

<b>Program of Studies:</b>	<b>Master Program Bioinformatics</b>
<b>Name of the module:</b>	<b>Geometric Modelling</b>
<b>Abbreviation:</b>	<b>I-M-7</b>
<b>Subtitle:</b>	Core Lecture
<b>Modules:</b>	Lecture: 4 h (weekly) Tutorial: 2 h (weekly)
<b>Semester:</b>	1 <sup>st</sup> -3 <sup>rd</sup> semester/at least every two years
<b>Responsible lecturer:</b>	Prof. Dr. Hans-Peter Seidel
<b>Lecturer:</b>	Prof. Dr. Hans-Peter Seidel, Dr. Rhaleb Zayer
<b>Language:</b>	English
<b>Level of the unit/ Mandatory or not:</b>	Graduate course / mandatory elective
<b>Total workload:</b>	270 h = 90 h of classes and 180 h private study; Practical assignments in groups of 3 students (practice) Tutorials consists of a mix of theoretical + practical assignments.
<b>Credits:</b>	9
<b>Entrance requirements:</b>	calculus and basic programming skills
<b>Aims/Competences to be developed:</b>	Gaining knowledge of the theoretical aspect of geometric modelling problems, and the practical solutions used for modelling and manipulating curves and surfaces on a computer. From a broader perspective: Learning how to represent and interact with geometric models in a discretized, digital form (geometric representations by functions and samples; design of linear function spaces; finding "good" functions with respect to a geometric modelling task in such spaces).
<b>Content:</b>	<ul style="list-style-type: none"> <li>- Differential Geometry Fundamentals</li> <li>- Interpolation and Approximation</li> <li>- Polynomial Curves</li> <li>- Bezier and Rational Bezier Curves</li> <li>- B-splines, NURBS</li> <li>- Spline Surfaces</li> <li>- Subdivision and Multiresolution Modelling</li> <li>- Mesh processing</li> <li>- Approximation of differential operators</li> <li>- Shape Analysis and Geometry Processing</li> </ul>

<b>Assessment/Exams:</b>	<ul style="list-style-type: none"> <li>- Regular attendance and participation.</li> <li>- Weekly Assignments (10% bonus towards the course grade; bonus points can only improve the grade; they do not affect passing)</li> <li>- Passing the written exams (mid-term and final exam).</li> <li>- The mid-term and the final exam count for 50% each, but 10% bonus from assignments will be added.</li> <li>- A re-exam takes place at the end of the semester break or early in the next semester.</li> </ul>
<b>Grade:</b>	Will be based on the performance in exams, exercises and practical tasks. The detailed terms will be announced by the module coordinator.
<b>Literature:</b>	Will be announced before the term begins on the lecture website.