SOLA9001

PHOTOVOLTAICS

in making sure that you understand the lecture material, completing the set assignments, further reading, and revising for any examinations.

Contact hours

	Day	**Time**	**Location**
Lectures	Wednesday	9am - 10pm	Online
	Thursday	2pm - 4pm	Online
Tutorial	Wednesday	12pm 2pm	Online
(Wk 1-4, 8-10)	Thursday	12pm 2pm	Ainsworth G01 (K-J17-G01)

3.	Use relevant standards and data sets for calculations of cell, module and system performance.	PE1.1, PE1.3, PE1.5, PE2.1, PE3.2
4.	Analyse and calculate power differences between photovoltaic cells, modules and arrays.	PE1.1, PE1.3, PE2.1, PE2.2, PE3.2
5.	Identify the appropriate system components and arrangements for different PV applications (e.g., grid-connect, stand-alone PV systems).	PE1.3, PE1.5, PE2.1, PE2.3, PE3.2, PE3.3
6.	Design Stand Alone PV systems and analyse system economics.	PE1.3, PE1.5, PE2.1, PE2.2, PE2.3, PE3.2, PE3.3, PE3.6

The teaching strategy for this course comprises a series of lectures, tutorial sessions, lab work and PV design practice. Lecture will introduce theory, worked examples and case studies. Tutorial problem sets will allow you to practice solving problems related to each topic. During some weeks, tutorials will be used to go through the problem sets for each topic (see the course schedule for details). In other weeks, lab exercises and associated assignments will allow you to develop skills related to the use of software for modeling solar cells, practical skills related to assembling and measuring the performance of photovoltaic systems and skills related to interpreting experimental results. These exercises will enhance your understanding of the operation of photovoltaic cells and systems. The course contains a significant component of self-learning through the experience gained by doing the solar cell/ system simulation using LTSpice and design of PV systems.

Each tutorial activity will be posted on Moodle during the week preceding the activity. It will have a number of learning objectives and students will work through exercises that aim to address these outcomes. Some activities require that students complete calculations, others will involve the use of simulation software and one will involve laboratory measurements.

Students can use their allocated tutorial session to ask any questions they may have about the material taught in lectures. Students are also strongly encouraged to use the Moodle discussion forums to assist their learning. Tutors will monitor the discussions and help answer posted questions.

The schedule for lectures and tutorials/labs is given below. The topics and the order are subject to change at any time.

Week	Lecture	Tutorial
1	PV systems, Stand-Alone PV systems design	Lab 0: Circuit simulation with LT Spice
2	Energy storage	Tut 1: PV systems & load assessment

3	Solar cells and modules	Lab 1: Modelling of Solar Cells
4	Solar cells and modules	Tut 2: Solar cells and modules
5	Solar resource assessment	Lab 2: Mismatch, IV and Thermal properties of PV modules
6	Q&A	
7	Solar resource assessment	Lab 2: Mismatch, IV and Thermal properties of PV modules
8	Charge controller and inverter sizing	Tut 3: Resource assessment
9	Installation, design and costing	Tut 4: PV systems and components
10	Other applications for PV (Grid-Connected PV Systems)	PV system design project presentation

Assessment overview

Assessment	**Group Project?** (# Students per group)	**Length**	**Weight**	**Learning outcomes assessed**	**Assessment criteria**	**Due date and submission requirements**	**Deadline for absolute fail**	**Marks returned**
Quizzes	No							

This course will include the following hurdle requirements that are closely linked to a set of learning outcomes which demonstrate that you have acquired the required skills and competencies within this discipline:

- Students must demonstrate they can design a stand-alone PV system for optimum performance and conformance to relevant Australian Standards. A minimum mark of 60% must be obtained in the Stand-Alone PV system design assignment in order to pass this subject. Failure to achieve this minimum mark will result in an unsatisfactory fail (UF) grade, regardless of the performance in the rest of the course.

The assessment scheme in this course reflects the intention to assess your learning progress through the term.

Quizzes: Regular online quizzes are designed to help with continues learning and learning enhancement. You will have to complete five quizzes (weeks 2, 4, 6, 8 and 10).

Lab

Stage 1 Competencies for Professional Engineers

	Program Intended Learning Outcomes
PE1: Knowledge and Skill Base	PE1.1 Comprehensive, theory-based understanding of underpinning fundamentals
	PE1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing
	PE1.3 In-depth understanding of specialist bodies of knowledge
	PE1.4 Discernment of knowledge development and research directions
	PE1.5 Knowledge of engineering design practice
	PE1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice
PE2: Engineering Application Ability	PE2.1 Application of established engineering methods to complex problem solving
	PE2.2 Fluent application of engineering techniques, tools and resources
	PE2.3 Application of systematic engineering synthesis and design processes
	PE2.4 Application of systematic approaches to the conduct and management of engineering projects
PE3: Professional and Personal Attributes	PE3.1 Ethical conduct and professional accountability
	PE3.2 Effective oral and written communication (professional and lay domains)
	PE3.3 Creative, innovative and pro-active demeanour
	PE3.4 Professional use and management of information
	PE3.5 Orderly management of self, and professional conduct
	PE3.6 Effective team membership and team leadership