



**Course Specifications:**  
**ARE7224 - Building Physics & Environmental Control**



### 1. Basic Information

<b>Program Title</b>	Architectural Engineering
<b>Department offering the Program</b>	Architectural Engineering
<b>Department Responsible for the Course</b>	Architectural Engineering
<b>Course Title</b>	Building Physics & Environmental Control
<b>Course Code</b>	ARE7224
<b>Year/ Level</b>	Second Year – Second Term
<b>Specialization</b>	Minor
<b>Authorization date of course specification</b>	2005

<b>Teaching Hours</b>	<b>Lectures</b>	<b>Tutorial</b>	<b>Practical</b>
	2	2	0

### 2. Course Attributes:

No.	Attribute
03	Design and conduct experiments as well as analyze and interpret data.
08	Consider the impacts of engineering solutions on society & environment.
09	Demonstrate knowledge of contemporary engineering issues.

### 3. Intended Learning Outcomes (ILOs):

#### a. Knowledge and Understanding:

No.	Knowledge and Understanding
A <sub>03</sub>	Characteristics of engineering materials related to the discipline.
A <sub>04</sub>	Principles of design including elements design, process and/or a system related to specific disciplines.
A <sub>06</sub>	Quality assurance systems, codes of practice and standards, health and safety requirements and environmental issues.
A <sub>12</sub>	Contemporary engineering topics.
A <sub>14</sub>	Principles of building technologies, structure & construction methods, technical installations, properties of materials, and the way they may influence design decisions.
A <sub>18</sub>	The significance of urban spaces and the interaction between human behavior, built environment and natural environment.
A <sub>23</sub>	Principles of sustainable design, climatic considerations, and energy consumption and efficiency in buildings and their impacts on the environment.

#### b. Intellectual Skills

No.	Intellectual Skills
B <sub>10</sub>	Incorporate economic, societal, environmental dimensions and risk management in design.
B <sub>15</sub>	Predict possible consequences, by- products and assess expected performance of design alternatives.



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B <sub>16</sub>	Reconcile conflicting objectives and manage the broad constituency of interests to reach optimum solutions.
B <sub>17</sub>	Integrate relationship of structure, building materials, and construction elements into design process.

**c. Professional Skills**

No.	Professional Skills
C <sub>02</sub>	Professionally merge the engineering knowledge, understanding, and feedback to improve design, products and/or services.
C <sub>05</sub>	Use computational facilities and techniques, measuring instruments, workshops and laboratory equipment to design experiments, collect, analyze, and interpret results.
C <sub>10</sub>	Apply quality assurance procedures and follow codes and standards.
C <sub>22</sub>	Contribute positively to the aesthetic, architecture and urban identity, and cultural life of the community.

**d. General Skills**

No.	General Skills
D <sub>01</sub>	Collaborate effectively within multidisciplinary team.
D <sub>03</sub>	Communicate effectively.
D <sub>04</sub>	Demonstrate efficient IT capabilities.
D <sub>06</sub>	Manage tasks and resources efficiently.
D <sub>09</sub>	Refer to relevant literature effectively.

**4. Course Contents:**

No.	Topics
1	Introduction.
2	Principal of thermal design.
3	Pollution aspect.
4	Energy resources.
5	Passive solar design.
6	Passive solar design.
7	Examples and research. Midterm Exam.
8	Midterm Exam.
9	Presentation -team work
10	Lighting.
11	Comfort thermal zones.
12	Green architecture.
13	Green architecture.
14	Group discussion.

**5. Teaching and Learning Methods:**

**5.1 Normal Students:**



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No.	Teaching Method	Choice
1	Lectures	√
2	Discussion Sessions	√
3	Information Collection from Different Sources	×
4	Practical	×
5	Research Assignment	√
6	Field Visits	√
7	Case Studies	×
8	Smart Sessions	√

**5.2 Disable Students:**

No.	Teaching Method	Reason
1	Presentation of the course in digital material.	Better access any time.
2	Web communication with students	Better communication with certain cases.
3	Asking small groups to do assignments; each composed of low, medium, and high performance students.	Knowledge and skills transfer among different levels of students.
4	Asking disabled students to do PowerPoint/Poster presentations.	Encouraging disabled students' engagement and interaction.

**5.3 Excellent Students:**

No.	Teaching Method	Reason
1	Developing course materials gradually to allow excellent students to receive teaching that meets their needs	Excellent students rely on excellent teaching
2	Encouraging students to participate in competitions with rewarded bonus marks.	Increasing excellent students' competitiveness

**6. Student Assessment:**

**6.1 Student Assessment Methods:**

No.	Assessment Method	Choice	ILOs
1	Mid Term Examination	√	A <sub>03</sub> , A <sub>04</sub> , A <sub>06</sub> , A <sub>12</sub> , A <sub>14</sub> , A <sub>18</sub> , A <sub>23</sub> , B <sub>10</sub> , B <sub>15</sub> , B <sub>16</sub> , B <sub>17</sub> , C <sub>02</sub> , C <sub>05</sub> .
2	Oral Examination	×	-
3	Practical Examination	×	-
4	Semester work	√	B <sub>10</sub> , B <sub>10</sub> , B <sub>15</sub> , B <sub>16</sub> , B <sub>17</sub> , D <sub>01</sub> , D <sub>03</sub> , D <sub>04</sub> , D <sub>06</sub> , D <sub>09</sub> .
5	Other types of assessment	×	-
6	Final Term Examination	√	A <sub>03</sub> , A <sub>04</sub> , A <sub>06</sub> , A <sub>12</sub> , A <sub>14</sub> , A <sub>18</sub> , A <sub>23</sub> , B <sub>10</sub> , B <sub>15</sub> , B <sub>16</sub> , B <sub>17</sub> , C <sub>02</sub> , C <sub>05</sub> , C <sub>10</sub> , C <sub>22</sub> .



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**6.2 Assessment Schedule:**

No.	Assessment Method	Weeks
1	Mid Term Examination	08 <sup>th</sup>
2	Oral Examination	×
3	Practical Examination	×
4	Semester work	2 <sup>nd</sup> -7 <sup>th</sup> ; 09 <sup>th</sup> - 14 <sup>th</sup>
5	Other types of assessment	×
6	Final Term Examination	15 <sup>th</sup>

**6.3 Weighting of Assessments:**

No.	Assessment Method	Weights
1	Mid Term Examination	10%
2	Oral Examination	-
3	Practical Examination	-
4	Semester work	30%
5	Other types of assessment	-
6	Final Term Examination	60%
Total		100%

**7. List of References**

No.	Reference List
1	Guzowski, M. Daylighting Sustainable Design. McGraw Hill, Co., 2000.
2	Cliff Moughtin, Urban Design: Green Dimension, 2000.
3	Brown, G. Z. Sun, Wind and Light: Architectural Design Strategies. John Wiley and Sons Inc., 2000.
4	Curran, R. Architecture & the Urban Experience. N.Y. Van Nostrand Reinhold, 1984.
5	The course notes are to be prepared by groups of students after constant reviewing by the course coordinator.

**8. Facilities Required for Teaching and Learning:**

No.	Facility	Choice
1	Lecture Classroom	√
2	Lab Facilities	×
3	White Board	√
4	Data Show System	√
5	Visualizer	×
6	Smart Board	√

No.	Facility	Choice
7	Wireless Board	×
8	Presenter	×
9	Sound System	√
10	Wire-Internet	×
11	Wireless Internet	√
12	...	-

**9. Matrix of Knowledge and Skills of the Course:**

No.	Topic	Attributes	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills



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1	Introduction.	03	A <sub>03</sub>	-	-	-
2	Principal of thermal design.	03	A <sub>04</sub>	B <sub>16</sub>	-	-
3	Pollution aspect.	03	A <sub>06</sub>	B <sub>17</sub>	C <sub>02</sub>	-
4	Energy resources.	03	A <sub>12</sub> , A <sub>14</sub>	-	C <sub>05</sub>	-
5	Passive solar design.	03	A <sub>14</sub>	-	C <sub>10</sub>	-
6	Passive solar design.	08	A <sub>12</sub>	B <sub>10</sub>	C <sub>22</sub>	-
7	Examples and research. Midterm Exam.	08	A <sub>18</sub> , A <sub>23</sub>	-	C <sub>22</sub>	-
8	Midterm Exam.	03, 08, 09	A <sub>18</sub> , A <sub>23</sub>	-	C <sub>22</sub>	-
9	Presentation -team work	08	A <sub>03</sub> , A <sub>04</sub> , A <sub>06</sub> , A <sub>12</sub> , A <sub>14</sub> , A <sub>18</sub> , A <sub>23</sub> ,	B <sub>10</sub> , B <sub>15</sub> , B <sub>16</sub> , B <sub>17</sub> ,	C <sub>02</sub> , C <sub>05</sub> , C <sub>10</sub> , C <sub>22</sub>	-
10	Lighting.	08	A <sub>18</sub>	-	C <sub>10</sub> , C <sub>22</sub>	-
11	Comfort thermal zones.	09	A <sub>18</sub>	-	C <sub>22</sub>	-
12	Green architecture.	09	A <sub>23</sub>	-	C <sub>22</sub>	-
13	Green architecture.	09	A <sub>23</sub>	-	C <sub>22</sub>	-
14	Group discussion.	09	-	-	C <sub>22</sub>	D <sub>01</sub> , D <sub>03</sub> , D <sub>04</sub> , D <sub>06</sub> , D <sub>09</sub>

**Course Coordinator:** Associate Professor Dr. Sherif Ahmed Ali Sheta

**Head of Department:** Professor Dr. Mohammad Mohammad Taha Al-Azab

**Date of Approval:**