UNIVERSITY OF MAINE

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

CIE 210: SUSTAINABILITY IN ENGINEERING

Semester : Summer 2018

Credits : 3

Instructor : Miltiades Zacas, PhD, P.E.
- Faculty Associate, Civil and Environmental Engineering at University of Maine,
- Geotechnical Engineering Consultant with FGS/CMT, inc.-Bangor, Maine

tel: (207) 581-2171, (207) 947-3184
e-mail: miltiades.zacas@maine.edu

Prerequisites No specialized background in engineering, sciences or social sciences is required.

COURSE FORMAT:
All lectures and exams for this course are accessed via the Internet on Blackboard at http://bb.courses.maine.edu. The course contains 14 Lecture Units; it will last 14 weeks; topics to be covered per week are shown under “Tentative Course Schedule”.

TECHNICAL ASSISTANCE

For all matters related to access to the course website and technical assistance do not contact your instructor but contact the CED help center:
Help Line Phone Number: 1-877-947-4357
Email: dlltechhelp@maine.edu

COMMUNICATING WITH THE PROFESSOR:
The main form of communication for this course will be online through Blackboard and email. For questions about course material and exams, not answered in the syllabus or announcements, please post questions for each other to the Discussion Board (see tab on course menu in Blackboard). Please use proper Netiquette, as your questions are viewed
by the entire class. For questions, not covered above, please email me at: miltiades.zacas@umit.maine.edu. I will try to respond within 24 hours if an email or post is received during the week (Monday – Friday). If you send a post or an email on Friday afternoon or over the weekend, you will receive a reply within 48 hours.

HARDWARE AND SOFTWARE REQUIREMENTS:
- High-speed internet access (DSL or cable)
- Mozilla Firefox web browser is recommended (available for download at no cost) http://www.mozilla.org/en-US/
- Adobe Acrobat Reader (available for download at no cost): http://get.adobe.com/reader/
- Microsoft Word (if you do not have Microsoft word, download Open Office for free at http://www.openoffice.org)

You are strongly advised to contact CED Help Center and check compatibility of your computer operating system and programs with blackboard course requirements. Do it immediately at the beginning of the course, not just before your exams.

ACCESSING THE COURSE WEBSITE:
This course is located on Blackboard. You may access the course website by typing in http://www.courses.maine.edu into your Internet Browser’s URL bar (Mozilla Firefox web browser is highly recommended). Type in your username and password and click on the Login button. Your login information should be the same user name and password that are used to access your MaineStreet account and your UNET (yourname@maine.edu) account. On the right side of the page under “My Courses”, you will now see a list of courses. Please click on “CIE 210-0990: Sustainability in Engineering (Summer 2016)”. The Home page for this course will appear. On the left side of the page, you will see a course menu with links to the course syllabus, lecture units, exams, discussion and announcement boards. If you have any problems with logging in, accessing the course or need technical assistance, please contact: Help Line Phone Number: 1-877-947-4357 Email: cedtechhelp@umit.maine.edu

COURSE DESCRIPTION
As the global population grows and standards of living improve, there will be increasing stress on the world's limited resources. Thus engineers of the future will be asked to manage the earth's resources more efficiently and produce less waste, while at the same time to satisfy an ever-increasing demand for goods and services. To prepare for such challenges, engineers will need to understand the impact of their decisions on built systems, natural systems and society. Engineers must be capable of working closely with planners, decision makers, and the general public.
The course is designed to encourage students to think from a different perspective. Students will be introduced to social, environmental, economic, ethical, political, and cultural aspects of sustainable development, as well as to how each of these influences the others. Particular emphasis is placed on understanding the sustainability and sustainable development problems our society faces. Emphasis is also placed on the need to shape and develop all human activity and procedures to be compatible with or enhance the natural systems.

**COURSE GOALS**

After completing the course, the students will be expected to: (1) better understand natural systems and how human actions should adapt and adjust to natural systems and vice-versa; (2) acquire new skills and tools for finding common themes of concern, asking critical questions and providing more holistic answers to those questions, as well as for integrating economic, social, and environmental aspects into decision making; and (3) develop new ways of thinking to become problem framers and leaders of change for sustainability.

**COURSE LEARNING OUTCOMES**

After completing the course, the students will be able to:

1. Describe the sustainability concepts;
2. Associate sustainability with population and resource availability;
3. Discuss the importance, across various areas of engineering, of implementing sustainability concepts in design, product development and processes;
4. Summarize the role and responsibility of engineers in sustainable development;
5. Demonstrate the impact of engineering on the social and natural environment and examine alternative environmental solutions to problems;
6. Distinguish professional, environmental and social ethics;
7. Identify the ethical responsibilities of engineers in sustainable development;
8. Explain the problems that engineers face working under environmental, social and ethical constraints;
9. Acquire new ways of thinking to become problem framers and leaders of change for sustainability in society.

**TEXTBOOKS**

No textbook will be required. Required readings will include various papers/articles either available at the library or sent electronically to the students (the article itself or corresponding web link).
EXPLANATION OF COURSE FORMAT AND REQUIREMENTS
This course follows a weekly schedule. Please be sure to check the course schedule often (see below for course schedule) to take the exams on time. Communications regarding lecture units and exams will be made via Blackboard. **It is your responsibility to check the blackboard site for announcements every day.** The different components of the course may be accessed from the course menu on the left side of the page, once you are logged on to Blackboard.

**Weeks and Lectures**
The course will be completed in six, (6), weeks. Each week will contain two to three Lecture Units which are going to be available on the course website under the “Weeks/Lecture Units” tab. In total, there will be twelve Lecture Units. Each unit will contain a text, assigned readings and possibly video (s) by your instructor or other sources. Please read the text, the assigned readings and watch the video (s).

**Grade**
Your final grade will be determined as follows:

Exams 100%

**Exams**
There will be four, (4), exams during the semester. **THERE IS NO FINAL EXAM.** Each exam will be composed of multiple choice and/or true/false questions. The exam grades will count as 100% (4x25%) toward the final grade. To prepare for the exam, please study your lecture notes and assigned readings. Each exam will be available for 24 hours during the dates listed on this syllabus under “Tentative Course Schedule”. Exams may be accessed from the “Exam” tab on the course website. The number of minutes allotted for each exam will be specified by you instructor on the exam page; usually it will be between 50 and 70 minutes. Once you begin the exam, you must complete it; **there is no pausing or stopping; if you pause or stop, time is still running. You must complete the exam within the allotted timeframe to receive credit for each exam.** Your exam grades will be provided via the course website on Blackboard.

**Grading scale**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>less than 60%</td>
</tr>
<tr>
<td>D-</td>
<td>60% - 63.5%</td>
</tr>
<tr>
<td>D</td>
<td>63.6% - 66.9%</td>
</tr>
<tr>
<td>C-</td>
<td>70% - 73.5%</td>
</tr>
<tr>
<td>C</td>
<td>73.6% - 76.9%</td>
</tr>
<tr>
<td>B</td>
<td>80% - 83.5%</td>
</tr>
<tr>
<td>B-</td>
<td>83.6% - 86.9%</td>
</tr>
<tr>
<td>A</td>
<td>87% - 89.9%</td>
</tr>
<tr>
<td>A-</td>
<td>90% - 94.9%</td>
</tr>
<tr>
<td>A</td>
<td>95% - 100%</td>
</tr>
</tbody>
</table>

**B+** (87% - 89.9%)  **C+** (77% - 79.9%)  **D+** (67% - 69.9%)
COURSE POLICIES

University Policies
The University of Maine shall not discriminate on the grounds of race, color, religion, sex, sexual orientation, national origin or citizenship status, age, disability, or veteran status in employment, education, and all other areas of the University.

Academic honesty
Academic honesty is very important. It is dishonest to cheat on exams, to copy term papers, to submit papers written by another person, to fake experimental results, or to copy or reword parts of books or articles into your own papers without appropriately citing the source. Students committing or aiding in any of these violations may be given failing grades for an assignment or for an entire course, at the discretion of the instructor. In addition to any academic action taken by an instructor, these violations are also subject to action under the University of Maine Student Conduct Code. The maximum possible sanction under the student conduct code is dismissal from the University.

Students with disabilities
If you have a disability for which you may be requesting an accommodation, please contact Disabilities Services, 121 East Annex, 581-2319, as early as possible in the term.

Course schedule disclaimer (disruption clause)
In the event of an extended disruption of normal classroom activities, the format for this course may be modified to enable its completion within its programmed time frame. In that event, you will be provided an addendum to the syllabus that will supersede this version.

Sexual Discrimination Reporting
The University of Maine is committed to making campus a safe place for students. Because of this commitment, if you tell a Professor about an experience of sexual assault, sexual harassment, stalking, relationship abuse (dating violence and domestic violence), sexual misconduct or any form of gender discrimination involving members of the campus, your Professor is required to report this information to the campus Office of Sexual Assault & Violence Prevention or the Office of Equal Opportunity.

If you want to talk in confidence to someone about an experience of sexual discrimination, please contact these resources:
For confidential resources on campus: Counseling Center: 207-581-1392 or Cutler Health Center: at 207-581-4000.

For confidential resources off campus: Rape Response Services: 1-800-310-0000 or Spruce Run: 1-800-863-9909.

Other resources: The resources listed below can offer support but may have to report the incident to others who can help:

For support services on campus: Office of Sexual Assault & Violence Prevention: 207-581-1406, Office of Community Standards: 207-581-1409, University of Maine Police: 207-581-4040 or 911. Or see the OSAVP website for a complete list of services at http://www.umaine.edu/osavp/

Other Class Policies

- Students must adhere to the University of Maine Conduct Code.
- Absence from exams because of extenuating circumstances (e.g. death or tragedy or illness) must be reported to the instructor prior to the exam and adequately documented.
- A make-up exam will only be allowed for those students 1) who are ill (with a doctor’s note or health center note), 2) who have an emergency (must show appropriate documentation), or 3) who have a UMaine engagement (requires documentation, and you must email me 1 week prior to the exam). Makeup exams will be not be given unless the instructor is contacted prior to the exam or the day of the exam (in case of illness).

Netiquette

It refers to network etiquette. Please use proper netiquette when communicating via email and the question board. Read the “Core Rules of Netiquette” at http://ludost.net/netiquette/0963702513p32.html before sending an email or posting to the question board in this course. More information about course netiquette may be found under the “Start Here” tab on the course website.

Course Schedule Disclaimer (Disruption Clause)

In the event of an extended disruption of normal classroom activities, the format for this course may be modified to enable its completion within its programmed time frame. In that event, you will be provided an addendum to the syllabus that will supersede this version.
### TENTATIVE COURSE SCHEDULE/OUTLINE

<table>
<thead>
<tr>
<th>Weeks</th>
<th>Lecture Units posting dates</th>
<th>Topics</th>
<th>Exams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>(May 14-15)</td>
<td>Lecture Unit 1: Sustainability &amp; Sustainable Development</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lecture Unit 2: Big issues of our world impacting sustainability/sustainable development</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lecture Unit 3: Big issues of our world impacting sustainability/sustainable development</td>
<td></td>
</tr>
<tr>
<td>Week 2</td>
<td>(May 21-22)</td>
<td>Lecture Unit 4: Sustainable Development and Engineering</td>
<td><strong>Exam1</strong> (on material from Lecture Units 1, 2, and 3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lecture Unit 5: Sustainable Development and Engineering (continued)</td>
<td><em>Due Date: May 24</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lecture Unit 6: Engineering and Sustainable Infrastructure</td>
<td></td>
</tr>
<tr>
<td>Week 3</td>
<td>(May 28-29)</td>
<td>Lecture Unit 7: Engineering and Sustainable Infrastructure (continued)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lecture Unit 8: Ethical dimensions of Sustainable Development</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Measuring Sustainability/Sustainable Development</td>
<td></td>
</tr>
<tr>
<td>Week 4</td>
<td>(June 4-5)</td>
<td>Lecture Unit 9: Measuring Sustainability/Sustainable Development – Organizing Indicators</td>
<td><strong>Exam2</strong> (on material from Lecture Units 4, 5, 6, and 7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lecture Unit 10: Measuring Sustainability/Sustainable Development – Assessment of Sustainability – Rating Systems</td>
<td><em>Due Date: June 7</em></td>
</tr>
</tbody>
</table>
| Week 5 (June 11-12) | **Lecture Unit 11** - Natural Hazards, Extreme Events and Sustainable Infrastructure  
**Lecture Unit 12** - Recycled Materials in sustainable engineering  
Some Concluding Thoughts  
**Lecture Unit 13** - Articles and case studies, which illustrate the ideas/principles outlined in the text of the units | **Exam3**  
(on material from Lecture Units 8, 9, and 10)  
*Due Date: June 14* |
|---|---|---|
| Week 6 (June 18-19) | **Summary** | **Exam4**  
(on material from Lecture Units 11, 12, and 13)  
*Due Date: June 21* |

**NOTES:**  
THERE IS NO FINAL EXAM