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**FLORIDA INTERNATIONAL UNIVERSITY**  
**Department of Civil and Environmental Engineering**  
**EGN 4070: Engineering for Global Sustainability and Environmental Protection (GL)**

**Course Syllabus**

**Spring 2021**

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Office Hours: Tue 10:30 - 11:30 AM, Wed 4:00 PM - 5:00 PM Other times by appointment

**Where and when does our class meet?**

This course is delivered in a Hybrid format. Our class meets as follows:  
**Online:** for 75-90 minutes per week (\*) and  
**Face-to-Face:** 20 students per week at EC 1104 on Wednesdays from 9:30 AM to 10:45 AM  
(\*) As for any typical 3-credit course, plan on spending about 8 to 10 hours each week on readings and assignments ([FIU-FAQ How much time will I spend on coursework?](#))

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**Why should you take this course?**

This course introduces students to the theory and practical methods used for designing and creating sustainable products and infrastructure. You will learn What is sustainable development? What is the role of the engineering community in sustainable development? How do we create sustainable products and infrastructure? How do we measure how sustainable an engineering solution is? and how can you become a LEED® or envision® certified professional? In this course you will combine your knowledge from core curriculum courses in mathematics, natural and social sciences, and engineering to draw connections among the social, environmental, and economic aspects of sustainable development. Prerequisites: EGN 3001 or PHY 1048 and CHM 1045

**What does the GL designation of this course mean?**

This is a Discipline-Specific Global Learning course. The course is designed to help students meet the Global Learning (GL) Outcomes: Global Awareness, Global Perspective, and Global Engagement, and it counts toward the GL graduation requirement. In this class, you will be encouraged to move beyond the surface, dig deeper to understand abstract and complex ideas, and to examine issues from different perspectives.

**What knowledge and skills will you gain from this course?**

- Understand how earth's systems and human systems (social, economic, and technological) are interconnected, and recognize that human development both affects and is affected by changes in the processes of earth's systems at the local, regional, and global levels. **(Global Awareness)**
- Develop the ability to apply multiple-perspective thinking to understand the importance of factors such as community values and culture, and stakeholders' importance and influence on the design and development of sustainable engineering solutions, particularly infrastructure. **(Global Perspective)**
- Analyze advanced modern sustainable methods, solutions, and technologies and use metrics and indicators to evaluate to what extent these avoid or reduce harmful environmental effects and are appropriate based on local and national factors, and regional and global impact. **(Global Engagement)**
- Understand how the concepts and principles of engineering for global sustainability relate to currently used rating systems for sustainable buildings (especially LEED®) and infrastructure (envision®).

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## What textbook or other material do you need for this course?

Software/Tools:

- This is **hybrid synchronous course**, due to occupancy restrictions imposed by the ongoing pandemic, only 20 of the 41 students can be in the assigned classroom. Synchronous communication requires to have a working **computer, internet connection, a video feature** (computer camera, phone camera, etc.), and **headset or microphone**.
- We will use Canvas Collaborations. This requires that you Register/Authorize Google Drive with Canvas

Textbook and Other Learning Resources:

- This textbook is recommended to make it easier to access concepts and definitions and to study for exams: "Engineering Applications in Sustainable Design and Development" by Bradley Strickling, Adebayo A. Ogundipe, and Maria Papadakis, 1<sup>st</sup> edition.
- This is a reading-intensive course. Sustainability is a multidisciplinary field that incorporates many disciplines of science and knowledge. There is not one book that adequately covers all topics; for this reason, I have assembled the learning material from a variety of source types: academic journals, news, magazines, dissertations, reports, videos and other. Access to these will be available from Canvas.
- You will need notebook paper for class notes, required handouts, and a calculator at each meeting.

## How will you succeed in this course?

*Communication:*

Instructor-students: My primary goal as an Instructor is to support your success in this course, and to provide a pleasant learning experience. Please communicate with me as soon as possible if there are parts of the course that prevent you from learning so I can find the most effective way to help you. My preferred method of communication is through Canvas messages.

Student groups: A significant portion of the active learning component in this class is conducted in groups. Practice taking leadership roles by getting your group started and stimulating timely and constructive communication. It takes time for a new group to become a team and work to its full potential. Team members go through stages as they move from strangers to co-workers and you should understand these stages. Read: [Do teams still form, storm, norm and perform?](#) to become aware of these concepts.

*Participation and participation:*

Online and in-class participation are required in this course. As a student-centered learning classroom, you are expected to assume the responsibility for your learning, to approach learning with commitment, persistence, and an attitude of curiosity. Carefully prepare to participate in all in-class activities by following the instructions and specifications provided on Canvas for the assignments. Real-world problems and situations very often don't have "one right answer," so don't fret with coming to a specific conclusion but think carefully and support your ideas with evidence from the preparation material. Participate in-class by sharing ideas, asking questions, and contributing to clarification and a better, more global understanding.

*Collaboration:*

Our class relies on group discussions and collaborative writing or presentations. Online activities prepare you for in-class activities and vice versa. Contribute to your group success by understanding the importance of shared responsibility and embracing opportunities to contribute.

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## How will you and I evaluate your progress?

*Coursework assignments divided into two categories:*

- *Out-of-Class (Home) assignments (30%):*

You will use information from research, face-to-face instruction, and class discussion to complete individual home assignments based on these activities.

- *In-class assignments and presentations (30%):*

You will use the resources posted on Canvas (read, view, and write notes) before face-to-face meetings and come well-prepared to use the information to engage in classroom activities and graded assignments. In-class assignments include collaborative writing, and informal or semi-formal group presentations. Some out-of-class coordination is required for face-to-face group presentations.

*Participation in a "community" event (10%):*

Community participation and community engagement are central aspects of sustainability that support goals related to teaching, learning, contributing, and creating. You are required to participate in one in person or virtual "community" event related to sustainability or sustainable development and complete a concluding assignment designed for the specific event. The list of possible events is provided, please sign up for one by the end of January.

*Quizzes (30%):*

Canvas quizzes to test your understanding of fundamental concepts.

Letter Grade for this course will be assigned based on the following scale:

94 ≤ A < 100	87 ≤ B < 94	70 ≤ C < 77
90 ≤ A- < 94	80 ≤ B- < 83	60 ≤ D < 70
87 ≤ B+ < 90	77 ≤ C+ < 80	F < 60

## Requirements for Writing Assignments:

- Include complete heading information: student's full name and panther ID, course ID and name, Instructor's full name, assignment date, and assignment title.
- Unless otherwise noted, all out-of-class assignments must be typed using Microsoft Words: Times New Roman (or equivalent) 11-point font, spacing set at Single, margins set at 1" each top, bottom, left and right sides of page. Typed assignments must also include a footer with student's name and page number.
- Include each problem or question statement completely in all assignments.
- Complete assignments following specified instructions and by the due date.
- If required, include citations and list of references in the appropriate format (APA or MLA).

## Course Expectations and Policies:

- I expect that you practice the professional attitudes that are important to become prepared for the practice of engineering at all levels. These attitudes include creativity, curiosity, persistence, honesty, dependability, and flexibility.
- The face-to-face meeting time in a Hybrid course is precious, two rules will help minimize distractions and maintain a productive learning atmosphere:
  - Arrive to class (virtual or in person) on time, well-prepared to participate in classroom activities, and well-equipped (notebook paper, class notes, and a calculator).
  - The use of cell phones, audio and video recording of any classroom activity are prohibited.

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- Electronic tablets and laptops may be used only with explicit permission from the Instructor to conduct synchronous group work with students in the class.
- Attendance to all face-to-face sessions is required, particularly because your absence may compromise the education and grade of your group members.
- In-class and out-of-class activities and assignment either complement or depend on each other. All assignments must be completed by the due date. Late assignments will not be accepted.
- Out-of-class assignments must be submitted by 7:00 PM on the Tuesday before class meets for the week.
- Excused absences will generally be granted for emergencies (covid-19 positive, acute illness, accidents, death of immediate family member). Excused absences might be granted in the following cases: health needs (non-acute), military obligation, and religious holidays, if communicated prior to the missed class. Supportive documentation is required for all absences.

### Academic Misconduct:

Academic dishonesty and disruptive conduct undermines the educational experience for everyone. FIU expects that all members of its academic community adhere to the highest ethical and professional standards. Students should be familiar with rules and policies concerning academic misconduct. Review the Undergraduate Academic Misconduct Policy (Compliance) and the Student Code of Conduct and complete the Quiz on Canvas.

### Accessibility and Accommodation:

The Disability Resource Center (DRC) collaborates with university faculty to provide inclusive learning environments. If you have a disability and wish to utilize academic accommodations, additional information may be found in the DRC's website: [drc.fiu.edu](http://drc.fiu.edu).

### ABET Outcomes:

This course is designed to support instruction and provide assessments aligned with specific ABET Student Outcomes ([www.abet.org](http://www.abet.org)). Thus, students who successfully complete the course should be able to demonstrate:

- (4) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- (5) 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.
- (7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

### NOTICE:

The Instructor reserves the right to change or modify the course schedule for reasons including, but not limited to, acts of nature, changes in the availability of materials and equipment, and other unforeseen conditions. If such a need arises, it will be promptly communicated to the class in person, via Canvas, or e-mail. Changes to the Schedule and to any other associated parts of the Syllabus may be necessary in the event of reasonable circumstances including, but not limited to, acts of nature, and changes in University schedules.

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Week	Module	Out-of-Class Work	Face-to-Face meeting	What's Due This Week
M Jan 11	Module 0: Introduction and Getting Started	<ul style="list-style-type: none"> <li>Understand the Syllabus</li> <li>Read the “The Rationale for Developing Global Competence” article (14 pages)</li> <li>Start Module 1 Home Assignment</li> </ul>	<ul style="list-style-type: none"> <li>Get to know each other (5 min)</li> <li>Discuss formation of groups (5 min)</li> <li>Class discussion on the results from the “Global Competence...” Survey (15 min)</li> <li>Instruction to introduce Module 1 (15 min)</li> <li>Clarify Module 1 Home Assignment (10 min)</li> </ul>	<p>Tu Jan 12, 7PM via Canvas: Syllabus Quiz Global Competence...” Survey (participation points earned)</p> <p>We Jan 13 in-class: Knowledge Survey (15 min)</p>
M Jan 18	Module 1: Historical context and future vision	<ul style="list-style-type: none"> <li>Complete Module 1 Home Assignment</li> <li>Review Canvas content: M01: Historical Context of Sustainable Development and Sustainability for in-class Quiz</li> <li>Start Module 2 Activities/Assignment NOVA-Earth from Space</li> </ul>	<ul style="list-style-type: none"> <li>Class discussion to finish Module 1 (15 min)</li> <li>Teaching Module 2 (concepts and Assignments) (25 min)</li> </ul>	<p>Tu Jan 19, 7PM via Canvas: Module 1 Assignment 1 (M01H) start</p> <p>We Jan 20 in-class: Module 1 finish (Quiz)</p>
M Jan 25	Module 2: Interrelatedness of earth's systems and human systems	<ul style="list-style-type: none"> <li>Complete Module 2.1 Assignment based on NOVA-Earth from Space</li> <li>Start Module 2.2 Activities/Assignment Work on System Perturbation</li> </ul>	<ul style="list-style-type: none"> <li>Clarification to start Module 2 group assignment (10 min)</li> <li>Introduce Assignment 2.2 (last 10 min)</li> </ul>	<p>Tu Jan 26, 7PM: Module 2 Assignment 2.1 (NOVA-Earth from Space) (M02.1H)</p> <p>We Jan 27 in-class: NOVA-Earth from Space (collaborative writing – starts 40 min) (M02.1 C)</p>
M Feb 1		<ul style="list-style-type: none"> <li>Complete Module 2.2 Assignment</li> <li>Start Module 3 Activities/Assignment</li> </ul>	<ul style="list-style-type: none"> <li>Clarification to start final part of Module 2 group assignment (5 min)</li> </ul>	<p>Tu Feb 2, 7PM: Module 2 Assignment 2.2 (M02.2H)</p> <p>We Feb 3 in-class: Module 2 Assignment 2.2 (collaborative writing – ends 45 min) (M02.2 C)</p>
M Feb 8 hiatus				
M Feb 15	Module 3: The nature of resources	<ul style="list-style-type: none"> <li>Complete Module 3 Reading for the Quiz and take the Quiz as soon as possible (open Feb 3)</li> <li>Read the material for your individual assignment and group assignment. Understand the assignments</li> </ul>	<ul style="list-style-type: none"> <li>Teaching Module 3 (concepts and Assignments)</li> </ul>	<p>Tu Feb 9, 7PM: Module 3 Quiz closes (M03.1HQ)</p>
M Feb 22		<ul style="list-style-type: none"> <li>Complete Module 3 Activities/Assignment</li> </ul>	<ul style="list-style-type: none"> <li>Groups presentations</li> <li>Audience Poll questions</li> </ul>	<p>Tu Feb 23, 7PM: Group Presentations –for students/groups presenting (M03.1C/h)</p> <p>We Feb 24 in-class: Half of the groups present (M03.1C/h)</p>

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M Mar 1		<ul style="list-style-type: none"> <li>Complete Module 3 Activities/Assignment</li> </ul>	<ul style="list-style-type: none"> <li>Groups presentations</li> <li>Audience Poll questions</li> </ul>	<p>Tu Mar 2, 7PM: Group Presentations –for students/groups presenting (M03.1C/h)</p> <p>We Mar 4 in-class: Remaining half of the groups present (M03.1C)</p>
M Mar 8	Module 4: Sustainability indicators, metrics and assessment tools	<ul style="list-style-type: none"> <li>Progress on Module 4 Activities/Assignment</li> </ul>	<ul style="list-style-type: none"> <li>Teaching Module 4 (Concepts and Assignment) (30 min)</li> <li>Module 4 in-class assignment starts</li> </ul>	<p>Tu Mar 9, 7PM: Submit your group's progress on M04.1</p> <p>We Mar 10 in-class: In-class M04.2 starts</p>
M Mar 15		<ul style="list-style-type: none"> <li>Complete Module 4 Activities/Assignment</li> </ul>	<ul style="list-style-type: none"> <li>Module 4 in-class assignment ends</li> </ul>	<p>Tu Mar 16, 7PM: Submit your group's completed M04.1</p> <p>We Mar 17 in-class: Complete M04.2</p>
M Mar 22	Module 5: Principles and Practice of Engineering for Sustainability	<ul style="list-style-type: none"> <li>Review Module 4 and Complete Module 5 Reading for the Quiz and take the Quiz as soon as possible (open Mar 16)</li> <li>Complete Module 5 Individual Activities/Assignment</li> </ul>	<ul style="list-style-type: none"> <li>Teaching Module 5 (concepts and group Assignment) (30 min)</li> </ul>	<p>Tu Mar 23, 7PM: Module 4+5 Quiz open (M04-5.1HQ) Submit your individual M05.1</p> <p>We Mar 24 in-class: Individual participation/engagement</p>
M Mar 29		<ul style="list-style-type: none"> <li>Complete Module 5 Activities/Assignment</li> </ul>	<ul style="list-style-type: none"> <li>Instructions and clarifications for M05.1C</li> </ul>	<p>Tu Mar 30, 7PM: Module 4+5 Quiz due (M04-5.1HQ)</p> <p>We Mar 31 in-class: Collaborative group assignment M05.1C</p>
M Apr 5	Module 6: Sustainability and the built environment	<ul style="list-style-type: none"> <li>Complete Module 6 Individual Activities/Assignment</li> </ul>	<ul style="list-style-type: none"> <li>Teaching Module 6 (concepts and group Assignments) (60 min)</li> </ul>	<p>Tu Apr 6, 7PM: Individual assignment M06.1H due</p> <p>We Apr 7 in-class: Individual participation/engagement</p>
M Apr 12		<ul style="list-style-type: none"> <li>Complete Module 6 Activities/Assignment</li> </ul>	<p>Module 6:</p> <ul style="list-style-type: none"> <li>Energy Benchmarking,</li> <li>Green Infrastructure,</li> <li>Conservation development</li> </ul>	<p>Tu Apr 13, 7PM: Group Presentations M06.1 C/h</p> <p>We Apr 14 in-class: Group Presentations M06.1 C/h</p>

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M Apr 19		Complete Module 6 Activities/Assignment	Module 6: <ul style="list-style-type: none"><li>Envision verified Projects</li></ul>	Tu Apr 19, 7PM: Group Presentations M06.2 C/h  We Apr 20 in-class: Group Presentations M06.2 C/h
Apr 19-24	EXAM WEEK			

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