



UNIVERSITY OF NEW YORK IN PRAGUE

Course: ITM218 Network Administration (6 ECTS/3 US credits)
Semester: Fall 2023
Prerequisites: Information Management
Instructor:

1. Course Purpose

The aim of this module is to introduce to the students the fundamentals of computer networks, based on TCP/IP. This is an introductory course thus there are no prerequisites, though this subject is the basis for many other networking directions: security, advanced networking, wireless networks, information systems for organisations, and others.

This course is designed according to the following modern principles applied in networking engineering (the principles are emphasised as *italic* font):

- *Three Tier Design* – the design of the network is performed on 3 layers (access, distribution and core) assuring *modularity, scalability* and *redundancy*.
- *Three Tire Design* is based on the older *SONA (Service Oriented Network Architecture)* which is the design of a network infrastructure based on the business needs.
- The principle of *segregation* which stipulates that data flows from different organisation partitions (e.g. departments) should be kept separated – with direct influence on security.
- The implementation wheel (*PPDIOO*) in which a network infrastructure is prepared planned, designed, implemented, operated and optimised thus the design is implemented and validated / tested and adjusted. Any adjustments follow the same PPDIOO recipe. This is exactly how organisations keep their infrastructures updated.
- The principle of *Defence-In-Depth (DID)* in which we try to secure every component of the network to the highest possible way which also allow the business needs.
- The principle of *minimality* which stipulates that the end users should be given minimal access to the resources which allows them to perform their business-related activities but not less.

Note that these principles are huge areas for networking and security design and they will not be presented in their entirety, though, the Computer Networks subject is designed in accordance to these principles which is a “healthy” way of understanding how these networks are built, operated and maintained.

Missing though from this subject are the acceleration mechanisms which are involved in any modern state-of-the-art network in the world, especially in large enterprises and service providers. This is why the subject is considered modern though introductory.

The technologies involved are mainly ISO and IEEE standards though the implementation will be made using Cisco equipment because Cisco is one of the leaders in the area and this is there the instructor has expertise.

2. Required Readings

Due to the nature of the course there is no required reading. There are however recommended materials, though each may go to a different depth in some areas and may not follow the exact path of the in-class lectures. This is why attending in-class lectures is crucial for the successful completion of the course.

3. Additional Readings

Books by Wendell Odom:

CCENT / ICND1 - 100-101 or 100-105 Official Cert Guide

CCENT / ICND2 - 200-101 or 200-105 Official Cert Guide

OR

CCNA / 200-120 or 200-125 Official Cert Guide

CBT Nuggets by Jeremy Cioara:

CCENT / ICND1 - 100-101 or 100-105

CCENT / ICND2 - 200-101 or 200-105

OR

CCNA / 200-120 or 200-125

Explanation for the codes: the 101 and 120 versions are older and currently they were replaced by 105 and 125 though, from the perspective of this course, both are equally good. The content of both ICND1 and ICND2 (thus codes 100-105 and 200-105) is the same with the CCNA (code 200-125) thus having the materials separated in two steps (ICND1 and ICND2) or in one single book (CCNA) is absolutely the same and both tracks are equally good.

4. Learning Outcomes

Upon successful completion of the course, students should be able to:

- Understand the basics of computer networks, covering hardware, protocols and security issues;
- Understand TCP/IP as the foundation of internet connectivity; IP address block subnetting;
- Understand the process of designing a computer network for a small-to-medium company, based on requirements;
- Implement a computer network based on the previously obtained design;
- Test the implementation for conformity with the requirements;
- Analyse security issues in the design and/or implementation (at a basic level);
- Be able to adapt the design and/or implementation according to required changes (expanding, scaling, etc.).

5. Course Content

The elements here presented are topics rather than actual classes. A class (lecture) can cover more or less topics, depending on the amount of details for each topic. I shall try to present one of these points each week of school, though this is not contractual.

1. Cables, repeaters, hubs, collisions, collision domains, CSMA/CD, MAC addresses, switches, CAM table, bridges, CAM table exhaustion, broadcast storm, switchport security, STP, Etherchannel
2. Cisco devices, boot-up procedure, VLANs, trunks, VTP and DTP, ARP, demos
3. Implementation of above, demos
4. Functioning of routers, static routing, gateways, dynamic routing - RIP, OSPF, EIGRP, demos

5. First Hop Redundancy, Inter VLAN Routing, demos
6. DHCP, TCP, UDP, demos
7. Remote control, subnetting with unequal size subnets, demos, EIGRP and subnetting, demos
8. ACL, demos
9. NAT, demos
10. ISO/OSI, Three Tier Design, SONA, launch of ICA1 and ICA2
11. Teamwork on ICA1
12. Teamwork on ICA1, submission of ICA1
13. Feedback of ICA1, teamwork on ICA2
14. Teamwork on ICA2
15. Consolidation, submission of ICA2

ICA = In-class-assignment

The demos will be performed in Cisco Packet Tracer and the screen and explanations will be screencasted (audio and video recorded) and placed on eLearning.

6. Course Requirements and Grading

In-Class-Assignment 1	30%
In-Class-Assignment 2	60%
Active Participation	10%
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Total	100%

Please mark the fact that both assignments are at the end of the semester. This is by design as for both assignments the students need all the information provided during the semester.

The ICAs can be solved in teams of maximally 2 students each being individually assessed for the contribution in the projects.

In-Class-Assignment 1 (30%)

The students receive the laic description of a business network as if coming from a manager. Based on this description the students will draw the diagram, outlining the departments, will identify the pieces of required equipment, subnets, VLANs, setup.

The outcome of this ICA1 is a formal technical report (its layout will be presented in class, as it is standardised) containing all the required information. This ICA1 does not require any configuration as it is purely a document.

In-Class-Assignment 2 (60%)

Based on the document in ICA1, approved by the instructor, the students will implement and thus configure the devices in Cisco Packet Tracer and build and execute a testing plan to check for conformity with the requirements in the ICA1.

The outcomes of this ICA2 are a .pkt Cisco Packet Tracer simulator file and a short technical report containing the testing plan and its results.

Active Participation (10%)

This is granted for being present in the class, actively discussing the topics, asking questions, etc.

Grading Scale

Letter Grade	Percent (%)	Generally Accepted Meaning	Notes
A	95-100	Outstanding work	Credits awarded
A-	90-94		
B+	87-89	Good work, distinctly above the average	
B	83-86		
B-	80-82		
C+	77-79	Acceptable Work	
C	73-76		
C-	70-72		
D+	67-69	Work that is significantly below average	Credits awarded but will NOT transfer to ESC (retake needed for ESC!)
D	63-66		
D-	60-62		
F	0-59	Work that does not meet the minimum standards for passing the course	Credits not awarded

7. Key UNYP Policies

Attendance

It is your responsibility to show up to class on time. If you are late you will be marked as absent for that hour. **If you miss more than 9 (nine) hours of class, for any reason, you will automatically fail the entire course. Pay strict attention to this. The class policy is standard UNYP policy.**

Academic Honesty

- The university's rules on academic dishonesty (e.g., cheating, plagiarism, submitting false information) will be strictly enforced. Please familiarize yourself with the **student honor code** or ask your instructor for clarification.
- For examinations: copying from your neighbor, communicating with another student, using a phone or anything similar will result in you failing the test or quiz.
- On written papers, properly note your sources with academic citations. Cutting and pasting from the Internet without accurately citing the source may be considered plagiarism. Students may be required to submit papers electronically, which could mean an automated check for plagiarism via the Turnitin resource. Students may also be required to defend the content of a paper orally to an instructor as a check on authorship.
- If you have questions about any of the above, please consult with the instructor.

8. General Requirements

- Students are expected to attend each class session and participate in a positive way.
- Students are expected to come to class fully prepared to discuss homework readings and cases.

- Students are expected to turn in homework assignments at the beginning of the class period on the day they are due.
- Students are expected to leave their mobile phones, etc. switched off.
- Students may not use laptops or netbooks for any reason other than taking notes. Do not surf the WEB during class time. If you do, you will lose the privilege to use a laptop or netbook.
- In the event of illness or emergency, contact your instructor IN ADVANCE to determine whether special arrangements are possible.
- It is the responsibility of the student to periodically check Moodle for changes / information / details.
- Moodle is the only official mean of communication between the students and the lecturer.

9. European Credit Transfer and Accumulation System (ECTS)

The students that complete the course will receive 6 ECTS credits or 3 American credits. One ECTS credit corresponds to 25-30 hours of work. For comparison, 1 American credit hour equals approximately 2 ECTS credits. For this course, students are expected to spend time in the following course-related activities:

Class Lectures and exams Reading class related material Exam preparations Team preparation and Final Exam preparation.

Class Lectures and in-class activities	45 hours
ICA1	30 hours
ICA2	40 hours
Preparation	35 hours
TOTAL	150 hours

10. Technology Expectations

No previous networking knowledge is required.

Students are assumed to be familiar with the use of Internet and in particular with the gathering of data from the wide world web.

All the required information for the successful completion of the subject will be provided in-class.