CEM 480: Sustainable Construction

Department of Civil and Environmental Engineering and Construction
Howard R. Hughes College of Engineering
University of Nevada, Las Vegas
Fall 2021

Catalog data:

Descriptions in the catalogs for the four courses are slightly different. The common thread is: **Overview of the regulatory, social, environmental, and economic impacts of sustainable planning, design and construction.** 3 credits. Credit at the 600-level requires additional work.

Prerequisites:
Advanced Standing in College of Engineering

Course meeting days/hours/location:

Online, non-synchronous. The course has weekly assignments and deadlines.

Instructor:

Contact:

Office hours:

Course Description:

In this course we consider the regulatory, environmental, social, and economic impacts of sustainable planning, design, and construction of the built environment in the contexts of natural constraints and human-imposed policies and practices. The built environment encompasses ***civil infrastructure*** as well as ***buildings***.

Students are exposed to several green-construction ***rating systems***. The Leadership in Energy and Environmental Design (**LEED**) system for buildings and the **Envision** system for civil infrastructure are emphasized. This exposure puts the successful student in a good position to prepare and test for **credentials**: the LEED Green Associate, which is administered by the Green Building Certification Institute, and the Envision Sustainability Professional, which is administered by the Institute for Sustainable Infrastructure. Credentialing is not a course requirement; additional preparation and fees would be involved. Still, the possession of one or both credentials could differentiate an A/E/C (architecture/engineering/construction) applicant's resume from the rest of the field – something to consider.

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Course format:
This course **is reading- and writing-intensive**. It is conducted online, asynchronously; there are no group meetings and no required attendance at fixed times. Content is conveyed via weekly modules using WebCampus <https://www.it.unlv.edu/webcampus>. In lieu of lectures, students are expected to examine and respond/react to all assigned content, which will involve among other things reading ***all*** posted narrative and most of the required textbook, and participating regularly in online discussions.

Textbooks / Materials

All are available online via the UNLV Libraries. The primary book can be checked out for the entire semester, while the supplementary book is accessible only short-term.

Required:

- **Primary:** Kibert, C.J. (2016). *Sustainable Construction: Green Building Design and Delivery*, 4th edition. Wiley. Note the publication year and think about how much our world has changed since then. We will be supplementing the textbook content with more current sources accessed online. This book emphasizes buildings, whereas the course scope also incorporates civil infrastructure.
- **Supplementary:** Reddy, K.R., Cameselle, C. and Adams, J.A. (2019). *Sustainable Engineering: Drivers, Metrics, Tools, and Applications*. Wiley. This book broadens scope beyond buildings to embrace civil infrastructure, and it brings key content in resiliency and sustainability metrics. Some assignments that arise late in the semester will require its use.

Recommended:

- Kelly, W.E., Luke, B., and Wright, R.N. (2017). *Engineering for Sustainable Communities: Principles and Practices*. ASCE.

Computer usage:

- Mandatory use of WebCampus, word processing software, and presentation software with audio & video.

Learning objectives:

Upon successful completion of the course, all students will be able to:

- convey the mandate for sustainability in the built environment
- formulate an overview of the built environment from both technical and policy perspectives as it relates to sustainability
- identify considerations with which to evaluate sustainable projects and communities
- enumerate and appraise rating systems available for sustainable construction, emphasizing LEED and Envision
- discuss the planning, design, and construction of sustainable systems in the built environment
- describe concepts and conduct of lifecycle assessments of built-environment systems and components

- convey the mandate for resilience in the built environment, and express how it relates to sustainability

Students completing at the graduate level will also have:

- conducted team-based independent inquiry on a sub-topic related to sustainability of the built environment
- obtained information through a variety of sources, conducted a critical assessment, and drawn relevant and meaningful conclusions
- presented findings to a diverse audience

Weekly course modules:

1. Sustainability and its Triple Bottom Line (Kibert, Chapter 1)
2. Environment, ethics, and social justice in the built environment (Kibert, Chapter 2)
3. Ecological design (Kibert, Chapter 3)
4. Assessing high-performance green construction
   - Kibert, Chapter 4
   - Regenerative design and The Living Building Challenge
   - Sustainable urban and regional planning
5. Rating systems for sustainable buildings
   - US Green Building Council's **LEED** system (Kibert, Chapter 5)
   - The Green Globes system (Kibert, Chapter 6 - brief introduction only)
6. Sustainable civil infrastructure and the Envision rating system
   - The Institute for Sustainable Infrastructure's **Envision** system
7. Planning and design for high-performance green building: structures and formats (Kibert, Chapter 7)
8. Site selection and management
   - The sustainable site and landscape (Kibert, Chapter 8)
   - Ecosystem protection and restoration
9. Energy and atmosphere in the built environment (Kibert, Chapter 9)
10. Water efficiency (Kibert, Chapter 10)
11. Materials and system lifecycles
    - Closing materials loops (Kibert, Chapter 11)
    - Lifecycle analyses (Reddy et al.)
12. Climate change and carbon footprint (Kibert, Chapter 12)
13. Indoor environmental quality
    - Kibert, Chapter 13
    - Well Building Standard
14. Resilience, class projects
    - Resilience in urban planning and infrastructure; its relation to sustainability (Reddy et al.)
    - Students enrolled at the graduate level work throughout the semester to complete a **project** of their choosing, related to sustainability of the built environment and subject to instructor approval, in teams of two or three. They present their work for the benefit of the entire class.

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Course components and weighting to compute course grade

Component	400-level (undergraduate)	600-level (graduate)
Assignments	25 %	20 %
Discussions	25 %	15 %
Project	N/A	25 %
Mid-term exam	25 %	20 %
Final exam	25 %	20%

Class policies and other pertinent information:

Assignments:
Weekly assignments will be due as directed on WebCampus. Most work is due on **Wednesdays**. There are **Friday** deadlines for teamwork assignments and discussion posts. Graduate-project deliverables are due on **Tuesdays**. If an assignment deadline falls on an official recess, the due date shifts to the next weekday. All deadline times are 8 pm.

Written communication:
Successful professionals write professionally. Submitted work must have appropriate composition and formatting; this will be a factor in grading of all deliverables.

Late policy:
Late work will not normally be accepted unless prior arrangements are made.

Examinations:

- **Mid-term exam** will be held on **Wednesday, October 13.**
- **Final exam** will be held on **Wednesday, December 8.**
- For each exam, reserve in your schedule a 2-hour block of your choosing between 8 am and 8 pm (start time no later than 6 pm).
- A missed examination without prior arrangements will count as a zero grade.

Grading:

- If your overall grade is 90% your letter grade will be no less than* A- ("superior knowledge")
- If your overall grade is 80% your letter grade will be no less than* B- ("above average knowledge")
- If your overall grade is 70% your letter grade will be no less than* C ("average knowledge")
- If your overall grade is 60% your letter grade will be no less than* D-.
- If your overall grade is less than 60% your letter grade will be F.

* Notes:

1. Deductions will be made for insufficient participation, particularly for failure to meet obligations that impact other students such as contributing to and especially leading discussions.

2. Plus and minus grades are not normally assigned in this course.

Key dates: Refer to semester schedule: https://www.unlv.edu/registrar/calendars

UNIVERSITY POLICIES

Public Health Directives
Face coverings are mandatory for all faculty and students in the classroom. Students must follow all active UNLV public health directives while enrolled in this class. UNLV public health directives are found at https://www.unlv.edu/coronavirus/health-requirements. Students who do not comply with these directives may be asked to leave the classroom. Refusal to follow the guidelines may result in further disciplinary action according to the UNLV Code of Student Conduct, https://www.unlv.edu/sites/default/files/page_files/27/StudentConduct-Code.pdf, including being administratively withdrawn from the course.

Academic Misconduct
Academic integrity is a legitimate concern for every member of the University community. We all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility, and professionalism. By choosing to join the UNLV community, students accept the expectations of the Student Academic Misconduct Policy, and are encouraged to always take the ethical path whenever faced with choices. Students enrolling at UNLV assume the obligation to conduct themselves in a manner compatible with UNLV's educational mission. An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another person, from the Internet or any other source without proper citation of the source(s). See the Student Conduct Code, https://www.unlv.edu/studentconduct/student-conduct.

Auditing Classes
Auditing a course allows a student to continue attending the lectures and/or laboratories and discussion sessions associated with the course, but the student will not earn a grade for any component of the course. Students who audit a course receive the same educational experience as students taking the course for a grade, but will be excused from exams, assessments, and other evaluative measures that serve the primary purpose of assigning a grade.

Classroom Conduct
Students have a responsibility to conduct themselves in class and in the libraries in ways that do not interfere with the rights of other students to learn, or of instructors to teach. Use of devices such as cellular phones and pagers, or other potentially disruptive activities are only permitted with the prior explicit consent of the instructor. Students are specifically prohibited to record classes without instructor authorization, including online/remote classes (either audio only, or video and audio). The instructor may rescind permission at any time during the class. If a student does not comply with established requirements or obstructs the functioning of the class, the instructor may initiate an administrative withdrawal of the student from the course.

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Since the COVID-19 pandemic forced some instruction to be delivered remotely starting in Spring 2020, numerous students have asked instructors to record their synchronous classes, so that they can access them at their convenience. Instructors who agree to record their classes (audio only, or video and audio) should inform students in advance. Recorded lectures may not be broadly released to anyone, but made available exclusively to those students enrolled in the class during the particular academic term. Recorded lectures must be stored securely, and are subject to the Nevada System of Higher Education's Records Retention Policy, meaning that the recordings can only be deleted 120 days after the end of class (i.e., after grades are posted). Once this requirement is met, the recordings should be deleted. Class recordings are protected from disclosure, as they are deemed part of an educational record under the Family Educational Rights and Privacy Act (FERPA).

Copyright
The University requires all members of the University Community to familiarize themselves with, and to follow copyright and fair use requirements. You are individually and solely responsible for violations of copyright and fair use laws. The University will neither protect nor defend you, nor assume any responsibility for employee or student violations of fair use laws. Violations of copyright laws could subject you to federal and state civil penalties and criminal liability, as well as disciplinary action under University policies. Additional copyright policy information is available at https://www.unlv.edu/provost/copyright.

Disability Resource Center (DRC)
The UNLV Disability Resource Center (Student Services Complex, SSC-A, Room 143, https://www.unlv.edu/drc, telephone 702-895-0866) provides resources for students with disabilities. Students who believe that they may need academic accommodations due to a permanent disability, temporary or permanent medical need, or academic support due to pregnancy are encouraged to contact the DRC as early as possible in the academic term. A Disabilities Specialist will discuss what options may be available to you. Students who are already registered with the DRC should request their accommodations online each semester, and make an appointment to discuss their accommodations with their instructors.

Final Examinations
The University requires that final exams given at the end of a course occur on the date and at the time specified in the Final Exam schedule. The Final Exam schedule is typically available at the start of the semester, and the classroom locations are available approximately one month before the end of the semester. See the Final Exam Schedule, https://www.unlv.edu/registrar/calendars.

Identity Verification in Online Courses
All UNLV students must use their Campus-issued ACE ID and password to log in to WebCampus-Canvas.

UNLV students enrolled in online or hybrid courses are expected to read and adhere to the Student Academic Misconduct Policy, https://www.unlv.edu/studentconduct/misconduct/policy, which states that "acting or attempting to act as a substitute for another, or using or attempting to use a substitute, in any academic evaluation or assignment" is a form of academic misconduct.

Intentionally sharing ACE login credentials with another person may be considered an attempt to use a substitute, and could result in investigation and sanctions, as outlined in the Student Academic Misconduct Policy.

UNLV students enrolled in online courses are also expected to read and adhere to the Acceptable Use of Computing and Information Technology Resources Policy, https://www.it.unlv.edu/policies/acceptable-use-computing-and-information-technology-resources-policy, which prohibits sharing university accounts with other persons without authorization.

To the greatest extent possible, all graded assignments and assessments in UNLV online courses should be hosted in WebCampus-Canvas or another UNLV-managed platform that requires ACE login credentials for access.

Incomplete Grades
The grade of "I" (Incomplete) may be granted when a student has satisfactorily completed three-fourths of course work for that semester/session, but cannot complete the last part of the course for reason(s) beyond the student's control and acceptable to the instructor, and the instructor believes that the student can finish the course without repeating it. For undergraduate courses, the incomplete work must be made up before the end of the following regular semester. Graduate students receiving "I" grades in 500-, 600-, or 700-level courses have up to one calendar year to complete the work, at the discretion of the instructor. If course requirements are not completed within the period indicated, a grade of "F" will be recorded, and the student's GPA will be adjusted accordingly. Students who are fulfilling an Incomplete grade do not register for the course, but make individual arrangements with the instructor who assigned the "I" grade.

Library Resources
Librarians are available to consult with students on research needs, including developing research topics, finding information, and evaluating sources. To make an appointment with a subject expert for this class, please visit the Libraries' Research Consultation website, https://guides.library.unlv.edu/appointments/librarian. You can also ask the library staff questions via chat and text message at https://ask.library.unlv.edu/.

Missed Classwork
Any student missing class, quizzes, examinations, or any other class or laboratory work because of observance of religious holidays will be given an opportunity during that semester to make up the missed work. The make-up opportunity will apply to the religious holiday absence only. It is the responsibility of the student to notify the instructor within the first 14 calendar days of the course for Fall and Spring courses (except for modular courses), or within the first 7 calendar days of the course for Summer and modular courses, of their intention to participate in religious holidays which do not fall on state holidays or periods of class recess. For additional information, please visit the Missed Work policy, under Registration Policies, on the Academic Policies webpage, https://catalog.unlv.edu/content.php?catoid=29&navoid=7326.

In accordance with the policy approved by the Faculty Senate regarding missed class time and assignments, students who represent UNLV in any official extracurricular activity will also have the opportunity to make up assignments, provided that the student provides official written notification to the instructor no less than one week prior to the missed class(es).

The spirit and intent of the policy for missed classwork is to offer fair and equitable assessment opportunities to all students, including those representing the University in extracurricular activities. Instructors should consider, for example, that in courses which offer a "Drop one" option for the lowest assignment, quiz, or exam, assigning the student a grade of zero for an excused absence for extracurricular activity is both contrary to the intent of the Faculty Senate's policy, and an infringement on the student's right to complete all work for the course.

This policy will not apply in the event that completing the assignment or administering the examination at an alternate time would impose an undue hardship on the instructor or the University that could be reasonably avoided. There should be a good faith effort by both the instructor and the student to agree to a reasonable resolution. When disagreements regarding this policy arise, decisions can be appealed to the Department Chair/School Director, College/School Dean, and/or the Faculty Senate Academic Standards Committee.

For purposes of definition, extracurricular activities may include, but are not limited to: academic recruitment activities, competitive intercollegiate athletics, fine arts activities, liberal arts competitions, science and engineering competitions, and any other event or activity sanctioned by a College/School Dean, and/or by the Executive Vice President and Provost.

Rebelmail
Rebelmail is UNLV's official email system for students and by University policy, instructors and staff should only send emails to students' Rebelmail accounts. Rebelmail is one of the primary ways in which students receive official University communications, information about deadlines, major Campus events, and announcements. All UNLV students receive a Rebelmail account after they have been admitted to the University. Emailing within WebCampus-Canvas is also acceptable.

Tutoring and Coaching
The Academic Success Center (ASC), at the Claude I. Howard Building, provides tutoring, academic success coaching, and other academic assistance for all UNLV undergraduate students. For information regarding tutoring subjects, tutoring times, and other ASC programs and services, please visit the ASC website, https://www.unlv.edu/asc, or call 702-895-3177. The ASC is located across from the Student Services Complex (SSC). Academic success coaching is located on the second floor of SSC A, Room 254. Drop-in tutoring is located on the second floor of the Lied Library, and on the second floor of the College of Engineering building (TBE A 207).

UNLV Writing Center
One-on-one or small group assistance with writing is available free of charge to UNLV students at the Writing Center, https://writingcenter.unlv.edu/, located in the Central Desert Complex,

Building 3, Room 301 (CDC 3–301). Walk-in consultations are sometimes available, but students with appointments receive priority assistance. Students may make appointments in person or by calling the Center, telephone 702-895-3908. Students are requested to bring to their appointments their Rebel ID Card, a copy of the instructions for their assignment, and two copies of any writing they have completed on their assignment.

Diversity Statement

As an institution of higher learning, UNLV represents a rich diversity of human beings among its faculty, staff, and students, and is committed to aspiring to maintain a Campus environment that values that diversity. Accordingly, the University supports understanding and appreciation of all members of its community, regardless of race, sex, age, color, national origin, ethnicity, creed, religion, disability, sexual orientation, gender, gender identity, marital status, pregnancy, genetic information, veteran status, or political affiliation. Please see University Statements and Compliance, https://www.unlv.edu/about/statements-compliance.

A successful learning experience requires mutual respect and trust between the students and the instructor. Accordingly, the instructor asks that students be willing to listen to one another's points of view, acknowledging that there may be disagreements, keep discussion and comments on topic, and use first person, positive language when expressing their perspectives.