Module name	**Foundations of Computer Graphics**
Module number	CMS-TRK-FCG
Senior Lecturer	Prof. Dr. Stefan Gumhold stefan.gumhold@tu-dresden.de
Qualification objectives	Students are familiar with the components of a graphical application and can design new graphical applications based on requirements. You can apply and analyse the basics of computer graphics in solving graphical problems. They have an overview of the subdomains of Modelling, Rendering and Animation and can make links between territories and address cross-territorial issues. They may also propose geometric representations suitable for problem definition and may reproduce, implement and analyse basic geometric modelling algorithms. You know the stages of the Rendering Pipeline and can describe the underlying techniques. You can share the idea of raytracing and have a detailed idea of how to implement a raytracer. They are familiar with basic animation techniques, can reproduce the mathematical backgrounds and describe how to enrich a graphical application with animations.
Contents	The module will deal with vectors and transformations, colour perception and colour spaces, as well as the installation of graphic systems, modelling such as parametric curves and surfaces, basic modelling techniques and polygonal networks, as well as the presentation with the broadcasting pipeline, basic lighting bill, texturisation and the Raytracing process. Other content related to the animation includes approaches based on keyframes, particle systems and morphing, as well as the basis for the use of acceleration data structures.
Forms of teaching and learning	The module includes lectures of 2 SWS, exercises of 2 SWS and self-study. The language of the lectures and exercises will be English.
Eligibility for participation	Skills on vector rooms and matrices as well as on imperative programming at bachelor's level are required.

Usability	In the Computational Modeling and Simulation Masters Course, the module is a compulsory voting module in Track Applied Artificial Intelligence, Track Visual Computing, Track Computational Engineering and Track Computational Life Science, to be selected in accordance with Annex 2 to the Specific Examination Regulations. The module cannot be chosen in the Master's Course Computational Modeling and Simulation if this or a module with substantially the same content from a Course with which the entry conditions under § 3 of the Studienordnung have been met has already been completed. The module provides the pre-requisites for the modules it designates under the pre-requisites for participation.
Conditions for the award of credits	Credits are awarded when the module test is passed. The module test consists of a 90-minute away day. Bonus performance for away time is the release of 15 hours of exercise tasks. The language of the test will be English.
Credits and marks	The module allows 5 credit points to be obtained. The module score corresponds to the test performance score.
Frequency of the module	The module is offered every winter semester.
Workload	The total workload is 150 hours.
Duration of the module	The module covers 1 semester.
Accompanying literature	Fundamentals of computer graphics. P. Shirley, M. Ashikhmin, S. Marschner. WG Peters/CRC Press, 2009.