Module MA-INF 2204	**Rendering Techniques I**			
Workload 180 h	**Credit points** 6 CP	**Duration** 1 semester	**Frequency** every year	
Module coordinator	Prof. Dr. Reinhard Klein			
Lecturer(s)	Prof. Dr. Reinhard Klein			
Classification	**Programme** M. Sc. Computer Science	**Mode** Optional	**Semester** 2.	
Technical skills	Analytical formulation of problems related to image synthesis and knowledge of techniques and algorithms for the generation of photorealistic image data. Knowledge of the major algorithms for the simulation of light distributions in 3D-scences and volume data sets. Self-dependent implementation of the basic algorithms.			
Soft skills	Analytical problem description, creativity, self-dependent solution of practical problems in the area of rendering, presentation of solution strategies and implementations, self-dependent literature research, collaboration abilities, self-management			
Contents	Topics among others will be: models for the description of optical material properties and light sources; transport, volume visualization and rendering equation; algorithms and techniques for the solution of the volume visualization and rendering equation; advanced methods for photorealistic image generation in real-time applications like 3D games. In addition, results from state of the art research will be presented.			
Prerequisites	**Recommended:** Algorithms and data structures, basic knowledge on multidimensional analysis und linear algebra, basic knowledge in stochastics and statistics, numerical analysis and numerical linear algebra, C++			

Format	**Teaching format**	**Group size**	**h/week**	**Workload[h]**	**CP**
	Lecture	60	2	30 T / 45 S	2.5
	Exercises	30	2	30 T / 75 S	3.5
	T = face-to-face teaching; S = independent study				

Exam achievements	Oral exam (graded)
Study achievements	Successful exercise participation (not graded)
Forms of media	
Literature	• L. Szirmay-Kalos: Monte-Carlo Methods in Global Illumination, Institute of Computer Graphics, Vienna University of Technology, Vienna. URL: citeseer.ist.psu.edu/szirmay-kalos00montecarlo.html, 1999/ • P. Dutre, K. Bala, P. Bekaert: Advanced Global Illumination, 2nd ed., B&T, 2006 • M. Pharr, G. Humphreys: Physically Based Rendering, Elsevier, 2004 • J. Kautz, J. Lehtinen, P.-P. Sloan: Precomputed Radiance Transfer: Theory and Practice, Siggraph Course Notes, 2005