

Environmental Systems



The Pompidou Center, Paris, 1971

Image Credit: Tyson Williams

Syllabus

Siobhan Rockcastle

email: s.rockcastle@neu.edu

Office hours: TBD Pending Survey

Office Location: 126 Holmes

Course Relevance:

Buildings can be defined as human-made structures that provide shelter and amenities for continuous occupation. They mediate man and his surrounding environment while providing systems that regulate human comfort. From the most basic shelters of early civilization to the skyscrapers of tomorrow, humans have learned to take control of climate and transform/condition occupied space for the means of comfort and survival. From a central hearth to the thickening of exterior walls and the mechanized conditioning of indoor air, architectural expression has transformed along with the adaptation of new environmental systems and technologies.

With the transformation of these systems, architects have become responsible for the integration of space and environmental mediation. We must understand the evolution of climate control, the impacts of energy use at a global scale, and our responsibility to rectify the damages done by previous generations through the field of sustainable building design and resource management. In this course, we will learn the historical evolution of environmental systems, the requirements for human comfort, and how to design both passive and low-energy systems to create an integrated environmental design approach.

Course Outcomes:

- A historical overview of environmental technologies and their influence on architecture and design
- A comprehensive understanding of architectural form and its response to environmental conditions
- A comprehensive understanding of building systems and integration
- A broad understanding of sustainability in architecture
- An introduction to emerging environmental analysis tools (thermal and daylight)

Course Prerequisites:

This course requires that the below listed prerequisites be completed satisfactorily before you will be allowed to take this course. If it is discovered that you have not completed these prerequisites, you may be dropped from the course at any time during the semester.

PHY 141: Physics 1 for Engineers
MTH 241: Calculus 1 for Engineers
ARC U356: Structures 1: Statics
ARC U357: Structures 2: Tectonics

Attendance:

Attendance is required at all lectures. Two or more unexcused absences will result in the reduction of the final letter grade. More than three unexcused or excused absences will result in a failure of this course.

Texting, making phone calls, browsing the web, or working on assignments for another class will not be tolerated in this course. Students caught misusing their technology will be given a single warning for the semester. A second violation will result in an unexcused absence for the day.

Note Taking:

Active note taking is strongly recommended in all lectures and will contribute towards the student's final grade in the submission of the course binder at the end of term. A summary of the student's reading notes must be submitted at the start of each class to ensure attendance and completion of assigned readings*. Specific requirements for the submission of reading notes can be found under the 'Reading Assignments' section.

*handwritten notes in lecture are strongly preferred as sketches and diagrams are essential to the spatial understanding of some concepts, but it is up to the individual student to decide whether handwritten or typed notes is preferred.

Course Requirements:

1	Reading Notes	15%
2	Project	40%
3	Exam 1	25%
4	Exam 2	15%
5	Course Binder	5%

Project:

A series of related assignments that follow the lecture and reading content sequentially develop the design of a simple building with energy and climate as a determinant of formal architectural decisions. Students will form pairs of two for the semester-long project. An understanding of how environmental influences shape architecture will provide the primary grading criteria for this project.

Exams:

There will be one exam that tests the student's understanding of those concepts in the lectures and readings and one exam that tests the student's ability to apply those concepts within a design-based problem. The exams will focus on key vocabulary, concepts, and principles from the lectures and readings. Expect to answer theoretical questions in essay form, diagram various energy principles, define terms, and generally be responsible for any content in the readings and lectures.

Course Binder:

A binder of the course material is required. It should have distinct sections for your notes on each lecture and each reading. It should also contain interim submissions made for the project as well as the final project itself. The aim is to produce a resource for future reference and will be graded as such. The course binder is worth 5% of your final grade and will be submitted at the end of the semester. Be aware that the course binder can raise or lower your grade by half a letter.

Grades:

A: Superior work. Students work is original and of exceptional intellectual quality, is very well written, represented, and complete. The graphics, documentation, and text reveal original

thinking. All work is supported by wide textual documentation, is structurally inventive and is thorough and complete.

- B: Good work.** Students work is of high intellectual quality, is well written, is supported by textual documentation, progresses logically, and is complete.
- C: Average work.** Meets the requirements. Students work is of average intellectual quality, is intelligible, is supported by some textual documentation, progresses logically, and is complete.
- D: Below average work.** Students work is of below average intellectual quality, is written poorly, is not adequately supported by textual documentation, progresses illogically and/or is incomplete.
- F: Students work is of unacceptable intellectual quality,** badly written, unsupported, illogical, and /or incomplete.

For more information refer to:

http://www.architecture.neu.edu/student_resources/grading_policy/studio_course

Grade Inquiries/Changes:

Any grade inquiries/changes will only be discussed in person, during office hours--*not through email*. If you want to discuss your grade, take the following steps: assemble your reading notes, assignments, attendance record and exams from the semester; record their grades in a spreadsheet according to the above percentages; and write a one page analytic summary of the perceived differences that construct an argument for why you think you deserve a different grade. After completing this work, make an appointment during office hours and bring this documentation with you so that we may discuss your grade. No grade changes will be discussed without this documentation.

NAAB Student Performance Criteria

The work that students produce toward their degree granted by the School of Architecture is the property of the School of Architecture. The complete course work from selected students shall be collected by the School for each course taught for the National Architecture Accreditation Board [NAAB] documentation. Students are encouraged to document their work for their personal portfolio if it is requested by the School for the NAAB, but the work must be submitted to the professor no later than one week after final exams week. This course meets the following NAAB Student Performance Criteria to the extent designated:

12.15: Sustainable Design Ability

12.19: Environmental Systems Ability

12.22: Building Service Systems Understanding

Academic Honesty

Northeastern University is committed to the principles of intellectual honesty and integrity. All members of the Northeastern community are expected to maintain complete honesty in all academic work, presenting only that which is their own work in tests and assignments. If you have any questions regarding proper attribution of the work of others, contact your professor prior to submitting work for evaluation. For more detail refer to <http://www.osccr.neu.edu/policy.html>

Required Textbook

Lechner, Norbert. *Heating, Cooling, Lighting: Sustainable Design Methods for Architects*. Third Edition. Wiley Press, New York, 2008

Note: other required readings will be provided in PDF format and may be subject to change

Reading Assignments

Tasks:

1. **Download** the appropriate reading(s) or read from the text book.
2. **READ** each reading (or assigned sections) thoroughly from start to finish.
3. **OUTLINE** key terminology, principles, and spatial concepts for your own study reference (Exams and future ARE)
4. **WRITE** a single, **high quality** paragraph summary for each reading after you've outlined the key terminology and concepts in your notes. The summary should be short but thorough, capturing the **primary knowledge** of each reading. The summary should objectively focus on the key knowledge contained in each reading. This summary is **NOT** a flaccid paragraph about your opinion of the reading or any other type of subjective reading response. It is a summary of the content of the reading. Note the difference. Keep your readings, your reading notes, and summaries together with your responses in your course binder.
5. **WRITE** any additional questions or comments you have about the reading after the summary and include in your submission.
6. **PRINT or SCAN/PRINT** a hardcopy of your summary.
7. **HAND IN** your reading assignment at the beginning of each class.
8. **NO** late submissions, no excuses, no extensions, no emailed responses accepted.

Grading:

Your grade on the reading assignments will follow this format*:

- + You've completed the reading assignment on time with the summary expressing an advanced level of comprehension. The summary is thorough, yet concise and objective.
- ✓ You've completed the reading assignment on time with a comprehensive, but limited understanding of the material. For example, the summary lacks a broad understanding of the reading or responds in a subjective, rather than an objective tone.
- 0 You've neglected to turn in the assignment on time or have insufficiently responded to the assigned readings

*note that any student suspected of copying or reproducing the work of another student will receive a 0 and will be reported through the appropriate administrative channels. It is acceptable and even encouraged to discuss the readings amongst your classmates, but the direct reproduction of another student's work is a violation of academic integrity.