

Open Course Title: UNIX SYSTEM PROGRAMMING

Target Students from Branches: ECE/TCE/EEE/CSE/MCA

Total duration of the course: 25 Hours.

No. of Lecture hours: 08

No. of hands on / Practical: 17

Abstract

This course provides a deep understanding of the operating system architecture and low-level interfaces required to build system-level applications on Linux and UNIX systems ranging from embedded processors to enterprise servers. The theoretical concepts and practical exercises provide students with the knowledge needed to write complex system, network, and multithreaded applications. The course dives into many specifics of the Linux system, but makes careful and frequent reference to the POSIX standard, so that it is also valuable to developers working on other UNIX systems.

Course objectives

- To understand the fundamental design of the UNIX operating system
- To become fluent with the systems calls provided in the UNIX environment
- To be able to design and build an application/service over the UNIX operating system

Open Course Details

- CO1: Recognize different ANSI and POSIX standards
- CO2: Use UNIX file APIs to develop system programs
- CO3: Comprehend the concepts of process, program, process groups, running programs, process control, address space, user and kernel modes, system calls, and, context switching demon processes.
- CO4: Apply various environment settings, system resource limits, signals, and interval timers to develop system programs
- CO5: Apply different Inter-Process communication mechanisms for developing system programs

Schedule

| Day 1:12/02/2019 | | | |
|-------------------------|--|--------------------------------|----------------------------|
| Time | Topics | Resource Person Details | CO-PO Mapping |
| 9:00-11:00 | Unix OS structure, internal and external commands | Ravikumar B N | CO1, PO1 |
| 11:30-1:00 | Files, permissions, umask, filters | | |
| 2:00-4:00 | Sed, grep, awk. Shell scripting | | |
| Day 2:13/02/2019 | | | |
| Time | Topics | Resource Person Details | CO-PO Mapping |
| 9:00-11:00 | UNIX APIs, Context switching, Command Implementation | Guruprasad S | CO2, PO1,PO2,PO5,PO12 |
| 11:30-1:00 | File APIs, Directory File APIs, Device File APIs | | |
| 2:00-4:00 | FIFO File APIs, Symbolic Link File APIs, File and Record Locking | | |
| Day 3:14/02/2019 | | | |
| Time | Topics | Resource Person Details | CO-PO Mapping |
| 9:00-11:00 | Introduction, main function, Process Termination, Command-Line Arguments, Memory Layout of a C Program | Guruprasad S | CO3, CO4, PO1,PO2,PO5,PO12 |
| 11:30-1:00 | Environment List, Shared Libraries, Memory Allocation, Environment Variables | | |
| 2:00-4:00 | setjmp and longjmp Functions, getrlimit, setrlimit Functions, UNIX Kernel Support for Processes | | |
| Day 4:15/02/2019 | | | |
| Time | Topics | Resource Person Details | CO-PO Mapping |
| 9:00-11:00 | Process Identifiers, fork, vfork | Guruprasad S | CO3, CO4, PO1,PO2,PO5,PO12 |
| 11:30-1:00 | wait, waitpid, wait3, wait4 Functions, Race Conditions, exec Functions | | |
| 2:00-4:00 | Process Accounting, User Identification, Process Times, I/O Redirection | | |

Day 5:16/02/2019

| Time | Topics | Resource Person Details | CO-PO Mapping |
|-------------|---|--------------------------------|--------------------------|
| 9:00-11:00 | Kernel Support for Signals, signal, Signal Mask | Guruprasad S | CO5, PO1,PO2,PO5,PO12 |
| 11:30-1:00 | IPC Methods, Pipes, FIFOs | | |
| 2:00-4:00 | Message Queues, Semaphores | | |