Module name:	**Advanced topic: Virtual and Augmented Reality**
Abbreviation:	SVR
Study semester:	3rd semester (WS), Frequency: once a year
Responsible for module:	Volker Ahlers
Teaching staff:	Volker Ahlers
Language:	German or English
Place in curriculum:	Master, compulsory elective, 3rd 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, Interactive Computer Graphics, Geometric Modeling
Learning goals:	Algorithmic and mathematical skills: Understanding of the basic mathematical and algorithmic principles of virtual and augmented reality (VR/AR), in particular of stereoscopy and tracking; knowledge of advanced technology for human-computer interaction (HCI); critical evaluation of VR/AR systems Analysis, design and realization skills: Experience in design and in the realization of VR/AR applications Technological skills: Knowledge of current VR/AR hardware, incl. display and tracking systems; ability to use and calibrate such systems Methodological skills: Understanding of human perception and the resulting requirements made on VR/AR applications
Contents:	Selected topics from the fields of virtual and augmented reality (VR/AR). Basic principles: Sensory perception, human-computer interaction (HCI), immersion, stereoscopy, tracking, technical applications VR/AR hardware: Stereo-display techniques, magnetic and optical tracking systems, pointing devices, calibration, control using current graphics and VR/AR software Digital image generation: Ray tracing, radiosity, light field rendering.
Examinations:	Examination (written or oral examination) and experimental work
Media forms:	Lecture: Presentation, board, examples, discussion Exercise: Independent project work with presentation of findings, use of VR/AR hardware, assessment and discussion of solutions, individual discussion
Literature:	Lecture notes Original literature on current teaching topics McMenemy, K., S. Ferguson: A Hitchhiker's Guide to Virtual Reality. A K Peters, latest edition Bimber, O., R. Raskar: Spatial Augmented Reality. A K Peters, latest edition.