

ENVS 294- W2 Green Roofs/Green Walls for Sustainable Healthy Cities

Fall 2020
Online Course

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COURSE DESCRIPTION: Credits 3. This interdisciplinary course explores the economic, social and environmental benefits of green infrastructures to provide a healthy community for residents; particularly for low-income and elderly residents who tend to be more vulnerable to illnesses related to extreme heat and poor air quality. It reviews the functional, technical and aesthetic aspects of green roofs/walls and their application to new and existing buildings and structures. The aim is to provide the opportunity for students to understand how well-designed green roofs/walls can contribute to a sustainable building by reducing energy use, mitigating heat island effect, reducing air pollution and greenhouse gas emissions, enhancing storm water management and water quality, and improving health, well-being and quality of life (addressing the UN' Sustainable Development 2, 3, 6, 9, 11 Goals¹). The course will use a mix of brief lectures, readings, videos, and online discussions to engage students more in learning and provide opportunities for them to move from consumers to creators. It (in part) prepares students for the Green Roof Professional (GRP) exam or becoming a GRP Accredited Professional. Online discussions, assignments, quizzes, essays/reports, and papers are designed to acquaint the students with the green design approaches, concepts, strategies, policies, and best practices to apply in their design projects as sustainability-focused citizens.

COURSE LEARNING OBJECTIVES (CLOs):

Upon completion of this course the student will be able to:

CLO 1: Explain the impact of cities as the major contributor to urban heat island (UHI), on global warming and climate change.

CLO 2: Define the concept of sustainable development as a multi-dimensional issue, and significance of UN sustainable development goals (SDGs) for future community development.

CLO 3: Discuss the role of green infrastructures (GI) in enhancing urban resilience and sustainability.

CLO 4: Describe the green roof system, and its different types, benefits, costs, anatomy, design, installation, and maintenance process.

CLO 5: Explain the green wall technology, and its advantages, problems, design, structure, and maintenance.

CLO 6: Analyze the green roofs/walls cases studies (with an emphasis on the LEED® certified projects), to extrapolate strategies (as lessons learned) to integrate in green buildings design for a sustainable future.

CLO 7: Demonstrate the acquired skills and knowledge associated with the green roofs/walls design, installation and maintenance, to enhance the buildings' energy efficiency, reduce the ambient temperature and UHI effects; improve stormwater and runoff water quality; promote biodiversity and wildlife habitats; decline of noise and air pollutions to improve air quality, public health, and well-being.

CLO 8: Prepare for Green Roof Professional (GRP) exam or becoming a GRP Accredited Professional.

¹ <https://sustainabledevelopment.un.org/post2015/transformingourworld>

COURSE CONTENT OUTLINE:

Module 1	Week 1: Introduction and Syllabus Review
Module 2	Week 2: Urban Heat Island (UHI) and Climate Change: Causes, Effects, and Solutions
Module 3	Week 3: Green Infrastructure (GI): Towards Resilient and Sustainable Communities
Module 4	Week 4: Green Roof System: Definition, Types, and Historical Overview
Module 5	Week 5: The Environmental Benefits of Green Roofs Week 6: The Economic and Social Benefits of Green Roofs
Module 6	Week 7: The Anatomy of Green Roof Systems
Module 7	Week 8: Green Roof Design and Installation Process Week 9: Green Roof Design and Installation Process Cont. Week 10: Green Roof Design and Installation Process Cont. Week 11: The Maintenance of Green Roof Systems
Module 8	Week 12: Green Wall Technology: Definition, Advantages, and Problems Week 13: The Design, Installation, and Maintenance of Green Walls.
-----	Week 14: Thanksgiving Holiday
Module 9	Week 15: Case Study Review: With an Emphasis on LEED® Certified Projects
-----	Week 16: Final Exam

MODULE LEARNING OBJECTIVES (MLOs):

Upon completion of each module the student will be able to:

Module 1: Introduction and Syllabus Review	Week 1	<u>MLO 1-1:</u> Recognize climate change as the biggest problem facing the world; its causes and consequences. (CLO 1) <u>MLO 1-2:</u> Discuss the key role of cities as a "cause of and solution to" climate change. (CLO 1, CLO 2, CLO 3, CLO 4, CLO 5, CLO 7)
Module 2: Climate Change and Urban Heat Island Effect (UHI): Causes, Effects, and Solutions	Week 2	<u>MLO 2-1:</u> Describe the role of cities as the major contributors to greenhouse gas (GHG) emissions, air pollution, global warming, and climate change. (CLO 1) <u>MLO 2-2:</u> Define the Urban Heat Island (UHI) phenomenon, and explain its impact on heat waves, energy consumption, natural habitat, human health and well-being. (CLO 1) <u>MLO 2-3:</u> Identify the potential Urban Heat Island (UHI) mitigation strategies to reduce the ambient temperature and cool the urban environment. (CLO 1, CLO 3, CLO 4, CLO 5)
Module 3: Green Infrastructure (GI): Towards Resilient and Sustainable Communities	Week 3	<u>MLO 3-1:</u> Describe the concept of sustainable development as a multi-dimensional issue, and list the UN's Sustainable Development Goals (SDGs) (CLO 2) <u>MLO 3-2:</u> Define the concept of green infrastructure (GI), and its different types and scales. (CLO 3) <u>MLO 3-3:</u> Explain the environmental, economic and social benefits of green infrastructure (GI). (CLO 2, CLO 3, CLO 7) <u>MLO 3-4:</u> Discuss the importance of Green infrastructure (GI) technology as an integral component of urban communities for a sustainable future. (CLO 2, CLO 3) <u>MLO 3-5:</u> Highlight the benefits of Green infrastructure (GI) to achieve the UN SDGs (with an emphasis on Goal #11: Make cities and human settlements inclusive, safe, resilient and sustainable). (CLO 1, CLO 2, CLO 3, CLO 7)

<p>Module 4: Green Roof System: Definition, Types, and Historical Overview</p>	<p>Week 4</p>	<p>MLO 4-1: Define the green roof (or eco roof, living roof, vegetated roof) systems, and list its main components. (CLO 4) MLO 4-2: Explain different types of green roofs (intensive, extensive and semi-intensive/extensive), and discuss their advantages and disadvantages. (CLO 4) MLO 4-3: Review the history and revolutionary process of green roofs from the past to present (as an integrated design strategy of sustainable buildings). (CLO 4, CLO 6, CLO 7)</p>
<p>Module 5: The Environmental, Social, and Economic Benefits of Green Roofs</p>	<p>Week 5</p>	<p>MLO 5-1: Explain the role of green roofs as urban ecosystems to encourage biodiversity and wildlife habitats in cities. (CLO 4, CLO 7) MLO 5-2: Describe the green roof technology as a sustainable design strategy to stormwater runoff control, and improve water quality. (CLO 4, CLO 7) MLO 5-3: Highlight the impact of green roofs to reduce CO2 emissions, the ambient temperature, and mitigate Urban Heat Island (UHI) effects. (CLO 1, CLO 4, CLO 7) MLO 5-4: Discuss the green roofs as a solution to minimize air pollutions (GHG emissions), and improve air quality for sustainable healthy communities. (CLO 2, CLO 4, CLO 7) MLO 5-5: Explain the function of green roof systems as sound insulation (barrier) to minimize the noise pollutions in urban areas. (CLO 4, CLO 7)</p>
	<p>Week 6</p>	<p>MLO 5-6: Explain the role of green roofs as thermal insulation to enhance building's energy efficiency and reduce energy consumption and cost. (CLO 1, CLO 4, CLO 7) MLO 5-7: Describe the impact of green roofs to extend the lifespan of the roofing material and structure by covering the waterproofing membrane with growing medium and vegetation, protecting it from UV radiation and physical damage. (CLO 4, CLO 7) MLO 5-8: Discuss the concept of green roofs as a sustainable design strategy to gain credits/points in green buildings certification programs such as LEED® and BREEAM rating system. (CLO 4, CLO 6) MLO 5-9: Highlight the role of accessible green roofs to provide urban amenities and outdoor environment to enhance public health (physically, psychologically). (CLO 1, CLO 2, CLO 4) MLO 5-10: Explain the potential of green roof systems to incorporate urban agriculture (farming) and food production in the building and/or community scale.(CLO 4, CLO 7)</p>
<p>Module 6: The Anatomy of a Green Roof System</p>	<p>Week 7</p>	<p>MLO 6-1: Describe the growing media (soil) as living part of the green roofs, and explain its different types, ingredients, composition, and physical properties. (CLO 4) MLO 6-2: Identify the characteristics of successful green roof vegetation (plants) in order to use for different extensive, intensive and hybrid green roof systems. (CLO 4) MLO 6-3: Discuss the non-green aspects of green roofs including loading, waterproofing, and drainage. (CLO 4)</p>
	<p>Week 8</p>	<p>MLO 7-1: Explain the complexity of green roof design as a multi-disciplinary approach. (CLO 4, CLO 7)</p>

Module 7: Design, Installation, and Maintenance of Green Roofs		<p><u>MLO 7-2:</u> Identify the long-term costs of green roof in the early stage design phase. (CLO 4)</p> <p><u>MLO 7-3:</u> List the required specifications of green roof projects. (CLO 4)</p> <p><u>MLO 7-4:</u> Recognize installation process, and its importance to maintain the integrity of the green roof design. (CLO 3)</p> <p><u>MLO 7-5:</u> Explain the basic design envelope and light weight assembly. (CLO 4)</p> <p><u>MLO 7-6:</u> Discuss the low-cost design strategies, and storm water considerations. (CLO 4)</p>
	Week 9	<p><u>MLO 7-7:</u> List the advantages of an amenity roof garden over the basic extensive green roof. (CLO 4)</p> <p><u>MLO 7-8:</u> Identify different plant species for an articulate green roof design for an extensive green roof. (CLO 4)</p> <p><u>MLO 7-9:</u> Explain the benefits and challenges associated with using berms in designing of a green roof. (CLO 4)</p> <p><u>MLO 7-10:</u> Recognize native plants and their benefits in designing of green roofs. (CLO 4)</p> <p><u>MLO 7-11:</u> Discuss using native (adopted) plants for green roofs to achieve credit/point for LEED® certification program. (CLO 4)</p>
	Week 10	<p><u>MLO 7-12:</u> Explore benefits and challenges associated with green roofs to create a wildlife habitat. (CLO 4)</p> <p><u>MLO 7-13:</u> Discuss the right systems (water-efficient) for green roof irrigation. (CLO 4)</p> <p><u>MLO 7-14:</u> Explain the impact of slope on the green roof drainage system. (CLO 4)</p> <p><u>MLO 7-15:</u> Identify the challenges of large green roofs, and effect of roof's scale in design, installation and maintenance. (CLO 4)</p> <p><u>MLO 7-16:</u> Describe the effect of wind and shade on designing of a green roof. (CLO 4)</p>
	Week 11	<p><u>MLO 7-17:</u> Identify the green roof maintenance basics as a part of design process. (CLO 4)</p> <p><u>MLO 7-18:</u> Discuss the role and responsibilities of the maintenance team in a successful green roof project. (CLO 4)</p> <p><u>MLO 7-19:</u> Explore green roof design against weed, and effective control strategies. (CLO 4)</p> <p><u>MLO 7-20:</u> Identify the most common types of weeds and their life cycles in green roofs (CLO 4)</p> <p><u>MLO 7-21:</u> Discuss the maintaining plant and soil health. (CLO 4)</p> <p><u>MLO 7-22:</u> Explain maintaining the non-green components of a green roof. (CLO 4)</p>
Module 8: Green Walls: Definition, Advantages, and Challenges; Design, Installation, and Maintenance	Week 12	<p><u>MLO 8-1:</u> Describe the effects of climbers (as thermal insulation) on building temperature, and reduction of urban heat island (UHI) effects. (CLO 1, CLO 5)</p> <p><u>MLO 8-2:</u> Highlight the role of climbers in trapping dust to improve air quality for sustainable healthy communities. (CLO 2, CLO 5, CLO 7)</p> <p><u>MLO 8-3:</u> Discuss the benefits of green walls to wildlife and biodiversity improvement in urban areas. (CLO 5, CLO 7)</p>

		<p>MLO 8-4: Explain the function of green walls as sound insulation (barrier) to minimize the noise pollutions. (CLO 5, CLO 7)</p> <p>MLO 8-5: Classify different categories of climbers, and Identify the structures and materials to support a large climber. (CLO 5)</p>
	Week 13	<p>MLO 8-6: Describe planting techniques and combining climbers in green roof design. (CLO 5)</p> <p>MLO 8-7: Discuss the impact of climate, size, support mechanisms, visual and ecological aspects on plant selection of the green walls. (CLO 5)</p> <p>MLO 8-8: Recognize problems and challenges of green walls associated with building's surface damage and maintenance process. (CLO 5)</p> <p>MLO 8-9: Explain vegetation mats and living fences for vegetated structures. (CLO 5)</p>
Module 9: Case Study Review: With an Emphasis on LEED® Certified Projects	Week 15	<p>MLO 9-1: Identify the LEED® (Leadership in Energy and Environmental Design) as the most widely-used sustainable buildings rating system in the world. (CLO 6)</p> <p>MLO 9-2: Explain the wide variety of benefits associated with green roofs to varying degrees in the USGBC's LEED®. (CLO 6)</p> <p>MLO 9-3: Identify the LEED® credits related to vegetated green roofs. (CLO 6)</p> <p>MLO 9-4: Analyze the green roof/walls in LEED® certified projects to extrapolate the strategies (as lessons learned) to integrate green building design for a sustainable future. (CLO 3, CLO 5, CLO 6)</p>

REQUIRED TEXT:

1. Dunnett, N., and Kingsbury, N. 2008. Planting Green Roofs and Living Walls, Timber Press, ISBN: 978-0881929119.
 2. Snodgrass, E. C., and McIntyre, L. 2010. The Green Roof Manual: A Professional Guide to Design, Installation, and Maintenance, Timber Press, ISBN: 978-1604690491.
- In addition to the textbooks, some additional materials will be provided including: posted documents, weblinks, online articles, and videos as online resources that are available for eLearning students.

RECOMMENDED TEXT:

1. Tsarounas, G. 2014. Green Walls Green Roofs: Designing Sustainable Architecture, Images Publishing Dist Ac., ISBN: 978-1864705522.
2. Isdm, D., and Moore R.L.A, C. 2016. Green Roofs and Living Walls for Landscape Architects, CreateSpace Independent Publishing Platform, ISBN: 978-1539342281.
3. Dover, J.W. 2015. Green Infrastructure: Incorporating Plants and Enhancing Biodiversity in Buildings and Urban Environments, Routledge, ISBN: 978-0415521246
4. Luckett, K. 2009. Green Roof Construction and Maintenance, McGraw-Hill Education, ISBN: 13: 978-0071608800.

COURSE ACTIVITIES/ TEACHING STRATEGIES: The course will use a mix of brief lectures, readings, videos, films, and other instructional strategies for online courses such as virtual field trips and guided tours to engage students more in learning and provide opportunities for them to move from consumers to creators. **Students are required to take one (1) exam, three (3) self-assessment quizzes, and six (6) assignments** in different types of questions, project, etc. **six (6) online discussion forums** are also designed as a part of class, to encourage students to a topic in detail and exchange ideas on design, construction and maintenance of green roofs/walls for healthy sustainable communities. Students are

required log in to the Blackboard to access the provided materials and follow the instructions of each module on weekly basis.

ADDITIONAL UNIQUE ASPECTS OF COURSE:

1. **Addressing the UN' Sustainable Development 2, 3, 6, 9, 11 Goals**², this interdisciplinary course focuses on the economic, social and environmental benefits of green infrastructures to provide a healthy community for residents; particularly for low-income and elderly residents who tend to be more vulnerable to illnesses related to extreme heat and poor air quality. (with an emphasis on **Goal #11: Make cities and human settlements inclusive, safe, resilient and sustainable**)
2. With a focus on the green roof/wall design, installation, and maintenance, this course (in part) prepares students to sit for **Green Roof Professional (GRP) exam**, or becoming a GRP Accredited Professional.
3. This course highlights the **mission of department of geography and environmental sustainability at SUNY Oneonta**, to “give students the geographic and/or environmental sustainability knowledge and skills they need to interpret social, physical and environmental influences at local, regional and global scales”³. It encourages students to consider sustainable design as an integral part of everyday life, to reduce greenhouse gas emissions, energy and resource consumption while showcasing SUNY Oneonta’s commitment to sustainability.
4. This course also fulfills the **SUNY General Education attributes NS3** to help students to “understand the methods scientists use to explore natural phenomena, including observation, hypothesis development, measurement and data collection, experimentation, evaluation of evidence, and employment of mathematical analysis; and application of scientific data, concepts, and models in one of the natural sciences”⁴.

COURSE REQUIREMENTS:

GENERAL REQUIREMENTS:

- **Course Format:** This course is delivered completely online asynchronously (so you will need consistent, reliable access to the Internet) via Blackboard. The tools that are part of Blackboard (grading, information posting, emails, etc.) will be used for administration and general communication. A discussion board will be the primary tool for interaction within the class. Microsoft Office, Adobe Acrobat, Google Earth, etc. will be used to develop and view materials as well as demonstrate concepts being discussed or presented. Media to be used will include digital documents, video and audio. The media will be a combination of instructor developed material as well as material available in print or web based. The tools and media are selected in conjunction with each course module and the associated learning objectives. Course components include online material, multimedia, threaded discussions and e-mail. This course is primarily **asynchronous** (not “real time”); please keep in mind that each module is designed to be completed within the designated timeframe and will include specific "due dates" for each part of the module's assignments.
- **Attendance Policy:** Success in this course is dependent on your active participation and engagement throughout the course. You need consistent, reliable access to the Internet via Blackboard, as it delivers online using an asynchronous (not “real time”) format. As such, students are required to complete all assignments by the due date, and to actively participate in class discussions. Additionally, students are expected to:
 - Log on at least three times a week – on different days in order to completely weekly assignments, assessments, discussions and/or other weekly deliverables as directed by the instructor and outlined in the syllabus;

² <https://sustainabledevelopment.un.org/post2015/transformingourworld>

³ <https://suny.oneonta.edu/geography-environmental-sustainability>

⁴ <https://suny.oneonta.edu/academic-advisement/general-education>

- Participate in the weekly threaded discussions, this means that, in addition to posting a response to the thread topic presented, students are expected to respond to each other and comment and questions from the instructor and/or other students;

If you find that you cannot meet the class' minimum discussion requirements due to such a circumstance, please contact your instructor as soon as possible. Students will not be marked present for the course in a particular week if they have not posted on the discussion forum and/or submit assignment/essay or complete assessment if administered in that week.

SPECIFIC REQUIREMENTS:

1. **Exams/Quizzes:** There will be **one (1) exam** (see the attached course schedule for the exam dates). In addition, there will be **three (3) self-assessment quizzes**. Quiz material will be drawn from the previous discussions and assigned readings. Exam/quizzes will consist of a mix of multiple choice, true/false, and short answer questions about the material covered in that unit.
2. **Discussions/Forums:** Students are required to participate in **six (6) online discussion forums** as a part of class, **to explore a topic in detail and exchange ideas**. Attendance by way of online participation is considered in the calculation of the student's final grade, as each activity is assigned a value and is counted toward the student's final grade. The instructor reserves to issue a failing grade for lack of online presence in this course.
3. **Homework Assignments:** Students are required to conduct **six (6) assignments**. All assignments should be completed independently unless they are specifically indicated as a team assignment by your instructor (directions for the homework assignments and group assignments will be made available on Blackboard). **Students are expected to complete all assigned readings prior to each class**; these may include materials supplemental to the textbook posted on Blackboard. Students must always properly cite their sources and properly credit all words, thoughts and images to the original author. Students are also responsible for completing all assignments by due dates and times. Due dates will be announced when the assignment becomes available on the Blackboard calendar. **You have to submit your assignments in Microsoft Word or PDF format using the Blackboard Assignment tool (digital drop boxes) on Blackboard** (please plan ahead in case there are technical difficulties) unless there are extenuating circumstances, **emailed papers will not be accepted**.

*****NOTE: I always aim to have assignments graded within a week of the due date, often sooner. If you don't see a score within a week, please check to make sure it was received. DO NOT WAIT until the end of the semester to check. To iterate, I will not accept missing material or reconsider missing grades after the final class.**

LATE ASSIGNMENT/ MAKE-UP TEST POLICY: All assignments must be submitted online on Blackboard on the due date announced unless otherwise noted by the instructor. If you cannot submit work on time, let me know beforehand and we'll make alternate arrangements. Unexcused late work will only be accepted for up to one week after the due date, with reduced credit.

METHOD OF EVALUATION & BASIS OF FINAL COURSE GRADE DETERMINATION:

Assessment Methods:

- Professor will regularly interact with the students through discussion forums, and provide feedback validating their understanding of the fundamental course material delivered through posted readings and videos and posts, papers and projects presented by other students. Discussions will be evaluated utilizing an associated Discussion Board Participation rubric and assigned points for each discussion forum.
- Posted module assignments will be discussed and critiqued by the professor and other students. The student will be evaluated utilizing an associated Written Assignment Assessment rubric and assigned points for each assignment.

- Self-assessment quizzes will be provided in seven modules to assist the student in assessing their understanding of the reading assignments. All quizzes are graded items and their weights are indicated in the course.

***NOTE: All rubrics and their associated assessment criteria will be available to the student.

Course Grading: Your final letter grade is determined on a **percentage-based scale**. Please don't assume that percentages from other classes guarantee a particular final grade in this class. You can track your progress throughout the semester by adding up points you've earned out of the total possible.

Course Grading:		Total Percentage
Final Exam	1@25%	25%
Self-assessment quizzes	3@5% each	15%
Assignments	6@5% each	30%
Discussion forums	6@5%	30%
Total		100%

Distribution: The distribution of your final grade will be based on the following:

A 90-100 B 80-89 C 70-79 D 60-69 F Below 60

Please do not email to ask if I will give you extra points or if you can complete missing assignments or extra credit after grades are posted (especially since I am required to submit final grades to the Registrar within 48 hours of the exam).

STUDENTS WITH DISABILITIES: All individuals who are diagnosed with a disability are protected under the Americans with Disabilities Act, and Section 504 of the Rehabilitation Act of 1973. As such, you may be entitled to certain accommodations within this class. If you are diagnosed with a disability, please make an appointment to meet with Accessibility Resources, 133 Milne Library, ext. 2137. All students with the necessary supporting documentation will be provided appropriate accommodations as determined by the Accessibility Resources Office. It is your responsibility to contact Accessibility Resources and concurrently supply me with your accommodation plan, which will inform me exactly what accommodations you are entitled to. You will only receive accommodations once you provide me with an Accessibility Resources accommodation plan. Any previously recorded grades will not be changed.

ACADEMIC INTEGRITY: You are expected to know and abide by SUNY Oneonta's Academic Integrity Policy⁵. Plagiarism in any form—including copying and pasting text from websites or other materials without using quotation marks and/or referring to information without properly crediting sources—will not be tolerated. If you unethically copy the work of another student or outside source, you will receive NO CREDIT for the entire assignment.

COURSE SCHEDULE:

Module	Topic	Task to Complete	Due Date
Week1 (8/24-8/30)	Introduction and Syllabus Review	W1_Ice Breaker (DB)	8/27
		W1_Discussion Board	8/30
Week 2 (8/31-9/6)	Urban Heat Island (UHI) and Climate Change: Causes, Effects, and Solutions	W2_Assignment	9/6
Week 3 (9/7-9/13)	Green Infrastructure (GI): Towards Resilient and Sustainable Communities	W3_Discussion Board	9/13

⁵ <http://www.oneonta.edu/development/judicial/code.pdf>

Week 4 (9/14-9/20)	Green Roof System: Definition, Types, and Historical Overview	W4_Discussion Board	9/20
Week 5 (9/21-9/27)	The Environmental Benefits of Green Roofs	W5_Assignment	9/27
Week 6 (9/28-10/4)	The Economic and Social Benefits of Green Roofs	W6_Quiz	10/4
Week 7 (10/5-10/11)	The Anatomy of Green Roof Systems	W7_Discussion Board	10/11
Week 8 (10/12-10/18)	Green Roof Design and Installation Process	W8_Assignment	10/18
Week 9 (10/19-10/25)	Green Roof Design and Installation Process Cont.	W9_Assignment	10/25
Week 10 (10/26-11/1)	Green Roof Design and Installation Process Cont.	W10_Assignment	11/1
Week 11 (11/2-11/8)	The Maintenance of Green Roof Systems	W11_Quiz	11/8
Week 12 (11/9-11/15)	Green Wall Technology: Definition, Advantages, and Problems	W12_Assignment	11/15
Week 13 (11/16-11/22)	The Design, Installation, and Maintenance of Green Walls	W13_Quiz	11/22
Week 14 (11/23-11/29)	Thanksgiving Holiday	No Class	-----
Week 15 (11/30-12/6)	Case Study Review: With an Emphasis on LEED® Certified Projects	W15_Discussion Board	12/6
Week 16 (12/7-12/13)	Final Exam	Final Exam	12/13