

Green Building Strategies: LEED Lab

SUNY Poly Utica Campus

Fall 2019 CE/ME 448 (4.0 CH)

Meeting Days/Times: MW 12:00 – 13:50

Location: Donovan G101

Instructors:

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Bb Collaborate office hours: W 9:15 – 10:15 pm

Certifying an Existing High Performance Sustainable Building

Green buildings help create healthy environment while saving energy, resources, and money. LEED for Existing Buildings: O&M contains performance standards for the sustainable operation of existing buildings that are not undergoing major renovations. It covers building systems, infrastructure, practices, and policies.

Course Description: This is a multidisciplinary course that utilizes the built environment's performance, operations and maintenance to educate and prepare students to become green buildings leaders and sustainability-focused citizens. This course will equip students with the skills, knowledge and expertise needed to be effective communicators, project managers, critical thinkers, problem solvers, engaged leaders, and team players in the field of sustainability. Campus buildings will be used to improve performance of the building through measurement and verification, operation, and maintenance with the application of green building rating systems focused on LEED v4.1 for Existing Buildings Operations and Maintenance. Successful course completion can prepare the student for LEED v4 Green Associate or O+M specialty exams credentials.

Learning Objectives This course is designed to produce the following outcomes:

- Students' ability to assess the performance of existing buildings and facilitate the LEED for Existing Buildings:

Operations and Maintenance (LEED EB: O+M) process with the goal of certifying the facility.

- Equip students with the skills, knowledge needed to be effective communicators, project managers, critical thinkers, problem solvers, engaged leaders, and team players to meet the needs of today's industry.
- Assess and explore techniques to improve building exterior, site, water and energy consumptions, remodeling, waste management, and purchasing.
- Understand LEED-EB: O+M pre-requisites and credits and the tools needed for implementation, and recognize synergies between multiple credits.
- Learn LEED project administration, registration, submission, and LEED online utilization.
- Recognize how improving building operation and maintenance lead to higher performing buildings.
- At the end of the semester the students can be prepared for LEED Green Associate (GA) or LEED EB: O+M professional credential exam.

Course Format:

Approach: The course will be approached as a project while working on an actual campus building, this semester **Wildcat Field House** has been selected for LEED EB O+M certification.

Delivery Method: Lectures, discussions, field trips on campus, hands on experience, guest speakers, work in teams, team presentations, quizzes, and reports.

Field Trips and Guest Speakers:

- Multiple field trips will be scheduled to Wildcat Field House.
- Field trips are required.
- Guest speakers will be invited to speak on topics related to greening existing buildings.

Required Reading Materials:

- LEED v4 for Existing Building Operations and Maintenance Reference Guide, 2018 *short version*, posted on Bb.
- LEED v4.1 Operations and Maintenance Getting started guide for beta participants, 2019, posted on Bb.
- Power point slides and short selected publications posted on Bb
- Using LEEDuser.com as supplemental resource for prerequisite and credit info.

This is a team oriented course working on a real life certification project. Active student engagement with the reading material and associated class discussions will be an important component of your grade. Being a team player will contribute to your team's success.

Tools and Resources:

- **Building Green**, buildinggreen.com ; is an excellent resource in the latest in sustainable built environment, cases studies, articles, materials, and more. This is a membership based site.
- **LEEDuser**, leeduser.com ; this is another resource with tools and examples on each LEED credit.

Paperless Activities and Assignments: E-learning on **Blackboard** will be the hub for the communication, discussion, announcements, turn in assignments, papers/projects, take quizzes, and presentation material.

- Check Bb for the material and presentations that will be covered weekly.
- Set up and check your e-mail to receive class announcements.
- All assignments/papers/presentations must be turned in electronically through Bb.

Participation, Attendance and other Policies:

- Students attend class prepared for active participation and discussion. A quality learning experience in this course rests heavily on interaction and exchange of ideas related to sustainable built environment.
- You are encouraged to take notes on paper or electronically. Using mobile phones or laptops during class for non-class work is highly discouraged.
- Reading material and discussion; **Students must complete the reading before each class.** Each topic discussion will be assigned to a team of three-four students. See schedule.
- Attendance is required. Arriving late to class (5-10 minutes after start of the class, or falling asleep in the class) will be considered a 1/2 absence. Leaving early while the class is in session will be considered an unexcused absence.
- Excused absences include illness, religious holidays, serious family problems, or participation as an athlete in official athletic events. To be excused, absences must be properly documented, for example with a doctor's note.
- All projects, presentations, quizzes, and assignments must be turned in on time; projects or assignments may be turned-in early. If you will not be in class to turn in the assignment, even if it is an excused absence (e.g. studio field trip), you must turn the assignment in early. Any assignment turned in after it is due will be marked late, and your grade will be penalized.
- Students should be prepared to experience learning through many different venues including case studies, guest speakers, campus projects, team projects, field trips, and research.

Grading

Final Project Topic: Each team will be assigned LEED v4.1 O+M performance categories, which they must complete by the last week of class.

Assignments

Quizzes & Assignments 20%

Attendance & participation, weekly progress reports 20%

Final project report and presentation 20%

Peer group evaluations 20%

Score on LEED GA or AP exam 20% (You must report to the instructors your LEED exam score when you receive it).

Grading Scale

percentage	grade	grade points
93 – 100	A	4.0
90 - 92	A-	3.7
87 - 89	B+	3.3
83 - 86	B	3.0
80 - 82	B-	2.7
77 - 79	C+	2.3
73 - 76	C	2.0
70 - 72	C-	1.7
67 - 69	D+	1.3
60 - 66	D	1.0
Below 60	F	0.0

Quizzes: Quizzes will be on Bb. Each quiz will cover the material that has been covered in class. These are non-cumulative.

Final Presentations and Reports: Final presentations about your group LEED performance category.

Academic Adjustments: for Students with Disabilities

In compliance with the Americans with Disabilities Act of 1990 and Section 504 of the Rehabilitation Act, SUNY Polytechnic Institute is committed to ensuring comprehensive educational access and accommodations for all registered students seeking access to meet course requirements and fully participate in programs and activities. Students with documented disabilities or medical conditions are encouraged to request these services by registering with the Office of Disability Services. For information related to these services or to schedule an appointment, please contact Evelyn Lester, Director, Office of Disability Services lestere@sunypoly.edu (315)792-7170 Utica Campus Peter J. Cayan Library, L145.

Student Honor Code and Academic Honesty

Students are expected to adhere to principles of academic integrity and any suspected violations will be taken seriously. Briefly, academic integrity means that when you submit any course work, the work should be your own. If information is taken from another source, it must be referenced appropriately (see [CSE Name-Year Citation style](#)). It is your responsibility to understand academic honesty and adhere to appropriate conduct. If you have any questions about proper academic conduct, please contact your instructor for clarification or see SUNY Poly's Academic Integrity Policy starting on page 47 in the [Student Handbook](#). Confirmed cases of

academic dishonesty will result in a penalty and may result in further disciplinary action, such as a failing grade for the course.

***Disclaimer** This syllabus represents our current plans and objectives. As we go through the semester, those plans may need to change to enhance the class learning opportunity. Such changes, communicated clearly, are not unusual and should be expected.*

Class Schedule by Topic

Introduction

(No Class 8/26/19. First class meeting 8/28/19 Bremer)

- Welcome & Introduction - Review syllabus - Review use of Bb, course files, material, and paperless approach - Form teams - campus sustainability overview and status
 - Review green building rating systems with focus on LEED EB;O+M - Green building/LEED goals, benefits, certification and recertification

Video 2014, [The blueprint for a carbon-free and just built environment by 2050](#). *Introduction to the following tools:* - [buildinggreen.com](#) - [Leeduser.com](#) **Assignment: Establish a USGBC account.**

Project Planning and Assessment

(No Class 9/2/19 Labor Day. Class meeting 9/4/19 Bremer)

Assessment - Minimum Program Requirements (reading) - Rating system selection (reading) - Single building approach

Integrative Approach in LEED - LEED-EB; O+M v4.1 scorecard - LEED Lab Timing Chart - Credit structure; establishment and performance - Identify pre-requisites and performance credits – **Assign performance categories with pre-requisites and credits to project team members** - Identify policies needed - **Performance period - Performance credits or establishment credits - LEED boundary - LEED online demonstration and invitation.**

Teams - Identify project team managers, members & responsibilities

In class: Breakout session

- Each team develop a strategy approaching the project roles and responsibilities

(Class meetings 9/9/19 Li and 9/11/19 Bremer)

Review the Building

All Teams - Learn about Wildcat Field House Facility - Building drawings, site, architecture, and Mechanical, Electrical, Plumbing (MEP) - Utility data analysis - Building green features, Review of prior LEED NC (BD+C) certification.

- Building occupancy schedule and operation - Occupancy, Full time equivalent (FTE), part time & visitors - Learn about the stakeholders that you need to know and work with including: building occupants, maintenance & operation, purchasing staff, utilities, energy, grounds, facilities management,

and custodians. - Assess LEED-EB; O+M v4.1 scorecard

In class: Breakout session - Think about a charrette for the project, identify your role in a project charrette - Prepare for site visit, assign site visit tasks/teams - ***Each team understand their roles and responsibilities for credits/pre-requisites completion and upload to LEED online.*** - Each team member to confirm his/her access to LEED online - Each team member to get familiar with the LEED online credits Forms and required documentations.

National Charrette Institute; charretteinstitute.org/resources.html

Assignment: each team to assess LEED checklist for Wildcat Field House project, address prerequisites and performance metrics.

All credits will be discussed and addressed in class. The pre-requisites and performance credits will require backup documentation and upload to LEED online. Each team needs to read the credits that assigned to identify documentations needed confirm meeting the requirements.

Energy Conservation Strategies and Measures

(9/16/19 Li and 9/23/19 Li)

- Energy efficiency and conservation strategies overview
 -ASHRAE Level 1 energy audit process, approach, equipment/tools, data collection, reporting. Prepare for site energy audit.
 -Existing building Commissioning (Cx) analysis, implementation, and ongoing, approach, tools, analysis, reporting

-Introduction to energy and air quality instrumentation for building measurement and verification

[Energy Star target finder](#)

Prepare for meeting the client including building users, manger, maintenance, operations, grounds, purchasing, and custodial contractor.

Guest Speaker

Energy Conservation Strategies and Measures

(9/30/19 Guest Speaker and 10/21/19 Guest Speaker)

-Energy efficiency best management practices

-Optimize energy performance -Advanced energy metering -Demand response -Renewable energy and carbon offsets -Enhanced refrigerant management

-Existing building commissioning analysis -Existing building commissioning implementation -Ongoing commissioning -Building level energy metering -Fundamental refrigerant management

Check for resources; leeduser.com

In class: Breakout session - Each team review their assigned credits and assess for meeting the requirement for Field House project. Make a list of back-up documentations needed. Confirm with LEED online credit Form too. - Each team review the documentations for each credit from summer interns. - Develop policies associated with this module

- Energy Star Portfolio Manager; demonstrate -Review utility data consumption with focus on electric, steam, chill water, gas.

Assignment: Energy Star rating for Facility and another example building will be provided.

Guest Speaker: Aaron LaFave, Campus Energy Manager, Building Management System

overview.

Guest Speaker: Chonghui Liu PE, CEM, LEED AP, Team Leader, Energy Services, [Popli Group](#). Sustainability and resiliency strategies.

Building Energy Audit

(10/28/19 Li)

- Meet at the building, - Introduction to the building and introduction to LEED Lab, benefits, schedule, and expectations. - Conduct ASHRAE Level 1 audit - Conduct water audit.

Assignment: Confirm what is on the drawings with what is installed - Use the forms used in class to record data during walk through - Take necessary photos for documentation and report - Share the data in next class.

All teams

Location and Transportation, Sustainable Sites

(9/18/19 Bremer and 9/25/19 Bremer)

Site overview

-Site and transportation Overview - Innovation in Operations

- Location & Transportation; Alternative transportation - Site management policy - Site development – protect and restore habitat.

- Rainwater management

- Heat island reduction - light pollution reduction - Site management - Site improvement plan - Joint use of facilities

Check for resources; [leeduser.com](#)

In class: Breakout session - Each team review their assigned credits and assess for meeting the requirement for Wildcat Field House project. Make a list of back-up documentations needed. Confirm with LEED online credit Form too. - Develop policies associated with this module.

Water Conservation Measures and Efficiency

(10/2/19 Bremer)

- Water efficiency and conservation strategies overview

- Indoor water use reduction - Building level water metering - Outdoor water use reduction - Indoor water use reduction - Cooling tower water use - Water metering

-Review water meter data for at least past three years - Review [EPA WaterSense](#)

Check for resources; [leeduser.com](#)

In class: Breakout session - Each team review their assigned credits and assess for meeting the requirement for Wildcat Field House project. Make a list of back-up documentations needed. Confirm with LEED online credit Form too. - Develop policies associated with this module.

Assignment: use Arc platform to calculate water saving and share with the class.

Materials and Resources

(10/9/16 Bremer, 10/16/19 Guest Speaker and 10/23/19 No Lecture/Group Breakouts)

- Building operations and material consumption overview
- Ongoing purchasing and waste policy - Facility maintenance and renovation policy - Purchasing-ongoing - Purchasing-lamps - Purchasing- facility maintenance and renovation - Solid waste management-ongoing - Solid waste management-facility maintenance and renovation

Check for resources; leeduser.com

In class: Breakout session - Each team review their assigned credits and assess for meeting the requirement for Wildcat Field House project. Make a list of back up documentations needed. Confirm with LEED online credit Form too. - Each team review the documentations for each credit from last semester. - Develop policies associated with this module.

Guest Speaker, Jaime Tuttle, OHSWA Recycling Educator, recycling policy and program. Discuss Waste Audit.

Indoor Environmental Quality, Human Health and Wellbeing

(10/7/19 Li , 10/28/19 Li and 11/4/19 Li)

- Building indoor environmental quality and health and wellbeing overview
- ASHRAE 62.1-2010, Minimum Indoor Air quality Performance, process, calculations, tools, reporting. Prepare for site air performance audit.
- Minimum indoor air quality performance - Environmental tobacco smoke control - Indoor air quality management program - Enhanced indoor air quality strategies - Thermal comfort - Interior lighting - Daylight and quality views

Check for resources; leeduser.com

In class: Breakout session - Each team review their assigned credits and assess for meeting the requirement for Field House project. Make a list of back up documentations needed. Confirm with LEED online credit Form too. - Each team review the documentations for each credit from last semester. - Develop policies associated with this module.

Guest Speaker, Commissioning (TBD)

Indoor Environmental Quality, Human Health and Wellbeing

(10/30/19 Bremer and 11/6/19 Bremer)

- Green cleaning policy -Green cleaning-custodial effectiveness assessment -Green cleaning products and materials -Green cleaning –equipment -Integrated pest management -Occupant comfort survey

Check for resources; leeduser.com

In class: Breakout session - Each team review their assigned credits and assess for meeting the requirement for Wildcat Field House project. Make a list of back-up documentations needed. Confirm with LEED online credit Form too. - Each team review the documentations for each credit from last semester. - Develop policies associated with this module -

Acquire Data and Assess Quality Control of the Documentation

(11/11/19 Li and 11/13/19 Bremer)

- Each team to review the documentations and all backup information for each credit - Each team to

upload information onto Bb team's page - Review all policies and pre-requisites including:

➤ Site management policy

All Teams

All Teams

➤ Indoor water use reduction ➤ Building level water metering ➤ Energy efficiency best management practices ➤ Minimum energy performance ➤ Building level energy metering
- Review Energy Star Rating – Conduct indoor air quality testing with handheld sensors.

Final Review of Presentation for the Stakeholders

(11/18/19 Li and 11/20/19 Bremer)

- Review all policies and pre-requisites including:

➤Fundamental refrigerant management ➤Ongoing Purchasing & Waste Policy ➤Facility maintenance and Renovation Policy ➤Minimum Indoor Air Quality Performance ➤Environmental Tobacco Smoke Control ➤Green Cleaning Policy - Review LEED certification process

- Each project team member to upload his/her credit docs to LEED online - Share the documentation for three policies with peer review. - Each team develop a PowerPoint for stakeholder (what to be presented? Questions/concerns) - Review of the course, strategies, now/other approaches, challenges, and lessons learned - Conduct waste audit of Wildcat Field House. **Teams review pre-requisites, policies and credits.**

LEED GA exam review

(11/25/19 Li, No Class 11/27/19 Thanksgiving, and 12/4/19 Li)

-Submit the completed credits to LEED online for certification

- Review LEED accreditation exam - Preparation for the exam - Review sample exam questions

Final Presentation to the Stakeholders

(12/9/19 Bremer & Li) 12:45 – 2:45 pm.

Take your LEED GA exam at testing center in Syracuse

(Alternate dates 12/7 – 12/16)