Computer Communications and Networks (INFR09027): Updated DRPS Entry

School	School of Informatics
College	College of Science and Engineering
Credit level (Normal year taken)	SCQF Level 10 (Year 3 Undergraduate)
Availability	Availability to all students
SCQF Credits	20

Summary

This is a comprehensive first course in Computer Communications and Networks, focusing on fundamental concepts, principles and techniques. The course will introduce basic networking concepts, including: protocol, network architecture, reference models, layering, service, interface, multiplexing, switching and standards. An overview of digital communication from the perspective of computer networking will also be provided. Topics covered in this course include: Internet (TCP/IP) architecture and protocols, network applications, congestion/flow/error control, routing and internetworking, data link protocols, error detection and correction, channel allocation and multiple access protocols, communication media and selected topics in wireless and data centre networks. It will cover recent advances in network control and management architectures by introducing the concepts of software-defined networking (SDN) and network (function) virtualisation. Students taking this course will gain hands-on experience in network programming using the socket API; network traffic/protocol analysis; and on assessment of alternative networked systems and architectures.

Course description

* Introduction to Computer Networking and the Internet
* Digital Communication Basics
* The Application Layer with comprehensive treatment of networked applications (incl. multimedia data and applications)
* The Transport Layer
* The Network Layer
* The Data Link Layer
* The Medium Access Control Sub-Layer
* The Physical Layer
* Software-defined networking (SDN)
* Network virtualisation and network function virtualisation (NFV)
* Network management

* Introduction to data centre and wireless networks
* Overview and selected aspects of network security

Relevant QAA Computing Curriculum Sections: Computer Communications, Computer Networks

Pre-requisites
None

Learning and Teaching Activities
Total Hours: 200 (Lecture Hours 30, Summative Assessment Hours 2, Programme Level Learning and Teaching Hours 2, Directed Learning and Independent Learning Hours 86, Coursework 80)

Assessment
Written Exam 60 %, Coursework 40 %, Practical Exam 0 %

Three practical assignments that provide hands-on experience on design, implementation, measurement and analysis of networked systems and protocols. One assignment will contribute to 20% of the overall course mark and will require about 40 hours while the other two assignments together will need about 40 hours of work and each will contribute to 10% of the course mark.

Learning Outcomes

On completion of this course, the student will be able to:
1. Be able to explain key networking concepts, principles, design issues and techniques at all protocol layers.
2. Be able to contrast between different types of networks (e.g., wide area networks vs. local area networks, wired vs. wireless) in terms of their characteristics and protocols used.
3. Be able to describe different types of networked applications and what underlying network protocols are needed to meet their diverse requirements.
4. Be able to distinguish between control and data planes in computer networks, and their corresponding architectures in real-world networks (including the Internet).
5. Have obtained hands-on experience in programming networked applications using TCP/UDP sockets as well as on measurement, implementation and analysis of networked system architectures and protocols.