

ABS 331 / 531 Environmental Control Systems I

Instructor:

Office Hours:

Grad. Assistant:

Office Hours:

Class Time:

Description: **ABS 331/531 Environmental Control Systems I (3 credit hours)**

Climate, energy use, and comfort as determinants of architectural form in small-scale buildings. Emphasis on architectural methods of daylighting, heating, cooling, and ventilation for envelope-load dominated buildings.

Prerequisites: PHYS 151 and AAE 280.

NAAB Criteria: ***Realm B: Building Practices, Technical Skills, and Knowledge***

Graduates from NAAB-accredited programs must be able to comprehend the technical aspects of design, systems and materials, and be able to apply that comprehension to architectural solutions. Additionally, the impact of such decisions on the environment must be well considered.

- B.6 Environmental Systems:** *Ability* to demonstrate the principles of environmental systems' design, how design criteria can vary by geographic region, and the tools used for performance assessment. This demonstration must include active and passive heating and cooling, solar geometry, daylighting, natural ventilation, indoor air quality, solar systems, lighting systems, and acoustics.

More information regarding NAAB Conditions of Accreditation and the Student Performance Criteria can be found on the NAAB website: www.naab.org

UNLV Policies:

Academic Misconduct

Academic integrity is a legitimate concern for every member of the Campus community; we all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility, and professionalism. By choosing to join the UNLV community, students accept the expectations of the Student Academic Misconduct Policy, and are encouraged to always take the ethical path whenever faced with choices. Students enrolling at UNLV assume the obligation to conduct themselves in a manner compatible with UNLV's educational mission. An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another person, from the Internet or any other source without proper citation of the sources. See the Student Conduct Code, <https://www.unlv.edu/studentconduct/student-conduct>.

Auditing Classes

Auditing a course allows a student to continue attending the lectures and/or laboratories and discussion sessions associated with the course, but the student will not earn a grade for any component of the course. Students who audit a course receive the same educational experience as students taking the course for a grade, but will be excused from exams, assessments, and other evaluative measures that serve the purpose of assigning a grade.

Classroom Conduct

Students have a responsibility to conduct themselves in class and in the libraries in ways that do not interfere with the rights of other students to learn or of instructors to teach. Use of electronic devices such as pagers, cellular phones, or recording devices, or potentially disruptive devices or activities, are only permitted with the prior explicit consent of the instructor. The instructor may rescind permission at any time during the class. If a student does not comply with established requirements or obstructs the functioning of the class, the instructor may initiate an administrative drop of the student from the course.

Copyright

The University requires all members of the University Community to familiarize themselves with, and to follow copyright and fair use requirements. You are individually and solely responsible for violations of copyright and fair use laws. The University will neither protect nor defend you, nor assume any responsibility for employee or student violations of fair use laws. Violations of copyright laws could subject you to federal and state civil penalties and criminal liability, as well as disciplinary action under University policies. Additional copyright policy information is available at <http://www.unlv.edu/provost/copyright>.

Disability Resource Center (DRC)

The UNLV Disability Resource Center (SSC-A, Room 143, <https://www.unlv.edu/drc>, 702-895-0866) provides resources for students with disabilities. Students who believe that they may need academic accommodations due to injury, disability, or due to pregnancy should contact the DRC as early as possible in the academic term. A Disabilities Specialist will discuss what options may be available to you. If you are registered with the UNLV Disability Resource Center, bring your Academic Accommodation Plan from the DRC to the instructor during office hours, so that you may work together to develop strategies for implementing the accommodations to meet both your needs and the requirements of the course. Any information you provide is private and will be treated as such. To maintain the confidentiality of your request, please do not approach the instructor in front of others to discuss your accommodation needs.

Final Examinations

The University requires that final exams given at the end of a course occur on the date and at the time specified in the Final Exam schedule. The general schedule is typically available at the start of the semester, and the classroom locations are available approximately one month before the end of the semester. See the Final Exam Schedule, <https://www.unlv.edu/registrar/calendars>.

Identity Verification in Online Courses

All UNLV students must use their Campus-issued ACE ID and password to log in to WebCampus.

UNLV students enrolled in online or hybrid courses are expected to read and adhere to the Student Academic Misconduct Policy, <https://www.unlv.edu/studentconduct/misconduct/policy>, which defines, “acting or attempting to act as a substitute for another, or using or attempting to use a substitute, in any academic evaluation or assignment” as a form of academic misconduct. Intentionally sharing ACE login credentials with another person may be considered an attempt to use a substitute and could result in investigation and sanctions, as outlined in the Student Academic Misconduct Policy.

UNLV students enrolled in online courses are also expected to read and adhere to the Acceptable Use of Computing and Information Technology Resources Policy, <https://www.it.unlv.edu/policies/acceptable-use-computing-and-information-technology-resources-policy>, which prohibits sharing university accounts with other persons without authorization.

To the greatest extent possible, all graded assignments and assessments in UNLV online courses should be hosted in WebCampus or another UNLV-managed platform that requires ACE login credentials for access.

Incomplete Grades

The grade of “I” (Incomplete) may be granted when a student has satisfactorily completed three-fourths of course work for that semester/session, but cannot complete the last part of the course for reason(s) beyond the student’s control and acceptable to the instructor, and the instructor believes that the student can finish the course without repeating it. For undergraduate courses, the incomplete work must be made up before the end of the following regular semester. Graduate students receiving “I” grades in 500-, 600-, or 700-level courses have up to one calendar year to complete the work, at the discretion of the instructor. If course requirements are not completed within the period indicated, a grade of “F” will be recorded, and the student’s GPA will be adjusted accordingly. Students who are fulfilling an Incomplete grade do not register for the course, but make individual arrangements with the instructor who assigned the “I” grade.

Library Resources

Librarians are available to consult with students on research needs, including developing research topics, finding information, and evaluating sources. To make an appointment with a subject expert for this class, please visit the Libraries’ Research Consultation website: <http://guides.library.unlv.edu/appointments/librarian>. You can also ask the library staff questions via chat and text message at: <http://ask.library.unlv.edu/>.

Missed Classwork

Any student missing class, quizzes, examinations, or any other class or laboratory work because of observance of religious holidays will be given an opportunity during that semester to make up the missed work. The make-up opportunity will apply to the religious holiday absence only. It is the responsibility of the student to notify the instructor within the first 14 calendar days of the course for Fall and Spring courses (except for modular courses), or within the first 7 calendar days of the course for Summer and modular courses, of their intention to participate in religious holidays which do not fall on state holidays or periods of class recess. For additional information, please visit the Policy for Missed Work, under Registration Policies, on the Academic Policies webpage, <https://catalog.unlv.edu/content.php?catoid=6&navoid=531>.

In accordance with the policy approved by the Faculty Senate regarding missed class time and assignments, students who represent UNLV in any official extracurricular activity will also have the opportunity to make up assignments, provided that the student provides official written notification to the instructor no less than one week prior to the missed class(es).

The spirit and intent of the policy for missed classwork is to offer fair and equitable assessment opportunities to all students, including those representing the University in extracurricular activities. Instructors should consider, for example, that in courses which offer a “Drop one” option for the lowest assignment, quiz, or exam, assigning the student a grade of zero for an excused absence for extracurricular activity is both contrary to the intent of the

Faculty Senate's policy, and an infringement on the student's right to complete all work for the course.

This policy will not apply in the event that completing the assignment or administering the examination at an alternate time would impose an undue hardship on the instructor or the University that could reasonably have been avoided. There should be a good faith effort by both the instructor and the student to agree to a reasonable resolution. When disagreements regarding this policy arise, decisions can be appealed to the Department Chair/Unit Director, College/School Dean, and/or the Faculty Senate Academic Standards Committee.

For purposes of definition, extracurricular activities may include, but are not limited to: fine arts activities, competitive intercollegiate athletics, science and engineering competitions, liberal arts competitions, academic recruitment activities, and any other event or activity sanctioned by a College/School Dean, and/or by the Executive Vice President and Provost.

Rebelmail

Rebelmail is UNLV's official email system for students, and by University policy, instructors and staff should only send emails to students' Rebelmail accounts. Rebelmail is one of the primary ways students receive official University communications, information about deadlines, major Campus events, and announcements. All UNLV students receive a Rebelmail account after they have been admitted to the University. Emailing within WebCampus is also acceptable.

Tutoring and Coaching

The Academic Success Center (ASC) provides tutoring, academic success coaching, and other academic assistance for all UNLV undergraduate students. For information regarding tutoring subjects, tutoring times, and other ASC programs and services, please visit the ASC website, <https://www.unlv.edu/asc>, or call 702-895-3177. The ASC building is located across from the Student Services Complex (SSC). Academic success coaching is located on the second floor of SSC A, Room 254. Drop-in tutoring is located on the second floor of the Lied Library, and on the second floor of the College of Engineering building (TBE A 207).

UNLV Writing Center

One-on-one or small group assistance with writing is available free of charge to UNLV students at the Writing Center, <https://writingcenter.unlv.edu/>, located in the Central Desert Complex, Building 3, Room 301 (CDC 3-301). Walk-in consultations are sometimes available, but students with appointments receive priority assistance. Students may make appointments in person or by calling the Center, 702-895-3908. Students are requested to bring to their appointments their Rebel ID Card, a copy of the instructions for their assignment, and two copies of any writing they have completed on their assignment.

School of Architecture Policies:

All work produced within the School of Architecture becomes and remains the property of the school for use in documenting work for accreditation. All work must be documented for your personal use prior to its final submittal.

Any course required for a major in which a grade of D+ (C+ for graduate level courses) or less is received must be retaken with an earned grade of C- (B- for graduate level courses) or above. For design studio courses this must be accomplished prior to progressing to the next studio level.

The School of Architecture is a professional school. While in class and in the studio, students are expected to conduct themselves in a professional manner. This means showing respect for property and for other individuals. Actions which might be offensive to another individual are to be avoided. Language and attire should be appropriate for a professional environment. Materials displayed within the classroom, the studio, or on a computer screen should also be appropriate to a professional environment. Please refer to the UNLV School of Architecture Student Handbook for other policies applying to the School of Architecture.

Course Overview

ABS 331/531 Environmental Control Systems I addresses the **important relationships that exist between people and the buildings they inhabit and between those buildings and the environment.** Therefore, it combines the study of physical phenomena (heat transfer, light, etc.) that influence people's sense of comfort and wellbeing with the study of environmentally appropriate design techniques and methods to provide optimum indoor and outdoor conditions.

Environmental Control Systems I combines the **three major influences on architectural design: aesthetic, social, and technical.** This course is designed to help you to quickly test your design ideas to see if they meet basic performance and energy/resource conservation criteria; the set of five team exercises and the material covered in lecture presents you these criteria. Although these criteria are stated in a technical (easy-to-calculate) way, they carry with them significant opportunities for social and aesthetic development.

Some of the most interesting ways in which people interact with the environment involve lighting, heating, cooling, sound, and water supply/waste. Designs are often considered "successes" or "failures" in large part by how effectively they provide both the comfort and the inspiration required/desired by our senses of sight, sound, touch, smell, and taste. All these senses are involved in the building/person interaction.

The emphasis on multiple choice questions accompanied by design vignettes during the midterm and final exams is in part due to the size of this class, but also to prepare you for the Architect Registration Examination (ARE). You will be eligible to take the ARE sometime after you graduate with a NAAB Accredited Master of Architecture degree. The questions in these exams are not simple, and frequently require sorting carefully through several seemingly attractive alternatives. This isn't intended to "trick" you, but to present you a slice of life as a designer; you will often be evaluating several attractive alternatives, and will be responsible for choosing the most rewarding option. If you do well on the *Environmental Control Systems I* class exams, you should be well prepared for the corresponding divisions of the ARE.

Lastly, *Environmental Control Systems I* also provides you with opportunities to explore innovative environmental solutions that can help mitigate the environmental impact of your designs. This aspect of the course will place you in an advantageous position since the American Institute of Architects and our society as a whole are now recognizing the importance of addressing sustainability issues in the design professions. I hope that by the end of this semester *Environmental Control Systems I* will have excited you by its richness of design criteria, and its many opportunities for creativity and expression!

Course Learning Outcomes

At the end of *ABS 331/531 Environmental Control Systems I* you are expected to:

- **Recognize** the importance of the climate as an architectural form determinant.
- **Identify** the implications of site design decisions on resource consumption and environmental impact.
- **Understand** and **utilize** adequate selection criteria for choosing appropriate passive environmental control systems early in the design process.

Required Texts: *Sun, Wind, and Light, 3rd Edition*
Brown and DeKay ([NA2542.3 .B76 2013](#))

Pilkington's Sun Angle Calculator (Published by the Society of Building Science Educators)
The Sun Angle Calculator manual can be downloaded at: www.sbse.org/sun-angle-calculator

Online Resource: Architecture 2030 Palette
<http://2030palette.org>

School of Architecture Letter Grade Description

- A Superior:** Represents comprehensive excellence. Not only does the work fulfill all requirements in an excellent and professional manner, but goes beyond the given requirements aiming at standards higher than requested. The student is an active and engaged participant in all class activities and intellectual progress and development have been demonstrated by the timely preparation of thoughtful work on a regular basis. This work is of a quality that is instructive to the teacher and exemplary to the rest of the class and sets a standard for the exercise and/or the course.
- B Above Average:** Represents work that can be distinguished as being of truly “good” quality. The work is free of significant flaws, is comprehensive in scope and exceeds all minimum requirements. The student is an active and engaged participant in all class activities and intellectual progress and development have been demonstrated by the timely preparation of work on a regular basis. This work is of a quality that is exemplary for the exercise and/or the course.
- C Average:** Represents satisfactory and average performance. The work is free of major flaws, is comprehensive in scope, and meets all minimum requirements. Intellectual progress and development have been demonstrated by the timely preparation of work on a regular basis. The student and instructor can take “satisfaction” in the average resolution of the exercise and/or course.
- D-F Failing:** *Represents substandard work that is not passable. The work has not fulfilled requirements, or has not been completed on time, or does not appropriately address the issues raised by the exercise and/or course and is unacceptable.*
- I Incomplete:** An “incomplete” on a **project** can only be given in exceptional cases in which failure to complete the assignment is a result of illness or injury requiring a visit to a doctor, a death in the immediate family, military or legal obligations, or other equally serious reasons that can be documented in acceptable written form (such as medical records or legal notification). When possible, all outstanding circumstances that might impact the completion of a project should be brought to the instructor’s attention in advance of the class(es) that may be missed. In addition, **documentation for excused absences must be provided no later than the third class meeting following the event** or the absence(s) will be counted as unexcused and no *Incomplete* can be given. All incomplete work is subject to late penalties as per the instructor’s policy.

An “incomplete” in a course is only given in exceptional cases where there is/was a serious excusable reason for not completing course requirements (see above). The quality of work in the course up to that point has been satisfactory and passing (see Academic Policies section of the Undergraduate Catalog for further details).

Instructors are permitted to assign + or – to grades. However, there is no grade of “A+” within these guidelines.

Grading

As stated on page 3 of this syllabus, School of Architecture policies stipulate that “any course required for a major in which a grade of D+ (or C+ for graduate level courses) or less is received must be retaken with an earned grade of C- (or B- for graduate level courses) or above.” The grading criteria for this course are explained in detail on the following two pages:

Your Basic Grade:

Your “basic grade” is determined as follows:

Term Project (set of five team exercises)	35 points	(7 points per exercise)
Midterm Exams (two)	50 points	(25 points each exam)
Individual Design Project	15 points	
	<u>100 points</u>	

Grading Scale:

The university +/- grading scale will be used in this course. The following standard cutoffs will be used to determine your final “basic grade”:

93.3 +	A
90.0 +	A-
86.7 +	B+
83.3 +	B
80.0 +	B-
76.7 +	C+
73.3 +	C
70.0 +	C-
66.7 +	D+
63.3 +	D
60.0 +	D-
< 60	F

Term Project:

The five team exercises will be graded according to the *rubric* distributed with each of the exercises. In order to obtain the 35 points assigned to the *Term Project* you have to:

- Turn in all exercises *completely finished*, with *all questions accurately and correctly answered*, and with graphic content *neatly presented* by the beginning of the class in which the exercises were due. Late submissions (within 24 hrs. of due date) will result in a grade reduction of 2 points per exercise. Submissions made after 24 hours of the due date will not be accepted and will receive a “0” grade.
- Graded exercises may be resubmitted with corrections for ½ of all missed points. Resubmitted exercises are due the following class after they were returned. No late submissions will be accepted on corrections.
- Turn in your five exercises in a binder with a USB Flash Drive containing the digital files (PDF or Adobe Illustrator). Failure to submit the bound exercises and accompanying USB Flash Drive at the end of the semester will result in a final grade reduction of 10 points.

Exams:

The following information pertains to the midterm exams (two) in this class:

- Exams will be given on a scheduled basis; make-ups will not be provided except in the case of a valid medical condition or any of the situations described in the “UNLV Policy” section of this syllabus.
- Exams will cover all lecture presentations, assigned readings, and homework exercises.

Individual Design Project:

Using your studio project as vehicle, complete ALL the calculations and architectural drawings to adequately illustrate your daylighting, passive solar heating and (at least one) passive cooling strategies.

Your Modified Grade:

You can **raise or lower** your final “basic grade” depending on your performance and participation in the course. Please read all the rules described in this section, as they can affect your final grade!

A. You can raise your basic grade:

By doing **remarkably good work** in the six exercises. If an exercise uses additional SWL design strategies or demonstrates mastery on the integration of class content, the exercise will receive **two additional points**. Notice that by doing exceptionally good work in all your exercises you could raise your final “basic grade” **ten points** (e.g. you can raise your grade from a “C-” to “B-”). Keep in mind that typically, less than 5% of the exercises receive this extra credit.

B. You can lower your basic grade:

- By having **one** unexcused absence to the class (in this case, your final “basic grade” will drop **1/3 of a letter grade** (e.g., from “C-” to “D+”).
- By having **two** unexcused absences to the class (in this case, your final “basic grade” will drop by **one letter grade** (e.g., from “C” to “D”).

C. You can fail this class by any of the following reasons:

(regardless of the grade and/or points obtained up to that point in the class)

- Having **three** unexcused absences to the class.
- Missing the Individual Project Review or any of the exams without an excuse acceptable to the instructor.

Course Materials on Reserve at the Architecture Studies Library:

The following books are fundamental references for this course. For your convenience, they have been placed on two-hour reserve at the Architecture Studies Library:

1. Mechanical and Electrical Equipment for Buildings, 11th Edition
Grondzik, Kwok, Stein, and Reynolds (TH6010 .S74 2010)
2. The Green Studio Handbook: Environmental Strategies for Schematic Design
Alison G. Kwok and Walter T. Grondzik (NA2542.35 .K96 2007)
3. Environmental Control Systems: Heating, Cooling, Lighting.
Fuller Moore (TH6021 .M66x 1993)
4. Heating, cooling, lighting: design methods for architects.
Norbert Lechner (TH7222 .L33 2001)
5. The HOK guidebook to sustainable design.
Sandra Mendler and William Odell (NA2542.35 .M445 2000)
6. Cradle to cradle: remaking the way we make things
William McDonough and Michael Braungart (TD794.5 .M395 2002)

Required and Recommended Readings:

“SWL” (3rd Edition of Sun, Wind, and Light).

Readings should be done before the lecture indicated.

- WEEK 1:** SWL Printed: Preface (pp. 1-10 –skip “Acknowledgements”) and Introduction (pp. 13-19).
- WEEK 2:** SWL Electronic: Analysis Techniques **A8, A9**, A10, and **A11** + Strategies 31, 33, 35, 38, and 41.
Review SWL Printed: Bundle B5 (pp. 148-155) + Case Studies from RPI’s Lighting Research Center:
https://www.lrc.rpi.edu/programs/daylighting/rp_casestudies.asp
- WEEK 3:** SWL Electronic: Strategies **33, 35, 38**, 55, **57**, 64, 68, 82, 83, **85**, 88, 90, and 103.
Review SWL Printed: Bundle B5 (pp. 148-155).
- WEEK 4:** SWL Electronic: Analysis Techniques A4, **A5**, A6, A13, **A24**, and **A26**.
- WEEK 5:** SWL Electronic: Analysis Techniques **A1, A2, A3, A7**, A24, and **A26** + Strategies 5 and **15**.
Review Pilkington’s Sun Angle Calculator Manual: <https://www.sbse.org/sun-angle-calculator>
Review SWL Printed: Bundles B3 (pp. 128-137) and B4 (pp. 138-147).
- WEEK 6:** SWL Electronic: Strategies **74**, 104, and **106** + Analysis Techniques A17, A21, A22, A23, **A27**, and A28.
- WEEK 7:** SWL Electronic: Strategies 24, 25, **28, 29**, 36, **37**, 39, **43, 48, 49, 50, 51**, and **52**.
Review SWL Printed: Bundle B7 (pp. 166-175).
- WEEK 8:** SWL Electronic: Strategies 51, 60, 62, 72, **75, 80**, 81, **84, 89**, and **94**, and 102.
Review SWL Printed: Bundle B7 (pp. 166-175).
- WEEK 9:** No readings assigned during Spring Break.
- WEEK 10:** **All the readings listed above will be included in the Midterm Exam 1.**
Review “Shading for Energy Savings” & “Playing the Angles for Solar-Responsive Design” by Lechner.
- WEEK 11:** SWL Electronic: Strategies **91**, 92, and **106** + Analysis Techniques A11, A16, A17, A18, A21, A22, A23, A24, **A27**, and A28.
- WEEK 12:** SWL Electronic: Strategies 26, 27, **30**, 44, **45, 53**, 67, 69, **86**, and 87.
Review SWL Printed: Bundle B6 (pp. 156-165).
- WEEK 13:** SWL Electronic: Strategies 52, **54, 60**, 72, 75, 76, 94, **95**, 97, and **98**.
Review SWL Printed: Bundle B6 (pp. 156-165).
- WEEK 14:** SWL Electronic: Strategies 9, 24, 27, 45, **46**, and 61.
Review SWL Printed: Bundle B6 (pp. 156-165).
- WEEK 15:** Review SWL Printed: Bundle B9 (pp. 184-193).
Material from weeks 10 through 15 will be included in the Midterm Exam 2.
- WEEK 16:** No readings assigned during Study Week.

WEEK	DATE	OTHER IMPORTANT INFORMATION	LECTURE CONTENT	DEADLINES & CLASS ACTIVITIES
1	M 20-Jan T 21-Jan W 22-Jan U 23-Jan F 24-Jan	Martin Luther King Jr. Day Recess	Course Introduction + Climate Emergency	
2	M 27-Jan T 28-Jan W 29-Jan U 30-Jan F 31-Jan	Last day to add, change or drop courses	Daylighting Introduction + Case Studies	
3	M 3-Feb T 4-Feb W 5-Feb U 6-Feb F 7-Feb		Daylighting Design Guidelines	
4	M 10-Feb T 11-Feb W 12-Feb U 13-Feb F 14-Feb		Human Comfort + Bioclimatic Design	Exercise #1 Due
5	M 17-Feb T 18-Feb W 19-Feb U 20-Feb F 21-Feb	Presidents' Day Recess	Solar Geometry + Solar Site Analysis	
6	M 24-Feb T 25-Feb W 26-Feb U 27-Feb F 28-Feb	Last day to withdraw (50% refund)	Estimation of Building Heating Loads	
7	M 2-Mar T 3-Mar W 4-Mar U 5-Mar F 6-Mar		Passive Solar Heating Introduction + Case Studies	Exercise #2 Due
8	M 9-Mar T 10-Mar W 11-Mar U 12-Mar F 13-Mar		Passive Solar Heating Design Guidelines	
9	M 16-Mar T 17-Mar W 18-Mar U 19-Mar F 20-Mar	Spring Break		
10	M 23-Mar T 24-Mar W 25-Mar U 26-Mar F 27-Mar		Midterm Exam 1 (25% of Final Grade) + External Shading	Exercise # 3 Due
11	M 30-Mar T 31-Mar W 1-Apr U 2-Apr F 3-Apr	Final day to withdraw or drop classes	Estimation of Building Cooling Loads	
12	M 6-Apr T 7-Apr W 8-Apr U 9-Apr F 10-Apr		Cross & Stack Natural Ventilation Strategies	
13	M 13-Apr T 14-Apr W 15-Apr U 16-Apr F 17-Apr		High Mass & Night Ventilation Cooling Strategies	Exercise # 4 Due
14	M 20-Apr T 21-Apr W 22-Apr U 23-Apr F 24-Apr		Passive & Active Evaporative Cooling Strategies	
15	M 27-Apr T 28-Apr W 29-Apr U 30-Apr F 1-May		Midterm Exam 2 (25% of Final Grade) + Integrating Strategies	Exercise # 5 Due
16	M 4-May T 5-May W 6-May U 7-May F 8-May	Study Week	Final Review: Integration of Passive Design Strategies	Individual Project Due
Exam Week	M 11-May T 12-May W 13-May U 14-May F 15-May		This course does not have a Final Exam	