Program	Level	Second cycle
	Name of the program	Theoretical Computer Science

COURSE

Course title	**Computer Graphics**			
Course code	Semester	Course status	ECTS	Contact hours (L+AE+LE)
CS 465	II	Mandatory course	8	3+0+2
Lecturer				
Course Goals	This course presents the basic concepts of rendering and raytracing. Each student will implement a ray tracer. All relevant theory and implementation details will be discussed in lectures. Students will initially make a simple ray tracer that will be upgraded by adding new features. At the end of the semester, students will have implemented an advanced ray tracer that will be able to generate realistic images using global illumination techniques.			
Learning Outcomes	After completing the module, students will be able to: - understand the processing stages of rendering algorithms - implement ray tracing for image synthesis and light propagation simulations - identify and resolve the problem of aliasing and problems related to sampling - independently find and acquire the most up-to-date knowledge in computer graphics			

COURSE CONTENT

- Digital images and transformations
- Camera rays and intersecting objects
- Lighting
- Shading
- Reflection and refraction of light
- Division of space
- Texture mapping and sampling
- Depth of field and motion blur
- Rendering equation and global illumination
- Path tracing
- Photon mapping

LITERATURE

1. K. Suffern: *"Ray Tracing from the Ground Up"*, 2007.
2. M. Pharr, G. Humphreys: *"Physically Based Rendering: From Theory To Implementation"*, 2nd Edition, 2010.
3. S. Marschner, P. Shirley: *"Fundamentals of Computer Graphics"*, 4th Edition, 2015.
4. P. Dutre, P. Bekaert, K. Bala: *"Advanced Global Illumination"*, 2nd Edition, 2006.
5. J. Hughes, A. van Dan, M. McGuire, D. F. Sklar.: *"Computer Graphics: Principles and Practice"*, 3rd Edition, 2013.

STUDENT WORKLOAD (hours in a semester)

Lectures	45	Tutorial	30	Individual work	125	T o t a l	200

GRADING			**REMARKS**
Criterion	Maximum points	Minimum points	
Midterm exams	30		
Laboratory assignments	30		
Final exam	40		
T o t a l	100	55	