PREREQUISITES:
1. **Standing:** Have University of Arizona’s graduate or undergraduate degree, non-degree, certification, undecided, professional development and correspondent students standing. Non degree participation is allowed with special program fee.
2. **Equipment:** Purchase equipment listed in the “REQUIREMENTS” section.

COURSE DESCRIPTION:
“Energy and the Environment” is a 3 credit online course that fosters awareness and thorough understanding of the qualitative and quantifiable environmental forces that contribute to energy use in buildings. The course introduces basics for understanding solar energy and light, climate and microclimate, and human thermal comfort as related to the built environment.

INSTRUCTOR:
Dr. Nader Chalfoun, Ph.D. LEED® AP, CEA
Contact: School of Architecture, Room #220, 621-6740, chalfoun@u.arizona.edu

“.. Man’s life, in sickness and in health, is bound up with the forces of nature, and that nature, so far from being opposed and conquered, must rather be treated as an ally and friend, whose ways must be understood, and whose counsel must be respected…” “.. Despite nature’s many earlier warnings, the pollution and destruction of the natural environment has gone on, intensively and extensively, for the last three hundred years, without awakening a sufficient reaction…”

- Lewis Mumford in his writing of the introduction of “Design with Nature” by Ian McHarg

COURSE OBJECTIVES:
Participants should develop an/a:
1. Awareness of principles governing the natural world.
2. Awareness of fundamentals of the physical and environmental systems such as solar energy, climate, daylight, and acoustics.
3. Understanding of the theories and methods that clarify the relationships between human behavior and human thermal comfort and the physical environment

NAAB PERFORMANCE CRITERIA:
The National Architectural Accrediting Board identifies 34 performance criteria it determines to “constitute the minimum requirements for meeting the demands of an internship leading to registration for practice”. The criteria, which this course addresses, are indicated in the box at the upper right corner of page one of this syllabus. More information on accreditation and a list of the performance criteria can be found on NAAB’s web site at: [HTTP://WWW.NAAB.ORG](HTTP://WWW.NAAB.ORG)
COURSE TOPICS AND STRUCTURE:
A basic awareness of the natural forces that contribute to energy use in buildings will be fostered with an understanding of how each individual force contributes to the energy problem currently faces the world. An introduction to the theories and concepts of solar geometry, shadings devices, and the affect of the sun on various materials and surfaces will be given. Additionally, the heat balance between the human body and its surrounding environment including human physiology and thermal comfort conditions, climate and micro-climate analysis will be introduced.

The course is structured into sections which include 1) a topic lecture, 2) a skill development exercise, and 3) a quiz. Each lecture will explain the theoretical goals of each section which then will be further understood through completion of a skill development exercise. A quiz will be taken at the end of each section to test participants understanding of the content. (For details see AGENDA below).

A dedicated interactive chat room session will be administered during class hours to foster a dialog that promotes the sharing of knowledge between the participants in the course.

ASSIGNMENTS:
Participants will complete skill development exercises and quizzes preferably in a sequential mode since information in each section could be built upon its preceding section. Online chat session will help facilitate dialogue between students and the instructor. In addition, there will be a comprehensive final exam covering all course information.

READING:
Online topic lectures will explain the pedagogical goals of each section. Additional required readings will be assigned from different sources to complement the lectures. All additional reading materials will be digitally distributed during the online class.

REQUIREMENTS:
All participants must have access to a computer with internet connection, have access to a digital camera, and must purchase one thermometer (approx. $20) and one non-contact laser-guided Infrared Temperature Gun (average price approx. $30 to $70 at hardware stores). Participants will also complete at least weekly readings of lectures, weakly perform the skill development exercises, take weekly tests, and read the support documents and watch the support video clips. The comprehensive final exam will be accessible only to participants who finished going through all the course material.
POLICIES:
Grading:
A bar chart will be displayed when you log into the online course website that will display your overall progress in the course and another pie chart will display your up-to-date and overall semester grades. All exercises are worth 200 points each while all the tests are worth 100 points each, your final exam is worth 400 points (about 10% of the course).

Your final grade will be based on the following:

<table>
<thead>
<tr>
<th>Grade</th>
<th>points</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Excellent 90-100</td>
</tr>
<tr>
<td>B</td>
<td>Good 80-89</td>
</tr>
<tr>
<td>C</td>
<td>Satisfactory 70-79</td>
</tr>
<tr>
<td>D</td>
<td>Poor 60-69</td>
</tr>
<tr>
<td>E</td>
<td>Failure 59 or below</td>
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</tbody>
</table>

Exams
End of section quizzes and a comprehensive final exam will be administered for the course.

Advancement
A passing grade in the course is required for advancement to the next course in the sequence.

Late Work
Late work will not be accepted after assignment period.

Incomplete Work
Incomplete work will not be accepted without instructor’s prior approval.

Plagiarism
All participants must follow the University of Arizona Policy against plagiarism is according to Students Code of Academic Integrity: http://studpubs.web.arizona.edu/policies/cacaint.htm

Behavior
All participants must follow the University of Arizona Policy against threatening behavior by students: http://policy.web.arizona.edu/~policy/threaten.shtml

STATEMENTS:
Subject to Change
With the exception of the grade policy, parts of this syllabus are subject to change with advance notice, as deemed appropriate by the instructor.

Handicapped Accessibility
Every effort will be made to accommodate participants with diagnosed disabilities. Please contact the instructor to initiate a discussion about how we can best help you succeed in this class.

Retention of Work
The School of Architecture has the right to retain any participants project whether it be for display, accreditation, documentation or any other educational or legal purpose.
AGENDA:
Each participant will go through the following sections and complete three tasks; 1) read the section’s lecture, read all supporting documents, and watch the supporting video clips, 2) download, perform and submit the skill development exercise and 3) take the section’s test:

Section 1 Lecture 1: Energy Perspective
   Skill Development Exercise 1: Your Energy Utility Bill
   Test 1

Section 2 Lecture 2: Renewable Energy
   Skill Development Exercise 2: Sizing a PV Array
   Test 2

Section 3 Lecture 3: Light Principle
   Skill Development Exercise 3: Efficiency and Efficacy
   Test 3

Section 4 Lecture 4: Daylight in Architecture
   Skill Development Exercise 4: Daylight Investigation
   Test 4

Section 5 Lecture 5: Solar Geometry
   Skill Development Exercise 5: Where the Sun is?
   Test 5

Section 6 Lecture 6: Solar Shading
   Skill Development Exercise 6: Window Shading
   Test 6

Section 7 Lecture 7: Solar Physics
   Skill Development Exercise 7: How Much Radiation
   Test 7

Section 8 Lecture 8: Thermal Comfort Sensation
   Skill Development Exercise 8: Chat room Forum Exercise
   Test 8

Section 9 Lecture 9: Evaporative Cooling
   Skill Development Exercise 9: Wet / Dry Cloth
   Test 9

Section 10 Lecture 10: Climate
   Skill Development Exercise 10: Bioclimatic Analysis
   Test 10

Section 11 Lecture 11: Climate Change
   Skill Development Exercise 11: Signs of Climate Change
   Test 11

Section 12 Lecture 12: Microclimate
   Skill Development Exercise 12: Microclimate Analysis
   Test 12

Section 13 Lecture 13: Urban Heat Island
   Skill Development Exercise 13: Haptic Experience
   Test 13

Section 14 Final Exam

Section 15 Grade Reporting and Feedback