Introduction to FOSS

(Free and Open Source Software)

Department Elective – Syllabi

Department of Computer Engineering, MNIT Jaipur

1. **Unit 1 – Introduction to the FOSS philosophy (2 hrs)**

   Overview of Free/Open Source Software, Definition of FOSS & GNU, History of GNU/Linux and the Free Software Movement, Advantages of Free Software and GNU/Linux, FOSS usage, trends and potential: global and Indian; Popular FOSS alternatives to non-free software (GIMP, OpenOffice, GAIM, Firefox, Thunderbird etc.)

2. **Unit 2 – GNU/Linux Basics (8 hrs)**

   GNU/Linux OS installation, detecting hardware, configuring disk partitions & file systems and install a GNU/Linux distribution, Basic shell commands - logging in, listing files, editing files, copying/moving files, viewing file contents, changing file modes and permissions, process management, User and group management, file ownerships and permissions, PAM authentication, Introduction to common system configuration files & log files, Configuring networking, basics of TCP/IP networking and routing, connecting to the Internet (through dialup, DSL, Ethernet, leased line and Wifi). Configuring additional hardware - sound cards, displays & display cards, network cards, modems, USB drives, CD writers.

3. **Unit 3 – GNU/Linux Advanced (8 hrs)**

   Understanding the OS boot up process; GNU/Linux distributions – case study of Fedora Core, Debian and Gentoo; basic understanding of the Linux kernel, kernel configuration, installing Linux from Scratch, understanding the Gnome and KDE environments and their components, Various methods of installing software: binary and source, analysis of popular software distribution methods and packaging schemes – deb, rpm and source, file-system overview (ext2, ext3, reiserfs), partitioning schemes and layouts.

4. **Unit 4 – Server Configuration (6 hrs)**

   Why use GNU/Linux as server; Setting up email servers - using postfix (SMTP services), courier (IMAP & POP3 services), SquirrelMail (web-mail services); Setting up web servers - Apache httpd (HTTP services), PHP (server-side scripting), Perl (CGI support); Setting up file services - using Samba (file and authentication services for windows networks), using NFS (file services for GNU/Linux and Unix networks); Setting up proxy services - using Squid (HTTP/FTP/HTTPS proxy services); Setting up a firewall - Using netfilter and IPTables, IPCop; Setting up printer services - using CUPS (print spooler) and foomatic (printer database); Setting up database services – mySQL with phpmyadmin and PostgreSQL.

5. **Unit 5 – The GNU Project (10 hrs)**

   GNU compiler tools; The GNU compiler collection (gcc, g++, gas and gcj); Understanding build systems - constructing Makefiles and using make, disadvantages of make and introduction to autotools; Understanding the GNU libc libraries and linker - linking against object archives (.a libraries) and dynamic shared object libraries (.so libraries), generating statically linked binaries and libraries, generating dynamically linked libraries; Using the GNU debugging tools - gdb to debug programs; Introduction to Bash, sed & awk scripting; Introduction to Emacs

6. **Unit 6 – FOSS Programming (6 hrs)**

   Introduction to Gnome/KDE programming with Gtk+/Qt; Python programming; Programming GUI applications with localization support; Using the Glib library; Introduction to web standards and design (XHTML, CSS, JavaScript, AJAX) and web toolkits; Alternates to make – Apache Ant and SCons

7. **Unit 7 – FOSS Development methodology and Tools (5 hrs)**

   FOSS Community structure & dynamics, Mailing lists, chat, wiki and messaging; Version control – rcs, cvs, Subversion and git; collaboration tools and issue tracking – GForge and Trac; Documentation systems – Docbook, LaTeX, and doxygen; Review of common programming practices and guidelines for GNU/Linux and FOSS; Opportunities for FOSS development (Red Hat Lord of the Code, Google Summer of Code™)

REFERENCES

Books

Open Sources: Voices from the Open Source Revolution, First Edition, January 1999
http://www.oreilly.com/catalog/opensources/book/toc.html

The Cathedral and The Bazaar by ESR
http://www.catb.org/~esr/writings/cathedral-bazaar/

Running Linux, Fourth Edition, Matt Welsh, Matthias Kalle Dalheimer, Terry Dawson, and Lar Kaufman, O'Reilly Publishers, December 2002

Linux Cookbook, First Edition, Carla Schroder, O'Reilly Cookbooks Series, November 2004

Free Software, Free Society: Selected Essays of Richard M. Stallman, First Edition, Joshua Gay (Editor), GNUPress, October 2002
http://www.gnupress.org/philosophy/fsfs/rms-essays.pdf

Learning the bash Shell, 3rd Edition, O'Reilly, 2005.
http://www.oreilly.com/catalog/bash3/index.html