Arab Academy for Science and Technology and Maritime Transport
Multimedia and Computer Graphics Curriculum
Course Syllabus

Course Code: GM323	Course Title: Digital Lighting and Rendering	Classification: E	Coordinator: Prof. Dr. Osama Badawy Lecturer: Dr. Ibrahim Hassan	Credit Hours: 3
Pre-requisites: GM324 (3D Modeling)	Co-requisites: None	Schedule: Lecture: 2 hours Tutorial: 2 hours		

Office Hours: (Room 207)
Sunday 12:30 p.m. - 01:30 p.m.

Course Description:
This course is designed to provide the basic knowledge and skills required in the creation of photorealistic still imagery. Emphasis is on a working knowledge of both virtual and real world lighting technologies and the tools necessary to create photorealistic imagery as well as an appreciation for production processes and deadlines. The course also covers algorithms in the field of lighting and rendering and shadow and occlusion algorithms.

Textbook:
Jeremy Birn, *Digital Lighting and Rendering*, New Riders Press.

References:

- Lee Lanier, *Advanced Maya Texturing and Lighting*, Maya Press.

- Lee Lanier, *Maya Studio Projects Texturing and Lighting*, Wiley Desktop Editions.

Course Objective/Course Learning Outcome:	Contribution to Program Student Outcomes:
1.Understand the concepts of shadows and occlusion to develop a knowledge of rendering.	(SO-1) Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
2.Introduce the basic of theory of light interaction and surfaces with materials.	
3.Understand and implement algorithms in lighting and rendering.	(SO-2) Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
4. Become aware of the physical and virtual technology of lighting.	
5.Understand the vocabulary and computer graphics theory conventions of lighting design.	
6. Become aware with digital lighting and texturing.	
7. Enhance the ability to utilize lighting and shading for storytelling and visual communication.	(SO-3) Communicate effectively in a variety of professional contexts. (SO-5) Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline. (SO-4) Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
8. Be able to create accurate, balanced UVW coordinates, layout descriptive, detailed and interesting textures & normal maps	

Course Outline:

Week 1. Introduction
Week 2. Lighting Techniques and surface physics Illumination.
Week 3. Surface Shading Fundamentals.
Week 4. Global Illumination, layering and compositing
Week 5. Fundamentals of color, and shape generation.
Week 6. Shadows and Occlusion
Week 7. 7th Week Exam
Week 8. Designing and Assigning Textures

Week 9. Aligning Maps with Models
Week 10. Solid textures and patterns
Week 11. Cameras and Exposure
Week 12. 12th Week Exam
Week 13. The camera view and clipping views.
Week 14. Advanced cameras types.
Week 15. Revision
Week 16. Final Exam

Grade Distribution:

7th Week Assessment (30%):
Exam (20%) + Homework Assignments 5% + Programming Assignments 5%

12th Week Assessment (20%):
Exam (15%) + Programming Assignments 5%

Year Work (10%):
Algorithm Presentation and Discussion (5%) + Homework Assignments (5%)

Final Exam (40%)

Policies:

Attendance:
AASTMT Education and Study Regulations (available at aast.edu)

Academic Honesty:
AASTMT Education and Study Regulations (available at aast.edu)

Late Submission:
Late submissions are graded out of 75% (1 week late), 50% (2 weeks late), 25% (3 weeks late), 0% (more than 3 weeks late)