

Plasmonics & Metamaterials

Module Code	PHYS97066	FHEQ Level	Level 7
Pre-requisites	Light and Matter	Co-requisites	None
Primary Department	Physics		
Module Leader	Dr Rupert Oulton and Dr Riccardo Sapienza		
Additional Teaching Departments	None		
Teaching Staff	Dr Rupert Oulton and Dr Riccardo Sapienza + Course Associates		
Programmes on which the Module is delivered			Core/Elective
All UG Physics programmes (F300, F303, F309, F325, F390, F3W3)			Elective
Learning Outcomes	<p>On completing the Plasmonics & Metamaterials course, students will have a:</p> <ul style="list-style-type: none"> • Basic understanding of how photonics and nanotechnology can be combined into the new discipline of nanophotonics, and impart a solid theoretical foundation and practical knowledge of important application areas. 		
Description of Content	<p>This lecture course provides an introduction to the classical and quantum theory of plasmonics and metamaterials, including the following topics:</p> <ul style="list-style-type: none"> • Fundamentals of nanophotonics: combining photonics with nanotechnology. • Optical properties of metallic and dielectric nanostructures. • Fundamentals of surface plasmons: metallic nanophotonics. • Propagation of light waves below the diffraction limit. • Nanofocusing and extreme optical localisation of light • Nanoscale light generation and control, single emitter spectroscopy and nanolasers • The metamaterials concept: photonic functionalities through nanostructured materials. • Waves in effective media: metalenses, perfect lenses, optical cloaking, superlenses. 		
Assessment		Assessment Type	Weighting
Written Exam		Exam	100%
Learning & Teaching Hours	Independent Study Hours	Placement Hours	Total Hours
47	103	0	150
ECTS Credit	6	CATS Credit	12
Date of introduction	October 2014	Date of Last Revision	May 2020