

Computer Systems Administration, 7.5 hp

Course description

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Weeks 35-42

Course details and contact information	
Placement in the education system	7.5hp freestanding course. (Mandatory course in the Network design and computer management programme 60 hp. Mandatory course in the IT-Forensics programme 120hp.)
Examiner	Magnus Jonsson Email: magnus.jonsson@hh.se Phone : 035-167177
Course responsible	Mattias Wecksten Email: mattias.wecksten@hh.se Phone: 035-167396 You can visit me at my office on F3, please book a time via phone or email first. <div data-bbox="1129 613 1355 873" data-label="Image"> </div>
Course webpage	http://www.hh.se/te2003
Course literature	“Mike Meyers CompTIA A+ guide to managing and troubleshooting PCs” and “Mike Meyers CompTIA A+ guide to managing and troubleshooting PCs lab manual” (E-books available free of charge to HH students via the course webpage)

Introduction

Personal computer systems are abundant and we rely on them in our daily lives, both at work and at home. This reliance means that when computers stop working the impact in terms of lost time and resources can be large. The practical skills necessary for administrating and maintaining these systems is what this course is about and the following topics are included:

- Computing basics – an historical viewpoint
- An overview of the computers low level building blocks – CPU, power supply, RAM, BIOS, bus systems ...
- An overview of available computer components – general input/ output, video, audio, networking ...
- Storage foundations – removable and fixed media
- Operating system basics – installing/ upgrading windows
- Basic operating system administration – working with the command line, understanding windows, trouble shooting

The course focuses on teaching skills that are applicable in a working environment, and thus practical exercises play a large role. Working as a system administrator means solving diverse and exciting problems in teams and independently, often these problems concern rapidly evolving technologies that have a very short “shelf life”. Therefore it is important to develop your self-learning skills, the best system administrators are those that learn also outside the classroom, and this is true in this course as well.

The course consists of 8 lectures addressing the above topics as well as preparing you for the 5 compulsory exercises. As a preparation for each lecture, you will be divided into groups where each group will be assigned a chapter from the book. Before the lecture where your chapter will be presented you are to prepare a summary on a power point slide and mail this to the lecturer. There will also be a written group assignment with compulsory supervision meetings. The written assignment will then be presented at a seminar in the end of the course. The course ends with a written exam. Besides the compulsory tasks there will be optional diagnostic tests for each of the chapters of the book. Passing the diagnostic tests generate bonus points for the ordinary written exam.

During the exercises you will, in pairs, get to practice applying your knowledge on real computer systems with the help of an exercise assistant. The assignments are described in the lab manual and you will be assigned a mandatory set of assignments for each exercise. In order to use the exercise time efficiently you should read the instructions and answer preparatory questions in it before coming to the exercise session.

The written assignment will consist of writing a short report on one of 18 given topics. A compulsory seminar will be held towards the end of the course where you present, in groups the topic you have chosen.

To pass the course you must attend and pass all exercises, the seminar and finally a written exam.

Intended Learning Outcomes

After finishing this course we intend that you should have learned the following factual, or declarative, knowledge and be able to:

- briefly explain the functionality of common hardware units in a work station.
- briefly discuss typical system administrative tasks.

Additionally we intend that you should gain functioning knowledge in computer systems administration, more specifically you should be able to:

- independently apply installation of hardware units in a work station.
- independently perform installation of an operating system in a work station.
- independently perform basic administrative tasks in an operating system.
- independently identify, isolate and fix problems in faulty systems.

Weekly Schedule

For up-to-date times and rooms, see the schedule at the course webpage

Week	Activity
1	Lecture 1 - The Visible PC, Microprocessors, Power Supplies
2	Lecture 2 - RAM, BIOS and CMOS, Expansion Bus, Motherboards Exercise 1 Decide on a project topic.
3	Lecture 3 - Hard Drive Technologies, Implementing Hard Drives, Removable Media, Input/ Output, Video, Sound Exercise 2 Project supervision 1
4	Lecture 4 - Portable Computing, Printers, FH: Local Area Networking, The Complete PC Tech Exercise 3
5	Lecture 5 – Installing and Upgrading Windows, Understanding Windows Exercise 4 Project supervision 2
6	Lecture 6 – Working with the Command-Line Interface, Maintaining and Troubleshooting Windows Exercise 5
7	Lecture 7 - SH: Local Area Networking, The Internet, Computer Security Project seminar
8	Lecture 8 – Summary, Exam preparation, Course evaluation Exercise redo sessions
9	Hand in of written report Written exam

Lectures and exercises

Lecture slides and exercise instructions, including preparatory questions, are downloadable from the course web-page. A chronological overview is given below.

Lecture 1 - Introduction to computing

In this lecture you will learn about how a PC works and its major components. We will also have a closer look at the actual computer – the CPU – and the relationship of the CPU and the rest of the PC components. We will also look at the power supply.

Chapters 2, 3, 8

Lecture 2 - The PC and its components

In this lecture we will learn about the PC mother board and its central components (RAM, BIOS busses...).

Chapters 4, 5, 6, 7

Exercise 1

In this first exercise you will, based on your knowledge so far, assemble a PC from its parts, identifying the various components and their use as you go along.

Lecture 3 - Storage and expansions

In this lecture we will talk about different types of storage media as well as different types of input/ output devices. We will also have a look at how the operating system use the hardware and how to configure these devices.

Chapters 9, 10, 11, 16, 17, 18

Exercise 2

In this exercise you will experiment with the basic components on the mother board, learning about how to identify the components and how to evaluate their performance.

Supervision 1

Supervision is performed for 5 groups at a time. This supervision will be dedicated to the initial planning and information gathering for the project.

Lecture 4 –Portable computers, printers and PC Troubleshooting

In this lecture we will cover portable computers and how they differ from the stationary and server types of PCs. We will also have a look at hard copy – printing that is. There will be a short introduction to networking, a topic we will get back to. Finally we have a look at a more strategic method for trouble shooting.

Chapters 19, 20, 21 (first half), 24

Exercise 3

In this exercise you will work with different types of storage media, installing, configuring and evaluating performance. We will also cover installation of an expansion card.

Lecture 5 - OS Installation and hardening

In this lecture we will cover how to install and configure the operating system MS Windows.

Chapters 12, 13

Exercise 4

In this exercise we will focus on trouble shooting of a given system.

Supervision 2

This supervision will be dedicated to the writing of the report and planning of the seminar presentation.

Lecture 6 – Maintenance and automation

This lecture will make your administration more efficient using the command line and how to maintain and trouble shoot the software and operating system.

Chapters 14, 15

Exercise 5

This exercise will cover the installation and hardening of the Windows operating system.

Lecture 7 – Networking and security

This lecture will cover the last part of the networking chapter and focus on Internet and Internet security.

Chapters 21 (second half), 22, 23

Lecture 8 - Summary

This lecture will sum up the course. We will also prepare for the written exam and evaluate the course.

Project

You are supposed to pick a topic from a list given to you during the course (see examples in this document) and write a two page summary of this given topic. Your findings will then be presented at a seminar. The project assignment will be done in groups of 2 students.

Report grading guidelines

Grade	Criteria
Fail	<ul style="list-style-type: none">• Academic dishonesty/plagiarism/lack of references• Only listing facts without any connecting argumentation or analysis
3	<ul style="list-style-type: none">• Only a limited number of secondary or aggregate references used (e.g. only Wikipedia)• Re-telling of information in a structured way with little analysis• Analysis of benefits and drawbacks is unbalanced• Report is understandable but has structural problems, e.g. spelling, grammar, clarity
4	<ul style="list-style-type: none">• More than aggregate references used• No major structural problems• Clear connection between problem statement, covered technology and conclusions• Balanced analysis of benefits and drawbacks
5	<ul style="list-style-type: none">• Analysis is made of benefits and drawbacks that presents original and relevant arguments• The report shows a deeper understanding of the relationships between the studied technologies and the problem statement• Excellent structure and style

Presentation guidelines

- Make sure that you motivate, explain and answer the problem statement that you have selected.
- Structure your presentation according to your expected audience and make sure you rehearse it so it fits in the allocated time slot (there are a lot of web sites dedicated to the topic of making good presentations)
- Both group members must be equally active during the presentation of your material.
- Both group members must be able to answer questions related to any part of the presented material.

Research paper topic examples

- 1) A modern car incorporates several computers. Even a dish washer or a microwave oven contains a computer today. Where do we find computers and how do they compare to an ordinary PC?
- 2) From what did the computer originate? How has the computer evolved over time up until the modern CPU?
- 3) How has the power supply evolved over time and why? Are there any problems to solve in this area? What about UPS?
- 4) How has RAM evolved over time? How does a modern RAM work internally?
- 5) How has BIOS evolved over time? Are there any problems with this technique?

Written exam

A written exam will be held at the end of the course. Previously held exams with suggested answers can be downloaded from the course web-page.

Missed and failed examination

The written exam is given three times at given dates. Chapter presentation slides handed in before the lecture leads to full credit, missed hand-ins can be completed until the end of the course. Missed exercises will be re-examined continuously including one extra occasion in the end of the course. Project examination will be given three times at given dates. Missed project presentation will be compensated by handing in a video recording of your presentation where at least another group attends and asks questions. Missed project supervision will require written hand-ins that can be completed until the end of the course.

After that, any completion has to be done during the next time the course is given. Please note that you then will have to complete the missing parts of the course according to a potential new course plan.

Final grade

To achieve a passing grade for the course all five exercises must have been graded as passed by the exercise assistant (this is done at the end of each exercise session). The short paper, chapter introduction and presentation must be graded at least passed. The final grade on the course will then be decided by combining the grading of the final exam and the research paper. The final grade will be one of U (fail), 3, 4 or 5.

