PHYC30016 Electrodynamics

Credit Points:	12.50
Level:	3 (Undergraduate)
Dates & Locations:	This subject is not offered in 2014.
Time Commitment:	Contact Hours: 2 to 4 hours per week, 36 in total, lectures and problem-solving classes Total Time Commitment: Estimated total time commitment of 120 hours
Prerequisites:	Physics **Subject** / **Study Period Commencement:** / **Credit Points:** PHYC20011 Electromagnetism and Optics — Semester 2 — 12.50 **And Mathematics** Either both of **Subject** / **Study Period Commencement:** / **Credit Points:** MAST20009 Vector Calculus — Semester 1, Semester 2 — 12.50 MAST20026 Real Analysis — Semester 1, Semester 2 — 12.50 Or both of **Subject** / **Study Period Commencement:** / **Credit Points:** MAST20009 Vector Calculus — Semester 1, Semester 2 — 12.50 MAST10009 Accelerated Mathematics 2 — Semester 2 — 12.50
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	Students may only gain credit for one of # PHYC30016 Electrodynamics
Core Participation Requirements:	For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Students Experiencing Academic Disadvantage Policy, academic requirements for this subject are articulated in the Subject Description, Subject Objectives, Generic Skills and Assessment Requirements of this entry.The University is dedicated to provide support to those with special requirements. Further details on the disability support scheme can be found at the Disability Liaison Unit website: http://www.services.unimelb.edu.au/disability/
Contact:	**Email: PHYC30016@physics.unimelb.edu.au (mailto:PHYC30016@physics.unimelb.edu.au)**
Subject Overview:	This subject provides an introduction to electrodynamics and a wide range of applications including communications, superconductors, plasmas, novel materials, photonics and astrophysics. Topics include: revision of Maxwell's equations, strategies for solving boundary value problems for static and time-varying fields, electromagnetic fields in materials (including dielectrics, magnetic materials, conductors, plasmas and metamaterials), electromagnetic waves, derivation of geometric optics from Maxwell's equations, guided waves, relativistic

	electrodynamics and the covariant formulation of electrodynamics, radiation by antennas and accelerating charged particles.
Learning Outcomes:	Students completing this subject should be able to: # explain classical electrodynamics based on Maxwell's equations including its formulation in covariant form; # solve problems involving the calculation of fields, the motion of charged particles and the production of electromagnetic waves; and # analyse the solution of these problems in the context of a range of applications.
Assessment:	Two assignments each equivalent to 1500 words during the semester (10% each), and a 3-hour written examination in the examination period (80%).
Prescribed Texts:	D J Griffiths, Introduction to Electrodynamics, 4th edition, John Wiley
Recommended Texts:	J D Jackson, *Classical Electrodynamics*, 3rd edition, Academic Press.
Breadth Options:	This subject potentially can be taken as a breadth subject component for the following courses: # **Bachelor of Arts (https://handbook.unimelb.edu.au/view/2014/B-ARTS)** # **Bachelor of Commerce (https://handbook.unimelb.edu.au/view/2014/B-COM)** # **Bachelor of Environments (https://handbook.unimelb.edu.au/view/2014/B-ENVS)** # **Bachelor of Music (https://handbook.unimelb.edu.au/view/2014/B-MUS)** You should visit **learn more about breadth subjects (http://breadth.unimelb.edu.au/breadth/info/index.html)** and read the breadth requirements for your degree, and should discuss your choice with your student adviser, before deciding on your subjects.
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees
Generic Skills:	A student who completes this subject should be able to: # analyse how to solve a problem by applying simple fundamental laws to more complicated situations # apply abstract concepts to real-world situations # solve relatively complicated problems using approximations # participate as an effective member of a group in tutorial discussions # manage time effectively in order to be prepared for tutorial classes, undertake the written assignments and the examination.
Notes:	This subject is available for science credit to students enrolled in the BSc (both pre-2008 and new degrees), BASc or a combined BSc course.
Related Majors/Minors/ Specialisations:	Chemical Physics (specialisation of Physics major) Mathematical Physics Physics Physics Physics (specialisation of Physics major) Science credit subjects* for pre-2008 BSc, BASc and combined degree science courses Science-credited subjects - new generation B-SCI and B-ENG.