1	**Module name**	Cell Adhesion and Cytoskeleton: Cell Biological, Biophysical, and Medical Aspects	**5 ECTS credits**
2	**Courses/lectures**	Lecture: 2 SWS Laboratory course: 2 SWS	
3	**Lecturers**	Dr. I. Thievessen	

4	**Module co-ordinator**	Dr. I. Thievessen
5	**Contents**	**Lecture:** Cell-ECM and cell-cell adhesion; Cytoskeleton components; Mechanically loaded and non-loaded cell adhesions; Building principles and components of cytoskeleton-adhesion linkages; Cellular force generation; Activation of integrins and cadherins; Adhesion and cytoskeleton morphodynamics; Cytoskeletal pre-stress and cell morphodynamics; Cell migration cycle; Rho-GTPases; Adhesion signaling and control of cell proliferation/apoptosis, polarity, differentiation; Durotaxis, Haptotaxis, Chemotaxis; 2D and 3D cell migration; Cell migration modes; Cell adhesion and migration in embryonic development, tissue morphogenesis, tissue homeostasis and diseases; Fibrosis, myopathies, cancer, autoimmunity; Cell adhesion in tissue engineering; Fluorescent proteins and modern microscopy techniques in cell adhesion/cytoskeleton research. **Laboratory course:** siRNA-mediated gene knockdown; High resolution short-term and low resolution long term live cell microscopy; Immunofluorescence staining; Western blot; Image analysis and data evaluation.
6	**Learning targets and skills**	The students are • able to understand basic concepts in cell and tissue mechanics and the concept of “molecular medicine”; • able to discern cellular, physical, and molecular aspects in biomedical contexts; • trained in analytical and critical thinking; • able to postulate and experimentally test a hypothesis; • able to apply standard cell biological, biophysical, biochemical, and microscopic techniques.
7	**Recommended prerequisites**	none
8	**Integration in curriculum**	From semester one onwards
9	**Module compatibility**	MA Integrated Life Sciences; MA Cell & Molecular Biology
10	**Method of examination**	Portfolio examination PL: Oral examination on lecture contents, 30 min PL: Evaluation of report on practical course
11	**Grading procedure**	Oral examination 50% and report 50%
12	**Module frequency**	WS
13	**Workload**	Contact 60 h; Independent study 90 h
14	**Module duration**	1 semester
15	**Teaching language**	Teaching and examination language is English.
16	**Recommended reading**	Required knowledge: Basics of cell biology, material on specific topics is provided during the course.