Green Building Strategies

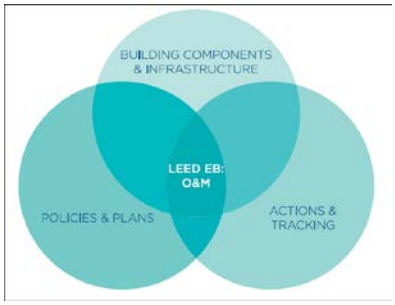
Fall 2018
DCP 4930, section 14EA
6 credit hours

Tuesdays & Thursdays, Periods 6-8 (12:50 - 3:50 PM)
ARCH, Room 411

Bahar Armaghani, LEED™ Fellow, LEED™ Faculty
ARCH 446 (east end of Architecture Building)
barmagh@ufl.edu, 352-294-1428
Office Hours: Ts & THs 11:45-12:45 pm, or by appointment

Strategies to Build Green
And
Transforming Existing Buildings into High Performance Sustainable Buildings

While the environmental performance of new commercial buildings in the United States has been improving dramatically in recent years, most existing buildings were constructed when energy was less expensive, technologies were less advanced, and environmental performance rarely a priority. Older, existing buildings generally use significantly more energy and water than new buildings of the same size and function. According to the Institute for Building Efficiency, existing buildings that are 20 years and older make up more than 70 percent of the built environment by square footage. Thus, existing buildings offer tremendous opportunities to conserve energy and water as well as provide healthier, more productive work environments. *EPA*



Green buildings help create healthy environments while saving energy, resources, and money.

Course Description

This is an interactive multidisciplinary course, in which students will be introduced to strategies for the design, construction and operation of high performance buildings. The course is designed to equip students with the skills and knowledge needed to be effective communicators, critical thinkers, project managers, problem solvers, and team players. Students learn the strategies for greening facilities with green building rating systems in mind and a focus on the principles of LEED. An on-campus building/project will be used for hands-on learning. In addition, successful course completion can prepare the student for LEED™ V4 Accredited Professional exams.

Course prerequisite

Minimum junior standing
DCP 3210, Sustainable Solutions for the Built Environment

Course Objectives

This course is designed to produce the following outcomes:

- An understanding of strategies to design and build green.
- Ability to assess the performance of existing buildings. Learn the tools needed for energy, water, IAQ, and lighting audits.
- Calculate ROI for energy, lighting and water fixtures retrofit.
- Assess and develop polices and techniques to improve building exteriors, site, water and energy consumption, remodeling, waste management, and purchasing.
- Recognize how building green will improve operation & maintenance and lead to higher performing buildings.
- Facilitate LEED™ V4 for Existing Buildings: Operations and Maintenance (EB: O+M) process with the goal of certifying a facility.
- Appreciation of the value of working in teams, and each team member's contribution to the success of a project.
- Equip students with the skills and knowledge needed in today's green industry.
- Prepare students for LEED™ V4 Green Associate (GA) and LEED™ V4 professional credential exams, should they be motivated to take them.

Course Format

Approach: The course will be approached as one would approach a real project, using an on-campus building. This semester the Lacrosse Locker Room Facility has been selected to evaluate its green features and propose strategies for optimizing its performance.

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

Course Website: http://elearning.ufl.edu/: This course's e-learning on Canvas site will contain all course materials, including readings, lecture slides, assignment instructions, quizzes, and announcements. All course material will be posted before semester starts.

Communication: Outside of class, barmagh@ufl.edu email is the best and preferred method of communication.

Field Trips Multiple field trips will be scheduled to the campus building/project selected for the semester. First trip will be to walk the building and see the building layout per the building drawings that reviewed in class. Second trip will be to conduct an energy, lighting and water audits at the building. A third trip is possible to verifying data collected on the second trip. All required field trips will be held during scheduled class times. Any field trips scheduled outside of normal class hours are optional.

Guest Speakers

Professionals practicing the topic in the industry present to the class to reinforce the importance of the learning skills and give the students a networking opportunity with industry leaders in the topic.

Required Reading Materials

LEED™ V4 for New Construction and Existing Building Operations and Maintenance Reference Guide, *short version* posted on Canvas along with other resources and readings.

- Power point slides and short selected publications posted on Canvas
- Using www.LEEDuser.com as supplemental resource

- LEED™ V4 EB; O+M Reference Guide web based access for one year for $50 per student (this is an electronic book). This is a special offer from USGBC to LEED™ V4 Lab students. Instructions for payment directly to USGBC and access will be provided after drop/add week.

Attendance is required for the fall semester Green Building Learning Collaborative event. The event is scheduled for Wednesday, September 26th, 3:30-5:30. More information on the program and place will be distributed a few weeks before the event.

Tools and Resources

- **Building Green**, **www.buildinggreen.com ;** is an excellent resource on the latest in sustainable built environment issues, cases studies, articles, materials, and more. This is a membership based site, and since the University is a member you have full access to all the site content.
  - To access this site while on campus, you will automatically be logged in the site and can use it.
  - To access the site while you are off campus, you can remotely access it using VPN. The UF VPN Service is designed to allow University Faculty, Staff, and Students to securely "tunnel" into campus over other networks, such as their home internet connection, and access services as if they were on campus. Basically, it lets your computer appear as if it were located physically on campus. To install, go to vpn.ufl.edu . To get more information about VPN, you can visit: https://connect.ufl.edu/it/wiki/Pages/glvpn.aspx.
- If you have problems accessing the site use the following; https://www.buildinggreen.com/ufl
- **LEEDuser**, http://www.leeduser.com ; this is another resource with tools and examples on each LEED™ V4 credit. UF has a membership to this resource, you can access on campus. If you need to access off campus go through the UF VPN Service, following above steps.
- If you have problems accessing the site use the following; http://www.leeduser.com/ufl
- **GSA**, https://sftool.gov/.

Paperless Activities and Assignments:

E-learning on Canvas will be the hub for the communication, discussion, announcements, turn in assignments, papers/projects/videos, take quizzes, and presentation material.

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

Class Attendance and Make-Up Policy

- 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 the sustainable built environment.
- **You are encouraged to take notes electronically, but do not use the computer for surfing the web for non-class related topics or doing work for other classes. If asked, students must e-mail the instructor his/her notes at the end of the class. Also, using cell phones and texting during class is not allowed except for an emergency.**
- Reading material: **Students must complete the reading before each class.**
- Only excused absences can be made up. Excused absences include illness, serious family emergencies, special curricular requirements (e.g., judging trips, field trips, and professional conferences), military obligation, severe weather conditions, religious holidays, and participation in official university activities such as music performances, athletic competition or debate. Absences from class for court-imposed legal obligations (e.g., jury duty or subpoena) is excused. Absences must be properly documented, for example with a doctor's note.
- All presentations, quizzes, credit submission, 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 the assignment in, 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.
- Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found in the online catalog at:
  https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

Exams

Exams will be on Canvas. Each exam will cover the material that has been covered in class. These are non-cumulative exams.

Final Projects/Presentations: Team Delivery

- **Energy team; develop written procedures for energy audit including return on investment (ROI) with a 3-5 minute video/skid making a compelling case on the topic. Also, complete Lacrosse building LEED certification submission with backup documentation.**
- **Indoor Environmental Quality audit team; develop written procedures for air ventilation and IAQ audit including return on investment (ROI) with a 3-5 minute video/skid making a compelling case on the topic. Also, complete Lacrosse building LEED certification submission with backup documentation.**
- **Water audit team; develop written procedures for water audit including return on investment (ROI) with a 3-5 minute video/skid making a compelling case on the topic. Also, complete Lacrosse Building LEED certification submission with backup documentation.**
- **Lighting audit team; develop written procedures for lighting audit including return on investment (ROI) with a 3-5 minute video/skid making a compelling case on the topic. Also, complete Lacrosse building LEED certification submission with backup documentation.**
- **Site and Transportation Team; develop a transportation survey for the building, analyze and make recommendation. Also, develop procedures for site analysis, runoff, and recommendation for runoff reduction include green roof and LID. Team has the option of calculating the runoff and determining the size of the green roof and LID to accommodate the run off and calculate ROI for installing either system, green roof or LID, or the team can apply SITES rating system, the most comprehensive system for developing sustainable landscapes for the project.**

Grading

Assignment	**Instruction**	**points**	**Due date**
Exam 1&2	Individual; 15 points each	30	On Canvas **Exam 1; 10/9/2018** **Exam 2; 11/15/2018**
Assignments,	Individual; complete assignment; 4 points each	20	On Canvas. See schedule
Attendance & participation	Individual; Read assigned reading, attend class, field trips, and participate in discussions	10	5 points discussion & participation 5 points field trips
Draft final project	Individual submission	10	On Canvas. **10/4/2018**
Final project; see above specifics	**Team's presentation to UAA on the BLDG's audit**	30	

Grade Scale

Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E
Numeric Grade	93-100	90-92	87-89	83-86	80-82	77-79	73-76	70-72	67-69	63-66	60-62	0-59
Quality Points	4.0	3.67	3.33	3.0	2.67	2.33	2.0	1.67	1.33	1.0	0.67	0.0

See the following link to UF's grade policy:
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Online course evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/

Accommodating Students with Disabilities

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Student Honor Code and Academic Honesty

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions.

Campus Resources

Health and Wellness

U Matter, We Care:
If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.

Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc/Default.aspx, 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS)
Student Health Care Center, 392-1161.
University Police Department, 392-1111 (or 9-1-1 for emergencies). http://www.police.ufl.edu/

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu
https://lss.at.ufl.edu/help.shtml
Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. http://www.crc.ufl.edu/
Library Support, http://cms.uflib.ufl.edu/ask . Various ways to receive assistance with respect to using the libraries or finding resources.
Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. http://teachingcenter.ufl.edu/
Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.
http://writing.ufl.edu/writing-studio/

Student Complaints Campus: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf
On-Line Students Complaints: http://www.distance.ufl.edu/student-complaint-process

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will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/."

Need Help? Don't hesitate to ask

PROBLEMS WITH e-learning on Canvas
For issues with technical difficulties for e-learning on Canvas, contact the UF Help Desk at:
Learning-support@ufl.edu
(352) 392-HELP (4357) - select option 2
https://lss.at.ufl.edu/help.shtml

Disclaimer
This syllabus represents our current plans and objectives. As we go through the semester, those plans may need to change depending on the building schedule. Such changes, communicated clearly, are not unusual and should be expected.

Weekly Class Schedule

Date	Topics
Module 1: Introduction to Green Building, Benefits, and Goals	
TH, 8/23	- Welcome & Introduction - Review syllabus - Review use of Canvas, course files, material, and paperless approach - UF campus sustainability overview and status - Review green building rating systems including: o Green Globes o BREAM o ASHRAE 189 o Living Building Challenge o IGCC o with focus on LEED™ V4 - Green building/LEED™ V4 goals, benefits, certification and recertification - Why green? ***Teams*** - Identify project team managers, members & roles and responsibilities ***Introduction to the following tools:*** - ***www.buildinggreen.com*** - ***www.Leeduser.com*** **- Video,** Watch Ed Mazria and Peter Calthorpe's Presentation from Congress for the New Urbanism (CNU) 23rd meeting, *May 21, 2015* http://architecture2030.org/watch-ed-mazria-and-peter-calthorpes-presentation-from-cnu-23/

T, 8/28	***Reading:*** ***- Getting Started*** ***- Minimum Program Requirements*** ***- Rating system selection***
	- Campus and/or a single building approach - LEED™ V4; O+M scorecard and compared to LEED BD+C scorecard - Credit structure; establishment and performance - Identify pre-requisites and credits - Identify policies needed - Performance period - Performance credits or establishment credits - Project boundary - LEED™ V4 online demonstration and invitation - Leading sustainability charrette - **Integrative Approach** Database of State Incentives, www.dsireusa.org - Identify teams in class (Site, Energy, Water, Lighting, and IAQ) - Review project managers' and team members' role and responsibilities - Review Lacrosse Locker Room Facility's LEED New Construction (LEED NC) - Review summary of green strategies used for LEED NC certification. - Identify strategies that were used for LEED NC and are contributing to green operation and maintenance of the building

Assignment #1: Establish a USGBC account

Module 2: Project Administration, Project Planning and Assessment

TH, 8/30	**Reading and Understanding Building Drawings**
	- Learn about Lacrosse Locker Room Facility - Building drawings, site, architecture, and Mechanical, Electrical, Plumbing (MEP) - Utility data analysis - Building green features, Review of prior LEED™ NC certification - Building occupancy schedule and operation - Occupancy, Full time equivalent (FTE), part time & transient - Calculate FTE for the project - 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 Waste management department. - How to assess LEED™ V4 scorecard for Lacrosse/campus approach - Access and how to manage LEED™ V4 online - How to run a project charrette **Check for resources; www.leeduser.com**

T, 9/4	**Utility Consumption and Analysis** **In class: breakout session;** - Teams working on developing and finalizing what is discussed on Tuesday utilizing tools and strategies learned. - Each project manager oversees the activities of his/her team. - Each team to present their progress at the end of class. - Each team to manage the information and result of work produced on Canvas - ***Introduction to instrumentation needed for building auditing*** - **Invite students to join LEED online**
Module 3: Reading and Understanding Building Drawings and Utility Bills	
TH, 9/6 *Energy Audit Team*	**Energy Conservation Strategies and Measures** **Energy efficiency and conservation strategies overview** - **Review energy and air quality instrumentation for measurement and verification.** - **Review building mechanical drawings.** - 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 - Review strategies used for to optimize building energy performance during design and ASHRAE 90.1 - Discuss energy molding, it benefits, strategies, and outcome for designing the building - Review strategies used for ventilation, filtration and thermal comfort during the design **Check for resources; www.leeduser.com**
	Reading; Energy and Atmosphere category to Building Commissioning credit **https://www.buildinggreen.com/sites/default/files/ebn/TBGR_26-08.pdf**
	Energy Star target finder https://portfoliomanager.energystar.gov/pm/targetFinder;jsessionid=604A5298165C35755993E38D12CB0816?execution=e1s1
T, 9/11	**In class: Breakout session** - Building utility data analysis - Each team to utilize building drawings to review what was discussed on Tuesday - Perform Energy Star rating for Lacrosse - Perform Energy Star rating for the Green Bank (data provided on Canvas) - Review utility data consumption with focus on electric, steam, chill water, gas, and water - Review and get familiar with all the forms needed for ASHRAE Level I audit - Energy Star Portfolio Manager; demonstration - Discuss and decide Campus or building approach ***Guest speaker; Robert Chronic, Energy audit forms and methodology*** **In class**

Module 4: Energy Audit and Energy Star Rating

TH, 9/13 *Energy Audit Team*	An **energy service company** or **energy savings company** (**ESCO** or **ESCO**) is a commercial or non-profit business providing a broad range of energy solutions including designs and implementation of energy savings projects, retrofitting, energy conservation, energy infrastructure outsourcing, power generation and energy supply, and risk management. ESCO focuses more on innovative financing methods. These include off-balance sheet vehicles which own a range of applicable equipment configured in such a way as to reduce the energy cost of a building. The building occupants, or landlord, then benefit from the energy savings and pay a fee to the ESCO in return. At all times, the saving is guaranteed to exceed the fee. The ESCO starts by performing an analysis of the property, designs an energy efficient solution, installs the required elements, and maintains the system to ensure energy savings during the payback period. The savings in energy costs are often used to pay back the capital investment of the project over a five- to twenty-year period, or reinvested into the building to allow for capital upgrades that may otherwise be unfeasible. If the project does not provide returns on the investment, the ESCO is often responsible to pay the difference.
T, 9/18	**What is commissioning? Why? When? How? And Who** - Commissioning during design and construction - Existing building commissioning analysis - Existing building commissioning implementation - Ongoing commissioning - Building level energy metering - Fundamental refrigerant management - Demonstrate ROI calculations for lighting audit - Demonstrate Energy Star rating **Reading: Energy and Atmosphere category from existing building commissioning credit to the end of Energy and Atmosphere category.** **Check for resources; www.leeduser.com**
Assignment #2, individual team members, submit a preliminary assessment of LEED™ V4 checklist for Lacrosse project.	
	Guest speaker: Commissioning, Mike Watts

Module 5: Lighting Audit, Cost Benefits and ROI And (Cont.) Energy Conservation Strategies

TH, 9/20 *Lighting audit team*	**Lighting audit** - Review Building electrical/lighting drawings and discuss strategies used for lighting design - Energy efficiency best management practices - Optimize energy performance and energy modeling during design and how it is benefiting the building during the operation and maintenance. - Advanced energy metering or sub-metering strategies - understanding Demand Response - Renewable energy and carbon offsets

	- Enhanced refrigerant management
T, 9/25	**In class: Breakout session** - Each team to review electrical consumption for the last five years. - Each team to review credits requirement in this module. - Discuss and decide Campus or building approach. - Each team to update LEED checklist based on the credits that are pursuing. - Each team member to calculate ROI for lighting retrofit for the building going from T8 to LED. - Project Manager to review the team's work and upload to team's Canvas page. - **Prepare for the site visit coming on Tuesday, review audit forms, obtain building drawings, and review the building information and data.** - **See site visit instruction under this module on Canvas.**
	Guest Speaker; Lighting audit, 9/20, John Lawson
Module 6: Building Audit, Measurement and Verification	
TH, 9/27	- Meet at the building, The south east gate and follow the site visit instruction. - Distribute instrumentation to each team. - Conduct ASHRAE Level 1 audit. - Conduct water audit. - Conduct lighting audit. - Use building drawings to walk the building. - Use the forms used in class to record data during walk through. - Take necessary photos for documentation and report. **Due to availability and access to the building, this site visit may be outside class time.**
Guest site visit, Robert Chronic, Eaton Corporation	
T, 10/2	**In class: Breakout session** - Review data collection from site visit - Share the data in class - Each team review credits pursuing in this module - Discuss and decide Campus or building approach - Work on assignment #3: Energy Star rating for Lacrosse Locker Room Facility and the Green Bank. - Each team to list the FIMs and ECM that were noted during the site visit. - Each team to update LEED checklist based on the credits that are pursuing.
Guest speaker; ESCO, Steve Moore, Siemens Industry	
Assignment #3, Energy star rating for Lacrosse and the Green Bank due	
Module 7: Water Audit, Conservation and Strategies	
TH, 10/4 *Water audit team*	**Water efficiency** **Water efficiency and conservation strategies overview** - Review indoor and outdoor water strategies used for design and construction of this building and the benefit gained from these strategies for the operation and maintenance of the building.

	- Discuss indoor water use reduction, review latest strategies, WaterSense, and tools for calculation - Demonstrate indoor water use reduction calculator. - Building level water metering, discuss master and sub-meter relationship - Outdoor water use reduction strategies and EPA tools - Demonstrate outdoor water use reduction calculator. - Cooling tower water use strategies and chemical use. - Review water meter data for at least past five years - Review WaterSense at http://www.epa.gov/watersense/our_water/start_saving.html
	Reading; Water Efficiency category
	Check for resources; www.leeduser.com **EPA interactive water budget tool; outdoor water** **http://www.epa.gov/watersense/water_budget/application.html** **water budget data finder; http://www.epa.gov/WaterSense/new_homes/wb_data_finder.html** **WaterSense® Water Budget Approach;** **http://www.epa.gov/watersense/docs/home_final_waterbudget508.pdf** **Calculate your personal water saving;** **http://www.epa.gov/watersense/our_water/start_saving.html#tabs-3** **Check for resources; www.leeduser.com**
T, 10/9	**In class: Breakout session** - Work on the water saving calculations for the project with baseline and design base for both indoors and outdoors. - Each team member to calculate indoor and outdoor water use reduction using the appropriate calculators. - Each team to review and update the policies in the module. - Each team review credits pursuing in this module. - Discuss and decide Campus or building approach. - Each team member to calculate ROI for plumbing retrofit. - Each team to update LEED checklist based on the credits that are pursuing.
	Final project outline due, 10/4
Exam 1 on Canvas	
Module 8: Data review	
TH, 10/11	- In class review energy, water, and lighting data collection, forms and calculations completion. Each to have a rough draft of the procedure and formula for ROI - Review the development of the guidelines for each team. - Review the format for credit status reporting for each team **Reading; Transportation and site categories to Rainwater management**
TH,10/11	**Field trip; *On campus project***
Module 9: Site and Transportation Survey and Assessment	
T, 10/16	**Site and Transportation strategies overview**

	- Review the strategies implemented during design and construction of the project including public transportation, bicycle storage, fuel efficient vehicles. - Review strategies used for site protection and open space, material used for roof and non-roof, managing rain water, and site light pollution. - Discuss strategies used to develop site management policy and protect habitat. - How heat island reduction material being managed and maintained. - Light pollution reduction. **Check for resources; www.leeduser.com** **Reading; Site categories from Rainwater management to the end of site category**
TH, 10/18	**In class: Breakout session** - Each team to review the policies in the module. - Each team review credits pursuing in this module. - Discuss and decide Campus or building approach. - Each team to update LEED checklist based on the credits that are pursuing.
Assignment #4: Calculate water saving and be prepared to share with the class. This includes indoor and outdoor water calculations.	
Module 10: Building Operations, Material Use	
T, 10/23	**Building operations and material consumption overview** - Review the strategies used in the building construction material selection with its recycled contact, its origin, and chemical contact including VOC and Formaldehyde. - Review the strategies used for waste diversion from construction and renovation. - Ongoing purchasing and waste policy - Facility maintenance and renovation policy - Purchasing-lamps directive. - Purchasing- facility maintenance and renovation guidelines. - Solid waste management-ongoing and facility maintenance and renovation. - Demonstrate the use of the material purchasing calculator. **Check for resources; www.leeduser.com** **Reading; Material category**
TH, 10/25	**In class: Breakout session** - Each team to review the policies related to this module posted on the policies module on Canvas. - Each team member to utilize the purchasing and material calculator tool. - Each team review credits pursuing in this module - Discuss and decide Campus or building approach - Each team to update LEED checklist based on the credits that are pursuing.
Module 11: Indoor Environmental Quality, Health and Wellbeing	
T, 10/30	**Building indoor environmental quality and health/wellbeing overview**

IAQ audit team	- Review strategies used during the design and construction for indoor environmental quality including ventilation, filtration, and material use. - Demonstrate ASHRAE 62.1 calculation. - Environmental tobacco smoke control - Indoor air quality management program during construction and before occupancy. - Thermal comfort and interior lighting strategies. - Daylight and quality views **Check for resources; www.leeduser.com** **Reading; Indoor Environmental Quality category** Harvard Study Shows Elevated CO2 Levels Directly Affect Human Cognitive function, 10/26/2015 http://www.hsph.harvard.edu/news/press-releases/green-office-environments-linked-with-higher-cognitive-function-scores/
TH, 11/1	**In class: Breakout session** - Each team to review the policies in the module - Each team review credits pursuing in this module - Discuss and decide Campus or building approach - Each team member to complete ASHRE 62.1 calculation - Each team to update LEED checklist based on the credits that are pursuing.
Assignment #5: ASHRAE 62.1 calculation.	
Module 12: Indoor Environmental Quality, Health and Wellbeing, (Cont.)	
T, 11/6 *IAQ audit team*	- Green cleaning policy; developing, maintaining, and implementing - Green cleaning-custodial effectiveness assessment, introduction of industry standards - Green cleaning products and materials, green product certification - Green cleaning –equipment - Integrated pest management, development and implementing the plan - Occupant comfort survey, developing a survey and organization with research on this topic, such as University of California, Berkeley **Check for resources; www.leeduser.com** **Reading; Indoor Environmental Quality categories continue**
TH, 11/8	**In class: Breakout session** - Each team to review the policies in the module - **Review I-BEAM process and forms** - **Review APPA process and forms** - Each team review credits pursuing in this module - Discuss and decide Campus or building approach - Each team to update LEED checklist based on the credits that are pursuing.

Module 13: Innovation and Regional Priority	
T, 11/13	- Discuss strategies for innovation in the project including: o Education and tours o Signage and graphics to describe green building and operation strategies o Using Pilot credit - Review LEED Online and how to develop documentation supporting the innovation credit's intent, requirements, and strategies. - Review Exemplary Performance strategies - On LEED Online, review and demonstrate credits completion and how RP credit and Innovation credits are completed and submitted. **Check for resources; www.leeduser.com** **Reading; ID and RP category**
TH, 11/15	**Renewable Energy**
	Renewable energy sources - Regional assessment use - Specifying and sizing a system - How to calculate the annual solar energy output of a photovoltaic system?
Exam 2 on Canvas	
Module 14: Progress Assessment and Reporting, Quality Control of the Documentations and final Review	
T, 11/20	Review; - All the policies developed - ROI on water and lighting - Calculators used for water reduction inside and outside the building - ASHRAE 62.1, ventilation calculation - Review I-BEAM forms - Review APPA forms - All team folders to be reviewed and organized with all credits, backup information and documentation, and credit Forms. - Review the final PowerPoint, CFR, and Energy Audit Report - Team to practice the final presentation
TH, 11/21	

Module 15: LEED™ V4 Green Associated (GA) exam review	
T, 11/27	- Review LEED™ V4 accreditation exam hand book - Demonstrate registration for the exam - How to prepare for the exam The LEED v4 exam is based on the following text specifications and references. The exam questions reflect Task Domains and Knowledge Domains. **Task Domains**: Task Domains reflect the tasks necessary to perform LEED safely and effectively. These include concepts such as LEED Project and Team Coordination, LEED Certification Process, Analyses Required for LEED Credits, and Advocacy and Education for Adoption for LEED Rating System. • LEED Green Associate Tasks (100%) **Knowledge Domains:** Knowledge Domains reflect the rating systems' credit categories and what one needs to know. These include concepts such as LEED Process, Integrative Strategies, LEED credit categories, and Project Surroundings and Public Outreach. • LEED Process (16 questions) • Integrative Strategies (8 questions) • Location and Transportation (7 questions) • Sustainable Sites (7 questions) • Water Efficiency (9 questions) • Energy and Atmosphere (10 questions) • Materials and Resources (9 questions) • Indoor Environmental Quality (8 questions) • Project Surroundings and Public Outreach (11 questions)
TH, 11/29	Review over 100 exam questions in real test format related to above knowledge in designing, building, and operating green building
Final Presentations	
T, 12/4	- The class will present one presentation to the client University Athletic Association (UAA). - The "One Team" will present professionally about the project assessment, methodology, audit, findings, and recommendations. - Each team members will present The section that is assigned to - The team presents to meet the expectation of any firm who is pursuing a project with UAA. - The team will upload the following to Canvas: 1. One PowerPoint presentation 2. One final CFR 3. One final energy audit report **All credit submittals with their back up documentation and a copy of LEED online Form to be completed and uploaded to Canvas.**