

RC324
Sustainable Building Design and Practices

3 Credits

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RC324 Version: 2



Sustainable Building Design and Practices

Calendar Description

This course examines sustainable building construction techniques, building location in the landscape, and options to use building design and features to optimize energy and resource conservation. Topics include site specific design related to climate, passive solar, natural lighting, and integration of renewable energy systems. The LEED building accreditation is also introduced. The course looks at the broad picture of how individuals and businesses can incorporate good design, and both technical and lifestyle changes to reduce our ecological footprint.

Rationale

This is a required course for the Renewable Energy and Conservation program.

According to the IPCC's Fifth Assessment Report (AR5) released in 2014, "*the building sector accounted for around 32% final energy use and 8.8 GtCO₂ emissions*". Each of us has an important role to play in ensuring the way we design, build and operate buildings is sustainable. At the same time the concept of sustainability can be applied to the development and advancement of our commercial interests.

This course provides you with the basic strategies for developing sustainable buildings and exploring the career and business opportunities provided by a transforming industry. The course is built around the LEED Green Associate preparation course and provides the foundation for challenging the LEED GA exam. The LEED GA credential informs employers or clients that you are knowledgeable about sustainability. Beyond LEED we explore other green rating systems such as BREEAM, Green Globes, BOMABest, the Living Building Challenge and ENVISION.

Introduction to innovative concepts of Integrated Project Delivery (IPD), Lifecycle Analysis and Building Energy Modeling are increasingly being used for successful sustainable projects.

Prerequisites

None

Co-Requisites

None

Course Learning Outcomes

1. Discussion of topics with other students, friends and colleagues
2. Discover the impact of buildings on climate change, describing how sustainable thinking and green rating systems mitigate their impact.
3. Describe how to choose a sustainable building site, keeping in mind the important elements that impact/reduce a sustainable project's impact on the environment.
4. Devise a plan to reduce a building's water consumption.
5. Illustrate where the energy within a typical building is consumed.
6. List strategies for reducing energy consumption towards NetZero.
7. Defend why the careful selection of materials and innovative design can result in a healthy and productive indoor environment.
8. Create a two page proposal to a building owner outlining the IDP process, its benefits, potential pitfalls, indicating why he or she should be an integral part of the process.
9. Practise writing the LEED GA exam.
10. Produce a 10 slide PowerPoint presentation that convinces a potential developer client to invest in a sustainable building.
11. Develop a sustainability plan, describing the location, objectives, and strategies applied to making building sustainable.

Resource Materials

Required Text(s):

- **Studio 4_LEED_Green Associate Study Guide 2nd Edition.**
- **LA 1.1 Review Building Certification Systems and Standards**

These text are available electronically.

General Reference Text(s):

- APA Format for references
- Netiquette Guidelines
- RC324 Glossary of Terms
- Web Links 2021

Optional Resources/ Text(s) and Links:

Bernheim, Anthony and Reed, William. Sustainable Building Technical Manual

Part II – Pre-Design Issues.

Green Building Certification Institute. 2012. LEED Green Associate Candidate Handbook

Government of Canada. Our Great Lakes.

Langdon, Davis. 2007. Cost of Green Revisited – Re-examining the feasibility and cost impact of sustainable design in the light of increased market adoption.

USGBC. Green Office Guide – integrating LEED into your leasing process.

USGBC. Guidance on Innovation & Design (ID) Credits.

USGBC. 2011. Minimum Program Requirements.

Links

Guide to Purchasing Green Power

http://www.epa.gov/greenpower/documents/purchasing_guide_for_web.pdf

Construction Carbon Calculator <http://buildcarbonneutral.org/about.php>

Green Building Certification Institute <http://www.gbci.org/home.aspx>

Canada Green Building Council <http://www.cagbc.org/>

US Green Building Council <http://www.usgbc.org/>

Videos

http://www.ted.com/talks/ray_anderson_on_the_business_logic_of_sustainability

http://www.ted.com/talks/amory_lovins_a_50_year_plan_for_energy?language=en

http://www.ted.com/talks/donald_sadoway_the_missing_link_to_renewable_energy?language=en

<https://www.youtube.com/watch?v=k8HKxvKVUsU>

http://www.ted.com/talks/william_mcdonough_on_cradle_to_cradle_design

http://www.ted.com/playlists/139/social_good_inc

<http://storyofstuff.org/>

Conduct of Course

This course consists of the equivalent of 45 hours of lecture, delivered in a self learning environment using an online learning management system. The course is delivered over a set 8-week period. Course content modules and links to some of the assigned readings will be available on-line. A course facilitator will be available to guide the learner through the course, answer any questions, and grade assignments.

Learners are expected review, read and complete module outline, learning activity and assignments for each module. All assignments are submitted electronically through the learning management system. Quizzes are taken on-line. Assignments are marked by the instructor and returned to the student with a grade and comments in the learning management system. Students can monitor their progress though the course using tools available in the learning management system. In order to complete the course on time, deadlines for assignments, exam, and projects are going to be enforced.

Evaluation Procedures

Module 1: Assignment 1.1	7%
Module 1: Quiz	3%
Module 2: Assignment 2.1	7%
Module 2: Quiz	3%
Module 3: Assignment 3.1	7%
Module 3: Quiz	3%
Module 4: Assignment 4.1	7%
Module 4: Quiz	3%
Module 5: Assignment 5.1	7%
Module 5: Quiz	3%
Module 6: Assignment 6.1	7%
Module 6: LEED Practice Quiz	10%
Discussion Posts	10%
Term Assignment	23%
(Studio 4 GA practice exam)	*BONUS 10%
Total	100%

Grade Equivalents and Course Pass Requirements

A minimum grade of D (50%) (1.00) is required to pass this course.

Letter	F	D	D+	C-	C	C+	B-	B	B+	A-	A	A+
Percent Range	0-49	50-52	53-56	57-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-100
Points	0.00	1.00	1.30	1.70	2.00	2.30	2.70	3.00	3.30	3.70	4.00	4.00

Students must maintain a cumulative grade of C (GPA - Grade Point Average of 2.00) in order to qualify to graduate.

Attendance

Active participation is required in all courses within the Renewable Energy and Conservation certificate and diploma programs. Each facilitator designates these requirements through the use of tools within the management system and personal contact with learners.

These expectations can be given marks as part of the assessment process. Each course outlines these expectations within the course structure.

For example, learners can be asked to demonstrate their participation/attendance through discussion forums, sharing research results, contributing relevant information, submitting assignments, communicating with colleagues and the facilitator, and participating in synchronous meetings or asynchronous activities.

Attendance is considered vital to the learning process. Absenteeism is recorded. For example, if a discussion forum is organized; the learner is expected to attend as per the guidelines set by the facilitator.

Students can request for an excused absence. An excused absence is one that is verified with your facilitator.

NOTE: Any exceptions to the above attendance policy (e.g. family or work-related issues) **must** be approved in writing by the Department Chair **prior** to the beginning of the course.

It is the student's responsibility to know their own absentee record.

Course Units/Topics

Module 1: Lay of the Land

Module 2: Sustainable Sites

Module 3: Energy

Module 4: Materials & Resources

Module 5: Green Economics

Module 6: Integrated Project Design & Delivery

Module 7: Life Cycle Analysis



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