ROTTERDAM UNIVERSITY OF APPLIED SCIENCES / CMI

Course Manual Format

[INFNEW01-A and INFNEW21-A]

ECTS: 4 ECTS
Course facilitator: Dr. R. Hassanpour (zarer@hr.nl)

Description of the course

Course name:	Networking
Course code:	[INFNEW01-A and INFNEW21-A]
Study points and workload:	4 ECTS
	The course is composed of online lessons and exercises.
	Guided lectures
	during 7 weeks: 7 × 150 minutes: 16 hours
	Unaccompanied hours per week
	Personal study and exam preparation 96 hours
	Total 112 hours
Learning goals:	At the end of the course a student should be able to:
	LO1 Describe:
	• network components and their functionalities
	• functionality of the protocols used in each layer (TCP/IP, etc…)
	LO2 Ability to apply their knowledge:
	• To use sockets and exchange information across the network.
	• To create standalone programs that cooperate with each other over networks to solve a task.
Course facilitator:	R. Hassanpour (zarer@hr.nl)
Date:	24 – 08 – 2020.

1 General Information

This course aims to expand the knowledge of students toward computer networks.

1.1 Introduction

Computer networks is a natural step after learning about operating systems and computer architecture. The course uses the knowledge acquired in the first year, especially about operating systems and programming in Python.
The course starts with the motivation behind using computer networks. Then it describes how digital data is converted into signals and transmitted over physical medium of computer networks. Following that, the protocols used by computer networks are introduced. We contrite on TCP/IP and discuss details of different protocols of TCP/IP.
The course also develops the skills to apply the acquired knowledge in developing networking applications. To this end, we will use socket programming using TCP/IP and client/server architecture.

1.2 Relationship with other courses

This course is the first course introducing the data communication and networking. The course relies on the knowledge acquired in the first year, especially Operating Systems, and programming in Python. The course also lays the groundwork for Concurrency, Web-Programming and Security courses.

1.3 Learning aids

Your main learning aid is a laptop, course slides, sets of exercises, and free downloadable documents and software from the Internet. The material will be provided during the course. We recommend to install the following software BEFORE THE LESSONS which will be of aid during the exercises and lessons.

PacketTracer:
https://www.netacad.com/courses/packet-tracer/introduction-packet-tracer
WireShark:
https://www.wireshark.org/
NetCat:
https://sectools.org/tool/netcat/

The following book is suggested for following the lessons and in-depth learning:
COMPUTER NETWORKS. 5th ED. ANDREW S. **Tanenbaum** David J**. Wetherall.**

2   Program

Week	Literature/Homework	Content	Main point of interest
1	Discussing current situation and future trends in the Internet Installing necessary tools	Introduction, Motivation and Applications Network Types Network hardware and software OSI protocol model TCP/IP stack of protocols	The concept of a computer network, and network protocols
2	Using CISCO Packet tracer to create a local area network and analyse its behaviours.	Physical Layer: Signals, modulation Transmissions medium types Transmission impairments Datalink Layer: Framing, Error detection Ethernet, Wireless networks	How bits are transmitted over physical mediums, How transmitted bits are grouped and interpreted.
3	Using CISCO Packet tracer to create a point-to-point network connecting multiple LANs, and analyse the behaviour of routers.	Network Layer: Routing and forwarding IPv4 addressing Masking IPv6 addressing	Message delivery in point-to-point networks
4	Using Wireshark for grabbing and analysing frames	Network Layer Protocols: IPv4 and IPv6 packets Address Resolution Protocol (ARP), Internet Control Message Protocol (ICMP) Dynamic Host Configuration Protocol (DHCP) Network Address Protocol (NAT)	Introducing network layer protocols and their duties
5	Introduction to socket programming in Python. TCP and UDP sockets	Transport Layer: Application-to-Application transmission Connection oriented and connectionless transmissions TCP and UDP protocols	Establishing an application to application connection
6	Introduction to networking tools: Using NetCat for file transferring and port scanning	Application Layer: Application layer protocols Domain Name Systems (DNS) World Wide Web and Hypertext Transfer Protocol (HTTP)	Applications that use the services of the underlying network protocols
7	Discussing the assignment	Overview, discussing sample questions, mock exam	Preparation for the final exam

3   Attendance

Attendance is not mandatory but highly encouraged.

4   Deliverables

Final Assignment:
The instructions for the final assignment will be provided in the course.
To access the assignment set-up the students must be in the school network.

5   Evaluation

See Osiris

6   Evaluation format for Osiris

6.1 Exam

The exam is structured in multiple choice questions.
The minimum number of correct answers to pass the exam will be communicated in the cover page of the exam.
See Osiris for any extra information.

1.1   Assignment:

The assignment is evaluated according to the correctness of the output (the delivery is assessed in person for all group members), with the aid of an test program that will be given during the course to the students (so they can check the functionality on their own at any given time).
The description and the details of the modality and correction will be communicated during the course.
The assignment should be done in small groups **up to 2 students**.
The exact date for the delivery will be available in the assignment description or announced in the class.
If the assignment is genuinely developed by the students, implements the requirements, and runs correctly producing the expected results, it is evaluated as a "PASS", otherwise as a "FAIL" for the group.

- **There will always be the possibility for the teacher to ask for an oral check to clarify the submissions.**

6.2 Procedure Resit

The resit exam will be scheduled at the end of OP2 (in the official resit week in the following period).
For the assignment: the student needs to submit the updated version of the assignment if it did *not* receive a passing grade on the first delivery. For the deadline refer to the classroom and/or exam calendar.

6.3   Test matrix

	Exam	Assignment
LO1	X	
LO2	X	X

Bloom simplified taxonomy

	Remember & Understand	**Apply** & Analyze	**Create** & Evaluate
Exam	X	X	
Assignment		X	X