

Module No.	Title of Module
10-MAT-MPSTAG	<b>Selected Topics of Algebra and Geometry</b>
Recommended for	2 <sup>nd</sup> or 3 <sup>rd</sup> semester of Int. Master Program Math. Phys.
Duration	1 Semester
Frequency	usually once every two years
Course types	(1) Lecture „Selected Topics of Algebra and Geometry" (2 SWS) = 30 h in class + 120 h individual studies = 150 h (2) Seminar „Selected Topics of Algebra and Geometry" (2 SWS) = 30 h in class + 120 h individual studies = 150 h
Workload	10 LP = 300 h
Aims	After active participation the students are able to show the state of research orally and in written form in a branch of Algebra and Geometry. They can apply the related methods to advanced problems.
Contents	Advanced topics of a branch of Algebra and Geometry, for example of the following sections: <ul style="list-style-type: none"> <li>- Representation theory, representations of finite and compact groups, characters and their properties, induced representations</li> <li>- Theory and classification of complex semi simple Lie-algebras and compact Lie-groups, representation theory of such</li> <li>-Representations of symmetric and classical o groups</li> <li>-Number theory and modular forms</li> <li>-Riemannian geometry</li> <li>-Symplectic geometry</li> <li>-Conformal geometry</li> <li>-Geometry of Principal Bundles</li> <li>-Geometry of Dirac operators</li> </ul> <p>Lectures and seminars will be held in English. Students' performance has to be in English as well.</p>
Prerequisites	None
Literature	According to section, such as <ul style="list-style-type: none"> <li>- James E. Humphreys, Introduction to Lie Algebras and Representation Theory, Graduate Texts in Mathematics 9, Springer-Verlag 1972.</li> <li>- William Fulton, Joe Harris, Representation Theory. A First</li> <li>- Hugh L. Montgomery, Robert C. Vaughan, Multiplicative Number Theory: I. Classical Theory, Cambridge Studies in Advanced Mathematics 97, Cambridge University Press 2006</li> <li>- Henryk Iwaniec, Emmanuel Kowalski, Analytic Number Theory, American</li> </ul>
Examinations	Oral exam of 25 min Oral lecture (60 min.) + written report (4 weeks).
Requirements	attendance at lecture „Selected Topics of Algebra and Geometry" (2 SWS) participation in seminar „Selected Topics of Algebra and Geometry" (2 SWS)