Georg-August-Universität Göttingen **Module M.Mat.4915: Advanced seminar on mathematical methods in physics**	3 C 2 WLH

Learning outcome, core skills: **Learning outcome:** In the modules of the cycle "Mathematical methods of physics" students get to know different mathematical methods and techniques that play a role in modern physics. They are introduced to current research questions and enabled to carry out independent contributions to research, e. g. within the scope of a Master's thesis. The topics of the cycle can be divided into four blocks, a cycle normally contains parts of different blocks, that topically supplement each other, but can also be read within one block. The introducing parts of the cycle form the basis for the advanced specialisation area. The topic blocks are • harmonic analysis, algebraic structures and representation theory, (group) effects; • operator algebra, C* algebra and von-Neumann algebra; • operator theory, perturbation and scattering theory, special PDE, microlocal analysis, distributions; • (semi) Riemannian geometry, symplectic and Poisson geometry, quantization. One of the aims is that a connection to physical problems is visible, at least in the motivation of the covered topics. Preferably, in the advanced part of the cycle, the students should know and be able to carry out practical applications themselves. **Core skills:** After having successfully completed the module, students will be able to • present a mathematical topic of current research interest in the area "Mathematical methods of physics" in a talk; • conduct scholarly debates with reference to current research.	**Workload:** Attendance time: 28 h Self-study time: 62 h

Course: M.Mat.4915.Sem **Advanced seminar**	2 WLH
Examination: Oral Presentation (approx. 75 minutes) M.Mat.4915.Mp: Advanced seminar on mathematical methods in physics **Examination prerequisites:** Participation in the advanced seminar	3 C

Examination requirements: Autonomous permeation and presentation of complex mathematical issues of current research literature in the area "Mathematical methods in physics"	

Admission requirements: none	**Recommended previous knowledge:** M.Mat.4515
Language: English	**Person responsible for module:** Dean of studies

Course frequency:	Duration:
not specified	1 semester[s]
Number of repeat examinations permitted:	**Recommended semester:**
twice	Master: 1 - 4
Maximum number of students:	
not limited	

Additional notes and regulations:
Instructor: Lecturers at the Mathematical Institute