**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-** 316 Course title: **Computer Applications in Architecture – II**

|  |  |
| --- | --- |
| Program | B.Arch. |
| Credit Hours | 0+2 |
| Duration | 16 Weeks |
| Prerequisites | AR-216, Computer Applications in Architecture – I |
| Resource Person | Sec AAr. Muhammad Nasir ChaudhryAr. Usman Baksh |
| Sec BAr. Hassan JafriAr. Arsala Hashmi |
| Counseling Timing(Room# ) | As per timetable |
| Contact | nasir.chaudhry@umt.edu.pk, 0331-6274724usman.buksh@umt.edu.pkhassan.amir@umt.edu.pkarsala.hashmi@umt.edu.pk  |

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

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

**Program educational objectives (PEO’s) of Bachelor of Architecture**

**PEO 1:** Ability to comprehend architectural skills manual as well as relevant computer programs

and think creatively and identify new trends in Architectural design

**PEO 2:** Critical learning for a broad function in various areas of Architectural sciences and

building technology including building materials, construction techniques, structural, mechanical, electrical, environmental, earthquake, and construction management

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

and a broad theoretical and conceptual base focusing on research, creativity and

 innovation

**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 architectural 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 architectural problems in a methodical way including literature survey, design and conduct of field surveys, analysis and interpretation of field 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)**

After studying this course, the students will be able to:

1. Recall the basic 3D modelling commands (C1)
2. Interpret design to enhance the design development process (C2).
3. Build and edit 3D models with solids, surfaces, and objects (C3)
4. Design ideas, visualize the concepts, and simulate the performance of designs in the real world (C6)
5. To develop and enhance the graduate’s communication and digital skills in the field of architecture (C3)

**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:** | **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** |
| **5th**  | **AR-216** | **COMPUTER APPLICATINS IN ARCHITECTURE-II**  | Recall the basic 3D modelling commands. | √ |  |  |  |  |  |  |  |  |  |  |  |
| Interpret design to enhance the design development process. |  | √ |  |  |  |  |  |  |  |  |  |  |
| Build and edit 3D models with solids, surfaces, and objects  |  |  |  |  | √ |  |  |  | √ |  |  |  |
| Design ideas, visualize the concepts, and simulate the performance of designs in the real world  |  |  | √ |  |  |  |  |  |  |  |  |  |
| To develop and enhance the graduate’s communication and digital skills in the field of architecture  |  |  |  | √ |  |  |  |  |  |  |  |  |

**Learning Methodology**

Lectures as provided in the schedule of the semester activities, along with practical demonstration in computer lab would done. New techniques would be incorporated along with the Moodle. Presentations and demonstrations will be given.

**Grade Evaluation Criteria**

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

|  |  |
| --- | --- |
| **Marks Evaluation** | **Marks in percentage** |
| Quizzes | 10% |
| Assignments | 60% |
| Mid Term  | 15% |
| Final exam  | 15% |
| **Total**  | **100%** |

**Recommended Text Books:**

**Autodesk AutoCAD 2020 Fundamentals**

* Publisher: SDC Publications (April 24, 2019)
* Language: English
* ISBN-10: 1630572594
* ISBN-13: 978-1630572594

**Reference Books:**

**AutoCAD 2020 3D Modeling**

* Paperback: 450 pages
* Publisher: Mercury Learning & Information (April 18, 2019)
* Language: English
* ISBN-10: 1683923790
* ISBN-13: 978-1683923794

**SketchUP for Interior Design: 3D Visualizing, Designing, and Space Planning**

* Page Numbers Source ISBN: 1118627695
* Publisher: Wiley; 1 edition (February 12, 2014)
* Publication Date: February 12, 2014
* Language: English
* ASIN: B00IG6M2ZQ

**The SketchUP® Book, Version 5**

By Bonnie Roskes, P.E. with Bob deWitt, MFA, MA

Third Edition. Copyright 2005, Bonnie Roskes

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

|  |  |  |  |
| --- | --- | --- | --- |
| **Week** | **Course Contents** | **CLO** | **Reference Chapter(s)** |
| 1 | Launch AutoCADWorkspaces3D Basics Interface3D Modeling InterfaceViewportsPreset 3D Viewports**Class Task: Students will practice the above mentioned commands.** | 1 | AutoCAD 3DChapter-1 3D Interface |
| 2 | Named ViewsDDVPOINTVPOINT CommandThickness CommandElevation**Class Task: Students will practice the above mentioned commands.** | 1,3 | AutoCAD 3DChapter-2 Thickness and Elevation |
| 3 | HIDE CommandVisual StylesVisual Style ManagerVisual Styles Panel3d navigation**Assignment: Draw 2D plan of a selected building.****Class Task: Students will practice the above mentioned commands.** | 1,2 | AutoCAD 3DChapter-3 Visualizing Your Model |
| 4 | ExtrudePolylineRevolveSweep Loft**Class Task: Students will extrude the building plan to make its 3D.** | 1,3 | AutoCAD 3DChapter- 11 Complex SurfacesChapter-12Creating Solids |
| 5 | **Quiz-1** |  | -------- |
| 6 | Boolean operationsAddSubtractIntersect**Class Task: Students will add doors, windows and punctures in the extruded 3D.** |  | AutoCAD 3DChapter- 14Solid Composites |
| 7 | * Rendering

Render CommandRender SelectionRender Quality* Materials

Adding and Applying MaterialMaterial Scale AdjustmentCreating a New MaterialMaterial MappingBump Material**Assignment: Students will apply materials to the 3D view and practice rendering commands.** | 1,2 | AutoCAD 3DChapter -18 Introduction to RenderingChapter -19 Materials |
| 8 | Mid Viva  |  | -------- |
| 9 | Mid-term examination week |  | -------- |
| 10 | Introduction to SketchUPHow to navigate the SketchUP interfaceZoom, pan and rotateUnderstanding XYZ axisSelecting toolbarsApplying templates**Class Task: Students will practice the above mentioned commands.** | 1,3 | The SketchUP® BookChapter 1: Introduction |
| 11 | Drawing and using the pencil toolDrawing basic geometric shapesDrawing with measurementsDrawing circles and arcsUnderstanding the benefits of sticky GeometryDiscovering layersUsing shortcutsMeasuring items inside SketchUPInformation database**Assignment: Students will practice the above mentioned commands. They will draw 2D plan of a given building.** | 1,3 | The SketchUP® BookChapter 2: The Basics |
| 12 | Moving and move/copySimple Array techniquesRotating objectsRotate / copyScale fractional and relative**Class Task: Students will practice the above mentioned commands.** | 3,4 | The SketchUP® BookChapter 3: Intersect and Follow MeChapter 4: Making Multiple Copies |
| 13 | Modelling techniquesUsing Push PullUsing Follow MeIntersecting GeometryCopy and Offset Faces, edges and polygonsHow to use polygons in 2D drawings**Assignment: Students will practice the above mentioned commands. Create a 3D model from the previously drawn 2D plan.** |  | The SketchUP® BookChapter 6: Groups and Components |
| 14 | Paint bucketMaterials EditorTextures and bitmapsGetting to understand the Materials EditorWhat makes a good texture?Where to find texturesPositioning texturesLimits to graphics and bitmaps**Class Task: Students will practice the above mentioned commands. Apply materials and textures to the previously created 3D model.** | 4,5 | The SketchUP® BookChapter 7: Painting, Materials, and Textures |
| 15 | Dimensions inside SketchUPAnnotation inside SketchUPPrinting from SketchUPExporting 2D images or PDF**Class Task: Students will practice the above mentioned commands. Annotate and dimension the previously created geometry.** | 1,4,5 | The SketchUP® BookChapter 8: SectioningChapter 9: Presentation |
| 16 | Create new scenesCreate new stylesSaving scenes and stylesIntroduction to animation**Class Task: Students will practice the above mentioned commands. Annotate and dimension the previously created geometry.** | 1,4,5 | The SketchUP® BookChapter 8: SectioningChapter 9: Presentation |
| 17 | Final examination |  | -------- |