Course Specifications

General Information

Course name	Advanced Graphics
Course number	ITCS4327
Faculty	
Department	
Course type	Major Needs
Course level	4
Credit hours (theoretical)	3
Credit hours (practical)	0
Course Prerequisites	

Course Objectives

1 - Introduce to Turtle Graphics

2 - Study LindenMayer System

3 - Examine how students understand fractals

4 - Study the methods of 3D visualization

5 - Introduce to image processing

6 - Learning how to see Fractals throughout nature in clouds, mountains, trees.

7 - Study of plane equation and 3D modeling.

8 - Discuss computer animation.

9 - A thorough introduction to computer graphics techniques, focusing on 3D modeling, image synthesis, and rendering.

Intended Learning Outcomes

Knowledge and Understanding	* a1. Explain the fundamental mathematics involved in generating a 3D
	* a2. Discuss the steps taken to transform and draw an object
	* a3. Describe scene graph architectures, their benefits and the rendering from a scene graph
	* a4. Identify the principles and techniques of a number of application areas informed by the research directions of computer graphics.
	* a5. Explain the essential mathematics relevant to computer graphics
	* a6. Identify basic knowledge and understanding of a core of analysis, algebra
	* a7. State the role of human-computer interaction.
Intellectual Skills	* b1. Relate computer vision to computer graphics.
	* b2. Discuss recent advances in computer graphics and put them in context.
	* b3. Perform comparisons between (algorithms, methods, techniques...etc).
	* b4. Perform classifications of (methods, techniques, algorithms.. etc.).
	* b5. Identify attributes, components, relationships, patterns, main ideas, and errors.
	* b6. Solve computer science problems with pressing commercial
Professional Skills	* c1. Create 3D objects using modeling software
	* c2. Apply knowledge gained in a series of exercises
	* c3. Use correct lighting and shading and know how it works.
	* c4. Use appropriate programming languages
General Skill	* d1. Communicate effectively by oral, written and visual means.
	* d2. Work effectively as an individual and as a member of a team.
	* d3. Demonstrate efficient IT capabilities
	* d4. Lead and motivate individuals.
	* d5. Manage tasks and resources.
	* d6. Acquire entrepreneurial skills.
	* d7. Work as part of a development team and to recognize the different roles of its members.
	* d8. Develop Creativity and imagination skills, Self-assessment ability

Course Contents

1 - Turtle graphics, Fractals
2 - Lindenmayer, systemMandellbrot set
3 - Projections and 3D-clipping
4 - Color Models, Introduction to Image Processing
5 - Image Operations, Image Transformations, Noise Reduction (MedianFilter, MeanFilter)

Teaching and Learning Methods

1 - Lectures
2 - Exercises
3 - Projects

Students Assessment

Assessment Method	TIME	MARKS
Mid-Term Exam	6th week	30
projects and / or Assignments	12th week	20
Final Exam	16th week	50

Books and References

Course note	Lecture Notes
Essential books	Computer Graphics C version Second Edition, Donald Hearn and M. Pauline Baker, Prentice Hall Int., 1997

Knowledge and Skills Matrix

Main Course Contents	Study Week	Knowledge and Understanding	Intellectual Skills	Professional Skills	General Skill
Turtle graphics, Fractals	1-3	a2, a5	b1-b5	c2, c4	d5,d7
Lindenmayer, systemMandellbrot set	4-6	a1, a4, a6	b1-b5	c2, c4	d2, d3, d7, d8
Projections and 3D-clipping	7-9	a1,a3	b4	c1,c3	d1-d8
Color Models, Introduction to Image Processing	10-12	a3, a4, a7	b1,b3	c2,c4	d1,d2
Image Operations, Image Transformations, Noise Reduction (MedianFilter, MeanFilter)	13-15	a4	b4	c2, c4	d1, d2, d6