

**Philadelphia University  
Faculty of Engineering  
Department of Architecture  
first semester, 2009/2010**

**Course Syllabus**

<b>Course Title: Environmental Control</b>	<b>Course code: 660233</b>
<b>Course Level: 2</b>	<b>Course prerequisite:</b>
<b>Lecture Time: 8:15-9:45</b>	<b>Credit hours: 3</b>

**Academic Staff  
Specifics**

<b>Name</b>	<b>Rank</b>	<b>Office Number and Location</b>	<b>Office Hours</b>	<b>E-mail Address</b>
<b>Abu Al Haija</b>	<b>Associate Professor</b>	<b>NO.6410/ T:2605</b>	<b>8-9 Sun 11-1 Mon 8-9 Tue 8-9 We</b>	<b>Ahaija@fastwebnet.it</b>

**Course module description:**

It concentrates on different climate conditions and its effects on the design process, temperature control inside buildings, shade measuring design and its utilities for defining the appropriate amount of insulation and shades, types of heat isolation, wind directions and ventilation in and outside building. Air conditioning by using passive system energy, Vernacular environmental solutions for regions of different climate. The Leader Ship in Energy and Environmental Design concept and the new Jordanian building code to save energy.

**Course module objectives:**

- 1.To establish a firm understanding of the effect of climate and weather upon the design process.
- 2.To develop firm basic understanding of the fundamental principles of the passive solar energy.
- 3.To achieve familiarity with the vernacular Architecture solutions for regions of different climate.
- 4.To be fully aware of different ways of protecting building and Architecture complexes from> overheating.
- 5.To enable the students construct and use the Stereographic sun-path diagram and shadow angle protractor.
6. to enable the students understand and use in practice the Jordanian building code to save energy.

## Course/ module components

The course is divided into the following parts:

### First part: Analytical

#### - Architectural Environmental Design and Control:

- concepts, definitions, climate conditions
- urban texture, building materials, shapes, masses: relation ship with climate and design.
- Case studies: Traditional Arab houses
- passive solar energy buildings
- Stereographic Sun-path diagrams, sunlight penetration, Shading Design
- Thermal control, insulation materials, aero-illumination control.
- case studies:
  - Examples from the Italian Experience regarding the building regulation aero-illumination control.
  - Traditional project of Qurna by Hassan Fathi
  - Modern project of Manara Mesiniana by K. Yeang
- The Jordanian Building Code to Save Energy
- Sustainability and LEED (Leader Ship in Energy and Environmental Design).

### Second part: Application

a- Students should apply their knowledge in an experimental schematic design of residential fabric in 2 climatic deferent condition in Jordan (humid hot) and cold arid: site plan analyses, building orientation, masse, materials, shape, openings, Stereographic Sun-path diagrams, sunlight penetration, Shading Design.

#### • Books (title , author (s), publisher, year of publication)

No limitations for books and publications for the subject but students will be advised to read list of publications (books, articles and web sites) as seen at the end of the course syllabus.

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• **Support material:** students have to develop their architectural environmental culture by visits to deferent traditional sites, historical sites, new architectural complexes, readings, seeing slide, video cassettes,

• **Homework and laboratory guide:** students are requested to prepare a sketch book and folder keeping.

#### Teaching methods:

The structure of this course is elaborated throw theoretical lessons, analytical case studies and application of schematic models.

#### Learning outcomes:

- Knowledge and understanding

To build up abilities in environmental control and design, sustainability and creativity

- Cognitive skills (thinking and analysis).

Develop personal abilities in design and that make him capable of dealing with environmental design requirements

- Communication skills (personal and academic).

Architectural students will be able to communicate, read, use resources (books, magazine, web sites, etc.) related to environmental architecture, interpret and explain their requirements.

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- Practical and subject specific skills (Transferable Skills).  
The course will train architectural students and qualify them for environmental control requirements using proper methods.

### **Assessment instruments**

- Environmental Design schematic models
- Three examinations according to the following table:

<b><u>Allocation of Marks</u></b>	
<b>Assessment Instruments</b>	<b>Mark</b>
1 <sup>st</sup> examination	<b>%20</b>
2 <sup>nd</sup> examination	<b>%20</b>
Analysis of case studies	<b>%10</b>
Schematic models of environmental design	<b>%20</b>
3 <sup>rd</sup> examination	<b>30</b>
Total	<b>%100</b>

## Documentation and academic honesty

- Students are requested to illustrate references whatever extracted from books, magazine or web sites, in order to respect the copyright protection and avoid plagiarism.

## Course/module academic calendar

Week	Basic and support material to be covered	Homework/reports and their due dates
(1)	concepts, definitions, climate conditions	<b>Reports: 1- Building materials, physical characters and behavior</b>  <b>2- Jordanian traditional houses: materials, forms and masses</b>
(2)	concepts, definitions, climate conditions	
(3)	urban texture, building materials, shapes, masses: relation ship with climate and design.	
(4)	Case studies: Traditional Arab houses	
(5)	passive solar energy buildings	
(6)	Stereographic Sun-path diagrams, sunlight penetration, Shading Design  <b>First exam</b>	
(7)	Thermal control, insulation materials, aero-illumination control.	
(8)	case studies: Examples from the Italian Experience regarding the building regulation aero-illumination control.	<b>Application design: schematic model of environmental houses in humid and arid regions.</b>
(9)	Traditional project of Qurna by Hassan Fathi	
(10)	Modern project of Manara Mesiniana by K. Yeang	
(11)	The Jordanian Building Code to Save Energy <b>Second exam</b>	
(12)	The Jordanian Building Code to Save Energy	
(13)	Sustainability and LEED (Leader Ship in Energy and Environmental Design).	
(14)	Sustainability and LEED (Leader Ship in Energy and Environmental Design).	
(15)	Zero energy buildings - photovoltaic cells	
(16)	<b>Final Examination</b>	

### **Expected workload:**

**On average students need to spend 2 hours of study and preparation for each 50-minute lecture/tutorial.**

### **Attendance policy:**

**Absence from lectures and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.**

### **Module references**

- 1- the HOK Guidebook to Sustainable Design, J. Wiley & Sons , the Independent, UK 2005.
- 2- USA Green building Council, Version 2.2 New constracion and Major Renovation, 2007
- 3- Environmental science Handbook for Architects and Builders S.V. Szokolay, the construction press New York 1990.
- 4- Design with climate, Olgyay, V. Van Nosrand Rienhold, New York 1992.
- 5- فتحي، حسن، الطاقات الطبيعية والعمارة التقليدية، المؤسسة العربية للدراسات والنشر، بيروت 1988
- 6- وزير، يحيى، التصميم المعماري الصديق للبيئة، مدبولي، 2003
- 7- استيته، كنعان، المرشد في التصميم المعماري المناخي، وزارة الطاقة والثروة المعدنية..
- 8- سمير، حسن المناخ والعمارة، الدار الجامعية للطباعة والنشر، عمان 1995.
- 9- كودة المباني الموفرة للطاقة، وزارة الأشغال العامة الأردنية، عمان 2009
- 10- نظام البناء في مدينة عمان، أمانة عمان الكبرى