Module name:	**Interactive computer graphics**
Abbreviation:	ICG
Study semester:	2nd semester (SS), Frequency: once a year
Responsible for module:	Volker Ahlers
Teaching staff:	Volker Ahlers, Frauke Sprengel
Language:	German or English
Place in curriculum:	Master, compulsory elective, 2nd semester, for students majoring in "Graphics and Visualization"
Teaching methods/SWS:	2 SWS lecture with approx. 15 students 2 SWS exercise with approx. 15 students
Work required:	Lecture = 34 h Exercise = 34 h Own study time = 112 h
Credit points:	6 CP (= 180 h)
Prerequisites acc. to exam regulations:	None
Recommended prerequisites:	Computer Vision, cryptography and algorithms, computer graphics lecture in Bachelor study program
Learning goals:	Algorithmic skills: Understanding of basic mathematical and algorithmic principles in computer graphics, real-time rendering, in particular; taking graphics hardware into account in programming Analysis, design and realization skills: Design and realization of interactive graphics applications with current graphics software; ability to develop shader programs Technological skills: Understanding of the function of current graphics hardware Methodological skills: Ability to evaluate and compare a computer's graphics performance
Contents:	Basic principles: Real-time rendering, architecture of current graphics hardware, rendering pipeline, lighting models, texture mapping, applications Advanced rendering techniques: mirrors, shadows, image-based rendering, particle systems Modeling: Scene graphs, acceleration techniques, spatial data structures, collision handling, picking, physics engines Programmable shaders: Shading languages, vertex and fragment shaders, technical applications (GPGPU) Graphics software: Current graphics APIs, scene graph libraries and physics engines
Examinations:	Examination (written or oral examination) and experimental work
Media forms:	Lecture: Presentation, board, examples, discussion Exercise: Independent problem-solving in groups of 2, project work with presentation of results, assessment and discussion of solutions, further discussion
Literature:	Lecture notes Akenine-Möller, T., E. Haines, N. Hoffman: Real-Time Rendering. A K Peters, latest edition. Angel, E.: Interactive Computer Graphics. Addison-Wesley, latest edition.