

## 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 catalog 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 context of natural constraints and human imposed policies and practices. The built environment encompasses civil infrastructure.

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 in 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:

- x 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.
- x Supplementary: Reddy, K.R., Cameselle, C. and Adams, J.A. (2009). Sustainable Engineering: Drivers, Metrics, Tools, and Applications. Wiley. This book broadens scope beyond buildings to embrace civil infrastructure, it holds key content in resiliency and sustainability metrics. Some assignments that arise late in the semester will require its use.

Recommended:

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

Computer usage:

- x Mandatory use of WebCampus, word processing software, presentations software with audio & video.

Learning objectives

Upon successful completion of the course, 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:

- x conducted a research-based independent inquiry on a sub-topic related to sustainability of the built environment
- x obtained information through a variety of sources, conducted a critical assessment, and drawn relevant and meaningful conclusions
- x 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 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 Envision system
7. Planning and design for high-performance green building: structures and forms (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 material loops (Kibert, Chapter 11)
  - { Lifecycle analysis (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
  - x Resilience in urban planning and infrastructure; its relation to sustainability (Reddy et al.)
  - x 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.







Intentionally sharing ACE login credentials with another person may be considered an attempt to use a substitute, and could result in investigation and sanctions 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 WebCampCanvas or another UNLV-managed platform that requires ACE login credentials for access.

### Incomplete Grades

The grade R I 3, 4, 5, Q, F, R, P, S, O, H, W, H, P, D, \, E, H, J, U, D, Q, W, H, G, Z, K, H, Q, D, V, W, X, G, H, C, fourths of course work for that semester/session, but cannot complete the last part of the course. I, R, U, U, H, D, V, R, Q, V, E, H, \, R, Q, G, W, K, H, V, W, X, G, H, Q, W, V, 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 V, W, X, G, H, Q, W, V, U, H, F, H, L, Y, L, 600, J, 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 Z, L, W, K, L, Q, W, K, H, S, H, U, L, R, G, L, Q, G, L, F, D, W, H, G, D, J, U, D, G, H, R, I, 3, 4, 5, Z, L, O, O, E, H, adjusted accordingly. Students who are fulfilling an Incomplete grade do not register for the F, R, X, U, V, H, E, X, W, P, D, N, H, L, Q, G, L, Y, L, G, X, D, O, D, U, U, D, Q, J, H, P, H, Q, W, V, Z, L, W, K, W, K, H, H.

### 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 [E U D U L H V Consultation Website](https://guides.library.unlv.edu/appointments/librarian), <https://guides.library.unlv.edu/appointments/librarian>. You can also [ask the library staff](https://ask.library.unlv.edu/) 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





Building 3, Room 301 (CDC 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-702-3908. 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) <https://www.unlv.edu/about/statements-compliance>.

A successful learning experience requires mutual respect and trust between the students and the LQ VW UX FW RU \$ FFRUGLQJO\ WKH LQ VW UX FW RU DVNV WKDV 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.