Photovoltaic and Renewable Energy Engineering

Course Outline

Term 1 2021

SOLA5050

Renewable Energy Policy

Contents

1. Staff contact details

Contact details and consultation times for course convenor

Name:	Anna Bruce
Office location:	TETB 318
Email:	a.bruce@unsw.edu.au
Moodle:	Moodle will be used to disseminate course material and announcements. Students are expected to monitor their UNSW email account and take careful note of all announcements.

Consultations: For all course administration enquiries, contact Anna Bruce. For content-related questions, you are encouraged to ask questions during class or via the Moodle discussion. Consultations are also available with Anna on Thursday afternoons by appointment.

Contact details for tutors

Email:	Abi Prakash abi.prakash@unsw.edu.au David Saldivia Salazar d.saldiviasalazar@student.unsw.edu.au Edoardo Santagata edoardo.santagata@student.unsw.edu.au Scott Watts scott.watts@unsw.edu.au

2. Important links

- Moodle
- Health and Safety
- Student Resources
- UNSW Timetable
- UNSW Handbook
- Engineering Student Support Services Centre
- UNSW Photovoltaic and Renewable Energy Engineering

3. Course details

Credit points

This is a 6 unit-of-credit (UoC) course and involves 5 hours per week of face-to-face/online contact.

The normal workload expectations of a student are approximately 25 hours per term for each UOC, including class contact hours, other learning activities, preparation and time spent on all assessable work.

You should therefore aim to spend about 13–14 hours per week on this course throughout the 10 week term plus 10-20 hours of exam prep. The non-contact time each week should be spent in making sure that you understand the lecture material, completing the tutorials, working on your assignments, further reading, and revising for the final exam.

Contact hours

	Day	**Time**	**Location**
Lectures (wks 1-5 & 7-10)	Tuesday	15:00 - 18:00	Online
Tutorials (wks 1-5 & 7-10)	Wednesday	13:00 - 15:00	Law 389
	Wednesday	15:00 - 17:00	Online
	Thursday	10:00 - 12:00	Blockhouse G13
	Thursday	12:00 - 14:00	Squarehouse 114
Assignment Feedback (wk 6)	Wednesday	13:00 - 15:00	**Schedule a time and location with your tutor for assignment feedback**
	Wednesday	15:00 - 17:00	
	Thursday	10:00 - 12:00	
	Thursday	12:00 - 14:00	

Please refer to your class timetable for the learning activities you are enrolled in and attend only those classes.

Summary and Aims of the course

We live in a time of energy transition. What are the implications of technological change and a clean energy future? Will our energy future be centralised or distributed? What is the role of the smart grid? Which technologies and business models might emerge and what are the policy and regulatory factors that affect their viability?

In this course, we review objectives and strategies of renewable energy policy. We develop an understanding of the renewable energy industry, markets, and the policy and economics context. We examine how technologies and industries evolve and how stakeholders and institutions interact in the energy industry. We develop frameworks and skills to access and analyse market and industry data, and use these to assess the impacts of policy and regulatory change and the emergence of new technologies and business models.

Selection and design of policy instruments, including regulation, taxation, tariffs, targets, incentives and market-based schemes will be explored. Specific policy and regulatory approaches, the views of different stakeholders and interaction with the broader policy regulatory environment will be examined for specific policy case studies.

Student learning outcomes

This course is designed to address the learning outcomes below and the corresponding Engineers Australia Stage 1 Competency Standards for Professional Engineers as shown. The full list of Stage 1 Competency Standards may be found in Appendix A.

Learning Outcome		**EA Stage 1 Competencies**
1.	Describe the context and drivers for renewable energy policy, with a focus on the different roles of markets and governments.	PE1.6, PE3.1, PE3.6
2.	Describe the structure, operation and stakeholders in the Australian renewable energy industry and energy markets.	PE1.1, PE3.2, PE3.6
3.	Apply economics and policy concepts and frameworks to identify market failures and barriers to renewable and distributed energy deployment and integration in energy markets.	PE1.1, PE1.4, PE3.4, PE3.6
4.	Access market and industry data and analyse renewable energy business models and the impacts of market regulatory arrangements and policy instruments.	PE1.3, PE1.4, PE3.3, PE3.4, PE3.6
5.	Critically evaluate renewable energy and climate policy effectiveness, efficiency, equity and feasibility, and propose policy and market reform.	PE1.3, PE1.4, PE3.2, PE3.3

4. Teaching strategies

Lectures will be used to introduce policy and economic concepts, current status and issues for sustainable energy transitions, analysis frameworks and tools, and to describe a range of policy instruments and their application. Examples of policy approaches will be used to illustrate concepts and to provide context.

Tutorials are designed to engage students with the course material and current developments in renewable energy policy. Student-led discussion on the week's topic and participation in discussion will allow students to expand their knowledge of the subject, engage with alternative views and improve their critical thinking.

Within the course, students are encouraged to actively participate in order to maximize their own learning.

5. Course schedule

Wk	Lecture		
1	16-Feb	1. Course Intro. Energy Markets, Government, Policy	Admin; Intro to NEM dispatch; Debate: free market vs govt
2	23-Feb	2. RE Policy across the Technology Lifecycle	1,2. Market and government failures through the technology lifecycle
3	2-Mar	3. RE Deployment Policies	Assignment Prep - Energy policy landscape mapping
4	9-Mar	4. Tariffs for Electricity and Renewable Energy	3. Implications of RE tradeable target and auction schemes
5	16-Mar	5. Electricity Markets and RE Integration	4. Tariffs in a post-FiT world
6	23-Mar	Flexibility Week	Assignment individual feedback
7	30-Mar	6. Distributed Energy Resources & Retail Markets	5. Renewable energy transitions and integration in electricity markets
8	6-Apr	7. GHG Emissions Policy	6. New DER business models
9	13-Apr	8. Network Planning, Regulation and RE	7. Australian Emissions Policy
10	20-Apr	9. International Climate Change Agreements	9. Climate Role-Play: International Agreements

Module 1 - Introduction to Government, Public Policy, and Energy Governance in Australia
Module 2 - Renewable Energy Industry, Investment and Policy
Module 3 - Electricity Industry Regulation and RE Integration
Module 4 - Climate Policy

6. Assessment

Assessment overview

Assessment	Group Project? (#per group)	Length	Weight	Learning outcomes assessed	Assessment criteria	Due date and submission requirements	Deadline for absolute fail	Marks returned
Tutorial Facilitation	Yes (4-5)	20 minutes	20%	1,2,3,4	Details of tutorial facilitation tasks and assessment criteria are provided via Moodle.	In class as per course schedule	Adequate explanation will need to be provided for missed tutorials otherwise a mark of zero will be recorded for tutorial facilitation in that week. Students who arrive very late or leave the tutorial before the end of class without explanation will also receive a mark of zero.	Each group will be given a mark at the end of the semester for tutorial participation. Intermediate marrks and feedback will be provided throughout semester.
Assignment	No	Report	40%	2,3,4,5	Details of assessment criteria are provided via Moodle.	Final report due week 11 with intermediate assessments due Friday week 4 and during week 7 class.	Late assignments will be penalised 5% plus 5% per day that the work is late, to a maximum penalty of 50%, unless acceptable reasons are given. Assignments will be submitted to Turnitin plagiarism detection software, and plagiarism will be penalised.	Feedback given in person in week 7. Marks for final report, within 3 weeks
Final exam	No	2 hours	40%	1, 3 and 5	Questions may be drawn from any aspect of the course, unless specifically indicated otherwise by the lecturer.	Exam period, date TBC	N/A	Upon release of final results

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Assignments

Assessment consists of tutorial facilitation, lecture participation, a written assignment (with intermediate assessment and feedback stages), and a final examination paper. Details of assignment and tutorial facilitation tasks will be provided via Moodle.

Assessment Rationale

Preparation for and facilitation of tutorial discussions will encourage students to actively engage in the course throughout the semester. Written assignments will require students to collect information about energy policies and regulations, their context, application and detailed design; to use modelling, analysis and frameworks to evaluate policy effectiveness, efficiency and impact on different stakeholder groups. The final exam will test understanding of the concepts introduced in the course and their application to policy analysis.

Tutorials will follow one of two formats:

1. Student led discussion and/or activities related to the current topic.
Groups, each of around 4-5 students, will be formed in the first tutorial. For the tutorial topics numbered in the course schedule below, groups will be allocated tutorial preparation and facilitation tasks.

Guidance and assessment criteria will be provided on facilitating the tutorial. Groups are encouraged to consult their tutor for support or feedback in relation to their preparation. The UNSW Learning Centre also provides advice to students on participating in tutorial discussions.

2. Support for assignment
The assignment is staged and feedback is provided to support student learning and skills development and improvement of the quality the final submissions. Prior to the week 3 tutorial, students submit their assignment proposal online, for discussion during the tutorial. During week 6, students will present part 1 of their assignment work for feedback from their tutor.

You may feel that the time required to complete the Tutorial and Assignment exercises is disproportionately large compared to their weighting in the assessment table. However, you should see these as formative assessment and note that performing well in the final exam will rely on knowledge and skills developed in tutorials and assignments.

Presentation

All non-electronic submissions should have a standard School cover sheet, which is available from this course's Moodle page.

All submissions are expected to be neat and clearly set out. Presenting your work clearly and referencing carefully and thoroughly gives the marker the best chance of understanding your work, your methods, data, arguments and conclusions, and their basis in the literature; even if there are things that have been overlooked or misunderstood.

Submission

Work submitted late without an approved extension by the course coordinator or delegated authority is subject to a late penalty of 5% plus 5% per day that the work is late, to a maximum penalty of 50%. The late penalty is applied per calendar day (including weekends and public holidays) that the assessment is overdue. There is no pro-rata of the late penalty for submissions made part way through a day.

For some assessment items, a late penalty may not be appropriate. These are clearly indicated in the course outline, and such assessments receive a mark of zero if not completed by the specified date. Examples include:

a. Weekly online tests or laboratory work worth a small proportion of the subject mark, or
b. Online quizzes where answers are released to students on completion, or
c. Professional assessment tasks, where the intention is to create an authentic assessment that has an absolute submission date, or
d. Pass/Fail assessment tasks.

Marking

Marking guidelines for assignment submissions will be provided at the same time as assignment details to assist with meeting assessable requirements. Submissions will be marked according to the marking guidelines provided.

Examinations

You must be available for all quizzes, tests and examinations.

Final examinations for each course are held during the University examination periods: February for Summer Term, May for T1, August for T2, and November/December for T3.

Please visit myUNSW for Provisional Examination timetable publish dates.

For further information on exams, please see the Exams webpage.

Special consideration and supplementary assessment

If you have experienced an illness or misadventure beyond your control that will interfere with your assessment performance, you are eligible to apply for Special Consideration prior to submitting an assessment or sitting an exam.

Please note that UNSW now has a Fit to Sit / Submit rule, which means that if you sit an exam or submit a piece of assessment, you are declaring yourself fit enough to do so and cannot later apply for Special Consideration.

For details of applying for Special Consideration and conditions for the award of supplementary assessment, please see the information on UNSW's Special Consideration page.

7. Expected resources for students

There is no text book for this course, however, topic specific resources will be available via Moodle. In addition to government resources, consultant and NGO reports will often be useful for this course. Energy Policy is the most relevant academic journal, and relevant articles also appear in other more technology-focused journals such as Sustainable and Renewable Energy Reviews, Renewable Energy, Applied Energy, Progress in Photovoltaics, Wind Energy, Solar Energy etc.

Keeping up to date

RE policy-related media, reports and events.
During lectures and tutorials, material will be linked to current media and issues as appropriate. Students should subscribe to the ReNew Economy e-newsletter in order to keep abreast of the issues and understand the relevance of the course material (it is not necessary to read all of the articles, only those that are of most interest).

UNSW Library website: https://www.library.unsw.edu.au/
Moodle: https://moodle.telt.unsw.edu.au/login/index.php

8. Course evaluation and development

Feedback on the course is gathered periodically using various means, including the UNSW myExperience process, informal discussion in the final class for the course, and the School's Student/Staff meetings. Your feedback is taken seriously, and continual improvements are made to the course based, in part, on such feedback.

In this course, recent improvements resulting from student feedback include introduction to tools for accessing and analysis of energy market data.

9. Academic honesty and plagiarism

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. *Plagiarism at UNSW is defined as using the words or ideas of others and passing them off as your own.*

Plagiarism is a type of intellectual theft. It can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement. UNSW has produced a website with a wealth of resources to support students to understand and avoid plagiarism, visit: student.unsw.edu.au/plagiarism. The Learning Centre assists students with understanding academic integrity and how not to plagiarise. They also hold workshops and can help students one-on-one.

You are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting and the proper referencing of sources in preparing all assessment tasks.

If plagiarism is found in your work when you are in first year, your lecturer will offer you assistance to improve your academic skills. They may ask you to look at some online resources, attend the Learning Centre, or sometimes resubmit your work with the problem fixed. However more serious instances in first year, such as stealing another student's work or paying someone to do your work, may be investigated under the Student Misconduct Procedures.

Repeated plagiarism (even in first year), plagiarism after first year, or serious instances, may also be investigated under the Student Misconduct Procedures. The penalties under the procedures can include a reduction in marks, failing a course or for the most serious matters (like plagiarism in an honours thesis) even suspension from the university. The Student Misconduct Procedures are available here:
www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf

10. Administrative matters and links

All students are expected to read and be familiar with UNSW guidelines and polices. In particular, students should be familiar with the following:

- Attendance
- UNSW Email Address
- Special Consideration
- Exams
- Approved Calculators
- Academic Honesty and Plagiarism
- Equitable Learning Services

Appendix A: Engineers Australia (EA) Competencies

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