p> <p>Evaluation:</p> <p>Take home exam 1: 30% ;</p> <p>Take home exam 2 :30 %,</p> <p>Final presentation: 40%</p>

Course Schedule

Class	Date (YYYY/MM/DD)	Course Topic	Lecturer
1		Introduction of bioenergy	WANG, HSIANG-YU
2		Principles for design and operation of bioenergy production systems	WANG, HSIANG-YU
3		Production of biohydrogen: current aspects	WANG, HSIANG-YU
4		Biohydrogen production from bio-oil and industry effluents	WANG, HSIANG-YU
5		Biohydrogen production from thermophilic reaction	WANG, HSIANG-YU
6		Analytical assays for biohydrogen production	WANG, HSIANG-YU
7		Production of biohydrogen: on future aspects	WANG, HSIANG-YU
8		Take home exam: how to improve biohydrogen production	WANG, HSIANG-YU
9		Production of bioelectricity: principles	WANG, HSIANG-YU
10		Microbial fuel cell system design	WANG, HSIANG-YU

		and current aspects	YU
11		Electrochemical analysis for microbial fuel cell systems	WANG, HSIANG-YU
12		Future aspects of bioelectricity production	WANG, HSIANG-YU
13		Take home exam: how to improve bioelectricity production	WANG, HSIANG-YU
14		Principles of producing biodiesel	WANG, HSIANG-YU
15		Production of biodiesel from vegetable oil or waste oil	WANG, HSIANG-YU
16		Production of biodiesel from microalgae	WANG, HSIANG-YU
17		Economic and future aspects of bioenergy	WANG, HSIANG-YU
18		Final presentations (opportunities of bioenergy)	WANG, HSIANG-YU