UNIT GUIDE

Unit Title:	**Computer networks design**
Mode:	Full/Part-Time
Co Requisites:	None
Pre Requisites	Computer networks
Lectures:	2 h per week/ total 30 h
Tutorials:	1 h per week/ total 15 h
Lab practicing:	2 h per week/ total 20 h
Individual Study Hours:	3 h per week/ total 45 h
Study Hours:	
Method of Assessment:	Coursework, Midterm and final test, oral and written
Study year:	4
Semester:	8
ECST Credit Value:	6
Web support	http://courses.ii.edu.mk/wireless
Module:	Specialization
Level:	Advanced
Subject Area:	CN
Unit Coordinator:	Prof. Dr. Marjan Gusev
Version:	March 2005

Abbreviations: ED (Education in Informatics), CS (Computer Science), SE (Software engineering), IS (Information Systems), CN (Computer Architectures and Networks) & IT (Information Technology).

SHORT DESCRIPTION

Advanced course in computer networks. Covers Routers and Routing Basics, with focus on initial router configuration, Cisco IOS Software management, routing protocol configuration, TCP/IP, and access control lists (ACLs). Switching Basics and Intermediate Routing with focus on Variable Length Subnet Masking (VLSM), Intermediate routing protocols such as RIP v2, single-area OSPF, and EIGRP, Command-line interface configuration of switches, Ethernet switching, Virtual LANs (VLANs), Spanning Tree Protocol (STP), VLAN Trunking Protocol (VTP), effective and practical design techniques for communication networks, avoiding the common pitfalls associated with setting up and running a network, techniques for planning and assembling network technology, real examples.

LEARNING OUTCOMES

Students who complete this course should be able to perform the following tasks:

- Install and configure Cisco switches and routers in multiprotocol internetworks using LAN and WAN interfaces
- Provide Level 1 troubleshooting service
- Improve network performance and security
- Perform tasks related to

    - Routers and their roles in WANs
    - Router configuration
    - RIP, IGRP, EIGRP and OSPF routing protocols
    - TCP/IP error and control messages
    - Router troubleshooting
    - Intermediate TCP
    - Access control lists
    - Switches and their roles in LANs
    - VLANs
    - Spanning tree protocol
    - VLAN trunking protocol
- Perform tasks in the planning, design, installation, operation, and troubleshooting of Ethernet and TCP/IP Networks

CONTENT

The content of the course covers:

- Routers and their roles in WANs
- Router configuration
- RIP and IGRP routing protocols
- TCP/IP error and control messages
- Router troubleshooting
- Intermediate TCP
- Access control lists
- Advanced routing
- EIGRP and OSPF routing protocols
- Switches and their roles in LANs
- VLANs
- Spanning tree protocol
- VLAN trunking protocol
- The Basics of Networking Design.
- Introducing the Enterprise Network Lifecycle and Design Process.
- Requirements Gathering and Analysis.
- Architectural and Physical Design.
- Logical Design.
- Operating the Network—Network Management Design.
- Planning for the Future.
- Verification, Validation, Testing and Operation.

ASSESSMENT METHOD

Active participation on classes – 50 points (16,7%)

Active class participation is mandative. There should be no more then 6 excuses from lectures and tutorials. Active participation is measured with continuous knowledge assessment realized by on-line e-testing system. Total of 50 points or 16,7% of total points can be graded for quality on time answering. Active participation means quality response and answers to given questions in one week period. Late submissions after one week are graded 50% of possible points and 20% if two weeks late. More then three weeks late submission is not allowed.

Project assignments – 50 points (16,7%)

Assignments and projects are obligatory. Each assignment and project is graded by 50 quality points or 16,7% of total points. Late submissions after one week are graded 50% of possible points and 20% if two weeks late. More then three weeks late submission is not allowed.

Knowledge assessment on tests – 200 points (66,6%)

Knowledge testing is realized by two colloquia. The first colloquium is the midterm test realized by the e-testing system and is graded by 90 points or 30% of total points. The second colloquium is realized in two parts: the final test realized by e-testing system graded with by 90 points or 30% of total points and synthesis of practical skills graded by 20 points or 6,6% of total points.

At least 30% of possible points are expected by each colloquium test. Active participation, projects and practical skills are mandatory.

GRADING

Grading system is given by the following table:

Assessment	Points	Percentage
Active participation	50	16,7
Project 1	20	6,7
Project 2	30	10,0
Midterm test	90	30,0
Final test	90	30,0
Practical skills	20	6,7
Total	300	100,0

Quality grading is realized by the following table:

Points	Grade	Equivalent
271-300	10	A
241-270	9	B
211-240	8	C
181-210	7	D
151-180	6	D-

COURSE LEARNING MATERIALS

Textbook

- Mark Norris, Steve Pretty – Designing the total area network, John Wiley & Sons (2000)
- http://www.cisco.com/en/US/learning/netacad/course_catalog/CCNA.html

Tutorial

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Lab practicum

- CISCO Lab Manuals for CCNA2 and CCNA3, Cisco Press, 2005

Web support

- http://courses.ii.edu.mk/cnd

BACKGROUND

Computer networks, data transmission, computer architecture.