

2024 / 25

School of Science and Computing

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🌐 [www.wit.ie/schools/science\\_computing](http://www.wit.ie/schools/science_computing)



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## Module Descriptor

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# Computer Networks (Computing and Mathematics)

# Computer Networks (A11144)

|                     |                           |               |              |
|---------------------|---------------------------|---------------|--------------|
| <b>Short Title:</b> | Computer Networks         |               |              |
| <b>Department:</b>  | Computing and Mathematics |               |              |
| <b>Credits:</b>     | 5                         | <b>Level:</b> | Introductory |

### Description of Module / Aims

This module introduces Computer Networking terminology, network protocols and models. Students will use simulation and protocol analysis software to configure network devices and explore various network protocol operations. A detailed examination of TCP/IP, IP addressing and Ethernet is presented. A brief introduction to Routing, Network management and Wireless LANs is also provided. Practical skills are an essential part of this module.

# Programmes

|           |  | stage/semester/status |
|-----------|--|-----------------------|
| COMP-0606 | BSc (Hons) in Applied Computing (International) (WD_KACCM_BI)      | 2 / 3 / M             |
| COMP-0637 | BSc (Hons) in Applied Computing (WD_KACCM_B)                       | 2 / 3 / M             |
| COMP-0637 | BSc (Hons) in Applied Computing (WD_KCOMP_B)                       | 2 / 3 / M             |
| COMP-0637 | BSc (Hons) in Computer Forensics and Security (WD_KCOFO_B)         | 2 / 3 / M             |
| COMP-0637 | BSc (Hons) in Computer Science (WD_KCMSC_B)                        | 2 / 3 / M             |
| COMP-0606 | BSc (Hons) in Software Engineering (WD_KDEVP_BI)                   | 2 / 3 / M             |
| COMP-0637 | BSc (Hons) in Software Systems Development (WD_KDEVP_B)            | 2 / 3 / M             |
| COMP-0606 | BSc (Hons) in the Internet of Things (International) (WD_KINTT_BI) | 2 / 3 / M             |
| COMP-0606 | BSc in Applied Computing (WD_KCOMP_D)                              | 2 / 3 / M             |
| COMP-0637 | BSc in Information Technology (WD_KINFT_D)                         | 2 / 3 / M             |
| COMP-0637 | BSc in Software Systems Development (WD_KCOMC_D)                   | 2 / 3 / M             |

## Indicative Content

- Introduction to Computer Networks and Protocols
- OSI and TCP/IP models
- Ethernet and VLANs
- IPv4 Addressing and subnetting
- IPv6
- Routing
- Transport Layer Protocols and Functionality
- Application Layer Protocols and Functionality e.g. HTTP, FTP, DNS, SMTP
- Wireless LANs
- Network Management

## Learning Outcomes

*On successful completion of this module, a student will be able to:*

1. Use network protocol models and tools to explain communications in data networks.
2. Describe in detail the major components, operation and functionality of a computer network and commonly used protocols and services.
3. Construct an IPv4/IPv6 addressing design solution.
4. Build a simple network using routers and switches.
5. Use Cisco command line interface to perform basic router and switch configuration.
6. Implement a basic wireless network.
7. Describe basic computer network management concepts.

## Learning and Teaching Methods

- The practical lab component will be delivered in one double lab session.
- There is a strong emphasis on practical, lab-based exercises.

## Learning Modes

| Learning Type        | F/T Hours | P/T Hours |
|----------------------|-----------|-----------|
| Lecture              | 36        | 12        |
| Practical            | 24        | 12        |
| Independent Learning | 75        | 111       |

## Assessment Methods

|                       | Weighting | Outcomes Assessed |
|-----------------------|-----------|-------------------|
| Continuous Assessment | 100%      |                   |
| Practical             | 60%       | 3,4,5,6           |
| In-Class Assessment   | 40%       | 1,2,3,4,5,6,7     |

## Assessment Criteria

- <40%: Unable to describe the major functions and operation of a Computer Network. Unable to describe and compare the OSI and TCP/IP models. Poor understanding of the role of communications protocols in computer networks.
- 40%–49%: Can describe and compare the OSI and TCP/IP models. Can provide overview of main computer network components and protocols.
- 50%–59%: All of the above. Can describe in detail the data encapsulation process. Demonstrate an understanding of basic LAN implementation.
- 60%–69%: In addition, be able to recommend a network solution given an organisation's requirements.
- 70%–100%: All the above to an excellent level. Be able to analyse and design solutions to a high standard for a range of both complex and unforeseen problems through the use and modification of appropriate skills and tools.

## Essential Material(s)

- "Cisco Network Academy." <https://www.netacad.com/>

## Supplementary Material(s)

- Cisco, Networking. *Network Basics, CCNA Routing & Switching Companion Guide*. NY: Cisco Press, 2014.
- Tanenbaum, A. and D. Wetherall. *Computer Networks*. 5th Ed. New York: Pearson Education, 2013.

## Requested Resources

- Computer Lab: Networks Lab