Sarajevo School of Science and Technology

COURSE SPECIFICATION

NAME OF COURSE: Advanced Computer Graphics		**COURSE CODE:**	
STATUS: Optional	**LEVEL:** M	**UNIT VALUE:** 8 ECTS	**TERMS TAUGHT:** 2nd term
Department offering course: Computer Science	**Course Co-ordinator:** Alan Chalmers, Diego Gutierrez, Jasminka Hasic	**Date of course commencement:** September 2008.	
Degree Programmes in which to be offered: Computer Graphics for the Media Industry			
Pre-requisites: Entry Requirement	**Indicate whether a new course or name of course being replaced:** new	**Total Contact Hours 40** Lectures: 20 Lab Sessions: 20	
AIMS OF THE COURSE: This optional module provides the students with an understanding of the techniques necessary to produce highly realistic computer imagery.			

INTENDED LEARNING OUTCOMES	LEARNING AND TEACHING STRATEGIES TO BE USED:	ASSESSMENT CRITERIA (SHOULD LINK EXPLICITLY TO INTENDED LEARNING OUTCOMES):
1. Theoretical knowledge of the computer algorithms for high fidelity graphics	1. Lectures to illustrate the concepts	1. Test on material 10%
2. Practical knowledge of high dynamic range imagery	2. Laboratories and example case studies creating HDR images and tone mapping	2. Practical exercises 330%
3. Practical knowledge of Radiance light simulation system	3. Laboratories and example case studies	3. Practical exercises 40%
4. Theoretical knowledge of computer algorithms for modelling natural phenomena	4. Lectures to illustrate the concepts	4. Test on material 10%
5. Theoretical knowledge of the human visual system and visual perception	5. Lectures to illustrate the concepts	5. Test on material 10%

TRANSFERABLE SKILLS AND OTHER ATTRIBUTES	LEARNING AND TEACHING STRATEGIES USED:	ASSESSMENT CRITERIA (SHOULD LINK EXPLICITLY TO INTENDED LEARNING OUTCOMES):
1. Ability to design and implement high fidelity graphics	1. Lectures and tutorials	1. Lab exercises
2. Ability to capture high dynamic range images and tone map for display on a low dynamic range display	2. Individual practical work	2. Practical exercises
3. Develop an appreciation for the perceived realism of computer imagery	3. Lectures, tutorials and practicals	3. Practical exercises and written report

COURSE OUTLINE/SYLLABUS:

- The physical world : colour, the propagation of light, high dynamic range imagery
- Global illumination: computer algorithms for high fidelity graphics, ray-tracing, radiosity, photon mapping
- Rendering in passes
- Simulating advanced natural phenomena: participating media, caustics, mirages
- Visual perception: the human visual system, saliency and task maps, selective rendering

KEY TEXTS AND/OR OTHER LEARNING MATERIALS:

Peter Shirley, Michael Ashikhmin, Michael Gleicher, Stephen R. Marschner, Erik Reinhard, Kelvin Sung, William B. Thompson, Peter Willemsen, “Fundamentals of Computer Graphics”, Second Edition, AKPeters, 2005.

Philip Dutré, Kavita Bala, Philippe Bekaert “Advanced Global Illumination, Second Edition”, AK Peters, 2006.

Erik Reinhard, Greg Ward, Sumanta Pattanaik, Paul Debevec, “High Dynamic Range Imaging: Acquisition, display and image based lighting”, Morgan Kaufman, 2005.

Greg Ward Larson, Rob Shakespeare, “Rendering with Radiance: The Art and Science of Lighting Visualization”, Booksurge, 2004.