PHYC30016 Electrodynamics

Credit Points:	12.50
Level:	3 (Undergraduate)
Dates & Locations:	2011, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus.
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 One of # 640-225 Electromagnetism & Relativity Advanced (prior to 2009) # 640-245 Electromagnetism & Relativity (prior to 2009)

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 with Applications	Semester 1, Semester 2	12.50

Or

620-296 Multivariable & Vector Calculus (prior to 2010)

For students who commenced second year level mathematics prior to 2009:

One of

620-231 Vector Analysis (prior to 2009)
620-233 Vector Analysis Advanced (prior to 2009)

And one of

620-232 Mathematical Methods (prior to 2010)
620-234 Mathematical Methods Advanced (prior to 2009).

Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	Students may only gain credit for one of # PHYC30016 Electrodynamics # 620-323 Electrodynamics Advanced (prior to 2009) # 620-343 Electrodynamics (prior to 2009)
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/
Coordinator:	Assoc Prof Ann Roberts
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.
Objectives:	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, 3rd 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/2011/B-ARTS)** # **Bachelor of Commerce (https://handbook.unimelb.edu.au/view/2011/B-COM)** # **Bachelor of Environments (https://handbook.unimelb.edu.au/view/2011/B-ENVS)** # **Bachelor of Music (https://handbook.unimelb.edu.au/view/2011/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 Course(s):	Bachelor of Science
Related Majors/Minors/ Specialisations:	Chemical Physics (specialisation of Physics major) Mathematical Physics

	Physics (specialisation of Physics major) Science credit subjects* for pre-2008 BSc, BASc and combined degree science courses