ENEN90033 Solar Energy

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2014, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 36 hours, comprising of two hours of lectures and one 1-hour tutorial per week Total Time Commitment: 200 hours
Prerequisites:	None
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:	Assoc Prof Lu Aye
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Subject Overview:	**AIMS** This subject provides the application of principles of solar energy engineering. A number of solar technologies and applications methods are investigated. This subject uses a project based learning where students work in teams to design a solar system for a particular application considering environmental, social and financial constraints. Students learn to apply the principles of solar energy and design. Knowledge gained in this subject will allow graduates to practice in the area of renewable energy industry. The subject complements other subjects offered in the energy theme of the Department such as Energy for Sustainable Development and Sustainable Infrastructure Engineering. **INDICATIVE CONTENT** # Introduction to Solar Energy in the energy economy; Fundamental heat & mass transfer; Radiation properties of materials; and selective surfaces # Solar Geometry and solar angles; atmospheric effects and radiation prediction; and Solar radiation measurement # Flat plate collectors design and performance characteristic # Concentrating collectors design and performance characteristic; Evacuated tube collectors # Solar System design methods, TRNSYS # Fundamentals of photovoltaic systems # Solar process heating # Solar drying, Solar cookers, Green houses and Solar stills

	# Solar water pumping; Solar refrigeration # Built environment applications passive and active systems # Solar hot water and solar heat pump systems
Learning Outcomes:	**INTENDED LEARNING OUTCOMES (ILO)** Having completed this subject the student is expected to: 1 Identify the potential and limitations of solar energy as an alternative source of energy 2 Analyse the distribution and variability of solar energy availability, and the limitations of solar energy devices 3 Create solar energy system designs for sustainable energy solutions
Assessment:	One 3-hour open-book examination at the end of semester (50%). Addresses Intended Learning Outcomes (ILOs) 1 - 3. One 2000 word report, due at the end of semester (30%). Addresses ILOs 1 - 3. One group task, 1000 words per person, due mid semester (20%). Addresses ILOs 1 - 3.
Prescribed Texts:	None
Breadth Options:	This subject is not available as a breadth subject.
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees
Generic Skills:	# Ability to utilise a systems approach to complex problems, design and operational performance # Proficiency in engineering design # Ability to manage information and documentation # Capacity for creativity and innovation # Ability to function effectively as an individual and in multidisciplinary and multicultural teams, as a team leader or manager as well as an effective team member
Notes:	**LEARNING AND TEACHING METHODS** The subject is based on presentations by two expert lecturers in the field. In addition each student prepares a group research report on a topic of their interest selected from an extensive list. Numerical problems solving based on analysis and design are investigated. **INDICATIVE KEY LEARNING RESOURCES** Reference books: # John A. Duffie and William A. Beckman 2006 Solar Engineering of Thermal Processes, Wiley, Hoboken, N.J. # Soteris A. Kalogirou 2009 Solar Energy Engineering: Processes and Systems [electronic resource], Elsevier/Academic Press Burlington, MA. Journal: # Solar Energy **CAREERS / INDUSTRY LINKS** Australian Solar Energy Council
Related Course(s):	Master of Energy Systems Master of Engineering Structures Master of Engineering Structures Master of Environmental Engineering Master of Environmental Engineering Master of Philosophy - Engineering Ph.D.- Engineering
Related Majors/Minors/ Specialisations:	Energy Efficiency Modelling and Implementation Energy Efficiency Modelling and Implementation Energy Studies Energy Studies Master of Engineering (Civil)

	Master of Engineering (Environmental) Master of Engineering (Geomatics) Tailored Specialisation Tailored Specialisation