

Department of Computer Science  
University of Pretoria

Computer Networks  
COS 332

Study Guide Part B  
Version 2019.0.99 (Draft)

2019

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# Chapter 1

## Overview

### 1.1 Description

The objective of this module is to acquaint the student with the terminology of communication systems and to establish a thorough understanding of exactly how data is transferred in such communication networks, as well as of applications that can be found in such environments. The study material includes concepts and terminology, the hierarchy of protocols according to the OSI and TCP/IP models, protocols on the data level, physical level and network level as well as higher level protocols. The practical component of the module involves programming TCP/IP sockets using a high level language.

### 1.2 Prerequisites

COS 216

### 1.3 Study units

The following ABET study units are covered in the course:

- Net-centric Computing
  - Introduction to net-centric computing
  - Communication and networking
  - Network security
  - The web as an example of client-server computing
  - Building web applications

- Network management
  - Wireless and mobile computing
- Social and Professional Issues
  - Social context of computing
  - Computer crime
- Algorithms and Complexity
  - Algorithmic strategies
  - Fundamental computing algorithms
  - Distributed algorithms
  - Cryptographic algorithms
- Architecture and Organisation
  - Interfacing and communication
  - Architecture for networks and distributed systems
- Information Management
  - Hypertext and hypermedia

# Chapter 2

## Outcomes

### 2.1 Career

According to Sun *The network is the computer* (1)

Let  $N$  be the set of people working in networking.

Let  $C$  be the set of people working in computing.

Let  $COS332$  be the set of all students who completed a networking course, such as COS332

For any (ex-) student  $s$ ,  $s \notin COS332 \Rightarrow s \notin N$

From (1)  $C \subseteq N$ ; therefore  $\forall s, s \notin COS332 \Rightarrow s \notin C$

QED

### 2.2 Course

The primary outcome is the ability to comprehend the notion of a *network*. In order to do this, the manner in which network technologies are categorised in layers is of fundamental importance. Linked to this is the need to comprehend how peer components communicate with one another via the lower layers of the protocol stack. Only once insight into this structure is gained is it possible to make sense of the myriad of technologies that play a role in data communications.

On a secondary level the student should become acquainted with the specific protocols (with TCP, IP, Ethernet and a variety of application protocols as the most prominent examples). The student should be able to demonstrate the use of some of these protocols in a practical context.

## **Chapter 3**

### **Plagiarism Policy**

This department considers plagiarism as a serious offense. Disciplinary action will be taken against student who commit plagiarism. For a formal definition of plagiarism, the student is referred to

<http://www.ais.up.ac.za/plagiarism/index.htm>

(From the UP Main page follow the Library link and then the Plagiarism link.)

# Chapter 4

## Instructors

### 4.1 Contact details

#### 4.1.1 Course coordinator

Prof MS Olivier — tel 012-420-2052

Consultation hours: See <http://mo.co.za/consult>

#### 4.1.2 Teaching assistants

Teaching assistants are only available in the laboratory during practical sessions. Contact the lecturer with any queries at other times.

### 4.2 Interaction with the instructor

Students are welcome to come and discuss any aspects of the course without appointment during the consultation hours listed above. Students are also welcome to make an appointment (in person or by telephone) to discuss work at other times. (The consultation period is also a good time to reach the lecturer by telephone — at other times he may be hiding somewhere to get some work done.) The deluge of email has unfortunately rendered email an ineffective tool for this purpose, and time often does not permit this lecturer to reply to email.

# **Chapter 5**

## **Study Material**

### **5.1 Prescribed**

The primary prescribed text will be provided incrementally on <http://netw.co.za>.

You are also expected to study the material provided on  
<http://www.networkmuseum.net>.

### **5.2 Additional references**

Various RFCs will have to be consulted for practical assignments. They are identified in the individual practical assignments.

RFCs are available from <http://www.rfc-editor.org/>.



# Chapter 6

## Assessment

### 6.1 Dates

Note that assessment dates (in particular examination dates) are subject to change by the University. Double check the examination date at the start of the examinations.

Assessment	Date	Time	Venue
Semester test 1	Friday, 05 Apr 2019	17:30 – 20:00	IT 4-1
Semester test 2	Tuesday, 14 May 2019	17:30 – 20:00	IT 2-23
Examination	Wednesday, 5 June 2019	8:00 – 11:00	TBD

- Semester test 1: 25%
- Semester test 2: 35%
- Class tests: 10%
- Practical assignments: 30%

Class tests will be written during the lecture on Mondays. The idea is to give you an indication of your progress acquiring the knowledge required to pass this course, as well as to give you an indication of the level of detail at which you need to know the material.

Of the  $n$  class tests, the highest  $n - 3$  scores will count towards the semester mark.

The semester mark and examination mark will carry equal weights when the final mark is calculated. A final mark of 50% is required to pass. Note that a subminimum of 40% is required during the semester to be allowed to write the examination. A subminimum of 40% in the examination is required to pass.

# Chapter 7

## Lecture schedule

The course is heavily based on the ISO OSI model; with the primary emphasis on the higher layers — in particular, layers 7, 4 and 3. The intention is to spend at least one week (two lectures) on each layer, and two to three weeks (four to six periods) on each of these (for the purposes of the course) more important layers. In addition, a week or two (two to four periods) are devoted to topics that span the entire protocol stack. These include the overview of networking and security.

Some topics are covered in practical assignments only. These topics will form part of the material assessed during tests and examination.

We will *more or less* follow the following lecture schedule:

- Week 1 Welcome, ISO OSI, other standards, socket programming
- Week 2 Application layer
- Week 3 Application layer (continued)
- Week 4 Presentation and session layers
- Week 5 Transport layer
- Week 6 Transport layer (continued)
- Week 7 Routing
- Week 8 Network layer
- Week 9 Network layer (continued)
- Week 10 Data link layer
- Week 11 Data encoding

- Week 12 Physical layer
- Week 13 Network security (if time permits)
- Week 14 Revision, start of examinations