

Systems Programming Laboratory

Course Metadata

Credit Structure	L-T-P: 0-0-3 Total: 2
Offering Semester	2 nd Sem, Spring
Level of Subject	UG Level
Compulsory or elective?	Core
Pre-requisite	None
Faculty Names	Arnab Sarkar, Prabhat K Mishra, Jiaul Paik
Overlapping Subjects	Systems Programming Laboratory (CS29206) ≈ 40%
Justification of overlap	This course will be a core subject for BTech in AI program

Course Description

This lab envisions to impart hands-on training in system Utilities (particularly, the Linux programming environment), and is part of the BTech in AI curriculum.

Course Content

- Familiarization with the Linux Programming Environment
- Using the Shell
- Shell Programming
- Editors and File System
- Program Development Tools
- System Administration

Lecture-wise Breakup

Sl No.	Module	Unit	Module Hr (36)
1	Familiarization with the Linux Programming Environment	Linux architecture – kernel and shell; basic commands; file system hierarchy and structure – commands, permissions, inodes; devices	6
2	Using the Shell	Command line structure; metacharacters; creating and combining commands; command arguments and parameters; I/O redirection; shell variables; regular expressions	6
3	Shell Programming	Keywords and variables; assignments; arithmetic and logical operators; looping and control within shell scripts; filters – grep and other filters, sed, awk	6

4	File System	Basic operations on files and directories, compressing and decompressing files/directories, File attributes: changing permissions, ownership management, creating links: hard and symbolic	3
4	Working with Editors	Vi, Emacs: Saving, Navigation and Editing content, Crash recovery	3
5	Networking Tools	Handling client-server applications with network access tools – ping, telnet, ssh, ftp, etc, Hostnames and IP Addresses	3
6	System Administration	Handling root privileges; User management; Booting & shutdown; File system partitioning & management; Installing packages & handling dependencies; Creating and managing virtual machines / containers; Cluster setup & management	9

Text Books and References

1. **Your Unix/Linux: The Ultimate Guide**, Sumitabha Das, third edition, McGraw Hill, 2013.
2. **The UNIX Programming Environment**, Brian W. Kernighan and Rob Pike, Prentice Hall, 1984.
3. **The Linux Development Platform: Configuring, Using and Maintaining a Complete Programming Environment**, Rafeeq Ur Rehman and Christopher Paul, Pearson Education, 2003.
4. Online Sources