# **Cover Sheet: Request 11618**

# DCP 4XXX Green Building Strategies

### Info

THIO	
Process	Course New Ugrad/Pro
Status	Pending
Submitter	Carr,Margaret H mcarr@ufl.edu
Created	4/12/2017 1:57:00 PM
Updated	9/7/2017 10:18:50 AM
Description	A permanent course number is requested for this course where students will be
of request	introduced to strategies for the design, construction and operation of high
	performance buildings.

Actions					
Step	Status	Group	User	Comment	Updated
Department	Approved	DCP - Design, Construction and Planning 011501000	Carr, Margaret H	Approved at meeting of 13 March, 2017	4/12/2017
No document	changes				
College	Recycled	DCP - College of Design, Construction and Planning	Chini, Abdol Reza	Per discussion with Professor Carr the course should focus on the topics related to high performance buildings using LEED as a case study.	4/21/2017
No document	changes				
Department	Approved	DCP - Design, Construction and Planning 011501000	Carr, Margaret H	Syllabus has been revised and approved by faculty committee per suggestions of DCP Curriculum Committee.	5/8/2017
Replaced Syll	abus, Fall 2	2017, DCP 4xxx,	Green BLDG Stra	tegies.pdf	5/8/2017
College	Approved	DCP - College of Design, Construction and Planning	Chini, Abdol Reza	Was approved by the College curriculum committee.	6/19/2017
Replaced Syll Added DCP 4	abus Fall 2 xxx Green I	017 DCP 4xxx Gr BLDG Strategies	een BLDG Strate final.docx	gies_carr (002).docx	5/11/2017 5/11/2017
University Curriculum Committee	Comment	PV - University Curriculum Committee (UCC)	Baker, Brandi N	Added to September Agenda.	8/15/2017
No document	changes				
University Curriculum Committee	Pending	PV - University Curriculum Committee (UCC)			8/15/2017
No document	changes				
Statewide Course Numbering System No document	changes				

Step	Status	Group	User	Comment	Updated
Office of the					
Registrar					
No document	changes				
Student					
Academic					
Support					
System					
No document	changes				
Catalog					
No document	changes				
College					
Notified					
No document	changes				

# **Course|New for request 11618**

# Info

Request: DCP 4XXX Green Building Strategies Description of request: A permanent course number is requested for this course where students will be introduced to strategies for the design, construction and operation of high performance buildings. Submitter: Carr,Margaret H mcarr@ufl.edu Created: 9/7/2017 10:24:40 AM Form version: 3

### Responses

Recommended PrefixDCP Course Level 4 Number XXX Category of Instruction Joint (Ugrad/Grad) Lab Code None Course TitleGreen Building Strategies Transcript TitleGrn Bldg Strategies Degree TypeBaccalaureate

Delivery Method(s)On-Campus Co-ListingNo

Effective Term Earliest Available Effective YearEarliest Available Rotating Topic?No Repeatable Credit?No

Amount of Credit6

S/U Only?No Contact Type Regularly Scheduled Weekly Contact Hours 6 Course Description Students will be introduced to strategies for the design, construction and operation of high performance buildings. Prerequisites DCP 3210 (C) & junior standing Co-requisites None

**Rationale and Placement in Curriculum** This course meets the requirements of our DCP 4941 Practicum, which is scheduled for semester 7. Students may also take the course for approved elective credit for the major, or as elective credit for our minor.

The prerequisite of DCP 3210 is required because 1) 3210 is required for both majors and minors and as such it provides a foundation for the approaches covered in Green Building Strategies.

This course has 6 contact hours and during class students are working with faculty to learn and apply technical skills for energy, water and air quality audits.

**Course Objectives** -LEED<sup>™</sup> V4 project administration, registration, submission, and LEED<sup>™</sup> V4 online utilization.

-LEED<sup>TM</sup> V4 assessment techniques for Existing Buildings: Operations and Maintenance (EB: O+M) process with the goal of certifying a facility.

- Preparation for LEED<sup>™</sup> V4 Green Associate (GA) and LEED<sup>™</sup> V4 professional credential exams

- Tools and methodologies used for energy, water, IAQ, and lighting audits.

- Familiarity with best practices in facility operations and maintenance.

- Techniques to increase performance of building exteriors, site, water and energy consumption, remodeling, waste management, and purchasing.

- An appreciation for working in teams, and the value added by team members and the project manager.

#### **Course Textbook(s) and/or Other Assigned Reading**LEED<sup>™</sup> V4 for New

Construction and Existing Building Operations and Maintenance Reference Guide, short version posted on Canvas.

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

**Weekly Schedule of Topics** Module 1: Intro to Green Building Benefits, Goals, and Tools

Module 2: Project Administration

Module 3: Reading and Understanding Building Drawings and Utility Bills

Module 4: Energy Audit and Energy Star Rating

Module 5: Lighting Audit, Cost Benefits and ROI, and Energy Conservation Strategies

Module 6: Building Visit Measurement and Verification

Module 7: Water Audit, Conservation and Strategies

Module 8: Data Review

Module 9: Site and Transportation Survey and Assessment

Module 10: Building Operations, Material Use

Module 11: Indoor Environmental Quality, Health and Wellbeing

Module 12: Indoor Environmental Quality, Health and Wellbeing (cont)

Module 13: Innovation and Regional Priority

Module 14: Progress Assessment and Reporting, Quality Control of the Documentation and final Review

Module 15: LEED<sup>™</sup> V4 Green Associated (GA) exam review

Links and PoliciesGrading Policy

https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Attendance Policy https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

Students Requiring Accommodations http://www.dso.ufl.edu/drc/

Student Honor Code and Academic Honesty https://www.dso.ufl.edu/sccr/process/studentconduct-honor-code/

Campus Resources http://www.counseling.ufl.edu/cwc/Default.aspx E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learningsupport@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/ University of Florida College of Design, Construction and Planning 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

**Grading Scheme** Exam 1, Individual; 15 Exam 2, Individual; 15 Assignments, Individual; 20 Attendance & participation; Individual; 10 (attendance- 5, field trips & discussion - 5) Draft final project; Individual 10 Final project; Teams; 30 **Instructor(s)** Bahar Armaghani, LEED<sup>™</sup> Fellow, LEED<sup>™</sup>Faculty Lecturer, College of Design, Construction & Planning

# **Green Building Strategies**

Fall 2017 DCP 4xxx, section xxx 6 credit hours

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

Bahar Armaghani, LEED<sup>TM</sup> Fellow, LEED<sup>TM</sup> Faculty ARCH 446 (east end of Architecture Building) <u>barmagh@ufl.edu</u>, 352-294-1428 Office Hours: Ts & THs 11:45-12:35 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<sup>TM</sup> 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<sup>TM</sup> 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<sup>TM</sup> V4 Green Associate (GA) and LEED<sup>TM</sup> 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:** <u>http://elearning.ufl.edu/</u>: 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, <u>barmagh@ufl.edu</u> email is the best and preferred method of communication.

# **Field Trips and Guest Speakers**

- Multiple field trips will be scheduled to the campus building/project selected for the semester. Some may be outside class time.
- Field trips are required.

# **Required Reading Materials**

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

- Power point slides and short selected publications posted on Canvas

- Using <u>www.LEEDuser.com</u> as supplemental resource

- LEED<sup>TM</sup> 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<sup>TM</sup> 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 October 25<sup>th</sup>, 2017 from 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**, <u>www.buildinggreen.com</u>; 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 <u>UF VPN</u> <u>Service</u> 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 <u>vpn.ufl.edu</u>. 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, <u>http://www.leeduser.com</u>; this is another resource with tools and examples on each LEED<sup>™</sup> 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; <u>http://www.leeduser.com/ufl</u>
- **GSA**, <u>https://sftool.gov/</u>.

# **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.
- 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 ½ absence. Leaving early while the class is in session will be considered an unexcused absence.
- The policy for attendance is as follows:

Unexcused Absences	Grade point deduction
4-5	5%
6-7	10%
8-9	15%
10-11	20%
Each addition 2 absences	Additional 2%
<b>Final presentations</b>	Additional 5%

#### <u>University of Florida</u>

#### **College of Design, Construction and Planning**

- **Only excused** absences can be made up. Excused absences include illness, religious holidays, a death in the family, or participation as an athlete in official UF athletic events; to be 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: <a href="https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx">https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx</a>

https://catalog.un.cdu/ugrad/current/regulations/info

### 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; 10/5/2017 Exam 2; 4/6/2017
Assignments,	Individual; complete assignment	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. 2/16/2017
Final project; see above specifics	Teams; present the summary of the developed procedures with a 3-5	30	

minutes video making a compelling case on the topic

# **Grade Scale**

Letter Grade	Α	A-	B+	В	B-	C+	С	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 <u>https://evaluations.ufl.edu</u> 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 <u>https://evaluations.ufl.edu/results/</u>

### Accommodating Students with Disabilities

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <u>www.dso.ufl.edu/drc/</u>) 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 <u>umatter@ufl.edu</u> 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). <u>http://www.police.ufl.edu/</u>

### **Academic Resources**

E-learning technical support, 352-392-4357 (select option 2) or e-mail to <u>Learning-support@ufl.edu https://lss.at.ufl.edu/help.shtml</u> Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. <u>http://www.crc.ufl.edu/</u>

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Library Support, <u>http://cms.uflib.ufl.edu/ask</u>. 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. <u>http://teachingcenter.ufl.edu/</u> Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. <u>http://writing.ufl.edu/writing-studio/</u>

Student Complaints Campus: https://www.dso.ufl.edu/documents/UF\_Complaints\_policy.pdf On-Line Students Complaints: <u>http://www.distance.ufl.edu/student-complaint-process</u>

"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/."

### 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: <u>Learning-support@ufl.edu</u> (352) 392-HELP (4357) - select option 2 <u>https://lss.at.ufl.edu/help.shtml</u>

### <u>Disclaimer</u>

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
Modul	e 1: Introduction to Green Building, Benefits, and Goals
Week 1	
T, 8/22	- 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:
	• Green Globes
	o BREAM
	• ASHRAE 189
	<ul> <li>Living Building Challenge</li> </ul>
	• IGCC
	• with focus on LEED <sup>TM</sup> V4
	- Green building/LEED <sup>™</sup> V4 goals, benefits, certification and recertification
	- Why green?
	Teams
	- Identify project team managers, members & roles and responsibilities
L	I

University	of Florida College of Design, Construction and Planni
	Introduction to the following tools:
	- <u>www.buildinggreen.com</u>
	- <u>www.Leeduser.com</u>
	- Video, Watch Ed Mazria and Peter Calthorpe's Presentation from Congress for the New Urbanism
	(CNU) $23^{ra}$ meeting, <i>May</i> 21, 2015
	http://www.itestum.2020.cm/watch.od.morris.cmd.neter.colthermon.mrseentetion.from.cm/.22/
	nttp://architecture2030.org/watch-ed-mazria-and-peter-calthorpes-presentation-from-chu-23/
FTT 0/3/	Identify teams in along (Engravy Water Lighting and IAO)
п, 8/24	- Identify teams in class (Energy, water, Lighting, and IAQ)
	- Review project managers and team members fole and responsionnes
	- 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
	Skills Learning
Modu	le 2: Project Administration
Neek 2	Project Planning and Assessment
Г, 8/29	
,	Reading:
	- Getting Started
	- Minimum Program Requirements
	- Rating system selection
	- Campus and/or a single building approach
	- I FEDIM VA: $\Omega \perp M$ scorecard and compared to I FED BD $\perp C$ scorecard
	- Credit structure: establishment and performance
	Identify pre requisites and credits
	Identify policies needed
	Performance period
	Performance credits or establishment credits
	Project boundary
	I EEDTM VA online demonstration and invitation
	Leading sustainability charrette
	Integrative Approach
	- Integrative Approach
	Database of State Incentives
	www.dsireusa.org
TH, 8/31	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
sciann	ant #1. Establish a USCBC account 8/31
1991Alill	
Modu	le 3: Reading and Understanding Building Drawings

	and Utility Bills
Week 3 T, 9/5	Building Review         - 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; <u>www.leeduser.com</u>
TH,9/7	<ul> <li>In class: Breakout session;</li> <li>Work on the project implementing the topics presented and discussed on Tuesday.</li> <li>Each project manager oversees the activities of his/her team.</li> <li>Each team to present their progress at the end of class.</li> <li>Each team to manage the information and result of work produced on Canvas</li> <li>Introduction to instrumentation needed for building auditing</li> <li>Invite students to join LEED online</li> <li>National Charrette Institute; http://www.charretteinstitute.org/resources.html</li> <li>All credits will be discussed and addressed in class, but only the pre-requisites and attempted credits will require backup documentation and upload to LEED<sup>TM</sup> V4 online</li> </ul>
Modul	e 4: Energy Audit and Energy Star Rating
Week 4 T, 9/12	<b>Energy Conservation Strategies and Measures</b> <b>Energy efficiency and conservation strategies overview</b>
Energy Audit Team	<ul> <li>Review energy and air quality instrumentation for measurement and verification.</li> <li>Review building mechanical drawings.</li> <li>ASHRAE Level 1, energy audit process, approach, equipment/tools, data collection, reporting. Prepare for site energy audit</li> <li>ASHRAE 62.1-2010, Minimum Indoor Air quality Performance, process, calculations, tools, reporting. Prepare for site air performance audit.</li> <li>Existing building Commissioning (Cx)analysis, implementation, and ongoing, approach, tools, analysis, reporting</li> <li>Review strategies used for to optimize building energy performance during design and ASHRAE 90.1</li> <li>Discuss energy molding, it benefits, strategies, and outcome for designing the building</li> <li>Review strategies used for ventilation, filtration and thermal comfort during the design</li> </ul>

	Check for resources; <u>www.leeduser.com</u>
	Reading; Energy and Atmosphere category to Building Commissioning credit
	Energy Star target finder <u>https://portfoliomanager.energystar.gov/pm/targetFinder;jsessionid=604A5298165C35755993E</u> <u>38D12CB0816?execution=e1s1</u>
TH,9/14	<ul> <li>In class: Breakout session</li> <li>Each team to utilize building drawings to review what was discussed on Tuesday</li> <li>Perform Energy Star rating for Lacrosse</li> <li>Perform Energy Star rating for the Green Bank (data provided on Canvas)</li> <li>Review utility data consumption with focus on electric, steam, chill water, gas, and water</li> <li>Review and get familiar with all the forms needed for ASHRAE Level I audit</li> <li>Energy Star Portfolio Manager; demonstration</li> <li>Discuss and decide Campus or building approach</li> </ul>
Assignment LEED <sup>TM</sup>	ent #2, individual team members, submit a preliminary assessment of V4 checklist for Lacrosse project.
	Guest speaker; Energy audit forms and methodology, 9/12
Modul	e 5: Lighting Audit, Cost Benefits and ROI
	And (Cont.) Energy Conservation Strategies
Week 5	Lighting audit - Review Building electrical/lighting drawings and discuss strategies used for lighting design
1,9/19	- Energy efficiency best management practices
Lighting audit team	the building during the operation and maintenance.
anan ream	- Advanced energy metering or sub-metering strategies
	- understanding Demand Response Renewable energy and carbon officets
	- Enhanced refrigerant management
	What is commissioning? Why? When? How? And Who
	<ul> <li>Commissioning during design and construction</li> <li>Existing building commissioning analysis</li> <li>Existing building commissioning implementation</li> <li>Ongoing commissioning</li> </ul>
	- Building level energy metering
	- Fundamental refrigerant management
	- Demonstrate KOr calculations for righting 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; <u>www.leeduser.com</u>

TH,9/21	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, get building
	drawings, and review the building information and data.
	- See site visit instruction under this module on Canvas.
	Guest Speaker; Lighting audit, 9/19
Module (	6: Building Visit Measurement and Verification
Week 6	- Meet at the building. The south east gate and follow the site visit instruction
VV CCII U	- Distribute instrumentation to each team.
T, 9/26	- 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.
TH, 9/28	In class: Breakout session
TH, 9/28	<ul> <li>In class: Breakout session</li> <li>Review data collection from site visit</li> </ul>
TH, 9/28	<ul> <li>In class: Breakout session</li> <li>Review data collection from site visit</li> <li>Share the data in class</li> </ul>
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University o	f Florida College of Design, Construction and Planni
	<ul> <li>Demonstrate outdoor water use reduction calculator.</li> <li>Cooling tower water use strategies and chemical use.</li> <li>Review water meter data for at least past five years</li> <li>Review WaterSense at <u>http://www.epa.gov/watersense/our_water/start_saving.html</u></li> </ul>
	Reading; Water Efficiency category
	Check for resources; <u>www.leeduser.com</u> EPA interactive water budget tool; outdoor water <u>http://www.epa.gov/watersense/water_budget/application.html</u>
	water budget data finder; <u>http://www.epa.gov/WaterSense/new_homes/wb_data_finder.html</u>
	WaterSense® Water Budget Approach; <u>http://www.epa.gov/watersense/docs/home_final_waterbudget508.pdf</u>
	Calculate your personal water saving; http://www.epa.gov/watersense/our_water/start_saving.html#tabs-3
	Check for resources; <u>www.leeduser.com</u>
TH,10/5	<ul> <li>In class: Breakout session <ul> <li>Work on the water saving calculations for the project with baseline and design base for both indoors and outdoors.</li> <li>Each team member to calculate indoor and outdoor water use reduction using the appropriate calculators.</li> <li>Each team to review and update the policies in the module.</li> <li>Each team review credits pursuing in this module.</li> <li>Discuss and decide Campus or building approach.</li> <li>Each team member to calculate ROI for plumbing retrofit.</li> <li>Each team to update LEED checklist based on the credits that are pursuing</li> </ul> </li> </ul>
	Final project outline due, 10/5
	Exam 1 on Canvas
Modul	e 8: Data review
Week 8 T, 10/10	<ul> <li>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</li> <li>Review the development of the guidelines for each team.</li> <li>Review the format for credit status reporting for each team</li> </ul>
	Reading; Transportation and site categories to Rainwater management
TH,10/12	Field trip; On campus project
Modul	e 9: Site and Transportation Survey and Assessment
Week 9 T, 10/17	<ul> <li>Site and Transportation strategies overview</li> <li>Review the strategies implemented during design and construction of the project including public transportation, bicycle storage, fuel efficient vehicles.</li> <li>Review strategies used for site protection and open space, material used for roof and non-roof, managing rain water, and site light pollution.</li> </ul>
	- How heat island reduction material being managed and maintained.

<ul> <li>Light pollution reduction.</li> <li>Check for resources; www.leeduser.com</li> <li>Reading; Site categories from Rainwater management to the end of site category</li> <li>In class: Breakout session         <ul> <li>Each team review the policies in the module.</li> <li>Discuss and decide Campus or building approach.</li> <li>Each team to review the policies and be prepared to share with the class. This cludes indoor and outdoor water calculations.</li> <li>Guest speaker: Commissioning, 10/17</li> </ul> </li> <li>For the strategies used in the building construction material selection with its recycled contact, its origin, and chemical contact including VOC and Formaldehyde.</li> <li>Review the strategies used in the building construction and renovation.</li> <li>Orgoing purchasing and waste policy</li> <li>Review the strategies used for waste diversion from construction and renovation.</li> <li>Orgoing purchasing and waste policy</li> <li>Purchasing-lamps directive.</li> <li>Purchasing-facility maintenance and renovation guidelines.</li> <li>Solid waste management-ongoing and facility maintenance and renovation.</li> <li>Demonstrate the use of the material purchasing calculator.</li> </ul> <li>Check for resources; www.leeduscr.com</li> <li>Reading; Material category</li> <li>Each team nember to utilize the purchasing and material calculator tool.</li> <ul> <li>Each team nember to utilize the purchasing and material calculator tool.</li> <ul> <li>Each team nember to utilize the purchasing and material calculator tool.</li> <li>Each team nember to utilize the purchasing and material calculator tool.</li> <li>Each team nember to utilize the clust stated on the colicits module on Carvas.</li> <li>Each team nember to utilize the clust stated on the</li></ul></ul>	U <b>niversity o</b>	of Florida College of Design, Construction and Plann
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Teek 10       Building operations and material consumption overview         10/24       - 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-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         H,10/26       In class: Breakout session         - Each team to review the policies related to this module posted on the policies module on Canvas.         - 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.         Iodule 11: Indoor Environmental Quality, Health and Wellbeing         overview         - Review strategies used during the design and construction for indoor environmental quality including ventilation, filtration, and material use.         - Demonstrate ASHRAE 6.2.1 calculation.         - Demonstrate tobacco smoke control	Modul	e 10: Building Operations, Material Use
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<ul> <li><i>Q audit</i></li> <li><i>A Review strategies used during the design and construction for indoor environmental quality including ventilation, filtration, and material use.</i></li> <li><i>D Demonstrate ASHRAE 62.1 calculation.</i></li> <li><i>Environmental tobacco smoke control</i></li> </ul>	T, 10/31	overview
	IAQ audit team	<ul> <li>Review strategies used during the design and construction for indoor environmental quality including ventilation, filtration, and material use.</li> <li>Demonstrate ASHRAE 62.1 calculation.</li> <li>Environmental tobacco smoke control</li> </ul>

U <mark>niversity</mark> a	of Florida College of Design, Construction and Plann
	- Indoor air quality management program during construction and before occupancy.
	- Thermal comfort and interior lighting strategies.
	- Daylight and quality views
	Check for resources; <u>www.leeduser.com</u>
	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-
TH.11/2	In class: Breakout session
	- Each team to review the policies in the module
	- Fach team review credits pursuing in this module
	- Discuss and decide Campus or building approach
	- Each team member to complete A SHRE 62.1 calculation
	- Each team to undate LEED checklist based on the credits that are pursuing
Assignmer	nt #5: ASHRAE 62.1 calculation.
<u> </u>	
Modul	e 12: Indoor Environmental Quality, Health and Wellbeing,
(Cont.)	
Week 12	- Green cleaning policy; developing, maintaining, and implementing
	- Green cleaning-custodial effectiveness assessment, introduction of industry standards
T, 11/7	- Green cleaning products and materials, green product certification
	- Green cleaning –equipment
IAQ aualt team	<ul> <li>Integrated pest management, development and implementing the plan</li> <li>Occupant comfort survey, developing a survey and organization with research on this topic, such as University of California, Berkeley</li> </ul>
	Check for resources; <u>www.leeduser.com</u>
	Reading; Indoor Environmental Quality categories continue
TH,11/9	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.
Modul	e 13: Innovation and Regional Priority

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Week 13- Discuss strategies for innovation in the project including:	
• Education and tours	
• Signage and graphics to describe green building and operati	on strategies
o Using Pilot credit	
- Review LEED Online and how to develop documentation supporting	ig the innovation
credit's intent, requirements, and strategies.	
- Review Exemplary Performance strategies	now DD and it and
Innovation credits are completed and submitted.	low KP credit and
Check for resources; <u>www.leeduser.com</u>	
Reading; ID and RP category	
TH,11/16 What is An energy service company or energy	v savings
company (FSCO or FSCo) and Why is it used	49
Company (ESCO of ESCO) and why is it used	
An energy service company or energy savings company (ESCO or Ex	SCO) is a commercial
implementation of energy savings projects, retrofitting, energy conserva	tion energy
infrastructure outsourcing power generation and energy supply and risl	<u>tion</u> , chergy
initiastracture outsourching, power generation and <u>energy suppry</u> , and its	C munugement.
ESCO focuses more on innovative financing methods. These include of	f-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 sav	ing is guaranteed to
exceed the fee. The ESCO starts by performing an analysis of the proper	rty, designs an energy
efficient solution, installs the required elements, and maintains the syste	m to ensure energy
savings during the <u>payback period</u> . The savings in energy costs are ofter	used to pay back the
capital investment of the project over a five- to twenty-year period, or re	Invested into the
building to allow for capital upgrades that may otherwise be unleasible.	the difference
provide returns on the investment, the ESCO is often responsible to pay	
Exam 2 on Canvas	
Module 14: Progress Assessment and Reporting, Qua	ality Control
of the Documentations and final Review	
Week 14 Review;	
- All the policies developed	
<b>1</b> , <b>11</b> /21 - ROI on water and lighting	
<ul> <li><b>1, 11/21</b> - ROI on water and lighting</li> <li>- Calculators used for water reduction inside and outside the building</li> </ul>	
<ul> <li>1, 11/21</li> <li>ROI on water and lighting</li> <li>Calculators used for water reduction inside and outside the building</li> <li>ASHRAE 62.1, ventilation calculation</li> </ul>	
<ul> <li>1, 11/21</li> <li>ROI on water and lighting</li> <li>Calculators used for water reduction inside and outside the building</li> <li>ASHRAE 62.1, ventilation calculation</li> <li>Review I-BEAM forms</li> </ul>	
1, 11/21       - 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	un information and
<ul> <li>1, 11/21</li> <li>ROI on water and lighting</li> <li>Calculators used for water reduction inside and outside the building</li> <li>ASHRAE 62.1, ventilation calculation</li> <li>Review I-BEAM forms</li> <li>Review APPA forms</li> <li>All team folders to be reviewed and organized with all credits, backudocumentation and credit Forms</li> </ul>	ıp information and

### **University of Florida**

TH, 11/23	Happy Thanksgiving!
Modul	e 15: LEED <sup>TM</sup> V4 Green Associated (GA) exam review
Week 15 T, 11/28	<ul> <li>Review LEED<sup>™</sup> V4 accreditation exam hand book</li> <li>Demonstrate registration for the exam</li> <li>How to prepare for the exam</li> </ul>
	The LEED v4 exam is based on the following text specifications and references. The exam questions reflect Task Domains and Knowledge Domains.
	<b>Task Domains</b> : 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%)
	<b>Knowledge Domains:</b> 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)
	<ul> <li>Indoor Environmental Quanty (8 questions)</li> <li>Project Surroundings and Public Outreach (11 questions)</li> </ul>
	• Troject Surroundings and Fublic Outcach (Tr questions)
TH,11/30	Review over 100 exam questions in real test format related to above knowledge in designing, building, and operating green building
	<b>Final Presentations</b>

University of	f Florida College of Design, Construction and Plannin
Week 16	- Each team to present one combined final PowerPoint presentation on the development of
	their guidelines.
T, 12/5	- An electronic copy of the Guidelines, organized with cover page, table of content, source
	cited, etc.
	- Each team to present one 3-5 minute video/skid on the audit. This can be at the beginning,
	end or imbedded in the presentation.
	- Each team will have 35 minutes including the video time.
	- All credit submittals with its back up and a copy of LEED online Form to be
	completed and uploaded to Canvas.
	Your video/skid and presentation can be a pitch or a fact presented to inform, motivate and convince the viewer to consider auditing building system and how it pays.