

# ENVIRONMENTAL TECHNOLOGY II

## ARC 4620/6621 (3 Credits)

### Fall 2016 Course Syllabus and Schedule

Instructor: Kristin Nelson, AIA, NCARB

Office: ARCH 248

Email: [kmnelson@ufl.edu](mailto:kmnelson@ufl.edu)

Office Hours: Wednesday/Friday 1: or by appointment (arranged by email)

Teaching Assistants: Hassan Azad ([h.azad@ufl.edu](mailto:h.azad@ufl.edu))  
Nick Johnson ([njohnson93@ufl.edu](mailto:njohnson93@ufl.edu))

### COURSE OBJECTIVES

Environmental Technology II, building upon the foundation established in Environmental Technology 1, continues to explore the relationships between people and the design of the environments in which they dwell. Thermal comfort, electric power and lighting, acoustics, renewable power systems and system integration will be examined through theoretical, conceptual and practical modes as integral components of architecture and the design process. Theoretical issues will be raised regarding modes of dwelling and environmental relationships to foster the development of individual architectural philosophy. Conceptual frameworks will be presented allowing theories to be applied as part of an architectural design process. Practical application of environmental technologies, based on qualitative reactions of people to dynamic, environments, and the measurable physical characteristics of these phenomenon will be investigated through regular homework assignments, a major group design project, and exams in each unit of study.

A further objective of this course is to familiarize students with the vocabulary and concepts involved in the design of various levels of environmental control used by architects. Students will develop their ability to implement these concepts in current and future design studios through the major project.

### TOPICS OF STUDY

#### ACTIVE SYSTEMS

**Artificial Lighting Systems** - the use of the many electric lighting systems that people have developed to extend cultural activities beyond the hours when daylight is available. Additionally, issues will be raised regarding the use of scarce resources to power these systems, the need for darkness and the quality and quantity of light applied in buildings.

**Mechanical Systems** – when the temperature and humidity of a space are outside of the comfort zone, mechanical systems provide heating, humidification, cooling and dehumidification to bring the interior conditions of the space into a comfortable range. This module will build upon the passive thermal strategies explored in ET1.

**Electric Power Systems** – modern life uses electric power to charge and power appliances, electric lighting systems, and equipment such as computers, printers and cell phones. This module will explore power sources, the grid distribution system, the major components of power systems, distribution within buildings and common symbols and terminology, in addition to power density and discussions on conserving power.

**ACOUSTICAL SYSTEMS** - those techniques, primarily passive in nature, that people have developed to enhance acoustic events, hear important information and provide appropriate levels of quietness in buildings. Hearing and perception and the relationship between the physical properties of sound, the influence of architectural form, and the influence of material properties on sound will be studied in the course.

**Room Acoustics** - shaping of room enclosures and the selection and distribution of construction assemblies and finish materials to enhance the loudness, richness and natural tonal qualities of voices or musical instruments.

**Noise Control** - design of room enclosure systems, selection of construction assemblies and detailing of building systems such as HVAC to prevent the spread of unwanted sounds throughout the building.

**BUILDING SYSTEMS INTEGRATION** – in practice, all of the competing technical factors demand simultaneous consideration and response. This final exercise will seek to engage this important aspect of architectural design.

## COURSE LOGISTICS

**Class Meeting:** Wednesday/Friday, Period 3 (9:35 AM – 10:25 AM) Room: FAB 0105

**Lab Meeting:** Thursday, period 9-10 (4:05 PM – 6:00 PM)

**Final Exam:** Thursday, December 15 (3:00 PM – 5:00 PM)

The Final Examination date is set by the Registrar of the University of Florida and is a fixed date. The Final Examination will only occur on the date and time specified above. **By enrolling in this course, students agree to take the examination on this date and this date only.**

**e-Learning Website:** <http://lss.at.ufl.edu/>

**Grading:** Student grades will be calculated as listed below:

Exams	33.3%
Major Project	33.3%
Homework Assignments	33.3%
<b>Total</b>	<b>100%</b>

**Projects & Homework.** A major project will be assigned during the semester in addition to regular homework vignette assignments. The project will explore the integration of passive systems, daylight, artificial light, acoustics, mechanical systems, renewable power systems, the tectonics of construction, and response to climate as part of a complete design exploration. This project will be completed in teams.

Approximately 10 short homework assignments will be assigned to reinforce important issues being presented in the course lectures. Successful completion of assignments should prepare students to excel on the course exams and, importantly, later in design practice and on the Architectural Registration Examination.

***Please note: homework assignments will only be accepted when due — Late assignments will not be accepted.*** Please respect this policy. Assignments must be professionally submitted — executed on a computer (no hand written submissions unless otherwise stated) and turned in **digital**

**copy through Canvas** and **printed copy** on 8 ½" x 11" or 11" x 17" bond paper (no trace paper), bound with a mechanical fastener (if multiple pages are included) **to your TA**.

**Attendance.** Attendance in all scheduled course activities is required. Exams and homework assignments will be generated primarily from information covered in the course lectures and discussion meetings. Therefore, attending class, taking personal notes and reviewing these notes will greatly contribute to success on the homework assignments and exams.

### Grading Scale

Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E
Numeric Grade	93-100	90-92	87-89	83-86	80-82	77-79	73-76	70-72	67-69	63-66	60-62	0-59
Quality Points	4.0	3.67	3.33	3.0	2.67	2.33	2.0	1.67	1.33	1.0	0.67	0.0

### UF Grading Policy

Information on UF's grading policy can be found at the following location:<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

### Students with Special Needs

Students with special physical needs and requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation. All attempts to provide an equal learning environment for all will be made.

### College of Design, Construction and Planning

#### Spray Painting Policy

Spray painting, or the use of any other sort of aerosol spray, is not allowed in the Architecture Building, Rinker Hall and in Fine Arts C, except within the spray booth found in Room 211 of Fine Arts C. Students found in violation of this policy will be referred to the Dean of Students for disciplinary action.

**Academic and Professional Ethics.** Many pressures and time constraints are placed on students in the architecture program. These may seem overwhelming at times. Please do not let this contribute to poor decision making with regard to academic integrity and honesty. Use the academy as an opportunity to develop and nurture your ethics and integrity. Any work for this class that violates the academic ethical code will result in a zero on the assignment and notification of the School of Architecture administration.

**Reading Assignments.** It is the responsibility of each student to complete the reading assignments.\*

Required texts: ***Mechanical & Electrical Equipment For Buildings 12th Ed.***, by Grondzik and Kwok. ISBN: 1118615905

Recommended texts:

*A Natural History of the Senses*, Diane Akerman

*American Building: The Environmental Forces that Shape It.*, (updated), James Marston Fitch with William Bobenhausen.

***Architectural Acoustics*, M. David Egan, McGraw Hill, 1998.**

*Architectural Acoustics Principles and Practice*. Cavanaugh & Wilkes John Wiley and Sons, New York, 1999

*Auditorium Acoustics and Architectural Design*, Michael Barron

*Concepts in Architectural Lighting*, 2nd Edition. M. David Egan, McGraw Hill, 2001

*Concert and Opera Halls: How They Sound.* Leo L. Beranek  
*Daylight in buildings,* Paul Kristensen & Roman Jacobiak, Academy Editors,  
2003.  
*Daylighting for Sustainable Design.* Mary Guzowski McGraw-Hill, 2000.  
*How Buildings Work: the Natural Order of Architecture;* 3rd Edition, Edward  
Allen, Oxford University Press, 2005  
*In Praise of Shadows,* Junichiro Tanizaki  
*Light Revealing Architecture,* Marietta S. Millet  
*Light: the Shape of Space,* Lou Michel  
*Lighting Design,* Gardner  
*Mechanical and Electrical Systems in Buildings;* 3rd Edition, Janis Tao, Prentice  
Hall, 2005.  
*Simplified Design For building Sound Control,* Ambrose & Ollswang  
*Sun, Wind & Light: Architectural Design Strategies;* 2nd Edition, G. Z. Brown &  
Mark Dekay, John Wiley & Sons, Inc., 2001.  
*The Architecture of the Well Tempered Environment,* 2nd Edition. Reyner  
Banham, The Architectural Press Ltd., 1984.  
***Architectural Lighting, M. David Egan, McGraw Hill, 2002.***

\* Readings are from the course text *Mechanical and Electrical Equipment for Buildings, 12<sup>th</sup> edition* unless otherwise stated.