UNIVERSITY of NICOSIA

Course Code	Course Title	ECTS
ECE-524	Advanced Computer Networks	8
Department	**Semester**	**Prerequisites**
Engineering	Fall or Spring	ECE-354, ECE-332
Type of Course	**Field**	**Language of Instruction**
Elective	Engineering	English
Level of Course	**Year of Study**	**Lecturer**
2nd cycle	1st	Dr Antonis Hadjiantonis
Mode of Delivery	**Work Placement**	**Co-requisites**
Face-to-face	N/A	None

Objectives of the Course:

The main objectives of the course are to:

- Explore mathematical techniques in network theory and data network analysis
- Quantitatively study delay models in data networks
- Investigate optimal routing in the network layer
- Compare and contrast various multi-access techniques
- Introduce a mathematical model for treating flow control and congestion
- Expose students to network modeling via discrete event computer simulation
- Expose students to recent research articles on various networking issues

Learning Outcomes:

After completion of the course students are expected to be able to:

- Apply queueing theory on general delay models found in Data Networks
- Fully comprehend the layering approach in data networks
- Apply mathematical treatment in data network related problems (delay models, flow and congestion control, etc.)
- Compare the performance of various algorithms and protocols via computer discrete-event simulation

Course Contents:

- Review of the layered approach and the OSI layers
- The Data Link Layer: ARQ protocols and Data Link Control
- Queueing Theory: Little's Theorem, the M/M/x and M/G/1 models
- Multi-access: Aloha and slotted Aloha, Carrier Sensing and Reservations
- Network layer: Routing with the Dijkstra and the Bellman–Ford algorithms
- Transmission Control Protocol
- Flow and Congestion Control in High-Speed Networks

Learning Activities and Teaching Methods:

Lectures, in-class exercises, case studies

Assessment Methods:

Midterm exam, final exam, homework, and computer simulation project(s)

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Dimitri P. Bertsekas and Robert G. Gallager	Data Networks	Prentice Hall	1992	0132009161

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Kurose & Ross	Computer Networking: A Top-Down Approach	Pearson International	2009	0136079679
Mischa Schwartz	Telecommunication Networks: Protocols, Modeling and Analysis	Prentice Hall	1987	020116423X
Tarek N. Saadawi and Mostafa H. Ammar	Fundamentals of Telecommunication Networks	Wiley-Interscience	1994	0471515825