

WM388-30 Network Routing and Switching Technologies

21/22

Department

WMG

Level

Undergraduate Level 3

Module leader

Alaa Al Sebae

Credit value

30

Module duration

11 weeks

Assessment

100% coursework

Study locations

University of Warwick main campus, Coventry Primary

Distance or Online Delivery

Description

Introductory description

The skills required of a network specialist is evolving as a natural response to the enterprises adoption of new technologies. This makes the design and implementation of new solutions to improve the resilience of the current environment vital for the business growth. In order to avoid profit loss, businesses rely greatly on their network engineers to ensure their smooth operation when any disruption or damage to any part of the network occurs.

[Module web page](#)

Module aims

This module will focus on routing and switching technologies, equipping students with the ability to install, configure, and troubleshoot medium-sized routed and switched networks. Advanced topics such as Virtual Local Area Networks (VLANs), inter VLANs routing, VLSM, RIP, EIGRP and OSPF will be introduced. Other topics such as IPV6, DHCP and NAT will also be covered. Students will consolidate their acquired knowledge using industry standard simulation tools.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

Advanced Sub-netting

- Dynamic addressing DHCP
- Private IP addressing.
- Network address translation NAT
- VLSM (variable length sub-net mask).
Internet protocol version 6 (IPv6)
- IPv6 addressing and expressions
- IPv6 shortened expression
- IPv6 internetwork
Routing techniques
- Network Layer routing algorithms (link-state, distance vector)
- Routing tables.
- Static, dynamic, interior and exterior routing protocols
- Brief of OSPF, EIGRP, and RIP.
Inter-switch connectivity
- Spanning Tree Protocol.
- VLANs, Native VLAN, access ports, trunk ports.
Network Layer protocols
- The internet Control Message Protocol (ICMP).
- Simple network management protocol (SNMP).
TCP and UDP protocols.
- Connectionless Vs Connection oriented transport.
- Stop and Wait, Go-Back-N and Selective repeat techniques.
- Flow and congestion control.
Network Queues and Delay Analysis
- Little's Theorem
- Birth-and-Death Process
- Queueing Systems
Network Security
- Introduction to network security, cryptography and Virtual Private Networks (VPNs).
- Brief introduction to Access Control Lists (ACLs)

Learning outcomes

By the end of the module, students should be able to:

- Describe the advanced switching and routing concepts.
- Configure the components required to meet a medium-sized network specification.
- Implement an appropriate classless addressing scheme using VLSM and VLANs.
- Configure, verify and troubleshoot routing protocols.

- Diagnose network problems and suggest an informed solution.

Indicative reading list

[Reading lists can be found in Talis](#)

[Specific reading list for the module](#)

Subject specific skills

Students should be able to demonstrate a high competency in:

Computer network design, corresponding configuration and implementation as well as corresponding technical documentation.

Transferable skills

Students should be able to demonstrate:

How teams work effectively to produce technology solutions.

Applies analytical and critical thinking skills to systematically develop, analyse and apply structured problem solving techniques to complex systems and situations.

High level of critical thinking and digital literacy.

Study

Study time

Type	Required
Lectures	20 sessions of 1 hour (7%)
Seminars	10 sessions of 1 hour (3%)
Practical classes	20 sessions of 1 hour (7%)
Work-based learning	64 sessions of 1 hour (21%)
Online learning (scheduled sessions)	10 sessions of 1 hour (3%)
Private study	111 hours (37%)
Assessment	65 hours (22%)
Total	300 hours

Private study description

Self-study (to include exam revision, report writing, software exercises).

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Assessment group A1

	Weighting	Study time	Eligible for self-certification
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Assessment component

Project 1	40%	25 hours	No
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A technical report on a network design that reflects on networking technologies (network-related problem solving and schemes) that may include simulation part. This project has two parts (group and individual). Students will re-sit a new individual assessment.

Reassessment component

Project 1 - resit			No
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A resit assessment that features all aspects assessed in project 1 (first attempt). However, the number of effort hours individual students need to provide will be taken into account.

Assessment component

Project 2	60%	40 hours	No
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A technical report on a network design that reflects on networking technologies (advanced networking capabilities and scalable architectures) that may include simulation part. This project has two parts (group and individual). Students will re-sit a new individual assessment.

Reassessment component

Project 2 - resit			No
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A resit assessment that features all aspects assessed in project 1 (first attempt). However, the number of effort hours individual students need to provide will be taken into account.

Feedback on assessment

Feedback will be given as appropriate to the assessment type:

- verbal formative feedback on lab activities related to in-module assessment.
 - written summative feedback on post module assessments.
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Availability

Courses

This module is Core for:

- Year 3 of DWMS-H653 Undergraduate Digital and Technology Solutions (Network Engineering) (Degree Apprenticeship)