



Adam Mickiewicz University in Poznań

Doctoral School of Exact Sciences AMU

Recent trends and new avenues in electromagnetic wave physics

dr-hab., prof. UAM Andriy E. Serebryannikov
Institute of Spintronics and Quantum Information
Adam Mickiewicz University in Poznan
andser@amu.edu.pl

Scientific lectures

Field of science	Exact Sciences / Physics	
Teaching method	Lectures in the stationary mode	
Language	English	
Numbers of hours	15	
Aims of the course	Acquisition of the knowledge by the participants on recent trends, advances, and new approaches in photonics and electromagnetic wave physics, which serve or will serve as enablers of scientific and technological progress in the next decade.	
Course contents	A comprehensive overview of the state-of-the-art and perspectives in the modern research fields that include metasurfaces, anomalous scattering, non-Hermitian photonics, topological photonics, time-varying wave processes, structures with spatio-temporal modulation and materials with near-zero material parameters. Both physics and design concepts and their possible connections to the prospective applications will be addressed.	
Prerequisites and co-requisites	There are no pre-requisites	
Learning outcomes		
On completion of the course PhD candidates will be able to:		Assessment mode
E_W01, E_W03, E_U01, E_U02 (Doctoral school)		the exam will be conducted at the end of the course
Literature	I. Brener, S. Lu, I. Staude, J. Valentine, and C. Holloway, eds., Dielectric metamaterials. Fundamentals, designs and applications, Elsevier (2019) W. Zhu and A.-Q. Liu, Metasurfaces: towards tunable and reconfigurable meta-devices, Springer (2022) Y. Li et al. Epsilon-Near-Zero Metamaterials, Cambridge University Press (2022) D. Werner, D.-H. Kwon, eds., Transformation electromagnetics and metamaterials, Springer (2014) Articles from the highly reputed journals published by Nature Publishing Group, Science, American Physical Society, Optica (formerly Optical Society of America), American Chemical Society, American Institute of Physics, DeGruyter, Wiley, Springer, Institute of Physics (2019-2025)	
Additional information	Course start date (preliminary): 22.10.2025, 14:00	