In the name of God

Computer Workshop Proposed Syllabus

Revision History:

10/12/2006:
[M.S.Dousti]
*The previous-terms syllabus is re-written from scratch.

10/17/2006:
[M.S.Dousti]
*Added revision history.
*Added networking commands to session 5.
*Added “awk” to session 8.

10/21/2006:
[M.S.Dousti]
*Added “search” to session 7 (Suggested by M.Vafadoost).
*Added “mesg” to session 7.

10/22/2006:
[M.S.Dousti]
*ZWNJ replaced with "Optional Hyphen" in session 3.

10/28/2006
[M.S.Dousti]
*Added ifconfig to the list of network commands in session 5.

10/30/2006
[M.S.Dousti]
*Added "hub" to network devices in session 5.
*Added secure versions of protocols in session 5.
*Re-ordered some of session 5 topics.

[M.S.Dousti]
*Added "whois" to session 5.
*Added "dig" to session 5.
*Corrected and added new tags in session 6.

[M.S.Dousti]
*Many changes to session 7.
*Added “HTML Forms” to session 9.

11/12/2006
[M.S.Dousti]
*Simple changes to session 7.
*Added xargs to session 8.

11/16/2006
[M.S.Dousti]
*Added backtick & sort to session 7.
1- Session 1: An Introduction to the Computer & Windows Basics

Objectives: The student should learn:

- How to power on/off the computer.
- How to log on/off the Windows.
- General Windows features, including, but not limited to:
  - Accessing different Windows properties using the mouse right-click (Start menu, Taskbar, Desktop, My Computer, etc.)
  - Windows Explorer, working with and searching for files and folders
  - Common actions, e.g. Copy, Paste, Cut
  - Common shortcuts, e.g. Ctrl+C, Ctrl+V, Ctrl+X, D+E, R,
    Tab, Alt+Tab, Caps Lock, Num Lock Esc, Alt+F4, PgUp, PgDn, Home, End
  - Common accessories, e.g. Notepad, Paint, Calculator, Command Prompt,
    On-Screen Keyboard, Magnifier.
- Creating new text/image files, and saving/opening them
- How to browse the Internet and use e-mail:
  - Introduction to browsers
  - Introduction to CE homepage, CE108 homepage, and mailing list

Assignment: The students should subscribe to the mailing list of this course, and send an e-mail to it. This e-mail should contain their forename & surname.
2- Session 2: Hardware Basics

Objectives: The student should learn:

- General (macroscopic) structure of a computer, e.g. Mouse, Keyboard, Case, and Monitor, and the way they are connected to each other.
- Specific (microscopic) structure of each part of a computer, i.e.:
  - How does a monitor display objects on the screen (including both CRT and LCD monitors)
  - How does a keyboard work (specifically, the buffering mechanism)
  - How does a mouse work (mechanical & optical mice)
  - What’s inside the case?
    - The power
    - The motherboard
    - The CPU & fans
    - Temporary (RAM) and permanent (Hard Disk) memories
    - The graphics card
    - The NIC (Network Interface Card/Controller)
    - Cabling
  - Floppy disks, CD-ROM, & DVD-ROM
  - Flash memories

Optional: If there’s more time, you may also describe:

- What’s a device driver (The software that lets the OS and the device talk to one another)?

Assignment: Students are grouped (2-3 individuals per group) and each group should write up to one page about a piece of hardware. Wikipedia and HowStuffWorks are good references. Electronic works are assigned extra mark. (TAs might describe a little about how to search the Internet)
3- Session 3: Microsoft Office (Part I: Microsoft Word)

Objectives: The student should learn:

- Getting started with Word: menus, toolbars, & shortcuts
- Typing text into Word:
  - Applying character/font formatting (Bold, Italic, Underline, Color)
  - Applying paragraph formatting (Text Direction, Alignment, Indentation, Spacing)
  - Adding columns, tables & images
  - Working with bulleted & numbered lists
  - Using tabs
- Formatting pages (margins, orientation, page size, page borders, page breaks, page numbers, headers & footers)
- Working with styles
  - Why styles?
  - Paragraph & character styles
  - Format Painter
  - Ctrl+Space & Ctrl+Q shortcuts (for clearing additional character & paragraph styles)
  - Creating TOC (table of contents)
- Inserting formula
- Farsi-specific features
  - Alt+Shift to change language
  - Ctrl+- to insert "Optional Hyphen"
- Converting documents to PDF files

Assignment: Students are asked to type a two-paged bilingual document and apply different Word formatting they learned. They are also asked to try to type as fast as they can. For the midterm, a minimum of 15-20 wpm (word per minute) is required. They should be able to improve this rate to 25-30 wpm for the final exam.

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1 It’s a good idea to introduce students with other kinds of breaks, such as column breaks / section breaks.
4- Session 4: Microsoft Office (Part II: Microsoft PowerPoint & Excel)

Objectives: The student should learn:

- Microsoft PowerPoint
  - Why PowerPoint?
  - Getting a feel for PowerPoint
  - Creating a new presentation
  - Applying designs & color schemes
  - Applying animations
  - Understanding “Slide Master”

- Microsoft Excel
  - What is Excel?
  - Describing tabular data structure
  - Entering data into cells
  - Formatting cells (number formats, colors, etc)
  - Using formulae (Mathematical Operators, Aggregation Functions, etc)
  - Creating charts

Assignment: Students are asked to create a PowerPoint presentation, applying as much effect as they can. They are also asked to create an Excel worksheet that does some math, and has charts.
5- Session 5: Networking & the Internet

Objectives: The student should learn:

− What is a network, and why do we need networks?
− What is the Internet?
− Using the Internet: web, search engines, & e-mail
− Understanding browsers
− URL, IP & MAC address
− Building blocks of networks (PCs, Servers, Hubs, Switches, Routers, Cables, etc.)
− What is a protocol?
  o Famous protocols:
    ▪ HTTP
    ▪ FTP
    ▪ SMTP
    ▪ POP3/IMAP
    ▪ HTTPS/SFTP/SMTPS/POP3S/IMAPS
− Using common networking commands: ping, nslookup (Linux: nslookup, dig), tracert (Linux: traceroute), ipconfig (Linux: ifconfig), etc.
− Using whois service.
− Understanding CE & Sharif network structure

Optional: If there’s more time, and the students are not confused, you may also describe:

− DHCP & DNS

Assignment: Each student is assigned a network/Internet concept to examine. The reports should be in Farsi (up to one page), and should be submitted electronically in PDF format.

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2 Again, the student is only supposed to be able to define these terms.
3 The student is only supposed to know what these devices do in a network, not how they work.
4 Using Telnet is recommended.
6- Session 6: Basic Web Programming

Objectives: The student should learn:

- HTML programming
  - What is & why to use HTML?
  - HTML tags:
    - What is a tag?
    - General HTML structure: <html>, <head>, <body>
    - Adding title to pages: <title>
    - Creating content: <p>, <br>, <a>, <img>
    - Creating lists: <ul>, <ol>, <li>
    - Creating tables: <table>
    - Formatting text: <b>, <i>, <u>, <font>
    - Special characters (&nbsp; etc.)
    - Plain text inside HTML: <pre>, <xmp>
    - Animating text: <marquee>
  - <meta> tags

- CSS basics
  - What’s a style sheet?
  - A simple CSS introduction
  - HTML <link> tag (external CSS)

- JavaScript programming
  - A simple description of DOM (Document Object Model)
  - Describing events & implementing them (e.g. OnClick)
  - Writing a simple JavaScript program

- HTML editors (e.g. FrontPage)

Assignment: Each student is asked to create some sort of “homepage”. They are not required to upload it to the CE server (unless they know how to). This homepage should consist of at least three HTML pages linking to each other. The pages should contain CSS & JavaScript. The students are not allowed to use WYSIWYG editors or off-the-shelf JavaScript code snippets in this assignment. Creating a page as their résumé is highly recommended (extra marks).

5 Show the student a simple CSS. Do not go into CSS details.
6 It’s sufficient that the student understands that every aspect of an HTML document can be referenced as an object, or a property of an object, and can be manipulated using either object properties or methods.
7 If there isn’t enough time, just describe that there is such a program. There’s no need to introduce FrontPage features.
7- Session 7: Linux OS (Part I: Basics)

Objectives: The student should learn:

- What’s SSH and how to use it to get a Linux shell
- What’s the shell, the differences between shell and kernel, famous shells (C, Z, Bourne, BASH, KORN, T C)
- Using Tab and Arrow keys
- Everything is a file, files are case sensitive.
- Escaping special characters
- Common shell commands:
  - File & directory commands (& switches):
    - cd, ls, cp, mv, rm, mkdir, pwd, ln
    - touch, cat, vim, head, tail
    - The meaning of wildcards (*, ?, and [])
  - Searching for files:
    - find, locate, updatedb
    - whereis, which
  - Permission-related:
    - chmod, chgrp, chown
  - Security-related:
    - su, passwd, logout
  - System-resources related:
    - ps, kill, free, df, du
  - Other commands:
    - echo
    - who, whoami, finger, write, talk, mesg
    - gcc
  - Creating a “public_html” directory, granting the right permissions to it, & uploading HTML files to it.

- Common techniques
  - The meaning of tilde (~)
  - Redirection (>), (<, >>) & piping (|), using less & sort
  - Running several commands using semicolon (;), &&, ||
  - Running commands in the background using &
  - Plugging the output of a command into another command using backtick (`) and $()
  - Using backslash (\) for commands that span more than one line
- Getting help
  - --help, man, info, how-to
- Using **what**is and **apropo**s

**Assignment:** Each student is asked to find the use of a new Linux command. The report should be typed in Farsi (at most one page), and submitted electronically in PDF format.
8- Session 8- Linux OS (Advanced Concepts)

Objectives: The student should learn:

- What are aliases, and how to use them (.bashrc file)
  - Using reset command
- Viewing a history of commands
  - Using history command
- Understanding regular expressions
  - Working with grep, awk, sed, and xargs
- Compressing/decompressing files & directories
  - tar, gzip, bzip
- Using bash scripts
  - $, if, for, while, [], case

Assignment: Students are grouped and each group is asked to write a bash script. The script should be complex enough to include as much commands as possible.
9- Session 9: PHP Programming

Objectives: The student should learn:

- What is server-side programming?
- Why PHP?
- HTML Forms
- Describing the flow of information between web pages and PHP, and vice versa.
- Defining variables in PHP context, and using `echo` command
- Working with numbers, strings, date & time, and arrays
- Using conditional statements (if), and loop statements (for, while)

Optional: If there’s more time, and the students are not confused, you may also describe:

- How to install PHP (+ a web server like Apache)

Assignment: Each student is asked to add PHP scripting to his/her homepage, and upload it to the CE server. A guest book is a classic example. Novel ideas are rewarded with extra marks.
10- Session 10: Advanced Topics in Windows

Objectives: The student should learn:

- Windows command prompt (describing common switches, especially /?):
  o cd, dir, md, rd, del, deltree, type, edit
  o Environment variables, SET command
  o Writing BAT files (+how to use FOR & IF in BAT files)
- Windows Registry
  o Describing main Registry hives (HKLM, HKCU, etc)
- Describing Active Directory & Domain
- Describing common programs users tend to install on Windows systems, e.g.
  Antivirus software, CD-Mounting utilities, Math programs, Graphics tools,
  Download managers, and Programming environments

Assignment: Each student is asked to write a BAT files that does something specific, e.g.
changing values in the Registry, batch-renaming files, and so on. Another acceptable
homework is to perform a research on the Active Directory (the report should be in
Farsi).

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8 Don’t go into the details. Just describe what it is and why it’s good.
9 No need to describe all of them if there’s not enough time, but TRY to mention as much as possible.