Classical Electrodynamics

Unit Title	Classical Electrodynamics
Level of Study	
Credit Value	**ECTS Value**
Home Department	Department of Theoretical Physics
Home Faculty	Physics Faculty
Unit Co-ordinator	Vitaly A. Demin
Key Words	Classical theory of electromagnetic field and special theory of relativity, theory of electromagnetism in vacuum, Maxwell equations, plane and spherical electromagnetic waves, Fresnel and Fraunhofer diffraction, Lienard – Wiechert potentials, electromagnetic field tensor.
Brief Summary	The course is devoted to the classical theory of electromagnetic field and special theory of relativity.
Indicative Content	The analysis is restricted by the theory of electromagnetism in vacuum and deals with logical derivation of Maxwell equations from the experimental laws. Some classical electromagnetic problems are solved with the help of Maxwell equations. The limiting cases of electrostatics and magnetostatics, electric circuit are discussed. The plane and spherical electromagnetic waves, Fresnel and Fraunhofer diffraction, Lienard – Wiechert potentials are considered on the base of fundamental approach. Electromagnetic field tensor is introduced which permits to get relativistic view for Maxwell equations. Lorentz transformation of the field and invariants in special theory of relativity are analyzed.