

INFS2607

Networking and Infrastructure

Course Outline

Semester 2, 2017

Course-Specific Information

The Business School expects that you are familiar with the contents of this course outline. You must also be familiar with the Course Outlines Policies webpage which contains key information on:

- Program Learning Goals and Outcomes
- Academic Integrity and Plagiarism
- Student Responsibilities and Conduct
- Special Consideration
- Student Support and Resources

This webpage can be found on the Business School website:

<https://www.business.unsw.edu.au/degrees-courses/course-outlines/policies>

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COURSE-SPECIFIC INFORMATION

1 STAFF CONTACT DETAILS

Position	Name	Email	Room
Lecturer-in-charge	Yenni Tim	yenni.tim@unsw.edu.au	2102, Level 2, Quad Building West Wing

LIC Consultation Time – **Thursday, 13:00 – 15:00** (or by appointment)

The best way to contact your lecturer or tutor is via email or to see them during their consultation times. Please use your **UNSW email account** to contact staff members. The subject of your email should begin with the course code (i.e., INFS2607).

To protect student privacy, staff members will not answer queries or disclose information relating to assessments of students if a non-UNSW email account is used. Please note that formal notices and correspondence regarding the course will only be sent to your UNSW email account.

Please contact the School Office (QUAD2091) should you not be able to contact either the Lecturer or your tutor. Alternatively, if you need to contact the school urgently, ring +61 (2) 9385-5320 or email: istm@unsw.edu.au.

2 COURSE DETAILS

2.1 Teaching Times and Locations

Lectures start in Week 1 (to Week 12)

Time: Monday, 11:00 – 13:00

Location: Chemical Sc M18 (K-F10-M18)

Tutorials start in Week 2 (to Week 13)

A full list of tutorials, times and tutors will be posted on the Course Website. For latest information about the lecture and tutorial locations, see: <http://timetable.unsw.edu.au/2017/INFS2607.html>

You must attend the workshop in which you are enrolled. If you are unable to attend your allocated workshop due to illness or misadventure, you must contact your LIC as soon as possible.

2.2 Units of Credit

The course is worth 6 units of credit.

2.3 Summary of Course

This course is about information technology infrastructure in a business environment, including inter-networked data communications and distributed data processing. Topics covered include, the business imperatives for distributed systems, systems architectural design (client/server; distributed processing, etc) layered architecture models (TCP/IP,

OSI, etc): key network models and technologies, security issues related to architecture, design and technology, network configuration and management techniques.

2.4 Course Aims and Relationship to Other Courses

The prerequisite for this course is INFS1602 Information Systems in Business. This course aims to provide you with a learning experience which encourages hands-on learning and building of ideas in regard to current issues in business data networks, telecommunications and infrastructure. You will learn about the managerial issues associated with the design and management of networking and infrastructure as well as gaining technical and practical skills in the setup and management of basic networks.

2.5 Student Learning Outcomes

The Course Learning Outcomes are what you should be able to DO by the end of this course if you participate fully in learning activities and successfully complete the assessment items. On successful completion of this course, you should:

1. Demonstrate ability to analyse data communications and networking issues in business environments.
2. Describe the principles of distributed data processing and the effect of application system design decisions on the supporting telecommunication systems.
3. Demonstrate ability to analyse issues associated with business data networks security and analyse possible networking solutions.
4. Demonstrate ability to identify, connect and install basic network devices.
5. Develop skills to diagnose basic computer communication problems and to develop the necessary strategies to work towards their resolution.
6. Demonstrate ability to evaluate the technical and economic issues which are associated with the deployment/upgrade of networks within the context of a specific business context.

The Learning Outcomes in this course also help you to achieve some of the overall Program Learning Goals and Outcomes for all undergraduate students in the Business School. Program Learning Goals are what we want you to BE or HAVE by the time you successfully complete your degree (e.g. 'be an effective team player'). You demonstrate this by achieving specific Program Learning Outcomes – what you are able to DO by the end of your degree (e.g. 'participate collaboratively and responsibly in teams').

For more information on Program Learning Goals and Outcomes, see the School's Course Outlines Policies webpage available at <https://www.business.unsw.edu.au/degrees-courses/course-outlines/policies>.

The following table shows how your Course Learning Outcomes relate to the overall Program Learning Goals and Outcomes, and indicates where these are assessed (they may also be developed in tutorials and other activities):

<i>This course helps you to achieve the following learning goals for all Business undergraduate students:</i>		<i>On successful completion of the course, you should be able to:</i>	<i>This learning outcome will be assessed in the following items:</i>
1	Knowledge	<p>Demonstrate ability to analyse data communications and networking issues in business environments.</p> <p>Demonstrate ability to analyse issues associated with business data networks security and analyse possible networking solutions.</p> <p>Demonstrate ability to evaluate the technical and economic issues which are associated with the deployment/upgrade of networks within the context of a specific business context.</p>	<ul style="list-style-type: none"> • Tutorial Problems • Quiz • Final Exam
2	Critical thinking and problem solving	<p>Develop skills to diagnose basic computer communication problems and to develop the necessary strategies to work towards their resolution.</p> <p>Demonstrate ability to identify, connect and install basic network devices.</p>	<ul style="list-style-type: none"> • Tutorial Problems • Quiz • Final Exam
3a	Written communication	Describe the principles of distributed data processing and the effect of application system design decisions on the supporting telecommunication systems.	<ul style="list-style-type: none"> • Tutorial Problems • Final Exam
3b	Oral communication	Not specifically addressed in this course.	
4	Teamwork	Not specifically addressed in this course.	
5a	Ethical, social and environmental responsibility	Not specifically addressed in this course.	
5b	Social and cultural awareness	Not specifically addressed in this course.	

3 LEARNING AND TEACHING ACTIVITIES

3.1 Approach to Learning and Teaching in the Course

This course introduces you to the fundamentals of information technology (IT) infrastructure, business data communications, network management and security. Content covered in this course serves as to facilitate understanding of the physical and logical infrastructure of IT networks and to learning the design and the management of IT network for business.

The course uses a combination of lectures and digital sandboxing workshops to assist and enhance student learning. The interactive lectures help to facilitate students' understanding of the concepts and the hands-on sandboxing workshops provide a simulated environment for students to apply the concepts to solving different problem scenarios.

The topics and contents covered in this course are technical by nature. While the lectures and workshops are designed to assist your learning, it is vital that you study from Week 1. Essentially, this means that you should read the course materials and prepare for all your lectures and workshops. The course team will facilitate your learning by providing the guidance as to what you need to study, and working with you on problems you may encounter. It is, however, your responsibility to make a concerted and timely effort to study. If you make this effort, you will find the material interesting, the course worthwhile and the interaction with your fellow students stimulating. You should also do well.

3.2 Learning Activities and Teaching Strategies

Each lecture will outline the main concepts for this course. Each week, the LIC will begin by reviewing and clarifying material previously covered. The LIC will then introduce a new topic, highlight relevant study material and present students with relevant materials. The lecture will also be interactive; the LIC will use the lecture time to pose questions to students and hold class discussions on topics covered. The technical nature of this course and the comprehensiveness of content covered make it crucial that every student properly prepare themselves for each lecture. Preparation for classes includes a thorough reading of the reference chapter(s), independent research and self-learning on the topic(s). Students should also identify areas that need further explanations and discussions in class. It is expected that you will spend approximately 10 hours per week studying for this course. This time should be made up of reading, revision, working on exercises and problems, and attending classes (lectures and tutorials). In periods where you need to complete quizzes or prepare for examinations, the workload may be greater.

Tutorials will be used to reinforce and apply concepts covered in lectures and study materials. Tutorials are the key element of the course. Tutorials for INFS2607 will be run as bi-weekly sandboxing workshops. These workshops provide an intellectually stimulating hands-on environment for students to experiment with and design simple network configurations to perform different tasks in a virtual, simulated environment (i.e., using virtual machines). Over the semester, you will engage in a variety of different problem-solving scenarios that build in complexity and that call for different combinations of knowledge and skills. Being prepared for your workshops is therefore essential. Student should routinely check what materials they are expected to read/complete prior to each sandboxing session. This includes completing any activities you have been asked to do in preparation for your next workshop as well as reviewing your lecture notes from your previous lecture. The sandboxing workshop will also give you the opportunity to discuss your work with fellow students and tutor, and hence gain an indication of your own progress. Students should also use their workshop time to ask questions for clarifications on the material covered in class as well as their study material.

4 ASSESSMENT

4.1 Formal Requirements

To receive a pass grade in this course, you must meet ALL of the following criteria:

- Achieve a composite mark of at least 50.
- Attend at least 80% of all scheduled classes.
- Attain a satisfactory performance in each component of the course. A mark of 45% or higher is normally regarded as satisfactory.
- Attain a mark of at least 45% in the final exam.

The School reserves the right to scale final marks to a mean of 60%.

4.2 Assessment Details

Assessment Task	Weighting	Length	Due Date
Tutorial Participation	20%	See below	Tutorials, Weeks 2 – 13
Mid Semester Quiz	20%	See below	Week 9 lecture time
Final Exam	60%	2 hours	University Exam Period
Total	100%		

Tutorial Preparation and Participation (20%)

Tutorials will be run as bi-weekly sandboxing workshops from Week 2 to Week 13 (with the exception of Week 10 and Week 11, which has no workshops). A sandboxing workshop provides an intellectually stimulating, hands-on environment where students will be engaged in problem solving and network design. Students will work in a group of 2 and attend 5 sandboxing workshops throughout the semester (i.e., even-week session OR odd-week session). The role of the sandboxing workshops is to help build your understanding through the application of what you have learnt (i.e., concepts of networking) to perform different tasks and solve different problems.

Students are required to prepare for each workshop and the workshop will require your **full participation**. Marks will be given for students who have prepared (i.e., completed any necessary self-study and preparation work), are on-time for the workshops and actively participate in the sandboxing activities. Active participation includes, but is not limited to: providing solutions for exercises; engaging in discussions; asking and answering questions; and taking notes. Students who are not prepared for a workshop, are late for the workshop, and/or are not fully engaged during the workshop itself (e.g. occupied with social networking, surfing the web, checking mail, etc.) may not be awarded an assessment mark. Detailed expectations for workshop preparation and participation will be discussed in your first lecture.

Please note: All students are expected to adhere to **their allocated workshop times**. If you are unable to attend your allocated workshop due to illness or misadventure, you must contact your LIC as soon as possible. Students will also be required to sign an attendance sheet each week. It is your responsibility to ensure that you arrive on time and sign the attendance sheet. Without a signature or failure to sign on the attendance

roll **before the end of the 10th minute from the start time of the workshop**, you will be marked as ABSENT even if you have attended the workshop or arrived on time.

Mid Semester Quiz (20%)

The mid-session quiz will be a 40 question multiple choice quiz conducted during the lecture time. Students will be given 50 minutes to answer the quiz. The quiz will cover ALL materials presented in the lectures 1-8 as well as laboratory sessions 1-3.

IMPORTANT: The mid semester quiz will be administered in an **examination condition**. Students will be required to arrive at the lecture venue **not less than 5 minutes before the lecture time** in Week 9 and display the UNSW student identification card for the duration of the quizzes. More specific details for each quiz and additional rules governing the conduct of the quiz will be uploaded on Moodle website.

Final Examination (60%)

A formal, closed-book, written examination will take place during the University Exam Period. The examination time will be 2 hours. The examination is worth 50% of the total marks for this course. You must plan to be available for the full examination period to attend the final exam. In addition, you should also ensure that you will be available for a supplementary examination in the event of illness or misadventure. All material covered in lectures, tutorials, exercises, and set readings is examinable. All exams are conducted in accordance with the UNSW Rules for the Conduct of Examinations and it is your responsibility to be familiar with these rules.

4.3 Special Consideration, Late Submission and Penalties

For information on Special Consideration please refer to the Business School's [Course Outlines Policies webpage](#).

4.4 Protocol for viewing final exam scripts

The School of Information Systems and Technology Management (ISTM) has set a protocol under which students may view their final exam script. ISTM exam script viewing day is usually a day after the official release of results. Details will be posted on both the school website and on your course Moodle.

Quality Assurance

The Business School is actively monitoring student learning and quality of the student experience in all its programs. A random selection of completed assessment tasks may be used for quality assurance, such as to determine the extent to which program learning goals are being achieved. The information is required for accreditation purposes, and aggregated findings will be used to inform changes aimed at improving the quality of Business School programs. All material used for such processes will be treated as confidential.

5 COURSE RESOURCES

The website for this course is on Moodle at:
<http://moodle.telt.unsw.edu.au>

The textbook for this course is:

Business Data Communications: Infrastructure, Networking and Security
by Stallings W. and Case, T
7th ed., Prentice Hall, Upper Saddle River, 2013

Student resources for the Stallings *Business Data and Computer Communications* are available at: <http://williamstallings.com/BusinessDataComm/BDC7e-student/>

Recommended Reading

- Comer, D., *Internetworking with TCP/IP volume 1: Principles, Protocols and Architecture*, 6th ed., Prentice Hall, 2013.
- Comer, D., *Computer Networks and Internets*, 6th ed., Prentice Hall, 2014.
- Stallings W., *Data and Computer Communications*, 9th ed., Prentice Hall, Upper Saddle River, 2011.

6 COURSE EVALUATION AND DEVELOPMENT

Each year feedback is sought from students and other stakeholders about the courses offered in the School and continual improvements are made based on this feedback. UNSW's myExperience survey is one of the ways in which student evaluative feedback is gathered. In this course, we will seek your feedback through end of semester myExperience responses.

7 COURSE SCHEDULE

Lecture Schedule

Lectures start in Week 1 and finish in Week 12.

LECTURE SCHEDULE		
Week	Topic	Reference
Week 1 24 July	Course Introduction <ul style="list-style-type: none"> • Benefits of telecommunications • Distributed data processing • OSI 	Stallings Ch. 1, 3
Week 2 31 July	Data Communications <ul style="list-style-type: none"> • Data transmission • Transmission media • Data communications interface • Data link control • Multiplexing 	Stallings Ch. 4-6
Week 3 7 August	Data Communications <ul style="list-style-type: none"> • Data transmission • Transmission media • Data communications interface • Data link control • Multiplexing 	Stallings Ch. 4-6
Week 4 14 August	TCP/IP <ul style="list-style-type: none"> • IPv4 • Routing • IP & ICMP • TCP & UDP • Inter-router protocols • IPv6 • TCP/IP infrastructure 	Stallings Ch. 7-8, 11
Week 5 21 August	TCP/IP <ul style="list-style-type: none"> • IPv4 • Routing • IP & ICMP • TCP & UDP • Inter-router protocols • IPv6 • TCP/IP infrastructure 	Stallings Ch. 7-8, 11
Week 6 28 August	TCP/IP <ul style="list-style-type: none"> • IPv4 • Routing • IP & ICMP • TCP & UDP • Inter-router protocols • IPv6 • TCP/IP infrastructure 	Stallings Ch. 7-8, 11

Week 7 4 September	TCP/IP <ul style="list-style-type: none"> • IPv4 • Routing • IP & ICMP • TCP & UDP • Inter-router protocols • IPv6 • TCP/IP infrastructure 	Stallings Ch. 7-8, 11
Week 8 11 September	Local Area Networks <ul style="list-style-type: none"> • LAN Architecture and Protocols • Ethernet • Wireless LANS • Virtual LANs • LAN infrastructure 	Stallings Ch. 12-14
Week 9 18 September	Mid-Session Quiz Local Area Networks <ul style="list-style-type: none"> • LAN Architecture and Protocols • Ethernet • Wireless LANS • Virtual LANs • LAN infrastructure 	Stallings Ch. 12-14
Mid-semester break: 23 September – 2 October inclusive (2 Oct = Labour Day Public Holiday)		
Week 10 3 October	NO LECTURES	Stallings Ch. 12-14
Week 11 9 October	Local Area Networks <ul style="list-style-type: none"> • LAN Architecture and Protocols • Ethernet • Wireless LANS • Virtual LANs • LAN infrastructure 	Stallings Ch. 12-14
Week 12 16 October	Information Integrity <ul style="list-style-type: none"> • Security threats • Encryption • Vulnerability and Disaster Recovery • Security infrastructure • Ethical issues 	Stallings Ch. 18-19
Week 13 23 October	<i>Revision Lecture</i>	

Please note that we will NOT cover all the material covered in the listed chapters of the textbook. The textbook should be treated as a resource to provide supporting information on the material covered in the lectures.

Tutorial Schedule

Tutorials start in Week 2 (or 3) and finish in Week 12 (or 13) depending on your workshop session.

TUTORIAL SCHEDULE		
Week	Topic	References
Week 1 24 July	NO TUTORIALS	
Week 2 31 July OR Week 3 7 August	Lab 1: Introduction to Virtual Machines The labs in this course will make extensive use of virtual machines and Linux to allow hands-on experience with networking. This lab provides the required background knowledge about the Virtual Box software and Ubuntu Linux operating system required to complete the subsequent labs.	Stallings Ch. 1
Week 4 14 August OR Week 5 21 August	Lab 2: Packets and Protocols A packet sniffing software will be used to examine various protocols like Hyper-Text Transfer Protocol (HTTP) and Address Resolution Protocol (ARP).	Stallings Ch. 4-6
Week 6 28 August OR Week 7 4 September	Lab 3: DHCP & DNS Configure the Linux image to be a Domain Name System (DNS) Server and a Dynamic Host Configuration Protocol (DHCP) Server.	Stallings Ch. 7-8
Week 8 11 September OR Week 9 18 September	Lab 4: Hubs, Switches & Routing Protocols Use network simulation software (Imunes) to examine how hubs and switches work and also investigate the RIP routing protocol. Imunes allows you to simulate different network set-ups and simulate the effects.	Stallings Ch. 11, 12-14
Mid-semester break: 23 September – 2 October inclusive (2 Oct = Labour Day Public Holiday)		
Week 10 3 October OR Week 11 9 October	NO TUTORIALS	
Week 12 16 October OR Week 13 23 October	Lab 5: Firewalls and VPNs This lab will look at security, specifically setting up a virtual private network (VPN).	Stallings Ch. 18-19