PHYC30016 Electrodynamics

Credit Points:	12.5
Level:	3 (Undergraduate)
Dates & Locations:	2016, 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 170 hours
Prerequisites:	Physics

Subject	Study Period Commencement:	Credit Points:
PHYC20011 Electromagnetism and Optics	Semester 2	12.50

And Mathematics

Subject	Study Period Commencement:	Credit Points:
MAST20009 Vector Calculus	Semester 1, Semester 2	12.50

And at least one of

Subject	Study Period Commencement:	Credit Points:
MAST10009 Accelerated Mathematics 2	Semester 2	12.50
MAST20026 Real Analysis	Semester 1, Semester 2	12.50
MAST20030 Differential Equations	Semester 2	12.50

Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	None
Core Participation Requirements:	For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Student Support and Engagement Policy, academic requirements for this subject are articulated in the Subject Overview, Learning Outcomes, Assessment and Generic Skills sections of this entry. It is University policy to take all reasonable steps to minimise the impact of disability upon academic study, and reasonable adjustments will be made to enhance a student's participation in the University's programs. Students who feel their disability may impact on meeting the requirements of this subject are encouraged to discuss this matter with a Faculty Student Adviser and Student Equity and Disability Support: http://services.unimelb.edu.au/disability
Coordinator:	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.
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/2016/B-ARTS)** # **Bachelor of Commerce (https://handbook.unimelb.edu.au/view/2016/B-COM)** # **Bachelor of Environments (https://handbook.unimelb.edu.au/view/2016/B-ENVS)** # **Bachelor of Music (https://handbook.unimelb.edu.au/view/2016/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 Physics Physics (specialisation of Physics major) Science-credited subjects - new generation B-SCI and B-ENG.