



DBLN CPSI 4493

This course is being offered at Griffith College, CAPA's academic partner in Dublin. The Irish academic system differs from the US, particularly with grading. Griffith College professors expect students to undertake a good deal of independent study to achieve a high mark in their classes. For additional information about this class, please contact the Boston Program Advising Team at 1-800-793-0334.

Advanced Network Theory

Continuous Assessment: 40%

Exam: 60%

Intended Module Learning Outcomes

On successful completion of this module learners will be able to:

1. understand network connectivity, topologies, and concepts of media access control and their protocols.
2. understand the detailed framing, error detection techniques used in communication systems
3. understand the detailed routing techniques for data through data networks

4. understand IP addressing and subnetting.
5. recognise congestion problems and implement congestion controls
6. implement through programming a simple communication system functionality or protocol
7. understand basic concepts of wireless networks and concepts network security

Module Objectives

This module provides you with a detailed understanding and appreciation of the different networking standards and protocols above the physical level. The module covers the different protocols commonly found and focuses on available WAN technologies, this module also covers network management and security issues.

Module Curriculum

Introduction to networks

- Review: ISO/OSI Reference Model and the TCP/IP standard.
- Review: LAN review : Topologies and media.
- Network devices: Repeaters, Hubs, Bridges, Switches, Routers and Front gates.
- Shared media,
- Media access protocols, time division, polling, token passing, CSMA, CSMA/DT

Datalink layer

- Framing, Bit stuffing and stripping
- Error detection, Parity bit, Parity block and CRC Error checks.
- Flow control, sliding window protocols.
- Analysis of go-back-n and selective reject algorithms
- Piggy back acknowledgements
- Hop-to-hop and end-to-end error detection systems

Network layer – routing

- Routing algorithms: types, classes and characteristics of routing algorithms. Fixed, Adaptive, local, distributed, central, Flood,
- Distance Vector routing algorithm and Link state routing algorithm.
- Routing tables.
- Optimality principle,
- Count to infinity
- Shortest routing algorithms

Network layer – congestion control

- Concepts of congestion
- Congestion control
- Causes of congestions, congestion prevention policies and techniques
- Traffic shaping, leaky bucket algorithms

- Congestion control, flow control.
- Choke packets and load shedding.

IP addressing

- Addressing concept, port number, physical and the IP addresses.
- IP4 and IP6, Classfull and classless IP addresses
- IP addressing and subnetting

Transport layer

- TCP/IP, Services, Handshaking and Flow control.

Wireless networks

- Concepts of wireless networks.
- Problems and applications,
- 802.11a/b/g, VOIP & Bluetooth.

Introduction to communication security

- Passive and active attacks.
- Encryption: symmetric and asymmetric
- Encryption keys, key distribution,
- Confidentiality, integrity, authentication, availability