

# CM0521 Further Networks

## Further Networks Image

This module is designed to serve as an introduction to the theory and practice of computer networking. The module uses a well-equipped network laboratory containing industry-standard routers and switches. It emphasises practical aspects of building and maintaining Local Area Networks.

The main ideas are communicated in a series of 12 lectures. The laboratory sessions are used by students to put these ideas into practice in a variety of networking exercises. By the end of the module, students should be able to design, configure, document and maintain a small LAN and to understand the basic principles underlying the Internet.

## 1. Module Team

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### Module Tutor

[David Kendall](mailto:david.kendall@northumbria.ac.uk) david.kendall@northumbria.ac.uk

### Lecturer

[Gerhard Fehring](mailto:gerhard.fehring@northumbria.ac.uk) gerhard.fehring@northumbria.ac.uk

## 2. Teaching Arrangements

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**Lecture** Mon 10.00 - 11.00 EB A102A

**Lab/Seminar** EB Lab D003 North

- Thu 09.00 - 10.00
- Thu 13.00 - 14.00

## 3. Synopsis

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The aim of the module is to enable students to learn intermediate networking theory and skills, with particular regard to routing and switching. A particular feature of the module is that it includes much of the syllabus pertaining to CCNA 2 and 3. There is an emphasis on practical work and students will have an opportunity to work with industry standard routers and switches. The module is assessed by coursework assignment.

On completion of this module, students will be able to:

1. Explain in detail the structure of the OSI Reference Model and the concepts of a layered data communication model.

2. Apply appropriate theory, practices and tools for the specification, design, implementation and evaluation of Local Area Networks.
3. Discuss the design principles and implementation of a variety of key networking protocols and algorithms and critically evaluate their effectiveness in a range of practical applications.
4. Review the concepts and operation of network layer security and apply their knowledge to a variety of practical networking scenarios

## 4. Teaching Plan

The following is a *provisional* guide to the organisation of the module for this year. These arrangements are subject to change during the course of the module.

Week	W/c	Lecture	Practical
1	17-Jan	Introduction. IP Addressing and Subnetting (FLSM)	Introduction to Packet Tracer
2	24-Jan	Introduction to Routing and Packet Forwarding	Configuring a simple network
3	31-Jan	Static Routing	Configuring static routes
4	07-Feb	Introduction to Dynamic Routing Protocols	Configuring RIP v1
5	14-Feb	Distance Vector Routing	Configuring RIP v1
6	21-Feb	RIP version 1	No supervised lab sessions
7	28-Feb	IP Addressing and Subnetting (VLSM); Classless Routing; RIPv2 [ <a href="#">Slides</a> ]	Assignment Introduction; VLSM exercises [ <a href="#">Lab</a> ]
8	07-Mar	Network Security (Firewalls and Access Control Lists) [ <a href="#">Slides</a> ]	RIP v2 configuration (Packet Tracer) [ <a href="#">Lab</a> ]
9	14-Mar	Link State Routing [ <a href="#">Slides</a> ]	ACL configuration (Packet Tracer) [ <a href="#">Lab</a> ]
10	21-Mar	Switching and Switches [ <a href="#">Slides</a> ]	RIP v2 and ACL configuration (Physical) [ <a href="#">Lab</a> ]
11	28-Mar	Spanning Tree	Assignment

		Protocol [ <a href="#">Slides</a> ]	Preparation (Packet Tracer)
12	04-Apr	Assignment surgery	Unsupervised lab session Assignment Preparation (Physical)
13	02-May	Assignment demos - 2 hour session starting at the usual time	Assignment demos - 2 hour session starting at the usual time

**Note:**

In addition to the taught sessions, you are expected to undertake independent and directed learning. On average, you should be spending about 8 hours per week on this module.

## 5. Assessment

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Summative assessment comprises:

- A practical networking exercise, involving some group work in the lab and an individual written report.

Formative assessment comprises a variety of theoretical and practical exercises with opportunities for discussion with tutors and colleagues.

- [Assignment Specification](#)

## 6. Recommended Reading

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You are strongly advised to obtain either of the first two texts from the list below for your personal use. The CCNA exam certification guide is useful for Cisco-specific information and for preparation for vendor-certification should you choose to undertake it. Try the [Northumbria University campus bookshop](#).

- Kurose, J., Ross, K. *Computer Networking: A Top-down Approach Featuring the Internet* (3rd Edition), Addison Wesley, 2004 [[Amazon](#)] [[Student Resources](#)]
- Tanenbaum, A., *Computer Networks* (4th edition), Prentice Hall, 2002 [[Amazon](#)]
- Odom, W, *Cisco CCNA Official Exam Certification Library*, Cisco Press, 2006 [[Amazon](#)]

Selected articles from the technical literature, as directed by your tutors, e.g.

- IEEE/ACM Transactions on Networking
- IEEE Transactions on Communications
- RFCs, IEEE & IETF standards
- Industry white papers and technical documentation

## 7. Other resources

- The Cisco Networking Academy curriculum is a valuable resource. There are local copies of the curriculum:
  - [CCNA Exploration 1](#)
  - [CCNA Exploration 2](#)
  - [CCNA Exploration 3](#)
  - [CCNA Exploration 4](#)
  - [Packet Tracer 5.1 \(Windows\)](#)
- [RFC search](#)
- [Technical Resources and Course Web Site for Data and Computer Communications, Sixth Edition](#)