**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 human 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.

Course code……**AR-234**……. Course title… **Structure fopr Architects- I**

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| --- | --- |
| Program | B-Arch |
| Credit Hours | 2+0 |
| Duration | 5 Years |
| Prerequisites | None |
| Resource Person | Beenish Mujhaid/Usman Muhammad Buksh |
| Counseling Timing | Thurs:12:00-2:00  Fri:10:00-12:00 |
| Contact | Contact no: 0334-4287336  Email: [beenish.mujhaid@umt.edu.pk](mailto:beenish.mujhaid@umt.edu.pk)  [usman.buksh@umt.edu.pk](mailto:usman.buksh@umt.edu.pk) |

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

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

**Program Educational Objectives (PEO’s)**

**PEO 1:** Ability to think creatively and identify new trends in Architectural design

**PEO 2:** Critical learning for a broad function in various areas of Architectural sciences including structural, mechanical, electrical, environmental, earthquake, and construction management

**PEO 3:** Ability to keep themselves abreast with recent developments in the relevant Architecture.

**PEO 4:** Spirit of discipline and respect for the code of ethics of the profession.

**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 apply knowledge of mathematics, science, architectural fundamentals and an architectural specialization to the solution of complex architectural problems.

**PLO 2** **Design Analysis:** An ability to identify, formulate, search literature, and analyze complex architectural problems reaching substantiated conclusions using principles of natural sciences and architecture.

**PLO 3** **Design/Development of Solutions:** An ability to design solutions for complex architecture problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

**PLO 4** **Case study analysis:** An ability to investigate complex architecture problems in a methodical way including literature survey, design and conduct of experiments, analysis and interpretation of experimental data, and synthesis of information to derive valid conclusions.

**PLO 5** **Modern 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 6** **The Architect and Society:** An ability to apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional architectural practice and solution to complex problems.

**PLO 7** **Environment and Sustainability:** Ability to understand the impact of professional architectural solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.

**PLO 8** **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of architectural practice.

**PLO 9** **Individual and Team Work:** An ability to work effectively, as an individual or in a team, on multifaceted and/or multidisciplinary settings.

**PLO 10** **Communication:** An ability to communicate effectively, orally and written, on complex architectural activities with the architectural community and with society at large, such as being able to comprehend and write effective reports, design documentation and make effective presentations. To develop an understanding of architectural language through manual and digital ways, in order to make working drawings and presentable sheets using different rendering modes.

**PLO 11** **Project Management:** An ability to demonstrate management skills and apply architectural principles to one's own work as a member and/or leader in a team and to manage projects in a multidisciplinary environment.

**PLO 12** **Lifelong Learning:** Ability to recognize the importance of, and pursue lifelong learning in the broader context of innovation and technological developments.

**Course Learning outcomes (CLO’s)**

1. Explain the students with different types of structural systems i.e. load bearing, frame, trussed, tensile, shells etc.(C5)
2. Summarize the construction activities and basic structures being used at different stages of buildings.(C2)
3. Compare the General Characteristics of load bearing and frame structures. (C2)
4. Explain Basic Structural Components of Building i.e beams, posts, lintels etc (C2).
5. To develop and enhance the graduate’s understanding on Loading Conditions in buildings: live, dead, moving, imposed and induced etc.(C3)

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

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Semester** | **Course Code** | **Title** | **Course Learning outcomes** | PLO 1: Architectural Knowledge | PLO 2: Design Analysis: | PLO3: Design/Development of Solutions Design/Development of Solutions Design/Development of Solutions Design/Development of Solutions | PLO 4: Case study analysis | PLO 5: Modern Tool Usage | PLO 6: The Architect and Society | PLO 7: Environment and Sustainability | PLO 8: Ethics | PLO 9: Individual and Team Work | PLO 10: Communication | PLO 11: Project Management | PLO 12: Lifelong Learning |
| **3RD SEMESTER** | **AR-234** | **Structure for Architects -I** | Explain the students with properties of traditional and contemporary building materials.(C5) | √ |  |  |  |  |  |  |  |  |  |  |  |
| Summarize the construction activities and basic materials being used at different stages of buildings.(C2) | √ |  |  |  |  |  |  |  |  |  |  |  |
| Compare the General Characteristics and drawbacks of materials. (C2) |  |  |  |  | √ |  |  |  |  |  |  |  |
| Explain Basic Components of Building-Foundations, Walls, and Arches (C2). | √ |  |  |  | √ |  |  |  |  |  |  |  |
| To develop and enhance the graduate’s understanding on materials used in the construction field.(C3) |  |  |  |  |  |  |  |  |  |  |  | √ |

**Learning Methodology:**

* Lectures as provided in the schedule of the semester activities.
* Assignments related to all studied topics.
* Presentation on allocated topics.
* Visits to different under constructed sites to understand different types of structures.

**Grade Evaluation Criteria**

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

* Quizzes :

All quizzes will be announced. Quizzes will be 10-15 minutes. Quizzes could be open book or closed book. All are advised to bring their text books along.

* Midterm :

60 minute exam. All topics covered before the midterm exam will be included.

* Final :

120 minute exam. Will be comprehensive.

**Marks Evaluation Marks in %**

Quizzes 10%

Assignments/ Presentations 15%

Mid Term 25%

Final exam 50%

Total 100

**Recommended Text Books:**

Building Construction: Principles, Materials & Systems, 2nd Ed, 2016

Building Structures Illustrated by Francis D.K.Ching, 2nd Ed, 2014

**Reference Books:**

1. Pearson Construction Technology, CM216, 2009
2. Building Construction Illustrated by Francis D.K.Ching, 4th Ed, 2008
3. Construction materials, methods and techniques by William P. Spence and Eva Kultermann, 3rd Ed, 2006
4. Modern Construction Handbook by Andrew Watts, 3rd Ed, 2014
5. Structure and Architecture by Angus J.Macdonald, 2nd Ed, 2000
6. Barry’s Advanced Construction of Buildings by Stephen Emmitt ,‎ Christopher A. Gorse , 3rd Ed, 2014
7. Building Construction by Varghese, P.C., 3rd Ed, 2009
8. Construction Technology 2 Industrial and commercial building by Riley, Mike and Alison, 3rd Ed, 2014
9. Construction Practice by Cooke and Brain, 1st Ed, 2011
10. Professional Building Construction Directory 1994 by Professional Publishers
11. Structural basis of architecture by Bjorn N.Sandaker, Arne P.Eggen & Mark R.Cruvellier, 2nd Ed, 2011.
12. Structure for architects and Engineers by Philip Garrison, 1st Ed, 2005
13. The Architect’s Studio Companion by Edward Allen and Joseph Iano, 3rd Ed, 2012

**Calendar of Course contents to be covered during semester**

Course code: AR-234 Course title: Structure for Architects-I

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| --- | --- | --- | --- |
| **Week** | **Course Contents** | **CLOs** | **Reference Chapter(s)** |
| 1 | General introduction to the Course Contents  Relationship between Structure and Architecture.  Classification of Building Structures  **Assignment #1**  Structural Vocabulary: Take Pictures of different types of structures you see on your travelling route. Draw their free hand sketches on 1-2 half size scholar sheet (20” x 30”) and mention the type of structure or any component of structure.  At least 20 structures should be evaluated. | C2 | Basic Structures for Engineers and Architects  by  Philip Garrison |
| 2 | Structural Behavior of Building Components | C2 | Chapter 3  Basic Structures for Engineers and Architects  by  Philip Garrison |
| 3 | An overview of Structures and Forces / Load & Stresses / Mass & Weight.  Equilibrium  **Quiz#1** | C3 | Chapter 4  Basic Structures for Engineers and Architects  by  Philip Garrison |
| 4 | Introduction to Load Bearing /Masonry Structures.  Study of relationship between wall thickness and wall height  **Assignment # 2**: Document their Current Houses.  Students will study the load transfer mechanism in their own houses or any of residential building and present their work in the form of free hand sketches. | C2 | Class Notes |
| 5 | Introduction to Frame Structures.  Loading and Load Paths | C5 | Chapter 5  Basic Structures for Engineers and Architects  by  Philip Garrison |
| 6-7 | Introduction to different definitions: Beam, Simply supported, Cantilever, Continuous, Column types/forms, Waffle slab etc.  **Quiz # 2** | C2 |  |
| 8 | **Mid Term Exam** | | |
| 10-11 | Structural Materials  Materials Selection for Structural Design | C2 | Chapter 21 & 22  Basic Structures for Engineers and Architects  by  Philip Garrison |
| 12 | Spanning with different construction materials  Loading Calculation  Quiz # 3 | C3 | Chapter 23 & 24  Basic Structures for Engineers and Architects  by  Philip Garrison |
| 13-14 | Wooden Light Frame Construction-WLF  Essentials of Wall, Floor and Roof Framing  Exterior Wall Finishes in WLF Building | C2 | Chapter 15 & 16  Building Construction by  Madan Mehta and Walter Scarborug |
| 15 | Underpinning , Shoring & Shuttering | C5 | Class Notes |
| **End Term Exam** | | | |