Swami Ramanand Teerth Marathwada University, Nanded

Third Year U.G. Program in Computer Science & Engineering

Effective from 2016-17

UNIX OPERATING SYSTEM

Teaching Scheme **L: 3 T: 0**

Evaluation Scheme	MSE	ESE	Minimum Passing Marks
	20 Marks	80 Marks	40%

Course Objectives:

1. To understand the basic concepts, design and structure of the UNIX operating system.
2. To implement various system calls.
3. To acquire skills in UNIX Shell programming.
4. To learn basics of UNIX system administration.

Course Contents:

Unit I: Introduction **(06 Hrs)**

General overview of the system - History, System structure, User perspective, Operating system services, Assumption about hardware,
Introduction to the KERNEL - Architecture of UNIX OS, Introduction to system concepts, Kernel data structure, System administration.

Unit II: The Buffer Cache **(08 Hrs)**

Buffer headers, Structure of the buffer pool, Scenarios for retrieval of a buffer, Reading and writing disk blocks, Advantages and disadvantages of cache.
Internal Representation of Files: I-nodes, Structure of the regular file, Directories, Conversion of a pathname to i-node, Super block, I-node assignment to a new file, Allocation of disk blocks, Other file types.

Unit III: System calls for the file System **(06 Hrs)**

Open, Read, Write, File and Record Locking, Adjusting the position of FILE I/O-LSEEK, Close, File Creation, Creation of Special File, Change Directory and Change Root, Change Owner and Change Mode, Stat and Fstat, Pipes, Dup, Mounting and Un-mounting file systems, Link, Unlink, File System Abstractions, File system maintenance

Unit IV: The Structure of process **(08 Hrs)**

Process stages and transitions, layout of system memory, The context of a process, Saving context of a process, Manipulation of the process address space.
Process Control: Process creation, Signals, Process termination, Awaiting process termination, Invoking other programs, The user id of a process, The shell, System Boot and the Init process.

Unit V: Process Scheduling and Time **(06 Hrs)**

Process Scheduling, System call for time, Clock.
Memory management policies: Swapping, Demand passing, A hybrid system with demand paging and swapping

Unit VI: The I/O Subsystem **(06 Hrs)**

Driver interfaces, Disk drives, Terminal drivers, Streams.
Inter-Process communication: Processing Tracing, System V IPC, Network communications, Sockets

Outcomes: By the end of this course, students will be able to:

1. Learn UNIX structure, commands, and utilities.
2. Describe and understand the UNIX file system.
3. Write shell scripts in order to perform shell programming.
4. Acquire knowledge about text processing utilities, process management and system operation of UNIX.

Text Books

1. Maurice. J. Bach, "The Design of the UNIX operating System", PHI. ISBN-13: 978-8120305168.

Reference Books

1. Sumitabha Das, "Unix concepts and administration" 4th Edition – Tata McGraw Hill. ISBN-13: 978-0070635463.
2. Robert Love, "Linux System Programming" SPD, O' REILLY. ISBN-13: 978-9351107729.
3. Richard Stevens, "UNIX Network Programming", PHI. ISBN-13: 978-0139498763
4. John Muster, "UNIX made easy", 3rd Edition, TMH Edition. ISBN-13: 9780072193145.
5. Meeta Gandhi,Rajiv Shah,Tilak Shety,Vijay Mukhi , "The C Odyssey: UNIX-The Open Boundless C" BPB Publications. ISBN-13: 978-8170291657.