Module	***Selected Topics of Mathematical Physics***
Code	
Instruction language	English
ECTS credits	4
Attendance time	3 hours per week
Duration	1 semester
Cycle	irregularly
Coordinator	Dean of Physics Studies
Instructors	PD Dr. Maxim Efremov
Allocation to study programmes	Physics M.Sc., elective module, 1st or 2nd semester Wirtschaftsphysik M.Sc., elective module, 1st - 3nd semester
Formal prerequisites	None
Recommended prerequisites	Foundations of theoretical physics
Learning objectives	This special lecture series aims at providing students with a Bachelor or Master degree with advanced mathematical tools to solve different problems faced by physicists, engineers, and applied mathematicians. They include (i) the Fourier method for partial differential equations (diffusion, wave, and etc.), (ii) method of integral transformations, (iii) the Green function and its applications, (iv) integral equations, etc. Each method is illustrated by both well-known and completely new examples of physics problems appeared within classical and quantum approaches.
Syllabus	• Partial differential equations • Fourier method and special functions • Method of integral transformation • Green function and its applications • Classical orthogonal polynomials • Integral equations
Literature	• P.M. Morse and H. Feshbach, Methods of Theoretical Physics (1953) • G.B. Arfken, H.J. Weber, and F.E. Harris, Mathematical methods for physicists (2012) • A.N. Tikhonov and A.A. Samarskii, Equations of mathematical physics (2011) • E. T. Whittaker and G. N. Watson, A Course of Modern Analysis (1948)
Teaching and learning methods	Lecture (3 hours per week)
Workload	45 hours lecture (attendance time)

	30 hours exercise (attendance time)
	105 hours self-study and exam preparation
	Total: 10 hours
Assessment	Written or oral examination. A prerequisite for the participation in the examination is an ungraded course achievement. Form and scope of the examination and of the course achievement are determined and notified by the instructor at the beginning of the course.
Examination	
Grading procedure	The module grade is the examination grade.
Basis for	