Faculty of Engineering & Technology

Environmental Control & Technical Installations 2

Information :

Course Code :	ARC 362	**Level :**	Undergraduate	**Course Hours :**	2.00- Hours

Department : Department of Architectural Engineering

Instructor Information :

Title	Name	Office hours
Lecturer	Dalia Anis Mekhaimer Abd Elhady	4

Area Of Study :

Upon successful completion of the course, the student should be able to: 1. Investigate, evaluate and optimize the thermal performance of simple architectural spaces. 2. Investigate, evaluate and optimize the luminance performance of simple architectural spaces.

Description :

The course focuses on the building energy consumption and thermal performance. It addresses thermal comfort and how to achieve it using architectural and mechanical manipulations. Many related topics are investigated: Heat transfer, Storage and insulation, Air conditioning and ventilation, Heating and cooling loads, Central distribution and package units, Mechanical ventilation, Heating appliances and systems. In addition, the course also addresses topics of architectural spaces lighting either naturally or artificially. Other related topics are also investigated: Daylight quality, Artificial lighting mechanism, Light sources and luminance design.

Course outcomes :

a.Knowledge and Understanding: :	
1 -	Define some of the environmental and bioclimatic architectural fundamental principles.
2 -	Define the term "comfort zone" and its criteria.
3 -	List some technologies for creating comfortable indoor environments in case of thermal and lighting performance.
4 -	List some programs that are used in environmental control simulation.
5 -	List differences between various A/C systems.
6 -	List differences between various artificial lighting systems.
b.Intellectual Skills: :	
1 -	Propose certain environmental manipulation process or concept to enhance a project design.
2 -	Analyze the impacts of some environmental issues such as climatic conditions, thermal performance, and lighting performance on the building design.
3 -	Calculate the cooling load for air conditioning.
4 -	Choose the proper lux according to the space function.
5 -	Evaluate the results of the analytical studies and conclude with architectural solutions and design requirements
6 -	Choose the proper digital software of Luminal and thermal analysis.

c.Professional and Practical Skills: :	
1 -	Apply architectural environmental control techniques or methods to enhance the design of a building according to climatic requirements.
2 -	Apply digital software to analyze and evaluate the lighting and thermal behavior of the building.
3 -	Apply field measuring tools to indicate the sound and lighting performance of architectural spaces.
d.General and Transferable Skills: :	
1 -	Search for relevant information
2 -	
3 -	

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Developing the relationship between human, building and natural environment through ages	3	2	1
Lighting and Daylighting-introduction	3	2	1
Lighting and Daylighting-Methods of Analyzing Daylighting	3	2	1
Lighting and Daylighting- Glare	3	2	1
Artificial Lighting systems	3	2	1
Thermal Comfort - Human Factors	3	2	1
Thermal Envelope-Glazing	3	2	1
Thermal Envelope-Ventilation	3	2	1
Thermal Envelope-Insulation	3	2	1
Passive Solar Heating and Cooling	3	2	1
Air conditioning systems	6	4	2
Cooling load calculations	3	2	1
Final project Discussion	6	4	2

Teaching And Learning Methodologies :

Lectures.
Research and assignments.
project

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
	5.00		
	10.00		
	30.00		
Assignments	20.00		
Final exam :	40.00		

First midterm :	15.00		
Performance & Participation	10.00		
Second midterm	15.00		

Course Notes :

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Recommended books :

a) Lechner, Norbert. Heating, cooling, lighting: Sustainable design methods for architects.
John wiley & sons, 2014.Students Lecture Notes
b) Tregenza, Peter, and Michael Wilson. Daylighting: architecture and lighting design.
Routledge, 2013.
c) Handbook, IESNA LIGHTING. "(2000)." New York: IESNA (2000).
d) Goswami, D. Yogi. "Energy Efficiency and Renewable Energy Handbook."
e) ASHRAE
f) Carrier load estimation

Periodicals :

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Web Sites :

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