

Advanced Classical Physics

Module Code	PHYS96001	FHEQ Level	Level 6
Pre-requisites	None	Co-requisites	None
Primary Department	Physics		
Module Leader	Professor Claudia de Rham		
Additional Teaching Departments	None		
Teaching Staff	Professor Claudia de Rham + Course Associates		
Programmes on which the Module is delivered			Core/Elective
UG Physics with Theoretical Physics programmes (F325, F390)			Core
All other UG Physics programmes (F300, F303, F309, F3W3)			Elective
Learning Outcomes	<p>On completing the Advanced Classical Physics course, students will be able to:</p> <ul style="list-style-type: none"> Describe the motion and stability of rotating objects Formulate the dynamics of physical systems using the Lagrangian formalism and analyse the outcome Understand the role played by the Hamiltonian and identify symmetries and conservation laws. Describe electromagnetism in a four-dimensional Lorentzian way and appreciate role role played by gauge symmetries in modern physics. 		
Description of Content	<ul style="list-style-type: none"> Rotating Rigid bodies: Inertia tensor, Principal moments and principal axes of inertia, angular momentum. Lagrangian Mechanics: Calculus of variations, Action integral, Principle of least action, Euler-Lagrange equation, Generalised co-ordinates and momenta, Constraints, Normal modes Hamiltonian Mechanics: Hamilton's equations, Poisson brackets, Canonical transformations, Continuous symmetries and conservations laws, stability analysis Relativistic Electromagnetism: Four-vectors, Lorentz transformations, Field-strength tensor, Lorentz transformations for electromagnetic fields, Maxwell's equations in four-vector form, Four-vector potential, Lagrangian for Electromagnetism 		
Assessment		Assessment Type	Weighting
Written exam		Exam	100%
Learning & Teaching Hours	Independent Study Hours	Placement Hours	Total Hours
57	93	0	150
ECTS Credit	6	CATS Credit	12

Date of introduction	October 2016	Date of Last Revision	April 2020
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