**University**: Benha University

**Faculty**: Faculty of Engineering at Shoubra

**Department offering the program**: Architecture Engineering Department

**Department offering the course**: Environmental Balance of Architecture and Built Environment

**1- Course Data (Basic Information)**

**Course Code & Title:** : ARC 448 **Semester/Year:** Fourth / 2020-2021

**Specialization:** Architecture Engineering **Core or Elective:** Elective Course

**Lecture :** 2 On line **Tutorial:** 0 **Total :** 2

**2- Course Aims**

The course aims to Identifying environmental Balance of Architecture and Built Environment in different countries to acquire knowledge about the effects of environment aspects on architecture Built Environment.

**3- Course Contents** (As indicated in the program Bylaw)

The course introduces students to the environmental system and the environmental balance in the sustainability frame through ideal utilizing the most out of the local potential and natural and preserving it – coordination between architecture and natural resources and heritage values and local traditions – enabling and participation – the right to choose – structures and sustainability systems – re-establishing the local values and environmental concerning the architecture – activating and developing the local technology and the inherited crafts and non-government organization in the field.

**4- Program Competencies Served by The Course (A5, A6, B3, B5)**

**Level (A) Engineering Competencies**

**A.1** Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics

**A.2** Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.

**A.3** Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.

**A.10** Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.

**5- Learning Outcomes (LO’s)**

*At the end of the course, the student will be able to:*

|  |
| --- |
| Cognitive Domain |
| LO1 | apply engineering fundamentals, basic science and mathematics to Identify, formulate, and solve complex engineering problems. |
| LO2 | use statistical analyses and objective engineering judgment to draw conclusions.to Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings. |
| LO3 | Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development. |
| Psychomotor Domain |
| LO4 | practice self, lifelong and other learning strategies. to Acquire and apply new knowledge. |

**6- Mapping Learning Outcomes (LO’s) with Competencies**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **LO’s NARS** | **A1** | **A2** | **A3** | **A10** |
| Cognitive Domain |
| LO1 | ◼ |  |  |  |
| LO2 |  | ◼ |  |  |
| LO3 |  |  | ◼ |  |
| Psychomotor Domain |
| LO4 |  |  |  | ◼ |

**7- Lecture Plan**

1. Topics to be Covered weekly & Matrix of LO’s

| Week | Topics | Planned Hours | Learning Outcomes |
| --- | --- | --- | --- |
| LO1 | LO2 | LO3 | LO4 |
| W1 | Introduction, course aim & important definitions | **2** |  |  | ◼ |  |
| W2 | Environmental balance in architecture (A) | **2** |  |  |  |  |
| W3 | Environmental balance in architecture (A) | **2** |  | ◼ |  | ◼ |
| W4 | LEED Assessment criteria & method | **2** |  | ◼ |  | ◼ |
| W5 | EDGE Assessment criteria & method | **2** |  | ◼ |  | ◼ |
| W6 | Environmental control in hot zones | **2** |  | ◼ |  | ◼ |
| W7 | Environmental control in cold zones | **2** | ◼ |  |  | ◼ |
| W8 | Midterm Exam | **2** | ◼ | ◼ | ◼ | ◼ |
| W9 | Environmental balance in the built environment | **2** | ◼ |  |  |  |
| W10 | Environmental balance in the built environment | **2** | ◼ |  |  |  |
| W11 | Ecological resources | **2** |  |  |  | ◼ |
| W12 | Ecological resources | **2** |  |  |  | ◼ |
| W13 | Student researches and discussion | **2** | ◼ |  | ◼ |  |
| W14 | Student researches and discussion | **2** | ◼ |  | ◼ |  |
| W15  | Final Exam | **2** | ◼ | ◼ | ◼ | ◼ |

1. Additional private study/learning hours expected for students per week is FOUR hours

**8) Teaching and Learning Methods**

| **Learning Outcomes** | **Teaching and Learning Methods** |
| --- | --- |
| Interactive Lecture | Seminars |
| **Cognitive Domain** | LO1 | ⚫ |  |
| LO2 | ⚫ | ⚫ |
| LO3 | ⚫ |  |
| **Psychomotor Domain** | LO4 | ⚫ | ⚫ |

**Student Academic Counseling and Support**

* Students are directed to contact teaching staff for academic support during specific office hours.
* Regarding this course, Instructor and TA will be available two hours a week as indicated on the time table declared for students from the beginning of the semester.

**9- Student Assessment**

**a) Student Assessment Methods**

| **Learning Outcomes** | **Assessment Methods** |
| --- | --- |
| assignments |  Mid-term exam |  Final exam  |
| **Cognitive Domain** | LO1 | ⚫ |  |  |
| LO2 | ⚫ | ⚫ | ⚫ |
| LO3 | ⚫ | ⚫ | ⚫ |
| **Psychomotor Domain** | LO4 | ⚫ |  |  |

**b- Assessment Schedule and Weight**

|  |  |  |
| --- | --- | --- |
| **Assessment Tools** | **Week** | **Weight** |
| Assignments | 1-14 | 30 % |
| Midterm Examination | 8 | 10 % |
| Final Examination | 14 | 60 % |
| **Total** | 14 | 100% |

**10- Facilities**

The following facilities are needed for this course:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ■ | Classroom | □ | Smart Board | □ | Computer with software |
| □ | Lecture Hall | ■ | White Board | ■ | MIS system |
| □ | Sound and Microphone | ■ | Data Show | ■ | Internet Access |
| □ | Other: ………………… |  |  |  |  |

**11- List of References**

**a- Course Notes**

prepared by instructor

**b- Books**

1. Peter F. Smith,” **Architecture in a Climate of Change- A guide to sustainable design** "An imprint of Elsevier Linacre House, Jordan Hill, Oxford Second edition 2005.
2. دليل العمارة والطاقة " العمارة الخضراء والطاقة" جهاز تخطيط الطاقة – يوليو 1998م

**c- Recommended Books**

* **د. ناهد فتحى عبد الغنى" الاسكان فى المناطق الصحراوية- دراسة نسق سريان الهواء فى الفراغات السكنية الخارجية الصحراوية فى المدن الجديدة بمصر" رسالة دكتوراة – هندسة شبرا-جامعة الزقازيق فرع بنها-1997م**
* **د.م/شفق العوضى الوكيل، د.م/ محمد عبد الله سراج " المناخ وعمارة المناطق الحارة" القاهرة 1989.**

1. Benoit Cushman- Roisin, **"Building Ventilation in hot climates**” 2017.
2. Norbert Lechner, “**HEATING, COOLING, LIGHTING-Sustainable Design Methods for Architects”** John Wiley&Sons.Inc, 2015**.**
3. An Architect's Guide**” Designing Spaces for Natural Ventilation “Taylor** & Francis, 2015**.**
4. Peter F. Smith," **Building for A Changing Climate-The Challenge for Construction, Planning and Energy**" Earthscan in the UK and USA in 2010.
5. Hocine Bougdah and Stephen Sharpies, "**Environment, Technology and Sustainability**” Taylor & Francis, London and New York.2010.
6. Robert D. Brown**, "Design with Microclimate- the Secret to Comfortable Outdoor Space**" Island press, 2010.
7. Peter F. Smith,” **Architecture in a Climate of Change- A guide to sustainable design** "An imprint of Elsevier Linacre House, Jordan Hill, Oxford Second edition 2005.
8. Baruch Givoni,”**Climatic Consideration in Building and Urban Design**” Van Nostrand Reinhold, 1998.
9. Fuller Moore,”**Environmental Control Systems – Heating, Cooling, Lighting**” United States of America McGraw – Hill, Inc. 1993.
10. Richard L. Crowther, FAIA, "**Sun/Earth- Alternative Energy Design for Architecture**" Van Nostrand Reinhold Company, Australia.1989.

 **d- Web Sites**

1. <http://www.eco.com>
2. <http://www.azsolarcenter.com>
3. http://www. Aaas.org
4. <http://andrewmarsh.com/apps/staging/sunpath3d.html>

**- Course Coordinator: Dr. Tarek el hennay**  **Signature:**

**- Program Coordinator: Assoc. Prof . Khaled Aly abdelhady Signature:**