

**Faculty of Engineering & Technology**

**Elective 9 / Innovative Architecture & Technologies**

**Information :**

**Course Code :** ARC E09

**Level :** Undergraduate

**Course Hours :** 3.00- Hours

**Department :** Department of Architectural Engineering

**Instructor Information :**

Title	Name	Office hours
Lecturer	Marwa Abdelkader Mohamed Elgendey	2
Assistant Lecturer	Randa Medhat Hussien Khalil Mohamed	1
Teaching Assistant	AYA TAREK IBRAHEM ABDELHADY AHMED	

**Area Of Study :**

Upon successful completion of the course, the student should be able to:

- Gain knowledge related to innovative approaches in environmental design and sustainability applications while still considering local climates, and social, and cultural environments.
- Demonstrate understanding of the wider sustainability concepts (Environment is not only subject to buildings)
- Use gained knowledge to support environmental design concepts.

**Description :**

Energy efficiency in buildings, New & renewable energy, Air / water / solar energy in architecture, Sustainable Architecture, Green Architecture. New materials and technologies. Case studies.

**Course outcomes :**

**a.Knowledge and Understanding: :**

1 -	a.1. Define the principles of sustainability in architecture and landscape, as process and product.
2 -	a.2. List some of building construction systems which relate to building's climatic adaptation such as kinetic architecture.
3 -	a.3. Define special technologies and detailing of adaptation methods, such as, double skin buildings, Energy Efficiency technologies, green roofs and walls, etc.
4 -	a.4. Explain sustainable design and climatic considerations in relation to the different elements of the natural environment, different energy types, appropriate environmental control techniques and different technical installations in buildings
5 -	a.5. Explain the social environmental considerations and human factors affecting the exercise of the architectural and landscape design decisions.
6 -	a.6. Explain contemporary environmental approaches such as biomimicry, biophilic, ecological design etc.

**b. Intellectual Skills: :**

1 -	b.1. Differentiate environmental architectural problems often on the basis of limited and possibly contradicting climatic information
2 -	b.2. Use creative thinking methods to integrate passive design solutions and zero energy concepts in relationship to building materials, and construction elements into design process.
3 -	b.3. Evaluate possible energy efficiency alternatives to propose design solutions.
4 -	b.4. Criticize informed innovative opinions.

**c. Professional and Practical Skills: :**

1 -	c.1. Design architectural projects that present solutions to climatic and environmental problems
2 -	c.2. Create 2D and 3D sketches to analyze possible case studies
3 -	c.3. Use presentation techniques to present case study analysis and design proposals
4 -	c.4. Build simple physical models that show innovative environmental solutions
5 -	c.5. Provide academic research techniques in terms of searching and analyzing academic

**d. General and Transferable Skills: :**

1 -	d1. Express ideas by visual, graphic, written and verbal means
2 -	d2. Discuss and defend ideas
3 -	d3. Manage time and meet deadline
4 -	d4. Search for relevant information
5 -	d5. Communicate effectively with peers and teamwork management

**Course Topic And Contents :**

Topic	No. of hours	Lecture	Tutorial / Practical
Introduction	4	2	2
Innovative Environmental Architecture Approaches	8	4	4
Sustainability in Egypt	4	2	2
Kinetic Architecture	12	4	4
Sustainable Landscape Design	8	4	4
Green Roofs	8	4	4
Towards Zero Energy Architecture	8	4	4
Re-design Project	12	6	6

**Teaching And Learning Methodologies :**

Lecture
One to one discussion
Group discussion
Research presentation
Poster designs
Physical Maquette

**Course Assessment :**

Methods of assessment	Relative weight %	Week No	Assess What
Assignments/Studio work	35.00		
Final exam	40.00		
In Class Quizzes	15.00		
Participation	10.00		

**Recommended books :**

- a) Carbon-neutral Architectural Design by Pablo La Poche, 2012.
- b) Green Building- Guidebook for Sustainable Architecture, by Michael Bauer, Peter Masle, and Michael Schwarz, 2010.
- c) Kinetic Architecture – Designs for Active Envelopes, by Russell Fortmeyer and Charles Linn, 2014.
- d) Sustainable Landscape Construction: A Guide to Green Building Outdoors, by William Thompson and Kim Sorving, 2nd ed, 2007