COURSE TITLE	: Operating Systems
COURSE PREREQUISITE	: Data Structures
COURSE DURATION	: 16 weeks (3 hours/week)
COURSE METHODOLOGY	: Lecture, Laboratory Exercises and Case Study

Course Description

Course Outline

Week	Topics
1	Introduction to Operating Systems
2	History of Operating Systems ● Pre-Batch Systems ● Simple Batch Systems ● Multi-Programmed Batch Systems ● Time-Sharing Systems ● Personal Computer Systems ● Parallel Systems ● Distributed Systems ● Real Time Systems
3	Process Concept ● Process Life Cycle ● Process Control Block
4-7	Process Scheduling ● Introduction ○ CPU Burst-I/O Burst Cycle ○ CPU Bound-I/O Bound Processes ○ Schedulers ○ Preemption ○ Context Switch Time ○ Scheduling Criteria ○ Representing Process Execution ○ Determining CPU Burst ● First-Come-First-Serve Scheduling ● Shortest Job First Scheduling ● Priority Scheduling ● Round-Robin Scheduling ● Multi-Queue Scheduling ● Solaris Process Scheduling

Course Outline	
Week	**Topics**
8-10	Process Synchronization ● Introduction ○ Race Condition ○ Resource Competition ○ Need for Synchronization ● Synchronization Problems ○ Critical Section Problem ○ Readers and Writers ○ Dining Philosophers ● Synchronization Solutions ○ Busy Wait ○ Wait and Notify ○ Semaphores ○ Monitors
11-13	Deadlocks ● Resource Allocation Graphs ● Conditions for Deadlocks ○ Deadlock Handling ● Deadlock Prevention ○ Mutual Exclusion Prevention ○ Hold and Wait Prevention ○ No Preemption Prevention ○ Circular Wait Prevention ● Deadlock Avoidance ○ Safe State ○ Resource Allocation Graph ○ Banker's Algorithm ● Deadlock Recovery ○ Deadlock Detection ○ Process Termination ○ Resource Preemption
14	Memory Management ● Logical Vs. Physical Memory ● Address Binding ● Contiguous Allocation ○ Mono Programming ○ Fixed Partitions ○ Multiple Partitions ○ Fragmentations ● Paging ○ Virtual Memory ○ Demand Paging ○ Page Replacement ○ Page Replacement Algorithms ○ Thrashing

Course Outline	
Week	**Topics**
15-16	File System ● Files ○ File Names ○ File Types ○ File Structure ○ File Access ○ File Attributes ○ File Operations ● Directories ○ Single-Level Directory System ○ Double-Level Directory System ○ Hierarchal Directory System ○ General Graph Directory System ○ Directory Operations ● File System Implementation ○ File System Layout ○ Implementing Files ○ Implementing Directories ● Disk Management Performance ○ Disk Block Size ○ Free Space Management ○ Disk Quotas ● File System Reliability ○ Backups ○ File Consistency ● File System Performance ○ Disk Structure ○ Distributed i-Nodes ○ Disk Cache

Requirements

Supported Operating Systems

The NetBeans IDE 6.0.1 runs on operating systems that support the Java VM.

- Microsoft Windows XP Professional SP2 or newer
- Microsoft Windows Vista
- Mac OS X 10.4.9 or newer
- Ubuntu 7.x
- Red Hat EL 4
- Solaris™ 10 Operating System Update 1 (SPARC® and x86/x64 Platform Edition)

Note: The NetBeans IDE's minimum screen resolution is 1024x768 pixels.

Operating System	Processor	Memory	Disk Space
Microsoft Windows	800 MHz Intel Pentium III or quivalent	512 MB	750 MB of free disk space
Linux	800 MHz Intel Pentium III workstation or equivalent	512 MB	650 MB of free disk space
Solaris OS (SPARC)	UltraSPARC II 450 MHz	512 MB	650 MB of free disk space
Solaris OS (x86/x64 Platform Edition)	AMD Opteron 100 Series 1.8 GHz	512 MB	650 MB of free disk space
Macintosh OS X operating system	PowerPC G4 or Dual Core Intel	512 MB	650 MB of free disk space

Recommended Hardware Configuration

Operating System	Processor	Memory	Disk Speed
Microsoft Windows	2.6 GHz Intel Pentium III workstation or equivalent	1 GB	1 GB of free disk space
Linux	2.6 GHz Intel Pentium III workstation or equivalent	1 GB	850 MB of free disk space
Solaris OS (SPARC)	UltraSPARC IIIi 1 GHz	1 GB	850 MB of free disk space
Solaris OS (x86/x64 Platform Edition)	AMD Opteron 100 Series 1.8 GHz	1 GB	850 MB of free disk space
Macintosh OS X operating system	PowerPC G5 or Dual Core	1 GB	850 MB of free disk space

Required Software

NetBeans IDE runs on the J2SE (Java SE Development Kit) JDK 5.0 Update 12 and higher (including JDK 6.0), which consists of the Java Runtime Environment plus developer tools for compiling, debugging, and running applications written in the Java language. You can download the JDK for your platform from one of the sites listed below:

Solaris: http://java.sun.com/j2se/1.5.0/download.html
Windows: http://java.sun.com/j2se/1.5.0/download.html
Linux: http://java.sun.com/j2se/1.5.0/download.html
Mac OS X: http://www.apple.com/support/downloads/javaformacosx104release5.html (Mac OS X 10.4.8 or later). Java upgrades for Mac OS-X are also available via Apple's Software Update mechanism.
Open VMS: http://h18012.www1.hp.com/java/download/index.html
For more information, please visit: http://www.netbeans.org/community/releases/60/relnotes.html

Java™ DB is supported on the Solaris, Linux and Windows operating systems and Sun Java 1.4 or later.