

*Chhattisgarh Swami Vivekanand Technical University, Bhilai*

Scheme of Teaching and Examination

**M.Tech. (Computer Science & Engineering)**

**I Semester**

S.N.	Board of Study	Subject Code	Subject Name	Periods per week			Scheme of Exam			Total Marks	Credit L+(T+P)/2
				L	T	P	Theory/Practical				
							ESE	CT	TA		
1	Computer Sc.& Engg.	522111 (22)	Advanced Operating System	3	1	-	100	20	20	140	4
2	Computer Sc.& Engg.	522112 (22)	Java Programmng and Applications	3	1	-	100	20	20	140	4
3	Computer Sc.& Engg.	522113 (22)	Advanced Computer Architecture	3	1	-	100	20	20	140	4
4	Computer Sc.& Engg.	522114 (22)	Advanced Computer Networks	3	1	-	100	20	20	140	4
5	Refer Table – I		Elective –I	3	1	-	100	20	20	140	4
6	Computer Sc.& Engg.	522121 (22)	Advanced Operating System Lab	-	-	3	75		75	150	2
7	Computer Sc.& Engg.	522122 (22)	Java Programming and Applications Lab	-	-	3	75		75	150	2
<b>TOTAL</b>				<b>15</b>	<b>5</b>	<b>6</b>	<b>650</b>	<b>100</b>	<b>250</b>	<b>1000</b>	<b>24</b>

L-Lecture, T- Tutorial, P- Practical, ESE- End Semester Examination, CT- Class Test, TA- Teacher's Assessment  
 Note : Duration of all theory papers will be of Three Hours.

Table – I			
Elective – I			
S.No.	Board of Study	Code	Subject
1	Computer Science Engineering	522131 (22)	Advanced Digital Communication
2	Computer Science Engineering	522132 (22)	Numerical Computing
3	Computer Science Engineering	522133 (22)	System Simulation
4	Computer Science Engineering	522134 (22)	Analysis and Design of Algorithms
5	Computer Science Engineering	522135 (22)	Digital Signal Processing

**Note (1) – 1/4<sup>th</sup> of total strength of students subject to minimum of twenty students is required to offer an elective in the college in a Particular academic session .**

**Note (2) – Choice of elective course once made for an examination cannot be changed in future examinations.**

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, Bhilai

Semester: M.E. I

Subject: Advanced Operating System

Total Theory Periods: 40

Total Marks in end Semester Exam.: 100

Minimum number of class tests to be conducted: 02

Branch: Computer Science & Engg.

Code: 522111 (22)

Total Tutorial Periods: 12

## Unit - I

**Operating System** Definition, Operating System as Resource Manager.

Types of Operating Systems: Simple Batch Processing, Multi-programmed Batch Processing, Time Sharing, Personal Computer systems, Parallel, Distributed and Real Time Operating Systems.

Operating System Components, Services, Calls, System Programs, Operating System Structure, Virtual Machines, System Design and Implementation.

**Process Management:** Concepts, Scheduling, Operations, Co-operating processes, Inter-process Communication.

**Threads:** Thread usage, threads in User Space, threads in Kernel, Hybrid Implementation, Scheduler Activation, Pop-up threads, Multithreading.

CPU Scheduling: Basic Concepts, Scheduling Criteria, Algorithms, Multiple-processor Scheduling, Real Time Scheduling, Algorithm Evaluation.

## Unit - II

**Process Synchronization:** Critical Section Problem, Synchronization Hardware, Semaphores, Classical Problem of synchronization, Critical Regions, Monitors.

**Deadlock:** Characteristics, Necessary Conditions, Prevention, Avoidance, Detection and Recovery.

**Memory Management:** Logical and Physical Address Space, Swapping

**Contiguous Allocation:** Single-partitioned, Multi-partitioned.

**Non-contiguous Allocation:** Paging, Segmentation, and Segmentation with Paging.

**Virtual Memory:** Demand Paging, Page Replacement Algorithms, Allocation of Frames, Thrashing, Demand Segmentation.

## Unit - III

**File and Directory System:** File Concepts, Access Methods, Directory Structure, Protection, File system Structure, Allocation Methods, Free Space Management, Directory Implementation, Recovery.

**Secondary Storage Management:** Disk Structure, Dedicated, Shared, Virtual, Sequential Access and Random Access Devices, Disk Scheduling, Disk Management, Swap-space Management, Disk Reliability, Stable Storage Management.

**Protection and Security:** Threats, Intruders, Accidental Data Loss, Cryptography, User Authentication, Attacks from inside the system, Attacks from outside the system, Protection Mechanism, Trusted Systems, Domain of Protection, Access Matrix, Programs Threats, System Threats.

## Unit - IV

Distributed systems, topology network types, design strategies.

Network operating structure, distributed operating system, remote services, and design issues.

Distributed file system: naming and transparency, remote file access, Stateful v/s Stateless Service, File Replication.

## Unit - V

**Distributed co-ordinations:** Event Ordering, Mutual Exclusion, Atomicity, Concurrency Control, Deadlock Handling, Election Algorithms, Reaching Agreement.

Case studies of Unix and MS-DOS operating system.

### Text Books:

1. Silberschatz and Galvin, "Operating System Concepts", Addison-Wesley publishing, Co., 1999.
2. A. S. Tanenbaum, "Modern Operating Systems", Pearson Education.

### References:

1. H.M. Dietel, "An Introduction to Operating System", Pearson Education.
2. D. M. Dhamdhere, "Operating Systems – A Concept Based Approach", Tata McGraw-Hill.
3. M. Singhal, N. G. Shivaratri, "Advanced Concepts in Operating Systems", Tata McGraw-Hill.
4. William Stallings, "Operating Systems", Pearson Education

## **CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, Bhilai**

**Semester: M.E. I**

**Subject: Java Programming and Applications**

**Total Theory Periods: 40**

**Total Marks in end Semester Exam.: 100**

**Minimum number of class tests to be conducted: 02**

**Branch: Computer Science & Engg.**

**Code: 522112 (22)**

**Total Tut Periods: 12**

### **Unit-I**

#### **Introduction to Java**

Importance and features of Java, Concepts of Java Virtual machine (JVM)

Keywords, Constants, Variables and data types, operators and expressions, Control statements, Conditional statements, loops and iterations. Class definition, adding variables and methods, creating objects, constructors, defining methods, calling methods, method overloading. Creating an array, one and two dimensional array, string array and methods String and String Buffer classes, Wrapper classes.

### **Unit-II**

#### **Inheritance**

Basic types, super classes, Multilevel hierarchy abstract and final classes, object class, Packages and interfaces, Access protection, extending Interfaces, Exception handling, Fundamental exception types, uncaught exception, throw, throws, final methods, creating own exceptions

### **Unit-III**

#### **Multithreaded programming**

Review of fundamentals, Java thread model, synchronization, messaging, thread class, Runnable interface, inter thread communication, Monitors, Deadlock, Producer/ Consumer problems, Wait() and notify(), Performance issues.

### **Unit-IV**

#### **Input/Output**

Basics, Streams, Byte and Character Streams, predefined streams, reading and writing from console and files, using Java packages.

#### **Networking in Java**

Networking fundamentals, Client/server model, Internet addresses, Sockets, networking classes and interfaces, using Java.net package, TCP/IP and data gram programming, HTTP protocol and URLs

### **Unit-V**

#### **Event Handling**

Different mechanism, the delegation event model, classes, Event Listener Interfaces, Adapter and Inner classes, Working with windows, graphics and text, using AWT controls, Layout managers and menus, handling Image, animation, sound and video Java Applet, Introduction to Swings, JDBC and Servlets.

#### **Programming Graphical System:**

#### **Text Book:**

1. "Java –2 The Complete Reference" Patrick Naughton and Herbertz Schidt, second edition

#### **References:**

1. "Programming with Java" E. Balaguruswamy, Second edition, TMH

2. "HTML 4 Unleashed" Rick Dranell, Second edition, Tec media publication
3. "Dynamic web publishing Unleashed" Shelley Powers, Second edition, Tec media
4. Cay S Horstmann and Gary Cornell, Java 2 Vol I and II-Sun Micro Systems-2001

## **CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, Bhilai**

**Semester: M.E. I**

**Subject: Advanced Computer Architecture**

**Total Theory Periods: 40**

**Total Marks in end Semester Exam.: 100**

**Minimum number of class tests to be conducted: 02**

**Branch: Computer Science & Engg.**

**Code: 522113 ( 22)**

**Total Tut Periods: 12**

### **Unit - I**

#### **Parallel Computer Models:**

The state of computing, multiprocessors and multi computers, multivector and SIMD computers, architectural development tracks.

#### **Program and Network Properties:**

Conditions of parallelism, program partitioning and scheduling, program flow mechanisms. System Interconnect Architectures. Network properties and routing, static interconnection networks and dynamic interconnection networks, MPI and PVM architecture.

### **Unit - II**

#### **Processors and Memory Hierarchy:**

Advanced processor technology- CISC, RISC, Superscalar, Vector, VLIW and symbolic processors, Memory hierarchy technology, Virtual memory technology (Virtual memory models, TLB, paging and segmentation)

### **Unit - III**

#### **Bus, Cache and Shared Memory:**

Cache memory organization, shared memory organization, sequential and weak consistency models.

### **Unit - IV**

#### **Pipelining and Super scalar techniques:**

Linear Pipeline Processors, Nonlinear Pipeline processors, Instruction Pipeline Design, Arithmetic Pipeline Design

### **Unit- V**

#### **Parallel and Scalable Architecture:**

Multiprocessors System Interconnects, Cache Coherence and Synchronization Mechanisms, Vector Processing Principles, Multivector Multiprocessors and Data Flow Architecture.

#### **Text Book:**

1. Kai Hwang "Advanced Computer Architecture", McGraw Hill.

#### **References:**

1. J.P.Hayes "Computer Architecture and Organization", McGraw Hill.
2. Harvey G. Cragon, "Memory Systems and Pipelined Processors", Narosa Publication.
3. V. Rajaranam & C.S.R. Murthy, "Parallel Computers", PHI.
4. R. K. Ghose, Rajan Moona & Phalguni Gupta, "Foundation of Parallel Processing", Narosa Publications.
5. Kai Hwang and Zu, "Scalable Parallel Computers Architecture", McGraw Hill.
6. Stalling W., "Computer Organization & Architecture", PHI.

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, Bhilai

Semester: M.E. I

Subject: Advanced Computer Networks

Total Theory Periods: 40

Total Marks in end Semester Exam.: 100

Minimum number of class tests to be conducted: 02

Branch: Computer Science & Engg.

Code: 522114 (22)

Total Tutorial Periods: 12

## Unit -I

### Introduction

Introduction to Network models-ISO-OSI, SNA, Appletalk and TCP/IP models. Fundamentals of digital communication, channel capacity, bit error rate, media characteristics, FDM, TDM, CDMA, statistical multiplexing, point to point and broadcast communication

### Queuing Models

Poisson Process, Markov chain, M/M/1 Queue- delay and little's formula. M/M/S/K Queues – average queue length, delay and waiting times. M/G/1 Queues

## Unit-II

### Data link protocols

Stop and wait protocols and Sliding window protocols - - performance and efficiency. Verification of protocols using Finite State Machines. Multi access protocols – ALOHA and CSMA and its variations. IEEE models and protocols- 802.3, 802.4, 802.5 and DQDB. Ad hoc networks.

### Network layer

Design issues for VC and datagram. Routing algorithms- Dijkstra's , Bellman-Ford, Flooding and broadcasting, link state routing, Flow and congestion control, internetworking, internet architecture and addressing

## Unit-III

### Transport layer

Design issues, Connection management, Elements of TCP/IP protocol, Finite state machine model

### Session and presentation layer

Dialog management, synchronization and session primitives, presentation concepts, cryptography – DES, DES chaining, AES, Public key methods, MD5. Secure Socket layer

## Unit-IV

### Application layer

SNMP, SMTP, RMON, DNS, email service, MIME and WWW

## Unit-V

**Distributed file systems** : file service architecture, Sun network file system, Andrew file system.

Distributed shared memory : Design and implementation, sequential consistency, ivy,

Security : techniques, cryptographic algorithms, digital signatures

### Text Books:

1. Andrew S. Tanenbaum " Computer Networks" by Pearson Education ,fourth edition.
2. Bertsekas and Gallager " Data Networks" by Prentice hall, Second Edition

### References:

1. William Stallings " Data and Computer Communication" , by Prentice hall, Seventh edition
2. William Stallings " Cryptography and Network security" by PHI, Third edition
3. Fred Halsall " Data Communications, Computer Networks and Open Systems" by Pearson Education , Fourth edition

4. William Shay "Understanding data Communication and Networks" by Thomson press , Second edition
5. William Stallings "High speed Networks and Internets" by Pearson education, second edition
6. Leon- Garcia and Widjaja "Computer Networks" by TMH , Second edition

## **CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, Bhilai**

**Semester: M.E. I**

**Subject: Advanced Digital Communication**

**Total Theory Periods: 40**

**Total Marks in end Semester Exam.: 100**

**Minimum number of class tests to be conducted: 02**

**Branch: Computer Science & Engg.**

**Code: 522131 (22)**

**Total Tut Periods: 12**

### **UNIT - I**

Digital Modulation: PCM system, Channel Capacity, delta modulation Adaptive digital waveform coding schemes, Matched filter receiver

Coherent Binary: PSK, FSK, QPSK, MSK, DPSK

### **UNIT - II**

Source coding methods: Review of information theory, Huffman and L-Z encoding algorithm Rate distortion theory for optimum quantization, Scalar vector quantization.

### **UNIT - III**

Advanced transmission methods: The signal space concept, Gram-Schmitt procedure, signal space representation of modulated signals, nonlinear modulation method with memory, Error probability and optimum receiver for AWGN channel.

### **UNIT - IV**

Advance transmission methods :- Review of channel coding , convolution encoding and decoding, distance properties, viterbi algorithm and Fano algorithm

Trellis coded modulation methods.

### **UNIT - V**

Spread-spectrum methods:-Study of PN sequences, direct sequences methods, Frequency hop method, digital spread spectrum, slow and fast frequency hop,

Performance analysis, synchronization methods for spread spectrum. Application of spread spectrum, CDMA.

### **Text Books:**

1. Digital Communication: John G. Prokis (TMG)
2. Digital communication: Simon Haykin (WEP)

### **Reference Books:**

1. Modern communication systems (Principles and application), Leon W. Couch JI(PHI)  
Digital communication; Shanmugh

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, Bhilai

**Semester: M.E. I**

**Subject: Numerical Computing**

**Total Theory Periods: 40**

**Total Marks in end Semester Exam.: 100**

**Minimum number of class tests to be conducted: 02**

**Branch: Computer Science & Engg.**

**Code: 522132 (22)**

**Total Tut Periods: 12**

## **Unit - I**

Computer arithmetic, binary system, octal and hexadecimal systems, floating point arithmetic, errors, machine computation, computer software.

Solution of transcendental and polynomial equations, direct and iterative methods, bisection, Regula falsi, secant and Newton's method, Muller method, Chebyshev method, multipoint iteration method, order of iterative method and efficiency considerations, Polynomial equations, Birge-Vieta method, Bairstow method, Graeffe's root square method.

## **Unit - II**

System of linear algebraic equations and Eigen value problems, Gaussian elimination and pivoting, matrix inversion, triangular factorization, iterative methods, Eigen values and Eigen vectors, Power methods.

Interpolation and approximation, Lagrange's and Newton's interpolation, Hermite interpolation, spline interpolation, least square approximation, uniform approximation.

## **Unit - III**

Numerical differentiation and integration, Simpson's rule, trapezoidal rule, Romberg integration, Gauss Legendre integration method, double integration.

## **Unit - IV**

Numerical solution of ordinary differential equations, Euler method, Taylor series method, Runge-Kutta method, multistep methods, systems of differential equations, higher order ordinary differential equations, boundary value problem.

## **Unit - V**

Partial differential equations, difference methods, parabolic equations, one space dimension, convergence hyperbolic and elliptic equations.

## **Text Book :**

1. V. Rajaraman, "Computer Oriented Numerical Methods", PHI, New Delhi.

## **References:**

1. J.H. Mathews, "Numerical Methods for Computer science, engineering and Mathematics", PHI

2. M K. Jain, S.R.K. Iyengar and R.K. Jain," Numerical Methods for Scientific and Engineering Computation", Wiley Eastern Limited, New Delhi, 1985.
3. S.C. Chopra and R.P.Canale, "Numerical Methods for Engineers", McGraw-Hill, New York.

## CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, Bhilai

Semester: M.E. I Sem.

Subject: System Simulation

Total Theory Periods: 40

Total Marks in end Semester Exam.: 100

Minimum number of class tests to be conducted: 02

Branch: Computer Science & Engg.

Code: 522133 (22)

Total Tut Periods: 12

### Unit - I

**System Models:** The Concept of a System, System Environment, Stochastic Activities, Continuous and Discrete Systems, System Modeling, Types of Models, Principles used in Modeling.

**System Studies:** Subsystems, A Corporate Model, Types of System Study, System Analysis, System Design, System Postulation.

**System Simulation:** The Technique of Simulation, The Monte Carlo Method, Comparison of Simulation and Analytical Methods, Types of System Simulation, Numerical Computation Technique of Continuous Models, Numerical Computation Techniques for Discrete Models, Distributed Lag Models, Cobweb Models, The Process of Simulation.

### Unit-II

**Continuous System Simulation:** Continuous System Models, Differential Equations, Analog Computers, Analog Methods, Hybrid Computers, CSMP III, Hybrid Simulation, Feedback Systems, Simulation of an Autopilot.

**System Dynamics:** Exponential Growth Models, Exponential Decay Models, Logistic Curves, Generalization of Growth Models, System Dynamics Diagrams, Multi Segment Models, Feedback in Socio-Economic Systems, A Biological Example, World Models, The Dynamo Language.

**Probability concepts in Simulation:** Stochastic variables, Discrete and continuous probability functions, numerical evaluation, random number generators, discrete distribution generation.

### Unit-III

**Introduction To GPSS:** GPSS Programs, General Description, Action Times, Succession of Events, Choice of Paths, Simulation of a Manufacturing Shop, Facilities and Storages, Gathering Statistics, Conditional Transfers, Program Control Statements.

**GPSS Examples:** Priorities and Parameters, SNAs, Functions, Simulation of a Super Market, Transfer Modes, Logic Switches, Testing Conditions, GPSS Model of a Simple Telephone System, Set Operations.

### Unit-IV

The Basic Nature of Simulation, When to Simulate ? Simulation of a Single Server Queue, Simulation of a Two Server Queue, Simulation of a More General Queue, Simulation of a PERT Network.

### Unit-V

Simulation of a general Inventory System, Simulation of an Inventory Policy(P, Q), Simulation of an Inventory System with Buffer Stock, Simulation Languages.

### Text Book :

1. Geoffrey Gordon, System simulation, Prentice Hall of India.
2. Narsingh Deo, System Simulation with Digital Computer, Prentice Hall of India (EEE)



## References :

1. Kishore S.Trivedi, Probability and Statistics with reliability, Queuing and Computer Science Applications, Prentice Hall of India (EEE)
2. Jerry Banks, John S. Carson II, Barry L.Nelson, Discrete Event System Simulation, Prentice Hall of India (EEE) 2<sup>nd</sup> Ed.

## CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, Bhilai

Semester: M.E. I Sem.

Subject: Analysis and Design of Algorithms

Total Theory Periods: 40

Total Marks in end Semester Exam.: 100

Minimum number of class tests to be conducted: 02

Branch: Computer Science & Engg.

Code: 522134 (22)

Total Tut Periods: 12

### Unit -I

Algorithm development for problem solving, Analyzing efficiency of algorithm, Asymptotic growth rates. ADT specification and Design Techniques, Elementary ADTs-Lists trees, Stacks and queues. Recursion and Induction Recursive procedures, Induction proofs, proving Correctness, recurrence relations, recursion trees.

### Unit -II

**Divide and Conquer technique of problem solving, sorting algorithms:** Quicksort, Mergesort, Merging Sorted sequences, Lower bounds for sorting, heap sort, shell sort, radix sort, Dynamic sets and searching : Array doubling, Red Black trees, hashing high, priority queues.

### Unit -III

**Graphs :** Definitions and representations, traversal, DFS and BFS., DFS on undirected graphs.

**Greedy algorithms :** Prim's algorithm, single source shortest paths, kruskal's minimal spanning trees. Transitive closure, APSP problem, Computing transitive closure for matrix operations.

### Unit- IV

**Dynamic Programming :** Sub problem, Graphs and their traversal, Multiplying a sequence of matrices, optimal binary search tree construction.

### Unit-V

**String Matching :** Knuth - Moore-Pratt Algorithm, Boyer- Moore Algorithm, P & N P, NP complete algorithms.

### Text Book :

1. Sara Baase, Allean Van Gelder : "Computer Algorithms, Introduction to Design and Analysis, 3<sup>rd</sup> Edition, Pearson Education, Asia.

### References :

1. Corman, Leiserson & Rivest : Introduction to Algorithms, PHI publication.
2. Aho, "Data Structures and Algorithms", Pearson Education.
3. Aho, "Design & Analysis of Computer Algorithms", Pearson Education.
4. Knuth : "The Art of Programming (Vol I to II), Pearson Education.
5. Mark Allen Weiss "Data Structures and Algorithm Analysis in C", second edition, Pearson Education.

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, Bhilai

**Semester: M.E. I Sem.**

**Subject: Digital Signal Processing**

**Total Theory Periods: 40**

**Total Marks in end Semester Exam.: 100**

**Minimum number of class tests to be conducted: 02**

**Branch: Computer Science & Engg.**

**Code: 522135 (22)**

**Total Tut Periods: 12**

## Unit - I

Discrete Signals and Systems: Basic elements of DSP, Classification of discrete time signals, signal representation, Operation on DTS, Classification of discrete time systems (DTS), Representation of arbitrary sequence, Impulse response and convolution sum, Solution of Difference equation using direct method, FIR and IIR systems, Stable and Unstable systems. Frequency response, Transfer function, correlation and Auto correlation.

The Z Transforms: Z Transform and ROC of finite and infinite duration sequence, stability and ROC, Properties of ZT, Inverse Z-Transforms (IZT), Solution of differential equation using ZT, Analysis of LTI system.

## Unit - II

Frequency domain representation of Discrete signals: Discrete time Fourier transform (DTFT), Inverse DTFT, Properties of DTFT, Discrete Fourier Transform (DFT), Properties of DFT, IDFT, Twiddle factor, DFT & IDFT using matrix method, circular convolution, Analytical, Graphical and Matrix method for circular convolution, Fast convolution, Fast Fourier transform (FFT), Radix – 2 FFT, DIT-FFT, DIT-IFFT, DIF-FFT, Radix –2 DIF – IFFT, Composite radix FFT, Applications of FFT.

## Unit - III

Implementation of discrete-time systems:

Block diagram and signal flow graph representation of IIR and FIR filters, Realization of IIR filters (Direct –I, Direct-II, Cascade, Parallel, Ladder and Transposed Realization), Realization of FIR filters (Direct, Cascade and linear phase FIR structure). Design of digital filter, specification of FIR filters, General consideration, design of FIR filters, Symmetric and antisymmetric FIR filter, Design of FIR filter using Windows, Frequency sampling method, Hilbert Transformers.

## Unit - IV

Filter Design Technique: Design of DTIIR filters. From continuous time filters, Introduction to analog filters for designing Digital filters (Butter worth and chebyshev filters), filters design using Impulse invariant, Bilinear Z transform, Matched Z-Transform and Approximation of derivatives methods, frequency transformation, Frequency Transformations, Design of IIR Filters in frequency Domain, Difference between FIR and IIR filters.

## Unit - V

Real time DSP Systems: Real time DSP systems: DSP and its benefits, key DSP operations, Typical Real time DSP system, ADC process, Uniform and Nonuniform quantization and Encoding DAC Process, Signal recovery, sampling of low pass and Band pass signals, Digital signal processors, Evaluation boards for real time signal processing, TMS320C10 forget board, DSP application, Adaptive removal of ocular artifacts from human EEGs: Multirate Digital Signal Processing, Decimation by factor D, Interpolation by factor I, Filter and implementation for sampling rate conversion, multistage implementation of sampling rate conversion, sampling rate conversion of band pass signals, Application of Multirate signal processing.

## Text Books:

1. Proakis J.G. and D.G. Manolakis, "Digital Signal Processing", Prentice Hall of India, New Delhi, 1999
2. Ifeachor Emmanuel C. and Barrie W. Jervis, "Digital Signal Processing A Practical Approach" Pearson Education Ltd., Fifth Indian Reprint, 2005.

## Reference Books:

1. Jonsson Jonny, "Digital Signal Processing", Tata Mc Graw Hill Publication.
2. Schafer R.W. and A.V. Oppenheim, "Digital Signal Processing", Prentice Hall of India, New Delhi, 1999
3. Kue R., "Introduction to Digital Signal Processing", Mc Graw Hill, New York 1988.

4. Porat B., "A course in DSP John Wiley & Sons, Inc., New York, 1997.
5. Bregham E.O., "Fast Fourier Transform" IEEE Spectrum, 1969.
6. Bose N.K. "Digital Filters: Theory & Application" Elsevier, New York, 1995.
7. Hayes Manson H., "Digital Signal Processing", Tata Mc Graw Hill publication.

## CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, Bhilai

**Semester: M.E. I Sem.**  
**Subject: Advanced Operating System - Lab**  
**Total Practical Periods: 40**  
**Total Marks in end Semester Exam.: 75**

**Branch: Computer Science & Engg.**  
**Code: 522121 (22)**

### Experiments to be Performed

- ✍✍ Write a program for the implementation of various CPU scheduling algorithms (FCFS, SJF, Priority ).
- ✍✍ Write a program for the implementation of various page replacement algorithms (FIFO , Optimal, LRU).
- ✍✍ Write a program for the implementation of Readers Writers problem.
- ✍✍ Write a program for the implementation of Banker's algorithm.
- ✍✍ Write a program to simulate the concept of semaphores.
- ✍✍ Write a program to simulate the concept of inter process communication.
- ✍✍ Write a program for the implementation of various memory allocation algorithms (First fit, Best fit, Worst fit).
- ✍✍ Write a program for the implementation of various Disk scheduling algorithms (FCFS, SCAN, SSTF, C-SCAN).
- ✍✍ Write a program for the implementation of Producer-Consumer problem.
- ✍✍ Write a program for the implementation of Fork and V-fork of Unix operating system.

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, Bilai

Semester: M.E. I Sem.  
Subject: Java Programming and Applications - Lab  
Total Practical Periods: 40  
Total Marks in end Semester Exam.: 75

Branch: Computer Science & Engg.  
Code: 522122 (22)

## Experiments to be Performed

- ✍✍ Write a program for matrix multiplication. Use InputStreamReader and Buffered Reader classes for Input/Output.
- ✍✍ Write a program to create a user defined Exception when the user inputs the marks which exceed more than 100.
- ✍✍ Write a program to animate a string on Applet. Use the concept of Multithreading.
- ✍✍ Write a program to design a calculator using the AWT controls provided in Java.
- ✍✍ Write a program for Client Server communication using either UDP or TCP protocols. Use ServerSocket and Socket classes.
- ✍✍ Write a program to create some of the features of Notepad. Use Swings for designing this application.
- ✍✍ Create functions like multiply ,addition and subtraction respectively. Invoke these functions from remote system by using the concept of Remote Method Invocation in  
✍✍ Java.
- ✍✍ Create a form containing fields name and password respectively, using applet as a container .The input entered in these fields should be stored in the database .Use  
✍✍ JDBC connectivity for implementing this program.
- ✍✍ Write a program to create a small portal which contains the registration form of students. Use Servlets and JDBC.
- ✍✍ Write a program create a bean component in Java for addition of two numbers.