School of Electrical Engineering and Telecommunications

Semester 2, 2018
Course Outline

TELE9781
Information Storage and Cloud Computing

COURSE STAFF

Course Convener: Dr. Guo Chen, Room Hilmer Building 519, guo.chen@unsw.edu.au

Lecturers: Mr. Vincent Wei vincent.wei@itic.com.au
(Huawei and Cisco Certified Internetwork Expert)

Dr. Guo Chen, guo.chen@unsw.edu.au

Consultations: You are encouraged to ask questions on the course material, after the lecture class times in the first instance, rather than via email. All email enquiries should be made from your student email address with TELE9781 in the subject line; otherwise they will not be answered.

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.

Lectures	Day	Time	Location
Running Week1-12	Tuesday	18:00 - 21:00	UNSW Business School 232 (K-E12-232)

Context and Aims

We are now in a digital era in which the world's information is more than doubling every two years. Virtualization and cloud computing are no longer an option for enterprises but an imperative for survival. The Cloud has introduced radically new technologies, computing models, and disciplines, dramatically changing the way IT is built, run, governed, and consumed. It has created new roles such as cloud technologists and cloud architects to lead this transformation. This course will give you an updated perspective and behind-the-scenes view of the new technologies and skills required today to design, implement, manage, optimize, and leverage virtualized infrastructures to achieve the business benefits of the cloud. You will learn from Huawei subject matter experts with the most advanced training, certification, and practical experience in the industry.

Indicative Lecture Schedule

Period	Summary of Lecture Program
Week 1	Introduction to Storage System Storage System Environment RAID
Week 2	Intelligent Storage System, DAS and Introduction to SCSI Fibre Channel Storage Area Network
Week 3	IP SAN and FCOE NAS
Week 4	Object-Based and Unified Storage Introduction to Business Continuity Backup and Archive
Week 5	Local Replication Remote Replication
Week 6	Securing the Storage Infrastructure Managing the Storage Infrastructure
Week 7	Mid-term test
Week 8	Cloud Computing Concepts, Models, and Terminology Network Infrastructure
Week 9	Virtualization Components Virtualization and the Cloud
Week 10	DevOps Performance Tuning
Week 11	System Management Security in the Cloud
Week 12	Security Best Practice Test, Automation and Changes Troubleshooting
Week 13	Catch up

Assessment

The following summative assessment tasks will give you your final mark for Semester 2, 2018.

Quiz 1   (40 mins)   10%
Quiz 2   (40 mins)   10%
Mid-term Exam (1 hour)   20%
Final Exam   (2 hours)   60%

- The Quiz 1 is scheduled in week 6, the Mid-term exam is scheduled in week 7 and the Quiz 2 is scheduled in week 13, all in lecture hours.
- The date of the Final exam will be announced by the University.

COURSE DETAILS

Credits

This is a 6 UoC course and the expected workload is 10–12 hours per week throughout the 13-week semester.

Relationship to Other Courses

This is a postgraduate elective course in the School of Electrical Engineering and Telecommunications. It is an elective course for students who have a BE in Electrical, or Telecommunications or Computer and other combined degree programs.

Pre-requisites and Assumed Knowledge

There are no pre-requisites for this course but it would be very helpful to have basic understanding of networking technologies, for example: TCP/IP model, IP addressing, routing and switching (equivalent to TELE3118)

Learning outcomes

After successful completion of this course, you should be able to:
1. Configure basic networks to include archive, backup, and restoration technologies.
2. Understand the fundamentals of business continuity, application workload, system integration, and storage/system administration, while performing basic troubleshooting on connectivity issues and referencing documentation.
3. Understand standard Cloud terminologies/methodologies, to implement, maintain, and deliver cloud technologies and infrastructures (e.g. server, network, storage, and virtualization technologies).
4. Understand aspects of IT security and use of industry best practices related to cloud implementations and the application of virtualization.

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 teaching in this course aims at establishing a good fundamental understanding of the areas covered using formal face-to-face lectures.

Learning in this course

You are expected to attend all lectures in order to maximise learning. In addition to the lecture notes, you should read relevant sections of the recommended text. Reading additional texts will further enhance your learning experience.

ASSESSMENT

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

Quiz

There will be two quizzes during lecture session as scheduled above.

Mid-term Exam

There will be a one-hour exam during lecture session as scheduled above. Questions may be drawn from any course material up to the end of week 6. Marks will be assigned according to the correctness of the responses.

Final Exam

The exam in this course is a standard closed-book 2 hours written examination. Questions may be drawn from any aspect of 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

Assessment	1	2	3	4
Quiz 1	✓	✓		
Mid-term exam	✓	✓	-	-
Quiz 2			✓	✓
Final exam	✓	✓	✓	✓

COURSE RESOURCES

Textbooks

Prescribed textbook

- "Data Storage Networking", Nigel Poulton, Sybex
- "CompTIA Cloud+ Certification Study Guide, Second Edition (Exam CV0-002)", Scott Wilson, McGraw-Hill

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

Dates to note

Important Dates available at: https://student.unsw.edu.au/dates

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://student.unsw.edu.au/guide), 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 Behavior

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 online student survey myExperience. 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.

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:
https://student.unsw.edu.au/guide
https://www.engineering.unsw.edu.au/electrical-engineering/resources

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

- 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.

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	