**20XW51 UNIX ARCHITECTURE AND PROGRAMMING**

**3 0 0 3**

**INTRODUCTION TO UNIX:** File System – Essential Commands – Directory and File Commands - General Purpose Utilities - Bourne Shell – Shell Wild Cards – Simple Filters – Regular Expressions – Grep Family - Advanced filters – sed, awk- Process - Communication and Scheduling. (8)

**PROGRAMMING WITH SHELL:** Shell Scripts – Command Line Arguments, Positional Parameters – Decision Making and Looping Constructs – Redirection – File System Architecture. (6)

**FILE SYSTEM STRUCTURE:** Kernel architecture - Kernel data structure - Buffer Cache - Structure of Buffer pool - Scenarios for buffer retrieval - Reading and Writing disk blocks - Advantages and Disadvantages of buffer cache - Inode - Structure of regular file - Conversion of a pathname to an inode - Inode assignment to a new file - Allocation of disk blocks. (15)

**PROCESS SYSTEM:** Process states and transitions - Context of a process - Saving the context of a process - Manipulating Process address space - Process creation and termination – Signals – Awaiting Process Termination - System Boot and INIT process - Process Scheduling – Functions of a Clock Interrupt Handler. (10)

**MEMORY MANAGEMENT:** Swapping - Allocation of swap space – Swapping Processes Out – Swapping Processes in - Demand Paging - Data structures of demand paging - Page stealer Process - Page faults. (6)

**Total L: 45**

**TEXT BOOKS:**

1. Sumitabha Das, "Unix System V.4 - Concepts and Applications", Tata McGraw Hill, 2014.
2. Maurice J Bach, "Design of the UNIX Operating System", Pearson, 2015.

**REFERENCES:**

1. Sumitabha Das, “Your Unix the Ultimate Guide “, Tata McGraw Hill, 2012.
2. Richard F Gilberg, Behrouz A Forouzan, “Unix and Shell Programming - A Text Book”, Cengage Learning India Private Limited, 2016.
3. UreshVahalia, "UNIX Internals: The New Frontiers", Pearson Education, 2011.
4. Keith Haviland, Dina Gray, “Unix System Programming”, Addison Wesley, 2007.

### 20XW56 UNIX SHELL AND SYSTEM PROGRAMMING LAB

**0 0 4 2**

1. Simple Bash shell Programs with basic Unix Commands – Essential Commands, General Purpose Utilities, Filters, Process and Communication.
2. Bash Shell Programs for Regular Expressions using grep family, sed and awk.
3. Bash Shell Programs using advanced programming concepts like getopts.
4. Low level File, Process and IPC System Calls using C.
5. Implement a package using Shell Programming / System Calls

Note: Separate Problem Sheets will be provided for Shell and System Calls.

**Total P: 60**