



University/Academy: Arab Academy for Science, Technology & Maritime Transport
Faculty/Institute: College of Engineering & Technology
Program: B.Sc. Architectural Engineering and Environmental Design

Form no. (12): Course Specification

1- Course Data

Course Code: AR 284	Course Title: 3D Modeling	Academic Year/Level: 2nd year / 4th semester
Specialization: Architecture	No. of Instructional Units Credit 3 Lecture 2 Tutorial 2	Prerequisite AR215/AR283

2- Course Aim

This course is an introduction to the world of 3D modeling. Through the course, students study the basics and go through the process of building a visual model. Students learn how to produce a professional model and to express their own designs using different tools and techniques.

The course aims to:

- Assist the student to use 3D tools and using them in his/her daily work.
- Assist the student to interact with the built model, and to view it in all directions.
- Develop the student's practical skills and professional tools.

3- Intended Learning Outcomes

a- Knowledge and Understanding	Through knowledge and understanding, students will be able to: <ul style="list-style-type: none"> • Express creative ideas and concepts using high quality rendered architectural, planning and working drawings, maps, documents, 3d models, etc. • Distinguish the role of the architect in simulation and modeling the physical environment and its processes and application on the built environment.
b- Intellectual Skills	Through intellectual skills, students will be able to: <ul style="list-style-type: none"> • Develop their architectural designs creatively, as well as urban design and planning of three dimensional objects and spaces. • Create innovative designs, ideas and concepts in 3D.
c- Professional Skills	Through professional and practical skills, students will be able to: <ul style="list-style-type: none"> • Design 3D models of architectural projects. • Give a professional presentation of architectural project. • Design new architectural forms and design solutions.
d- General Skills	Through general and transferable skills, students will be able to: <ul style="list-style-type: none"> • Master architectural presentation (orally, visually, 3D, etc.) and its techniques. • Assess architectural design drawings and presentations. • Gain an appreciation and ability for long life learning. • Independently seek knowledge, set aims, targets, objectives and plan to meet them with a deadline (time management). • Adopt an open-minded approach in the appraisal of design issues, requirements and opportunities. • Transfer techniques and solutions from one field of architecture to another.

4- Course Content

- Week No.1** Overview and 3ds Max Interface: Visualization Workflow. Menus, Toolbars, Status Bar, and the Command Panel. Setting the project folder and configuring User Paths, Viewport Configuration and Navigation. Object Selection Tools. Use the program basic Navigation skills. Understand the production process. Explore and Customize the interface. Feeling the third dimension.
- Week No.2** Basic Functions: Control Primitives Vertex, Edge, Face. Apply transforms. Reference Coordinate Systems. Cloning and grouping. Compare between different primitive geometries, and understand cloning and grouping. Create basic modeling and navigate them in the space.
- Week No.3** 3ds Max Configuration: Differentiate between different sub-object levels, regarding different shapes and geometries. Poly, Patch, NURBS, Sub-Object Mode, Preferences
Configure Paths. Set project folder, Units setup. Customizing the User Interface. Use the program basic Modeling skills.
- Week No.4** 3D Modeling from 2D Objects: Draw 2D Lines, the Lathe Modifier, the Extrude Modifier, Loft Objects. Use Snap bars for Precision. Understand Shapes, and link them to the corresponding modifiers, in addition compare and use snaps and angular snaps. Model a small Chalet unit including walls, ceiling, floors, and openings (CAD based).
- Week No.5** Assembling Project Files: Link data and Import it, DWG Link and Import Options
Layers and Objects Properties. Develop an integration between AutoCAD and 3ds Max.
Model a historic complicated building (Khonsu Temple) to develop new techniques and skills.
- Week No.6** General Revision: Questions and Answers. Use the same orders for different approaches.
Introduction to Poly and Mesh Modeling. Use smoothing groups.
- Week No.7** Continuation of the previous lecture and evaluation.
- Week No.8** Working with Modifiers (Advanced): Polygonal modeling
Sub Object control. Explore new 3d conversation. Model a Space Ship Develop new poly techniques and skills.
- Week No.9** Introduction to Materials: How Materials Work, Understand maps and materials, materials and libraries. Compare between different types of materials, and formulate a general knowledge of materials properties. Apply materials to the previously made Temple, and Rocket models.
- Week No.10** Material Types and Parameters: Understand standard Materials, Multi/Sub-Object Materials, Opacity, Bump, and Reflection Mapping. Other Material Types. Model a Pharaonic Chair to develop new techniques and skills.
- Week No.11** Mapping Coordinates and Scale: Understand Mapping Coordinates, UVW vs. Unwrap UVW. Introduction to light and shadow. Basic scan line. Rendering and Printing Format. Put the previously made models together. (Temple, Space Ship, Chair and imported Characters).
- Week No.12** Continuation of the previous lecture and evaluation.
- Week No.13** Lighting and Rendering Overview: Local vs. Global Illumination. Choose a Lighting Strategy. Render (Scan Line). Import characters to the scene. Materials physical properties approach. (Case Study) Chalet modeling (previously modeled). Color with light. Khonsu Temple (Work in Progress).
- Week No.14** Basic Animation and Camera movements. Free Style Animation. Path Animation and camera movements. Video Formats & Rendering. The language of Motion Picture. Demonstrate some Video Examples for architects projects.
- Week No.15** Applications and Revision.

5- Teaching and Learning Methods

The course comprises a combination of:
Lectures, project work, research assignment, practical training, and class activities.

6-Teaching and Learning Methods for Students with Special Needs

- Consulting with lecturer during office hours.
- Consulting with teaching assistant during office hours.
- Private sessions for redelivering the lecture contents.
- For handicapped accessibility, please refer to program specification.

7- Student Assessment

Students must present classwork and homework assignments that contribute toward their understanding of the program's basic concepts. A preliminary project consisting of a small villa is assigned to the students for practice of modeling skills. Students are assessed through the 7th and 12th week exam, to evaluate the students' gained skills in 2D and 3D modeling, and a final exam to assess their gained skills of modeling.

Asses No.	Procedures used		Start Week No.	Subm. Week No.	Weighting of Asses.
	Type	To assess			
1	Assignment	Knowledge and understanding	1	1	5%
2	Assignment	Practical skills	2	2	5%
3	Assignment	Practical skills	4	5	5%
4	Exam. of studio project work	Intellectual and practical skills	7	7	15%
5	Project	All skills	9	10	5%
6	Assignment	Knowledge and practical skills	10	10	5%
7	Exam. of studio project work	Knowledge and intellectual skills Practical skills	12	12	10%
8	Assignment	Knowledge and practical skills	12	15	10%
9	Exam. of studio project work	Knowledge and intellectual skills Practical skills	16	16	40%
Total					100%

8- List of References:

a- Course Notes	Notes are handed out to students at weekly intervals.
b- Required Books (Textbooks)	<ul style="list-style-type: none"> • KALAMEJA, Alan, <i>AutoCAD 2004: 3D Modeling, A Visual Approach</i>, Autodesk press, 2003. • MURDOCK, Kelly, <i>3D MAX 8 BIBLE</i>, Wiley Pap/Cdr edition, 2006
c- Recommended Books	N/A
d- Periodicals, Web Sites, etc.	www.evermotion.org