Name of the Programme: MCA
Course Code: CSA-530
Title of Course: Advanced Unix Programming
Number of Credits: 4 (4L-0T-0P)
Effective from AY: 2022-23

Prerequisites for the course	Basic knowledge of Programming in C and Operating systems	
Objectives	● Introduces system administration tasks, including software installation, system configuration, and managing user accounts. ● Introduce the concept of UNIX system programming including process, signals and interprocess communication.	
Content	Introduction: Organization of UNIX interface, Programmer interfaces. System call API , Error handling. UNIX standardization. UNIX implementations. Relationship of standards and implementation. File I/O and Directories : File descriptor and basic file I/O calls. Duplicating file descriptors. File Types, File access permissions, Set-user-id and set-group-id bits. Setting file permissions. Changing file ownership. Soft and hard links. Reading directories. Synchronising file contents. Standard I/O library.	15 hours
	Process : Environment of UNIX process. Command Line arguments. Environment variables. Memory allocation. Process relationship, Process groups, sessions, Controlling Terminal, Process related system calls. Foreground, Background Processes and Job control. Orphaned process groups.	15 hours
	Signals: Signal concept, Reliable and unreliable signals, Signal sets, Signal related system calls. Non local jumps. Job control using signals.	10 hours
	Terminal I/O: Special Input Characters. Canonical and Non canonical modes. Terminal Option flags. Getting and setting terminal attributes. Pseudo terminals. Opening and using pseudo Terminals. Advanced I/O: Nonbloking I/O, Record locking. Stream, I/O multiplexing, Memory mapped I/O, Asynchronous I/O.	10 hours
	Inter-process communication: Pipes, Message queues, Semaphores and shared memory.	10 hours
Pedagogy	lectures/ tutorials/Hands-on assignments/self-study	
References/ Readings	1. Steven W R, Advanced Programming in UNIX Environment, Addison Wesley. 2. Unix man pages and Standard C library (libc) Documentation	
Course Outcomes	After completing the course, students will be able to: ● Manage UNIX users, file systems, and devices using root powers. ● Access UNIX file management and process management functions via system calls. ● Develop complex system-level software in the C programming language	

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