**Department of Architecture**

**School of Architecture and planning**

**University of Management and technology**

**Course Outline (on OBE)**

**UMT’s Vision**

***Our Vision is... Learning***

It defines our existence, inspires all stakeholders associated with us, creates a powerful momentum inside, and responds to the challenges outside. It continues to evolve as present captures new realities and foresight to unfold new possibilities. All in an incessant attempt to help individuals and organizations discover their God-given potentials to achieve Ultimate Success actualizing the highest standards of efficiency, effectiveness, excellence, equity, trusteeship and sustainable development of global society.

**UMT Mission**

**Our Mission is.... Leading**

We aspire to become a learning institution and evolve as the LEADING COMMUNITY for the purpose of integrated development of the society by actualizing strategic partnership with stakeholders, harnessing leadership, generating useful knowledge, fostering enduring values, and projecting sustainable technologies and practices.

**Mission of the School**

The mission of the School is to provide the best leadership in the fields of the built environment; particularly in the development, management and innovation in the fields of architecture, urban planning and related specializations and sub-specializations.

**Mission of the Department**

At the Department of Architecture our mission is to challenge the participants to develop their abilities in solving complex problems by thinking creatively & informed decision making as a core of their professional schooling. Offering them a diverse interdisciplinary and meticulous program of studies led by an adroit faculty in a comprehensive studios or class environment and preparing them for leadership roles in the field of Architecture, Construction, Landscape, Built Environment and community development.

**University of Management and Technology**

**Course Outline**

**Course code:** AR-401 **Course title:** Green & Sustainable Architecture

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| --- | --- |
| Program | **Program:** Bachelors in Architecture (B-Arch)  **Course:** AR-401, Green & Sustainable Architecture |
| Credit Hours | **Program:** 176  **Course:** 2+0 |
| Duration | **Program:** 5 years  **Course:** 15 weeks |
| Prerequisites | ECS I, II & III |
| Resource Person | Ar. Arsala Hashmi  Ar. Madiha Ghafoor |
| Counseling Timing  (Room# ) | As per timetable |
| Contact | [arsala.hashmi@umt.edu.pk](mailto:arsala.hashmi@umt.edu.pk)  madiha\_ghafoor@umt.edu.pk |

**Chairman/Director signature………………………………….**

**Dean’s signature…………………………… Date………………………………………….**

**Program Educational Objectives (PEO’s) of Bachelor of Architecture**

**Program educational objectives (PEO’s)**

**PEO-1:** Able to interpret and elaborate architectural knowledge, communication, graphical and computer skills.

**PEO- 2:** Able to develop building and architectural plans through design coordination selecting suitable materials and construction techniques.

**PEO-3:** Able to propose appropriate solution to complex building issues and adapt recent developments in architecture focusing on research, creativity and innovation.

**PEO-4:** Able to maximize ethics by keeping spirit of discipline and respecting the professional codes and society.

**Program Learning outcomes PLO’s)**

Graduates of the B-Architecture at UMT are expected to have acquired and developed the following set of knowledge, skills and personality traits (these are also referred to as graduate attributes).

**PLO 1 Architectural Knowledge:** An ability to illustrate, architectural fundamentals through verbal and graphical Techniques

**PLO 2 Design Analysis and development:** An ability to identify literature and analyze architectural problems reaching substantiated conclusions to meet specified needs with appropriate societal and environmental consideration.

**PLO 3 Case study analysis:** An ability to analyze architectural issues in a methodical way including design, field surveys, interpretation of field data, and synthesis of information to derive valid conclusions.

**PLO 4 Digital Tool Usage:** An ability to create, select and apply appropriate techniques, resources, and modern architectural computer simulations, including prediction and modeling, to complex activities, with an understanding of the limitations.

**PLO 5 Environment and Sustainability:** An ability to propose sustainable solutions to environmental problems through architectural design thinking.

**PLO 6 Project Management:** An ability to demonstrate management skills and leadership qualities in individual and teamwork capacity.

**PLO 7 Design Coordination:** An ability to coordinate effectively across different sectors of construction industry. (Material suppliers, Electrical plumbing, HVAC and Civil works).

**PLO 8 Ethics and the society:** An ability to apply ethical principles and professional codes of the profession following the social norms to the best interest of the mankind.

**Course Learning Outcomes (CLO’s)**

1. Interpret the principles of sustainable architecture and their importance in addressing climate change. (C2)
2. Demonstrate real time planning constraints imposed by the forms, forces, and features of nature and our built environment. (P1)
3. Discover implications of climate, culture, identity, biodiversity, and consequently creation of more efficient and pleasant places within the context of the region. (C4)
4. Evaluate the implementation of vernacular architecture and its potential impact on sustainability. (C5)
5. Discuss the concept of biophilia in architecture and the ways it can enhance human well-being and environmental sustainability. (A2)
6. Formulate nature based strategies sustainable urban ecology. (P6)

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| --- | --- | --- | --- |
| **CODE** | **NAME** | **CLO** | **CLO Type** |
| 401.1 | 401.C1 | Interpret the principles of sustainable architecture and their importance in addressing climate change. | C2 |
| 401.2 | 401.C2 | Demonstrate real time planning constraints imposed by the forms, forces, and features of nature and our built environment. | P1 |
| 401.3 | 401.C3 | Discover implications of climate, culture, identity, biodiversity, and consequently creation of more efficient and pleasant places within the context of the region. | C4 |
| 401.4 | 401.C4 | Evaluate the implementation of vernacular architecture and its potential impact on sustainability. | C5 |
| 401.5 | 401.C5 | Discuss the concept of biophilia in architecture and the ways it can enhance human well-being and environmental sustainability. | A2 |
| 401.6 | 401.C6 | Formulate nature based strategies sustainable urban ecology. | P6 |

**Mapping of CLO’s to Program’s Learning outcomes (PLO’S)**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Semester** | **Course Code** | **Title** | **Course Learning outcomes** | **PLO 1: Architectural Knowledge** | **PLO 2 Design Analysis and development** | **PLO 3 Case study analysis Design/Development of Solutions Design/Development of Solutions Design/Development of Solutions** | **PLO 4 Digital Tool Usage** | **PLO 5 Environment and Sustainability** | **PLO 6 Project Management** | **PLO 7 Design Coordination** | **PLO 8 Ethics and the society** |
| **8th SEMESTER** | **AR-401** | **Green & Sustainable Architecture** | Interpret the principles of sustainable architecture and their importance in addressing climate change. (C2) | √ |  |  |  |  |  |  |  |
| Demonstrate real time planning constraints imposed by the forms, forces, and features of nature and our built environment. (P1) |  |  | √ |  |  |  |  |  |
| Discover implications of climate, culture, identity, biodiversity, and consequently creation of more efficient and pleasant places within the context of the region. (C4) |  |  |  |  | √ |  |  |  |
| Evaluate the implementation of vernacular architecture and its potential impact on sustainability. (C5) |  |  |  |  | √ |  |  |  |
| Discuss the concept of biophilia in architecture and the ways it can enhance human well-being and environmental sustainability. (A2) |  |  |  |  | √ |  |  |  |
| Formulate nature based strategies sustainable urban ecology. (P6) |  |  |  |  |  |  | √ |  |

**Learning Methodology:**

* Lectures as provided in the schedule of the semester activities.
* Study of recommended books uploaded on the moodle and class given notes.
* Discussion on Term Project.

**Grade Evaluation Criteria**

Following is the criteria for the distribution of marks to evaluate final grade in a semester.

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| --- | --- |
| **Marks Evaluation** | **Marks in percentage** |
| Quizzes | 10% |
| Assignments/Presentations | 15% |
| Mid Term | 25% |
| Term Project | 10% |
| Final Exam | 40% |
| Total | 100% |

**Reference Books:**

**Heating, cooling, lighting;** **Sustainable methods for architects** By: Nobert Lechner

**Biophilic and Bioclimatic Architecture** By: Amjad Almusaed

**Sustainable Building Design:**  By: Chitrarekha Kabre

**Strategies for Sustainable architecture:** By Paola Sassi

**Sustainable Urban Design: An Environmental approach** By:Adam Ritchie & Randall Thomas

**Calendar of Course Contents to be covered during Semester**

**Course code:** AR-401  **Course title:** Green & Sustainable Architecture

|  |  |  |  |
| --- | --- | --- | --- |
| **Week** | **Course Contents** | **CLO** | **Reference Chapter(s)** |
| 1 | Introduction to Sustainable Architecture  Green building rating system  Sustainable development goals | C2 | From ***2nd chapter*** of the book by Norbert Lechner and ***1st chapter of book***  by Paola Sassi |
| 2 | A Comparison between  Non-Renewable versus Renewable Sources  **Introducing Assignment 1:** A Presentation on Climate-change or/and Passive Design Guidelines. | C2 | From ***2nd chapter*** of the book by Norbert Lechner and ***1st chapter of book***  by Paola Sassi |
| 3 | **Environment and Building Science**   * Climate responsive architecture * Building envelope design and performance * Passive design strategies for energy conservation | C4 |  |
| 4 | **Submission of Assignment 1:** A Presentation on Climate-change or/and Passive Design Guidelines.   * Analysis and evaluation of green and sustainable building projects * Best practices and lessons learned | P1 | From ***chapter 7 & 10*** of the book by Norbert Lechner |
| 5 | **Green Building Policy and Regulation**   * International and national green building codes and standards   **Quiz-1** | P1 | From ***4th & 8Th chapter*** of the book by Amjad Almusaed |
| 6 | **Vernacular Architecture**   * **Introducing Assignment 2:** Based on the introduction and implementations of Vernacular Architecture | C5 | From ***4th & 8Th chapter*** of the book by Amjad Almusaed |
| 7 | **Critical Regionalism**  Concept of sustainability and critical regionalism w.r.t. the works of master architects | C4 | Readings |
| 8 | **MID TERM EXAMINATION** |  |  |
| 9 | **Eid Holidays** |  |  |
| 10 | **Green Architecture – Real life Case Studies**   * Global action on climate change and the problems associated with green urban solutions in mega cities * Examples of carbon-neutral and eco-friendly design using green innovations, renewable technologies and climate change solutions in the buildings around the world * Analyzing the Building Carbon Footprint   **Introducing Assignment 3:** Critical review discussing the role of green and sustainable architecture in addressing environmental challenges, promoting ecological sustainability, mitigating the impacts of urbanization and climate change through case studies. | P1 | Handouts and Web links |
| 11 | **Assignment 3: Poster presentations and Feedback** | P1 |  |
| 12 | **Sustainable Materials and Construction Techniques**   * Sustainable building materials * Life-cycle assessment and environmental impact analysis * Green building certifications and rating systems | C2 | Industrial visit |
| 13 | **Biophilic Architecture**   * Biophilia and sustainability * 14 principles of Biophilic design   **Quiz-2**  **Introducing Assignment 4:** Term Assignment | A2 |  |
| 14 | **Urban ecology**   * Climate Change and Climate Compatible Development * Sustainable Urban Design Concepts * Biodiversity and habitat restoration * **Environmental injustice and Nature based solutions**   **Guest Lecture** | C4 | From the book by Adam Ritichie |
| 15 | **Water Conservation – Strategies and Implementations**  Water Sensitive Urban Design & Water Conservation at Domestic Level  **Submission of Assignment 4:** Term Assignment | P6 | From the book by Adam Ritichie |
| 16 | **FINAL TERM EXAMINATION** |  |  |