Course Outlines

https://courseoutline.auckland.ac.nz/dco/course/COMPSCI/315/1205

COMPSCI 315 : Data Communications Technologies

Science

2020 Semester Two (15 POINTS)

Course Prescription

The structure of data communications and networks, including the internet, covering all levels of the communications architecture. The layered protocol model, data transmission and coding, link-level and local area network protocols, wide-area internet working, routing, transport and security protocols. Basic application protocols as the foundation for distributed computing.

Course Overview

The course focuses on the fundamentals and technologies of data communications and computer networks. Students taking this course shoud have a coarse understanding of protocol stacks as taught in COMPSCI110 and of the Internet protocols and technologies taught in COMPSCI215. COMPSCI315 fills in the gaps and develops a comprehensive understanding of what makes data communications tick at all layers. Students taking this course will become familiar with the fundamental limits of data communication as well as with the approaches taken in the development of common communication technologies, along with the challenges, trade-offs and alternative approaches involved. This course prepares students for the postgraduate course COMPSCI742 and any role in which they may need to assess competing options for data communication solutions, troubleshoot communication systems, or choose elements to include in the design of a system. The course is delivered using the bottom-up approach following the TCP/IP protocol stack.

· Part 1 covers physical layer.
· Part 2 covers the network layer and transport layers
· Part 3 covers the application layer, CDNs and Internet measurement / analysis.

Course Requirements

Prerequisite: COMPSCI 210, 215 Restriction: COMPSCI 314

Capabilities Developed in this Course

Capability 1:   Disciplinary Knowledge and Practice

Capability 2:   Critical Thinking

Capability 3:   Solution Seeking

Capability 4:   Communication and Engagement

Capability 5:   Independence and Integrity

Capability 6:   Social and Environmental Responsibilities

Graduate Profile: Bachelor of Science

Learning Outcomes

By the end of this course, students will be able to:

1. Explain and apply how signals and data are transmitted over various media, including coding mechanisms, compression techniques, and data integrity (Capability 1, 2 and 3)
2. Explain and apply how network protocols, especially TCP/IP, are designed and fitted together, and how they form the basis for the Internet and for distributed computing (Capability 1, 2 and 3)
3. Describe, analyse and consider underlying principles of protocol design for routing, data transport, naming, secure transmission, and elementary applications, illustrated with descriptions of actual protocols and discussion of real-world experience (Capability 1, 2, 3 and 4)
4. Identify, explain and evaluate how Internet applications function and apply techniques for understanding the functioning of Internet services (Capability 1, 2, 3, 4, 5 and 6)

Assessments

Assessment Type	Percentage	Classification
Assignments	30%	Individual Coursework
Test	15%	Individual Coursework
Final Exam	55%	Individual Coursework
3 types	100%	

Assessment Type	Learning Outcome Addressed			
	1	2	3	4
Assignments	✔	✔	✔	✔
Test	✔	✔	✔	✔
Final Exam	✔	✔	✔	✔

To pass the course, students must achieve at least half the marks in the assignments component and half the marks in the test and exam combined. Test and final exam will be individualised assessments.

Tuākana

This course is supported by the Computer Science Tuākana programme (https://canvas.auckland.ac.nz/courses/34081). Contact the course coordinator for details.

Key Topics

Signals, media and systems, modulation, fundamental limits of communication, coding, error correction, clocking, framing, compression, collision detection / avoidance, flow control, Ethernet, IP versions 4 & 6, TCP, UDP, switches and routers, routing algorithms, Internet structure, applications, P2P, streaming and content delivery, Internet measurement tools and approaches.

Learning Resources

The course will be offered as traditional lectures on campus and, as an alternative, in the form of videos. Students unable to come to the lectures may follow the course online using the videos.

Special Requirements

The course will be offered both in the form of on campus lectures and in the form of videos, and students may follow the course via either or both offerings at any time. To pass the course, students must achieve at least half the marks in the assignment component and half the marks in the test and exam combined. Test and final exam will be individualised assessments.

Workload Expectations

This course is a standard 15 point course and students are expected to spend 10 hours per week involved in each 15 point course that they are enrolled in.

For this course, you can expect 33 hours of lectures/videos, [33] hours of reading and thinking about the content and [54] hours of work on assignments and/or test preparation.

Digital Resources

Course materials are made available in a learning and collaboration tool called Canvas which also includes reading lists and lecture recordings (where available).

Please remember that the recording of any class on a personal device requires the permission of the instructor.

Copyright

The content and delivery of content in this course are protected by copyright. Material belonging to others may have been used in this course and copied by and solely for the educational purposes of the University under license.

You may copy the course content for the purposes of private study or research, but you may not upload onto any third party site, make a further copy or sell, alter or further reproduce or distribute any part of the course content to another person.

Academic Integrity

The University of Auckland will not tolerate cheating, or assisting others to cheat, and views cheating in coursework as a serious academic offence. The work that a student submits for grading must be the student's own work, reflecting their learning. Where work from other sources is used, it must be properly acknowledged and referenced. This requirement also applies to sources on the internet. A student's assessed work may be reviewed against online source material using computerised detection mechanisms.

Inclusive Learning

All students are asked to discuss any impairment related requirements privately, face to face and/or in written form with the course coordinator, lecturer or tutor.

Student Disability Services also provides support for students with a wide range of impairments, both visible and invisible, to succeed and excel at the University. For more information and contact details, please visit the Student Disability Services' website at http://disability.auckland.ac.nz

Special Circumstances

If your ability to complete assessed coursework is affected by illness or other personal circumstances outside of your control, contact a member of teaching staff as soon as possible before the assessment is due.

If your personal circumstances significantly affect your performance, or preparation, for an exam or eligible written test, refer to the University's aegrotat or compassionate consideration page: https://www.auckland.ac.nz/en/students/academic-information/exams-and-final-results/during-exams/aegrotat-and-compassionate-consideration.html.

This should be done as soon as possible and no later than seven days after the affected test or exam date.

Student Feedback

During the course Class Representatives in each class can take feedback to the staff responsible for the course and staff-student consultative committees.

At the end of the course students will be invited to give feedback on the course and teaching through a tool called SET or Qualtrics. The lecturers and course co-ordinators will consider all feedback.

Your feedback helps to improve the course and its delivery for all students.

Student Charter and Responsibilities

The Student Charter assumes and acknowledges that students are active participants in the learning process and that they have responsibilities to the institution and the international community of scholars. The University expects that students will act at all times in a way that demonstrates respect for the rights of other students and staff so that the learning environment is both safe and productive. For further information visit Student Charter (https://www.auckland.ac.nz/en/students/forms-policies-and-guidelines/student-policies-and-guidelines/student-charter.html).

Disclaimer

Elements of this outline may be subject to change. The latest information about the course will be available for enrolled students in Canvas.

In this course you may be asked to submit your coursework assessments digitally. The University reserves the right to conduct scheduled tests and examinations for this course online or through the use of computers or other electronic devices. Where tests or examinations are conducted online remote invigilation arrangements may be used. The final decision on the completion mode for a test or examination, and remote invigilation arrangements where applicable, will be advised to students at least 10 days prior to the scheduled date of the assessment, or in the case of an examination when the examination timetable is published.