

Course Name

Introduction to Computer Networks

Justification of Proposal

Networking technologies at a global and local scale, such as the Internet or the home network formed by one's mobile phone, laptop, tablet or desktop computer, have become an integral part of our society and economy. Acknowledging that fact, all universities now offer courses covering the basics of such technologies in their computer science, IT or electrical engineering programs.

However the majority of these courses are theoretical with laboratories based around simulators. Only a few provide students with practical experience with real-world deployment of networking devices or protocols. This course aims at filling that gap by providing students with extensive hands-on illustrations of key networking concepts. This will utilize real devices and protocols deployed on NICTA's wireless experimental platform (aka testbed). It is expected that such hands-on component will foster deeper understanding of networked systems, which will be useful for students from all disciplines.

Consultation Process

This course proposal has been discussed with Aruna Seneviratne, Guillaume Jourjon, and Thierry Rakotoarivelo.

Load – Hours per Week

This course will run over 3 days, with a total 8 hours per day, including lectures and laboratory work. The total contact time is thus 16 hours with a further 8 hours of self directed laboratory work. This course does not require additional workload from the students outside these hours.

Course Description

The objective of this course is to provide postgraduate students with the basic but essential knowledge on key concepts, currently used protocols, and emerging applications in networking systems. This course will adopt a theoretical and practical approach to networking, with a strong emphasis on the latter. Thus the first component of this course will follow a top down approach to introduce the concept of networking layers and protocols. This will allow students with former networking training to refresh their knowledge, and students without such training to gain the essential understanding of networking systems. The second component of this course will consist of an in-depth exploration of three topics at the application, the transport, and the network levels. This second component will be divided in three laboratory sessions, where the students will experiment with specific protocols and systems deployed on a real networking platform. These practical sessions will be designed to foster knowledge acquisition, and develop the student's interest and critical view of networking systems.

Proposed Teaching methods and assessment practices

The course will be divided in 4 sessions of directed learning of about equal size, and one session of self directed learning. The first session will have a classic lecture format, and present the key

concepts and protocols. The remaining sessions will be in the form of laboratory class (i.e. lab). The first lab will introduce the platform being used in this course and will propose experiments and questions focused on application-level protocols. The second lab will focus on experiments and questions related to performances of transport-level protocols in a wireless environment, while the third lab will focus on routing protocols in such environments. The self directed learning session will require students to complete a small 8h-project on a topic which will extend one of the previous three labs. The specific details of this project will be finalised prior to the course. No assessment is currently being considered for this course. However an assessment component based on the progress and results from the lab session and/or from the self directed learning session can be added if required by the education committee. In such case a Pass/Fail grading system will be adopted.

Assessment grades to be used

No assessment is currently being considered for this course. However as mentioned above, a Pass/Fail grading system could be adopted if required.

Mode of Delivery

Internal. This course will be provided from the NICTA's ATP Laboratory.

Information Technology Requirements for students

The students will have to bring their own laptop with Wifi capability and a working Web browser to be able to access and use the experimental platform during the laboratory sessions. Prior to the beginning of the course students will be ask to create an account on the experiment platform.

Textbooks

The top-down approach adopted in this course will be based on the classic "Computer Networking, A Top-Down Approach Featuring the Internet" textbook, by James F. Kurose and Keith W. Ross (Pearson, Addison Wesley). However due to the short lecture session, only a small subset of the textbook content will be covered.

Teaching Arrangements

No other unit courses will contribute to this course.

Administrative Arrangements

- Delivery of course material: provided through a web portal to be set up at NICTA
- Timetable coordination: will be done by NICTA
- Contingency arrangements: none
- Minimum enrolments for viability of the course: 8 students
- Maximum class sizes: 16 students (= 4 groups of 2 students for each of the 2 lab demonstrators. If more demonstrators are available, then we could increase that size limit)
- Examination cost, invigilation, and location: will be handled by NICTA
- Any other administrative requirements: none