Module No.	Title of Module
10-MAT-MPDG1	**Advanced Differential Geometry 1**

Recommended for	2nd semester of Int. Master Program Math. Phys.
Duration	1 Semester
Frequency	Each Summer Semester
Course types	(1) Lecture „Advanced Differential Geometry 1 " (4 SWS) = 60 h in class + 90 h individual studies = 150 h (2) Seminar „ Advanced Differential Geometry 1" (2 SWS) = 30 h in class + 120 h individual studies = 150 h
Workload	10 LP = 300 h
Aims	The students know the main conceptual basics of Differential Geometry. The students are able to explain and describe their knowledge in oral and written form and to apply it to concrete problems, to solve simple model problems and justify their proceedings.
Contents	Essential contents comprise e.g.: - geometric structures on manifolds and vector bundles - concept of integrability of geometric structures and examples for obstructions - geometric structures on vector bundles, connections, parallel transport, monodromy - basic ideas of geometric topology/differential topology - concepts of Riemannian geometry, curvature tensor, sectional curvature, Ricci and scalar curvature - introduction into symplectic geometry: Theorem of Darboux, Lagrangian submanifolds, Weinstein tubular neighborhood Lectures and seminars will be held in English. Students' performance and exams English as well.
Prerequisites	None
Literature	T. Frankel: The geometry of physics. 3rd. ed., Cambridge Univ. Press 2012 S. Gallot, D. Hulin, J. Lafontaine: Riemannian Geometry, 3rd ed., Springer 2004 G. Rudolph, M. Schmidt: Differential Geometry and Mathematical Physics, I. Springer 2013 McDuff, Salamon: Introduction to Symplectic Topology, Oxford Univ. Press, 3rd ed., 2017
Examinations	Oral exam of 25 min Seminar presentation (60 min.) + written report (within 4 weeks).
Requirements	lecture „Differential Geometry 1“ (4 SWS) seminar „ Differential Geometry 1“ (2 SWS)