ARC 4930/6611 **Advanced Topics in Building Performance**

Fall of 2025

Instructor:..... Dr. Ryan Sharston

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Office Hours:…….....Thursday, 2 – 4 PM, Architecture Building, Room 246, or by appointment (arranged by email)

Course Schedule: ..... Weil Hall, 408E, Tuesdays, Period 4-6 (10:40 AM - 1:40 PM)

Course Objectives:..... ARC 4930/6611 investigates thermal and luminous qualities within the built environment, with an emphasis on building envelope and system design. The main goal of the course is to advance students' knowledge of **computational modeling** in building technologies such as lighting and energy simulation. The course begins with a study of building lighting and thermal systems and then focuses on the evaluation of **building energy performance** in various climate zones. *Specific topics* include advanced lighting and daylighting strategies, visual and thermal comfort assessment, building primary (boilers, chillers, etc.) and secondary (comfort delivery) mechanical systems, and building energy performance. This course will use a mix of traditional lecture and **interactive and experiential learning**, and will include laboratory sessions, guest lectures, in-class debates and discussions, site visits, and real-time building performance measurements and experiments. The goals of this course are to provide a/an:

- Understanding of the principles of building physics and the impact of the building mass and envelope
- Understanding of the principles of the environmental systems such as lighting, and mechanical systems as well as building energy performance
- Understanding of important concepts that will allow intelligent collaboration with other building professionals
- Starting point from which an intuitive sense for thermal environments created in buildings can be developed

Course Structure: The course is organized in three distinct, yet interrelated modules. The schedule is generally scheduled as follows:

Module I: Passive Design Strategies

Week 1: Lecture 1: Climate; Recommended reading: *Chapter 5: Climate (textbook)*

Week 2: Lecture 2: Human Comfort Building Form; Recommended reading: *Chapter 4: Thermal Comfort (textbook)*

Week 3: Lecture 3: Solar Geometry, Part I, Recommended reading: *Chapter 11: Site Design, Community Planning and Landscape (textbook)*

Week 4: Lecture 4: Solar Geometry, Part II; Recommended reading: *Chapter 11: Site Design, Community Planning and Landscape (textbook)*

Module II: Lighting

Week 5: Lecture 5: Architectural Lighting: Basics & Fundamentals; Recommended reading: *Chapter 6: Solar Geometry (textbook)*

Week 6: Lecture 6: Lighting/Daylighting Design & Analysis; Recommended reading: *Chapter 7: Passive Solar, Chapter 9: Shading and Light Colors and Chapter 13: Daylighting (textbook)*

Week 7: Lecture 7: Lighting/Daylighting Design & Analysis Part II; Recommended reading: *Chapter 7: Passive Solar, Chapter 9: Shading and Light Colors and Chapter 13: Daylighting (textbook)*

Module III: Building Systems & Energy Efficiency

Week 8: Lecture 8: Building Systems, Part I; Recommended reading: *Chapter 16: Mechanical Equipment for Heating and Cooling (textbook)*

Week 9: Lecture 9: Building Systems: Part II; Recommended reading: *Chapter 16: Mechanical Equipment for Heating and Cooling (textbook)*

Week 10: Lecture 10: Building Systems: Part III; Recommended reading: *Chapter 16: Mechanical Equipment for Heating and Cooling (textbook)*

Week 11: Lecture 11: Energy Efficiency: Fundamentals of Energy; Recommended reading: *Chapter 3: Basic Principles (textbook)*

Week 12: Lecture 12: Energy & Sustainability: Energy Consumption & Analysis; Recommended reading: *Chapter 15: The Thermal Envelope: Keeping Warm and Staying Cool*

Week 13: Building Simulation Workshop I – *For Graduate Students Only*

Week 14: Building Simulation Workshop II – *For Graduate Students Only*

Grading: .....Final course grades are based on the following scale:

5%	Attendance Quizzes
20%	Shading Project
30%	Midterm Project

45% Final Project

* Attendance/Participation

*. This course *will* use "+" and "-" designations on the final grades, and a curve may be applied to final course averages at the discretion of the instructor. If a curve is applied, it will only be used to raise course grades, not to lower them.

Attendance Quizzes: ..... There will be attendance quizzes given during the course of the semester.

Attendance Quizzes will be 5% of total grade.

Shading Project *(small scale)* .....There will be an early shading project. A tentative schedule for the project and due dates is listed below:

Shading project (20% of total grade): Sunday, September 14, 2025

Midterm Project: .....There will be one midterm project assigned during the course of the semester. A tentative schedule for the project and due dates is listed below:

Midterm project (30% of total grade): Sunday, October 12, 2025

Final Project: .....There will be one final project assigned during the course of the semester. A tentative schedule for the project and due dates is listed below:

Final project (45% of total grade): Sunday, December 7, 2025

There are **no make-ups** for missed quizzes, exam, projects.

Group projects may include calculations and applications of concepts discussed in class to design situations. These may or may not be related to current or past design projects performed by individual students in design studio. Details on the project will be provided separately including exact submission requirements. Projects submitted late will be penalized in the same manner as late homework assignments. In the case of an excused absence (see exam policy above), any new homework deadline must be determined by the instructor.

Optional Extra Credits:…….. There are three options available to obtain extra credits; 20% total credit to be counted toward the final project:

1. Participation in an approved sustainability event and/or join and participate in an approved sustainability group / committee. Extra credit in this category is limited to 1 event for a total of 3% points to be counted toward the project. Certification required!
2. Post advanced building technology relevant topics in eLearning website's DISCUSSIONS (forum). If your topic gets three relevant replies and higher, you will receive 5%. When replying to a post in DISCUSSIONS (forum), please refer to which post you are replying. Replies to discussions will be reviewed before assigning points.
3. Site visit reports (500 words): Each report can earn up to 4%.

Site Visit Schedule (tentative – aligned with the content of weekly modules):

Week 3	Rinker School of Construction Management
Week 4	Herbert Wertheim Laboratory for Engineering Excellence
Week 5	Newell Hall & Smith Family Chemistry Building
Week 6	Malachowsky Hall for Data Sciences & Information Technology
Week 7	Stephen C. O'Connell Center
Week 8	Reitz Union
Week 9	Waste Water Treatment Plant
Week 10	Co-Generation Power Plant

Grading Scale:.....

Letter Grade	Numeric Grades	Quality Points	Qualitative Description
A	100 to 94.0%	4.0	Outstanding work. Execution of work is thorough, complete, and demonstrates a superior level of achievement overall with a clear attention to detail in the production of drawings, models, and other forms of representation. The student can synthesize course materials with new concepts and ideas in a thoughtful manner and is able to communicate those ideas in an exemplary fashion.
A -	< 94.0% to 90.0%	3.67	Close to outstanding work.
B+	< 90.0% to 87.0%	3.33	Very good, high-quality work.
B	< 87.0% to 84.0%	3.0	High quality work. Student work demonstrates a high level of craft, consistency, and thoroughness throughout drawing and modeling work. The student demonstrates a level of thoughtfulness in addressing concepts and ideas, and actively participates in group discussions. Work may demonstrate excellence but is inconsistent and/or uneven in its development.
B -	< 84.0% to 80.0%	2.67	Good work with some problems.
C+	< 80.0% to 77.0%	2.33	Slightly above average work.
C	< 77.0% to 74.0%	2.0	Average or satisfactory work. Student work meets project and assignment objectives with problems. Graphics and models are complete and satisfactory, possibly exhibiting concerns in craft, development, and detail.
C -	< 74.0% to 70.0%	1.67	Average work with some problems.
D+	< 70.0% to 67.0%	1.33	Poor work with some effort.
D	< 67.0% to 64.0%	1.0	Poor or less than satisfactory work. Graphic and modeling work is substandard, incomplete in significant ways, and/or lacks craft and attention to detail.
D -	< 64.0% to 61.0%	0.67	Poor work with some problems.
E	< 61.0% to 0.0%	0.0	Inadequate and unsatisfactory work. Work exhibits several major and minor problems with basic conceptual premise lacking both intention and resolution. Physical representations in drawings and models may be severely lacking and are weak in clarity, craft, and/or completeness.

Communication:…… Use the e-Learning in Canvas environment to send an email to the instructor.

Please do not e-mail the course instructor outside of the e-Learning in Canvas system because emails received outside of e-Learning may not receive a response. Please allow 36 hours for a response to your email. The instructor reserves the right not to respond to course inquiries on the weekend.

Students are responsible for addressing grades/omissions within one week of the grade being posted on e-Learning in Canvas. After one week, the grade/input stands for the class regardless of cause or circumstance.

Students are responsible to ensure that their assignments, quizzes, exams… etc. have been submitted on Canvas properly and before the deadlines.

Please make sure that you receive all **Canvas notifications**.

Attendance:……..Attendance and participation in lectures and laboratory sessions are course requirements and therefore mandatory. Attendance and participation for this course is defined as being present from the start of class until class is dismissed on each day that class meets and actively participating in course activities. Students who are late, leave early, or do not participate actively in class may be counted as absent. *"Participation quizzes"* may be given at the beginning of classes. If you miss the quiz due to the late arrival, it may be counted as an absence. **Online participants** are strongly encouraged to turn on their cameras during the class period.

Students may only participate in classes if they are registered officially or approved to audit with evidence of having paid audit fees. The Office of the University Registrar provides official class rolls to instructors. Students are responsible for satisfying all academic objectives as defined by the instructor. Absences count from the first-class meeting. Acceptable reasons for absence from or failure to engage in class include illness; Title IX-related situations; serious accidents or emergencies affecting the student, their roommates, or their family; special curricular requirements (e.g., judging trips, field trips, professional conferences); military obligation; severe weather conditions that prevent class participation; religious holidays; participation in official university activities (e.g., music performances, athletic competition, debate); and court-imposed legal obligations (e.g., jury duty or subpoena). Other reasons (e.g., a job interview or club activity) may be deemed acceptable if approved by the instructor. For all planned absences, a student in a situation that allows an excused absence from a class, or any required class activity must inform the instructor as early as possible prior to the class. For all unplanned absences because of accidents or emergency situations, students should contact their instructor as soon as conditions permit. Students shall be permitted a reasonable amount of time to make up the material or activities covered during absence from class or inability to engage in class activities because of the reasons outlined above. If a student does not participate in at least one of the first two class meetings of a course or laboratory in which they are registered, and they have not contacted the department to indicate their intent, the student can be dropped from the course. Students must not assume that they will be dropped, however. The department will notify students if they have been dropped from a course or laboratory. For further details, please visit: https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/

General Education Course Syllabus Policy: https://undergrad.aa.ufl.edu/general-education/gen-ed-courses/structure-of-gen-ed-courses/gen-ed-syllabus-policy/

Academic Policies & Resources: https://syllabus.ufl.edu/syllabus-policy/uf-syllabus-policy-links/

Cellphones:……. Cellphone use is not allowed in classrooms unless they are used for computer-based examinations upon given instructions in the class.

Laptops & Tablets:……. These devices shall only be used to take notes related to lectures and/or computer-based exams upon given instructions in the class. Use of these devices for social media or any other unrelated purposes during class hours will discontinue attendance.

Course Text/Readings: .....The textbook for this course is ***4th Edition Heating, Cooling, Lighting: Sustainable Design Strategies Towards Net Zero Architecture*** by Norbert M. Lechner, Patricia Andrasik. ISBN: 978-1119585749. It is the responsibility of each individual student to read the course text. Additional information may be provided as handouts in class.

UF Academic Policies and Resources

For additional UF "Academic Policies & Resources," go to: https://go.ufl.edu/syllabuspolicies. These resources include information about:

- Requirements for class attendance, make-up exams, and assignments not noted above
- Processes for students with disabilities who may require accommodations
- Current UF grading policies
- Expectations for course evaluations and constructive feedback
- The University's Honesty Policy regarding cheating, plagiarism, etc.
- In-class recording of class lectures for personal use
- Academic resources, including contact information
- Campus health and wellness resources, including contact information

Netiquette, Communication Courtesy Policy*:*

All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and chats. Detailed guide is available at http://teach.ufl.edu/wpLinks to an external site.content/uploads/2012/08/NetiquetteGuideforOnlineCourses.pdfLinks to an external site.

Getting Help with E-Learning Website:

In the case you have technical difficulties with e-Learning in Canvas, please contact the UF Help Desk at: Learningsupport@ufl.edu; (352) 392-HELP - select option 2; https://lss.at.ufl.edu/help.shtml Links to an external site.. If your technical difficulties will cause you to miss a due date/time, you MUST report the problem to the UF Help Desk before the due date/time.

Religious Observances: Please inform the instructor of any religious holidays or other days of special religious significance that may interfere with your participation in this class so that he or she can accommodate these events.

Special Consideration: The principle of equal treatment of all students is a fundamental guide in responding to requests for special consideration. No student shall be given an opportunity to improve a grade that is not made available to all members of the class. This policy is not intended to exclude reasonable accommodation of verified student disability or the completion of work missed due to religious observance, verified illness, or absence due to circumstances beyond your control. Reconsideration of subjective judgments of an individual student's work will be done only if all students in the class can be and are given the same consideration.

Sexual Harassment: Sexual harassment is reprehensible and will not be tolerated by the University. It subverts its mission and threatens the careers, educational experience, and well-being of students, faculty, and staff. The University will not tolerate behavior between or among members of the university community that creates an unacceptable working environment.

Stress: The academic year presents many opportunities as well as challenges, sometimes resulting in increased stress. If at any time you feel anxious or stressful, please contact the instructor or the university's Counseling + Wellness Center at https://counseling.ufl.edu/

Note from the Instructor:

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