



EML 4930 | Special Topics in Mechanical Engineering: App of Thermo Solar Power Gen

Class Number: 17974

Delivery Method: Primarily Classroom

Instructor Information

Jonathan Scheffe

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Office Hours

On demand as needed.

Preferred Method of Communication: Email

Office Location

Classroom at host Universities in Almeria and Seville.

Course Details

Catalog Description: Variable content in mechanical engineering not offered in other courses.

Pre- and Co-Requisites: Prereq: Engineering major of junior standing or higher.

Credit Hours: 1-3

Course Fees: \$0.00

Additional Course Description

In this class, students will take tours to concentrating solar power plants and emerging industries in southern Spain to learn about solar-to-heat power generation, industrial decarbonization of energy intensive industries such as cement and steel, and solar fuels production for next generation aviation fuels.

Required Materials

The instructor has stated that there are no items required or recommended for this section.

Course Goals and Objectives

Students will 1) learn about manufacturing process of industry processes, such as fuels, cement and steel manufacturing, 2) learn about the energy flows and net carbon dioxide emissions of relevant industrial processes, 3) be able to describe alternative methods of industrial processing that reduce CO₂ emissions, 4) be able to detail the technological hurdles facing these alternative manufacturing approaches, 5) better understand the role of solar thermal heat in decarbonizing energy sectors and 6) be capable of discussing the economic, political and environmental implications of industrial decarbonization.

Expectations and Student Learning Outcomes

- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
- An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
- An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Methods of Evaluation

Reports

Two reports of 3000 words each are required. Each report is worth 20% of the course grade. The first report is a literature review on a topic provided by Prof. Scheffe. For the second report this will follow the lectures of provide Steinfeld and is focused on comparing and contrasting various renewable technologies with respect to 1) technological maturity, 2) costs, 3) scale (e.g. distributed versus centralized, residential, commercial, etc), and 4) their ability to integrate with various storage technologies (e.g., thermal, battery, fuels). More details to follow as the semester progresses.

Participation

Participation will be based on attendance and engagement during class and industry excursions.

Grading Scale

Letter grade and percentage

Letter	Percentage Value
A	94 - 100%
A -	90 - 93%
B +	87 - 89%
B	83 - 86%
B -	80 - 82%
C +	77 - 79%
C	73 - 76%
C -	70 - 72%
D +	67 - 69%
D	63 - 66%
D -	60 - 62%
E	59% and below

Course Schedule

Week 2 – Fundamentals of Solar Energy, Introductory Concepts, Energy Demands and Industrial Sectors

Week 3 – H₂ and Energy Storage Vectors

Weeks 4 – Concentrated Solar Power + Storage, Report 1 due May 28th, 2026

Weeks 5 – Solar Fuels + CO₂ Capture

Week 6 – Solar Photovoltaics, Report 2 July 10th, 2026

University Policies and Resources

Information about grading policies, support for students with disabilities, course evaluations, the Honor Code, and other course policies and campus resources can be found on the [Syllabus Policies page](#).

Attendance Policy

Excused and Unexcused Absences

Students may only participate in classes if they are registered officially or approved to audit with evidence of having paid audit fees. The Office of the University Registrar provides official class rolls to instructors.

Students are responsible for satisfying all academic objectives as defined by the instructor. Absences count from the first-class meeting.

Acceptable reasons for absence from or failure to engage in class include illness; Title IX-related situations; serious accidents or emergencies affecting the student, their roommates, or their family; special curricular requirements (e.g., judging trips, field trips, professional conferences); military obligation; severe weather conditions that prevent class participation; religious holidays; participation in official university activities (e.g., music performances, athletic competition, debate); and court-imposed legal obligations (e.g., jury duty or subpoena). Other reasons (e.g., a job interview or club activity) may be deemed acceptable if approved by the instructor.

For all planned absences, a student in a situation that allows an excused absence from a class, or any required class activity must inform the instructor as early as possible prior to the class. For all unplanned absences because of accidents or emergency situations, students should contact their instructor as soon as conditions permit.

Students shall be permitted a reasonable amount of time to make up the material or activities covered during absence from class or inability to engage in class activities because of the reasons outlined above.

If a student does not participate in at least one of the first two class meetings of a course or laboratory in which they are registered, and they have not contacted the department to indicate their intent, the student can be dropped from the course. Students must not assume that they will be dropped, however. The department will notify students if they have been dropped from a course or laboratory.

The university recognizes the right of the instructor to make attendance mandatory and require documentation for absences (except for religious holidays), missed work, or inability to fully engage in class. After due warning, an instructor can prohibit further attendance and subsequently assign a failing grade for excessive absences.

Religious Holidays Guidelines

At the University of Florida, students and faculty work together to allow students the opportunity to observe the holy days of their faith. A student should inform the faculty member of the religious observances of their faith that will conflict with class attendance, with tests or examinations, or with other class activities prior to the class or occurrence of that test or activity. The faculty member is then obligated to accommodate that particular student's religious observances. Because students represent a myriad of cultures and many faiths, the University of Florida is not able to assure that scheduled academic activities do not conflict with the holy days of all religious groups. Accordingly, individual students should make their need for an excused absence known in advance of the scheduled activities.

The Florida Board of Education and state law govern university policy regarding observance of religious holidays.

Guidelines

- Students, upon prior notification to their instructors, shall be excused from class or other

scheduled academic activity to observe a religious holy day of their faith.

- Students shall be permitted a reasonable amount of time to make up the material or activities covered in their absence.
- Students shall not be penalized due to absence from class or other scheduled academic activity because of religious observances.

If a faculty member is informed of or is aware that a significant number of students are likely to be absent from class because of a religious observance, the faculty member should not schedule a major exam or other academic event at that time.

A student who is to be excused from class for a religious observance is not required to provide a second party certification of the reason for the absence. Furthermore, a student who believes that they have been unreasonably denied an education benefit due to religious beliefs or practices may seek redress through the student grievance procedure.

Absence due to Illness

A student who is absent from class or any required class-related activity because of illness should contact their instructor, if feasible, as early as possible prior to the missed class or activity.

Students shall be permitted a reasonable amount of time to make up the material or activities covered during an excused absence.

Students should contact their college by the deadline to drop a course for medical reasons. Students can petition the Dean of Students Office to drop a course for medical reasons. The university's policy regarding medical excuse from classes is maintained by the Student Health Care Center.

Twelve-Day Rule

Students who participate in university-sponsored athletic or scholarly activities are permitted to be absent 12 scholastic days per semester without penalty. A scholastic day is any day on which regular class work is scheduled as defined in the approved university calendar. [More Info](#)

The student or student's advisor must notify the instructor as early as possible prior to the anticipated absence to allow ample time for accommodations. Instructors must be flexible and not penalize students when re-scheduling during-term and final exams, class assignments, and other required activities and must follow the UF Attendance Policy herein and UF Examination Policies.

As noted in the UF Examination Policies, during-term exams should be re-scheduled no later than before the end of the semester, while final exams no later than 90 days after the originally scheduled exam time. However, instructors are encouraged to re-schedule final and during-term exams, assignments, and other activities as soon as possible after the last day of the absence and must not penalize the student in any way. [More Info](#)

A group's schedule that requires absence of more than 12 scholastic days should be adjusted so that no student is absent from campus more than 12 scholastic days. Students who previously have been warned in writing by their instructor about the impact of absences on their individual class performance should not incur additional absences, even if they have not been absent 12 scholastic days. The student is responsible to maintain satisfactory academic performance and attendance.