

NCHU Course Outline

中文

Course Name	(中) 永續資源、能源暨碳管理(0229)						
	(Eng.) Sustainable Energy, Resource and Carbon Management						
Offering Dept	General Education Center						
Course Type	Required	Credits	2	Teacher	吳孟真		
Department	General	Language	English	英文/EMI	Y	Semester	2024-SPRING
Course Description	<p>This course intends to provide an overview of sustainable energy resources and carbon management in our society, appropriate for the undergraduate student. We utilize lecture sessions, presentation slides, and in class discussion to engage topics. The instructor has prepared a series of online questionnaires assuming no foreknowledge of the topic to engage the student. Answering questions honestly is required. Student groups are assembled and students are tasked to take measurement equipment and design and carry out a group study project. We have the following equipment: an air quality monitor, air flow/velocity anemometer, CO2 monitor, lux light meter, particulate matter PM monitor, thermometer, and laser distance meter. The results are to be presented, articulated and discussed in 10-15 minutes per group in class.</p>						
Prerequisites						self-directed learning in the course	N

Relevance of Course Objectives and Core Learning Outcomes(%)			Teaching and Assessment Methods for Course Objectives	
Course Objectives	Competency Indicators	Ratio(%)	Teaching Methods	Assessment Methods
Topics that we are to cover are developing a basic understanding of the energy resources available in our homes and societies, force and work, heat and work, heat transfer, energy sources (such as solar, wind, fossil fuel), pollution, and recycling. Through the learnings of this course, we ask students to help plan for a sustainable future campus and society.			topic Discussion / Production Visit Exercises Discussion Practicum Lecturing	Attendance Oral Presentation

Course Content and Homework/Schedule/Tests Schedule

Week	Course Content
Week 1	能源利用及人類問題, 能源利用及永續發展 Energy Utilization and Human Issues, Energy Utilization and Sustainable Development Questionnaire 0
Week 2	能源運用概述 Energy Use Overview Questionnaire 1

Week 3	能量力學 Mechanics and Energy Questionnaire 2
Week 4	能量守恆 Conservation of Energy Questionnaire 3
Week 5	熱與功 Heat and Work Questionnaire 4
Week 6	家庭能量節約及熱傳控制 Home energy conservation and heat transfer control Questionnaire 5
Week 7	太陽能：特性和加熱 Solar energy: properties and heating Questionnaire 6
Week 8	Exam 來自化石燃料的能量 Energy from fossil fuels
Week 9	來自化石燃料的能量 Energy from fossil fuels We also discuss rubrics for group Project Presentation.
Week 10	電磁理論及發電 Electromagnetic theory and power generation Questionnaire 7 TSMC Case Study
Week 11	Project Week Questionnaire 8
Week 12	Project Week 空氣污染及能量運用 Air pollution and energy use Questionnaire 9
Week 13	溫室效應及熱污染 Greenhouse effect and thermal pollution Questionnaire 10 Time in class provided to work on group Project Presentation
Week 14	來自太陽能、風力和水力的電力 Electricity from solar, wind and hydro Questionnaire 11
Week 15	綠色清潔生產 Green and Clean Production Questionnaire 12 Project Presentation
Week 16	Project Presentation
Week 17	物質的基礎：原子及原子核 The basis of matter: atoms and nuclei Flexible Week
Week 18	Flexible Week

Evaluation

The course grading is based on attendance and participating in class discussion (25%), working through required online questionnaires (25%), an in class exam (25%), and a group project with presentation (25%). There may be problem sets available for bonus points. Attendance will be taken at the beginning of each class.

Textbook & other References

Roger A. Hinrichs, Merlin H. Kleinbach, Energy: Its Use and the Environment(5e), Brooks/Cole, 2013.

Teaching Aids & Teacher's Website	
phillip-wu.com/science	
Office Hours	
Wednesday at 10 am, Chemistry Building 422 or by appointment.	
Sustainable Development Goals, SDGs	
01.No Poverty 02.Zero Hunger 03.Good Health and Well-Being 04.Quality Education 05.Gender Equality 06.Clean Water and Sanitation 07.Affordable and Clean Energy 08.Decent Work and Economic Growth 09.Industry, Innovation and Infrastructure 10.Reduced Inequalities 11.Sustainable Cities and Communities 12.Responsible Consumption 13.Climate Action 14.Life Below Water 15.Life On Land 16.Peace and Justice 17.Partnerships for the Goals	include experience courses : Y

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