**BASIC COURSE OUTLINE MODEL**

**SCHOOL OF ARCHITECTURE & APPLIED SCIENCES**

**DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY**

**Course Code**: COMP201 **Credit Hour(s)**: **3** **Webpage: Any** relevant site

**Course Title**: **Open Source & System Administration**

**Course Lecturer: Daniel Obuobi Room: G319-G320**

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**Office Hours: Mondays, Tuesdays and Thursdays**

# Course Objective

The objective of this course is to enable students learn about the essential features of an Open Source software and develop the skills required by the system administrator to deploy and maintain free and open source systems in an operational environment.

# Course Description

This course introduces students to open source software issues in the computing industry Students will be exposed to basic installation, configuration and administration of Open Source packages such as Linux, as well as basic troubleshooting techniques. Some of the topics include: installing the Operating System, configuring the kernel, performance tuning and creating users and groups, tools for Linux administrator, commands, files and Processes. Others are System optimization and disk management, Networking and troubleshooting, Setting up mail server, Communication with devices and scripting.

# Learning Outcomes

At the end of this course, students should be able to:

* Understand the role and responsibility of a system administrator
* Understand the Unix/ Linux file system and also navigate the file system
* Use the Unix / Linux commands and also write scripts to manage the system
* Install and configure the Linux operating system as well as manage network services
* Manage users, resources and security of a computer running Linux at a basic level
* Make effective use of Unix/ Linux utilities and scripting language
* Make effective use of AWK, SED utilities and also Perl and CGI programming
* Configure and manage simple TCP/IP network and develop and appreciation for documentation available as part of an installed Unix/ Linux system

# Instructional Methods

Instructional approaches to be used during the course (e.g., lectures, presentations and assign readings). **Note that attendance is also a requirement.**

# Required Course Materials and Readings

Evi, N., Grath, S., Trent, R., Hein, B. W. (2010). *Unix and Linux system administration handbook* (4th ED), London:Prentice Hall.

Shotts W. E. Jr. (2012). *The Linux Command Line: Complete Introduction*. San Francisco: William Pollock,

Blum, R. & Bresnahan, C. (2015). *Linux Command Line and Shell Scripting Bible*. Indiana:John Willey & sons

Nemeth, E; Snyder, G., Trent R. Hein, (2013) *UNIX and Linux System Administration.*Handbook (4th ed.): Michigan, Pearson Education

# Evaluation

Quizzes, Mid-Semester, Assignments etc 40%

End of Semester Exams 60%

Total 100%

# Commit To Academic Integrity

Students in the department are expected to maintain **high degrees of professionalism,** **commitment to active learning, participation and academic integrity every time**.

# Academic Dishonesty

Please note that students involved in academic dishonesty will receive a **ZERO** mark on the particular component in which the infraction occurred and a notation of academic dishonesty in the departmental office. This may also reflect on references written by the department.

**It is the student’s responsibility to understand what constitutes academic dishonesty.**

# Missed Exams / Tests / Assignments

**Assignment Submission**: Assignments must be received on the due date specified for the assignment.

**Lateness Penalty: Assignments received later than the due date will be penalized.** Exceptions to the lateness penalty for valid reasons such as illness, etc., may be entertained by the Lecturer but will require supporting documentation (e.g., a doctor’s letter).

**Missed Tests:** Students with a documented reason for missing a course test, such as illness, which is confirmed by supporting documentation (e.g., doctor’s letter) will be handled by the Lecturer.

**WEEK BY WEEK COURSE SCHEDULE / ORGANISER:**

| **Week** | **Topic** | **Activities** | **Due Date** |
| --- | --- | --- | --- |
| 1 | **Introduction**  What is Open Source, Open source software development and business model, licensing, Free Software foundation and GNU project, Linux | Lectures begin | Week 1  **Assignment Major** |
| 2 | **Linux Installation**  Linux distribution, installation and partition - installation steps, Configuring the Kernel, Booting the kernel, partitioning the Hard disk, file system choice, Packages and selection, Booting(more in week 6) and Basic Network configuration | Lecture  Reading | Week 2 |
| 3 | **Unix / Linux file systems**  Basics of Unix, Layered view of a computer system, the Unix OS, Brief history of Unix, layers of Unix System, Unix shell, structure of Unix command, Unix File System Structure, Some directories, Navigating the file system, Unix command, Unix file permission. | Lecture  Reading | Week 3 |
| 4-5 | **Vi Editor and file processing etc**  The Vi editor, Vi commands, executing shell from within Vi, Unix file processing- standard files, redirection, pipe and processes etc, Sorting, finding files, grep etc  AWK and SED utilities | Lecture  Reading  **Quiz 1** | Week 4 – Week 5  Week 4 or 5 - Quiz 1 |
| 6 | **Linux System Administration**  Systems Administrator, privilege hierarchy, Super User, System operation- booting the system, init and runlevels, scripts, shutting down the system, scheduling and crontab, file management, creating a new file system, User administration- creating users and groups, Networking ifconfig, route, host name and interfaces, Kernel modification and compilation | Lecture  Reading | Week 6 |
| 7-8 | **Shell Programming**  Unix shell scripts, shell programming, features of Unix shell – variables, expression and logical structures, writing and debugging shell programs. | Lecture  Reading  Quiz 2 | Week 7  Week 7 - Quiz 2 |
| 9 | **Perl Programming**  Introduction to Perl Programming, helpful resources, sample program, variable and scalars, interacting with user and chomp function interchangeability of strings and numbers, arrays, sort, join and split operations, push and pop operations, shift and unshift operations, relational operators if/unless, while/until/ for each loops, files and file handlers, hash | Lecture  Reading | Week 9  Quiz 3 |
| 10-11 | **System Admin – backup**  What is Backups, Types of failures and backups, other possible backup methods, Network backup systems such as Amanda and Bacula, RAID and mirroring, type of redundancy, Log management, centralized logging, syslog basics, sorting logs, Large Volume Management (LVM) | Lecture  Reading – Read more about RAID and LVM. | Week 10 – Week 11  Mid Semester  Submit Assignment |
| 12 | **System Administration tasks**  System Administration tasks, important user, Processes, properties, components of process, process states and monitoring (signal, niceness), execution modes, daemons, creating and killing processes, Boot process, resource management and administrative tools. | Lecture  Reading  **Assignment** | Week 12 |
| 13 | **Network and troubleshooting, DNS, mail Server and network security**  IP basics, solving problem using divide and conquer principles, TCP/IP, encapsulation and decapsulation, Frames, datagram, segments and packets.  IP address, Network Masks, allocating IP addresses, Iv4, IPv6, super and subnetting, numbering rules, reaching hosts, forwarding packets, packet routing using ping, traceroute, tcpdump, arp and route, user security, network security etc  Administering remote system and general services – FTP, HTTP, POP3, IMAP,SSH,STMP etc | Lectures end  Reading – Read about Security –Physical and file system security, Security modules and updates, Creating Security policy, | Week 13 |
|  |  | Revision Week | 2nd Jan., – 6th Jan., 2018 |
|  |  | Exams begin | 8th Jan., 2018 |
|  |  | Exams end / vacation | 27th Jan., 2018 |