ELEC9781
Space Law and Radio Regulations
Course Outline – Semester 1, 2015

Never Stand Still | Faculty of Engineering | School of Electrical Engineering and Telecommunications

Course Staff

Course Convener: Dr. Elias Aboutanios Room 308 elias@unsw.edu.au
Guest Lecturer: Prof. Steven Freeland

Consultations: You are encouraged to ask questions on the course material, after the lecture class times in the first instance, rather than via email. When emailing the lecturer, ALL email enquiries should be made from your student email address with ELEC9781 in the subject line, otherwise they will not be answered. Lecturer consultation times will be advised during lectures.

Keeping Informed: Announcements may be made during classes, via email (to your student email address) and/or via online learning and teaching platforms – in this course, we will use Moodle https://moodle.telt.unsw.edu.au/login/index.php. Please note that you will be deemed to have received this information, so you should take careful note of all announcements.

Course Summary

Contact Hours

The course consists of 3 hours of lectures each week.

	Days	Time	Location
Lectures	Wednesday	6 - 9pm	ElecEng 222

Context and Aims

This course belongs to the Masters Program: ELECOS8338 - Masters of Engineering Science Extension in Satellite Systems Engineering (it is running under the Special Topics course only this semester as a replacement for ELEC9765).

Space is a realm for humankind and human space activities transcend national boundaries. Hence there is a need for space regulation to be implemented at both international and national levels. This exciting new course gives engineering students seeking a future in the space industry a solid grounding in space law and radio regulations. The course starts with an introduction to legal frameworks and the formulation of laws. It then covers the international treaties that comprise the international regulatory framework for space activities, leading to the study of national legislative systems with a focus on the Australian Space Activities Act 1998. The various engineering, environment, and regulatory implications of these legal systems will also be discussed.

In this course you will:

- Learn about the fundamental legal frameworks and how they are developed.
- Learn about the historical context of space law and the International Space Treaties governing human space activities.
- Describe the specific ‘hard’ and ‘soft’ law principles that have been developed for the regulation of activities in outer space, as well as the unique complexities inherent in

designing regulatory principles and guidelines for the space environment.

- Learn about national space legislations and in particular the Australian Space Activities Act 1998.
- Learn about the radio regulations frameworks and their application to space systems.
- Learn about the environmental aspects of space law (e.g. space debris).
- Learn about the implications of space law to a number of applications of satellites and spacecraft.
- Take a look at the future of Space from a legislative perspective (e.g. cubesats, space tourism...).

Indicative Lecture Schedule

Note that, as this course is running for the first time, the schedule is subject to change in order to optimise the delivery of the material.

Period	**Date**	**Summary of Lecture Program**
Week 1	Mon, 4 March	Introduction and housekeeping Introduction to International Law
Week 2	Wed, 11 March	The Legal Regime of Space Activities
Week 3	Wed, 18 March Fri, 20 March	The international legal framework for outer space *Assignment Posted on Moodle*
Week 4	Wed, 25 March	Environmental aspects of space activities: 'space sustainability'
Week 5	Wed, 1 April	Commercial uses of outer space
Break		
Week 6	Wed, 15 April	The role of space insurance
Week 7	Wed, 22 April	The impact of space law on engineering decisions
Week 8	Wed, 29 April	Overview of Australia's Space Activities
Week 9	Wed, 6 May	The Australian Space Activities Act
Week 10	Wed, 13 May Fri, 15 May	Military uses of space activities *Assignment due*
Week 11	Wed, 20 May	The needs of developing countries
Week 12	Wed, 27 May	Seminars
Week 13	Wed, 3 June	No lecture

Assessment

Assignment	25%
Seminar	15%
Final Exam (3 hours)	60 %

Course Details

Credits

This is a 6 UoC course and the expected workload is 10–12 hours per week throughout the 13 week semester. The University defines a UoC as requiring 25 hours of total learning effort per

semester (spread over lectures, tutorials, labs, and the student's own study time.) Therefore, it is expected that 150 hours will be allocated to this course.

Relationship to Other Courses

This is a masters course that forms part of the ELECOS8338 Satellite Systems Engineering Stream. It is also available to Undergraduate students as a substitution for an L4 elective (subject to approval by the Course and Program Authorities).

Pre-requisites and Assumed Knowledge

There is no assumed knowledge for this course.

Following Courses

Although this course is an integral part of the ELECOS8338 stream, and is recommended to be taken in the first semester of the degree, it is not a pre-requisite for any of the other courses.

Learning outcomes

After successful completion of this course, you should be able to:

1. Describe the legal systems governing space activities.
2. Describe the treaties on the use of outer space and their implications for the nations that are signatory to them.
3. Explain the need for national space legislation and describe the Australian Space Activities Act.
4. Describe the various uses of outer space, the engineering decisions involved, and the legal principles that govern them.

This course is designed to provide the above learning outcomes which arise from targeted graduate capabilities listed in Appendix A. The targeted graduate capabilities broadly support the UNSW and Faculty of Engineering graduate capabilities (listed in Appendix B). This course also addresses the Engineers Australia (National Accreditation Body) Stage I competency standard as outlined in Appendix C.

Teaching Strategies

Delivery Mode

The primary delivery of material in this course is via face-to-face lecturing.

Learning in this Course

You are expected to attend all lectures, and attempt the assignment and seminar in order to maximise learning. Prior to each lecture you should prepare the recommended reading if given. In addition to the lecture notes/video, you should read relevant sections of the recommended text. Reading additional texts will further enhance your learning experience. Group learning is also encouraged. UNSW assumes that self-directed study of this kind is undertaken in addition to attending face-to-face classes throughout the course.

Assessment

The assessment scheme in this course reflects the intention to assess your learning progress through the semester. The assessment is implemented in the form of the assignment, seminar, and final exam.

Laboratory Assessment

Laboratories are primarily about learning, and the laboratory assessment is designed mainly to check your knowledge as you progress through each stage of the laboratory tasks. You are required to maintain a lab book for recording your observations. A lab book is an A4 size notebook containing a mix of plain pages and graph sheets. You have to purchase your own lab book from any stores.

It is essential that you complete the laboratory preparation before coming to the lab. You are required to write the aim of the experiment and draw the circuit diagram if any in your lab book. This will be verified and signed by your demonstrators in the lab. You will be recording your observations/readings in your lab book first and then completing and submitting the results sheet before leaving the lab.

After completing each experiment, your work will be assessed by the laboratory demonstrator. Both the results sheet and your lab book will be assessed by the laboratory demonstrator.

Assessment marks will be awarded according to your preparation (completing set preparation exercises and correctness of these or readiness for the lab in terms of pre-reading), how much of the lab you were able to complete, your understanding of the experiments conducted during the lab, the quality of the code you write during your lab work (according to the guidelines given in lectures), and your understanding of the topic covered by the lab.

Assignment

The assignment allows self-directed study leading to the solution of partly structured problems. Marks will be assigned according to how completely and correctly the problems have been addressed, the quality of the code written for the assignment (must be attached to the report), and the understanding of the course material demonstrated by the report.

The assignment will be posted on Moodle by Friday March 20, and the final report will be due by 5pm on Friday May 15. Submission will be done via Moodle. Late reports will attract a penalty of 10% per day (including weekends).

Final Exam

The exam in this course is a standard closed-book 3 hour written examination. University approved calculators are allowed. The examination tests critical thinking and general understanding of the course material in a controlled fashion. Questions may be drawn from any any material delivered during the course, unless specifically indicated otherwise by the lecturer. Marks will be assigned according to the correctness of the responses. Please note that you must pass the final exam in order to pass the course.

Relationship of Assessment Methods to Learning Outcomes

	Learning Outcomes						
Assessment	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Laboratory practical assessments	✓		✓				
Lab exam				✓			
Mid-semester exam		✓					✓
Assignment						✓	
Final exam					✓		

Course Resources

Textbooks

This course does not have a prescribed textbook and relevant reading from any source is encouraged. However, recommended text include (but are not limited to) the list below. Additional reference material may be posted on Moodle

Reference books

- Diederiks-Verscoor and Kopal, An Introduction to Space Law, Wolters Kluwer, 2008
- Lyall and Larsen, Space Law: A Treatise, Ashgate Publishing, 2009
- Jakhu, National Regulation of Space Activities, Springer, 2010

On-line resources

Moodle

As a part of the teaching component, Moodle will be used to disseminate teaching materials, host forums and occasionally quizzes. Assessment marks will also be made available via Moodle: https://moodle.telt.unsw.edu.au/login/index.php.

Mailing list

Announcements concerning course information will be given in the lectures and/or on Moodle and/or via email (which will be sent to your student email address).

Other Matters

Academic Honesty and Plagiarism

Plagiarism is the unacknowledged use of other people's work, including the copying of assignment works and laboratory results from other students. Plagiarism is considered a form of academic misconduct, and the University has very strict rules that include some severe penalties. For UNSW policies, penalties and information to help you avoid plagiarism, see: https://student.unsw.edu.au/plagiarism. To find out if you understand plagiarism correctly, try this short quiz: https://student.unsw.edu.au/plagiarism-quiz.

Student Responsibilities and Conduct

Students are expected to be familiar with and adhere to all UNSW policies (see https://my.unsw.edu.au/student/atoz/ABC.html), and particular attention is drawn to the following:

Workload

It is expected that you will spend at least **ten to twelve hours per week** studying a 6 UoC course, from Week 1 until the final assessment, including both face-to-face classes and independent, self-directed study. In periods where you need to need to complete assignments or prepare for examinations, the workload may be greater. Over-commitment has been a common source of failure for many students. You should take the required workload into account when planning how to balance study with employment and other activities.

Attendance

Regular and punctual attendance at all classes is expected. UNSW regulations state that if students attend less than 80% of scheduled classes they may be refused final assessment.

General Conduct and Behaviour

Consideration and respect for the needs of your fellow students and teaching staff is an expectation. Conduct which unduly disrupts or interferes with a class is not acceptable and students may be asked to leave the class.

Work Health and Safety

UNSW policy requires each person to work safely and responsibly, in order to avoid personal injury and to protect the safety of others.

Special Consideration and Supplementary Examinations

You must submit all assignments and attend all examinations scheduled for your course. You should seek assistance early if you suffer illness or misadventure which affects your course progress. All applications for special consideration must be **lodged online through myUNSW within 3 working days of the assessment**, not to course or school staff. For more detail, consult: https://student.unsw.edu.au/special-consideration.

Continual Course Improvement

This course is under constant revision in order to improve the learning outcomes for all students. Please forward any feedback (positive or negative) on the course to the course convener or via the Course and Teaching Evaluation and Improvement Process. You can also provide feedback to ELSOC who will raise your concerns at student focus group meetings. As a result of previous feedback obtained for this course and in our efforts to provide a rich and meaningful learning experience, we have continued to evaluate and modify our delivery and assessment methods. <You should insert here changes made to the current version of the course in response to previous feedback>

Administrative Matters

On issues and procedures regarding such matters as special needs, equity and diversity, occupational health and safety, enrolment, rights, and general expectations of students, please refer to the School and UNSW policies:
http://www.engineering.unsw.edu.au/electrical-engineering/policies-and-procedures
https://my.unsw.edu.au/student/atoz/ABC.html

Appendices

Appendix A: Targeted Graduate Capabilities

Electrical Engineering and Telecommunications programs are designed to address the following targeted capabilities which were developed by the school in conjunction with the requirements of professional and industry bodies:

- The ability to apply knowledge of basic science and fundamental technologies;
- The skills to communicate effectively, not only with engineers but also with the wider community;
- The capability to undertake challenging analysis and design problems and find optimal solutions;
- Expertise in decomposing a problem into its constituent parts, and in defining the scope of each part;
- A working knowledge of how to locate required information and use information resources to their maximum advantage;
- Proficiency in developing and implementing project plans, investigating alternative solutions, and critically evaluating differing strategies;
- An understanding of the social, cultural and global responsibilities of the professional engineer;
- The ability to work effectively as an individual or in a team;
- An understanding of professional and ethical responsibilities;
- The ability to engage in lifelong independent and reflective learning.

Appendix B: UNSW Graduate Capabilities

The course delivery methods and course content directly or indirectly addresses a number of core UNSW graduate capabilities, as follows: <select those which apply (maybe 3-5) and adapt to suit course>

- Developing scholars who have a deep understanding of their discipline, through lectures and solution of analytical problems in tutorials and assessed by assignments and written examinations.
- Developing rigorous analysis, critique, and reflection, and ability to apply knowledge and skills to solving problems. These will be achieved by the laboratory experiments and interactive checkpoint assessments and lab exams during the labs.
- Developing capable independent and collaborative enquiry, through a series of tutorials spanning the duration of the course.
- Developing digital and information literacy and lifelong learning skills through assignment work.
- Developing ethical practitioners who are collaborative and effective team workers, through group activities, seminars and tutorials.
- Developing independent, self-directed professionals who are enterprising, innovative, creative and responsive to change, through challenging design and project tasks.
- Developing citizens who can apply their discipline in other contexts, are culturally aware and environmentally responsible, through interdisciplinary tasks, seminars and group activities.

<more detail: https://my.unsw.edu.au/student/atoz/GraduateAttributes.html – please consult this particularly if your course develops skills in team work, leadership, design (innovation and creativity), ethics or communication skills>

Appendix C: Engineers Australia (EA) Professional Engineer Competency Standard

	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	✓