

# Network Engineering

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## n 現職

- n 國立成功大學電機系教授
- n 國家高速網路與計算中心副主任

## n 學歷

- n 國立成功大學電機博士 1984 ~ 1987
- n 國立成功大學電機碩士 1982 ~ 1984
- n 國立成功大學工程科學士 1972 ~ 1976

## n 經歷

- n 國立中山大學電機系副教授
- n 國立中山大學資工系教授
- n 國立中山大學資訊工程研究所所長
- n 國立中山大學計算機與網路中心主任



# 助教

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- n 林澤志 [manstalk000@hotmail.com](mailto:manstalk000@hotmail.com)
- n 柯宗瑋 [thusnoy@gmail.com](mailto:thusnoy@gmail.com)
- n 陳昭欣 [spearsea@gmail.com](mailto:spearsea@gmail.com)



# 課程教材

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- n Cisco Networking Academy Program
  - n Cisco Certified Network Associate ( CCNA)
    - n CCNA1
    - n CCNA2



# 課程目標

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- n Focuses on network terminology and protocols
- n Local-area networks (LANs)
- n Open System Interconnection (OSI) models
- n Cabling and Cabling tools
- n Ethernet
- n Internet protocol (IP) addressing
- n Network standards
- n Perform entry-level tasks in the planning, design, installation, operation, and troubleshooting of Ethernet and TCP/IP network



# 課程活動

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## n 上課

- n 週一上午 9:10 ~ 11:00, 92271
- n 週二上午 10:10~ 11:00, 92271

## n 教材

- n Cisco CCNA 教材
- n 投影片
- n 上課內容影音檔上網

## n Office hour

- n 星期三 13:00 ~ 16:00

## n 測驗

- n 每章一小考
- n 三次期中考
- n 期末考

## n 專題與報告



# 評分標準

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n	測驗	80%
n	平時考	20%
n	每章一小考	
n	70分及格, 不及格需要補考	
n	第一次期中考 (10/13)	15%
n	第二次期中考 (11/17)	15%
n	第三次期中考 (12/22)	15%
n	期末考 (1/19)	15%
n	專題與報告	20%



# Course Index

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- n Living in a Network-Centric World
- n Communicating over the Network
- n Application Layer Functionality and Protocols
- n OSI Transport Layer
- n OSI Network Layer
- n Addressing the Network – IPv4
- n Data Link Layer
- n OSI Physical Layer
- n Ethernet
- n Planning and Cabling Networks
- n Configuring and Testing Your network



# Course Overview

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- n Learn both the practical and conceptual skills
  - n Build the foundation for understanding basic networking
- n Examine human versus network communication and see the parallels between them
- n Introduced to the two major models used to plan and implement networks: OSI and TCP/IP
  - n Understand the “layered” approach to networks
  - n Examine the OSI and TCP/IP layers to understand their functions and services
  - n Network devices, network addressing schemes and the types of media used to carry data across the network,



# Chapter 1 Living in a Network-Centric World

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- n Presents the basics of communication and how networks have changed our lives
- n Introduced to the concepts of networks, data, local area networks (LANs), wide area networks (WANs), quality of service (QoS), security issues, network collaboration services, and Packet Tracer activities
- n Learn how to set up a wiki and establish an instant messaging session in the labs

# Chapter 2 Communicating over the Network



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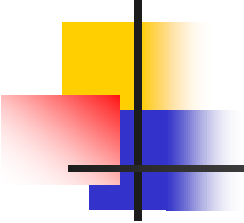
- n Focuses on how networks are modeled and used
- n Introduced to the OSI and TCP/IP models and to the process of data encapsulation
- n Learn about the network tool Wireshark®
  - n Used for analyzing network traffic
  - n Explore the differences between a real network and a simulated network
  - n Build your first network – a small peer-to-peer network in the lab

# Chapter 3 Application Layer

## Functionality and Protocols

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- n Use a top-down approach to teach networking
- n Introduce the top network model layer, the Application layer
- n Explore the interaction of protocols, services, and applications, with a focus on HTTP, DNS, DHCP, SMTP/POP, Telnet and FTP
- n Practice installing a web server/client and use Wireshark® to analyze network traffic in the labs
- n The Packet Tracer activities let you explore how protocols operate at the Application layer



# Chapter 4

## OSI Transport Layer

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- n Introduces the Transport layer and focuses on how the TCP and UDP protocols apply to the common applications
- n Incorporate the use of Wireshark®, the Windows utilities command netstat, and Packet Tracer to investigate TCP and UDP

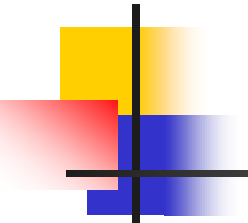
# Chapter 5 OSI Network Layer



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- n Introduces the OSI Network layer
- n Examine concepts of addressing and routing and learn about path determination, data packets, and the IP protocol
- n Configure hosts to access the local network and explore routing tables

# Chapter 6 Addressing the Network – IPv4



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- n Focus on network addressing in detail
- n Learn how to use the address mask, or prefix length, to determine the number of subnetworks and hosts in a network
- n Introduce ICMP (Internet Control Message Protocol) tools
  - n ping and trace



# Chapter 7 Data Link Layer

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- n Discusses the services provided by Data Link layer
- n An emphasis is placed on the encapsulation processes that occur as data travels across the LAN and the WAN



# Chapter 8 OSI Physical Layer

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- n Introduces the Physical layer
- n Discover how data sends signals and is encoded for travel across the network
- n Learn about bandwidth and also about the types of media and their associated connectors



# Chapter 9 Ethernet

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- n Examine the technologies and operation of Ethernet
- n Use Wireshark®, Packet Tracer activities, and lab exercises to explore Ethernet



# Chapter 10 Planning and Cabling Networks

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- n Focuses on designing and cabling a network
- n Apply the knowledge and skills developed in the previous chapters to determine the appropriate cables to use, how to connect devices, and develop an addressing and testing scheme

# Chapter 11 Configuring and Testing Your network



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- n Connect and configure a small network using basic Cisco IOS commands for routers and switches
- n Upon completion of this final chapter, you will be prepared you to go on to either CCNA Exploration Routing or CCNA Exploration Switching courses