North Maharashtra University, Jalgaon
New Syllabus with effect from Year 2008-09
BE Computer
Term I

Sr. No	Subject	Teaching Scheme per Week			Examination Scheme				
		L	T	P	Paper Hr.	Paper	TW	PR	OR
1	Elective I	4	-	2	3	100	25	-	25
2	Artificial Intelligence	4	-	-	3	100	25	-	-
3	Advanced Unix Programming *	4	-	2	3	100	25	25	-
4	Object Oriented Modeling and Design *	4	-	2	3	100	25	-	25
5	Advanced Computer Network	4	-	-	3	100	-	-	-
6	Seminar	-	-	2	-	-	25	-	-
7	Project I			2	-	-	25	-	25
	Total	20	0	10		500	150	25	75
	Grand Total	**30**			**750**				

Elective I
Operation Research *
Embedded Systems *
Image Processing *

Term II

Sr. No	Subject	Teaching Scheme per Week			Examination Scheme				
		L	T	P	Paper Hr.	Paper	TW	PR	OR
1	Elective II	4	-	2	3	100	25	-	25
2	Data Warehousing and Mining *	4	-	2	3	100	25	-	25
3	Software Metrics and Quality Assurance *	4	-	2	3	100	25	-	25
4	Advanced Computer Architecture	4	-	2	3	100	25	-	-
5	Industrial Visit / Case Study		-				25	-	-
6	Project II		-	6	-		100	-	50
	Total	16	0	14		400	225	0	125
	Grand Total	**30**			**750**				

Elective II
Fuzzy Logic and Neural Networks
Mobile Network*
Compiler Construction

* Common subject with BE IT

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING / IT)
(w.e.f. 2008-09)

TERM – I

Elective – I
Operation Research

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25
Oral: 25

Unit – I **(10 Hrs. 20 Marks)**

Introduction to Operation Research – Modeling in operation research, principles of modeling, Main phases of operation research, scope, role of operation research in decision making, linear programming, model formulation, graphical method, simplex method, advantages of Linear Programming.

Unit – II **(10 Hrs. 20 Marks)**

Dynamic Programming - Introduction, Basic concepts and applications, characteristics of dynamic programming approach, special techniques of Linear programming, Transportation problems, North – West corner rule, Least cost method, Vogel's approximation method, Balanced and unbalanced problems, Assignment problems, Hungarian method, balanced and unbalanced problems, traveling sales man problem.

Unit – III **(10 Hrs. 20 Marks)**

Project Planning Using PERT/CPM : Phases of project management, construction of network or arrow diagrams, time estimates, earliest expected time, latest allowable time and slack, critical path computations for PERT, calculations on CPM networks various floats for activities, critical path, Difference between CPM and PERT , Project time Vs project cost, use of CPM/PERT in project management.

Unit – IV **(10 Hrs. 20 Marks)**

Replacement Model – Deterministic and probabilistic considerations, Replacement of old equipment by the most efficient by the sudden failure items, failure trees, examples of failure trees, sequencing model Terminology and notations, Principles assumptions, Solution of sequencing problems, Processing of n jobs through two machines, Processing n jobs through three machines, Two jobs through m machines, Processing n jobs through m machines .

Unit – V **(10 Hrs. 20 Marks)**

Decision theory and game theory: Decision trees, classes of decision model, decision under certainty, uncertainty and risk.

Game Theory: Theory concept characteristics, maximum and minimum principles saddle points, dominance, basic concept, terminology of two persons zero sum game, MXZ and ZX games subgames methods, graphical method.

Reference Books:

1. N. D. Vohra, Quantitative Techniques in Management, TMH
2. Taha H. A., Operation Research – An Introduction PHI
3. S. D. Sharma, Operation Research, Kedarnath Ramnath Compay
4. N. G. Nair, Operation Research, Dhanpat Rai
5. Prem kumar Gupta, D. S. Hira, Operation Research, S. Chand & Company
6. L. S. Srinath, PERT and CPM Principles & Applications, EWP

Term work:

Assignment based on:

1. Implementation of Linear Programming Model
2. Implementation of Simplex Method
3. Implementation of Dynamic Programming
4. Implementation of transportation model
5. Implementation of assignment model
6. Implementation of Traveling Sales man problem
7. Implementation of sequencing model
8. Implementation for replacement model
9. Game playing with min / max search
10. Program for decision tree

Any Five Lab Assignment should be framed by concern staff member based on above list.

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TERM – I

Elective – I
Embedded Systems

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25
Oral: 25

Unit – I **(10 Hrs. 20 Marks)**

Embedded system Introduction

Introduction to Embedded System, History, Design challenges, optimizing design metrics, time to market, applications of embedded systems and recent trends in embedded systems, embedded design concepts and definitions, memory management, hardware and software design and testing, communication protocols like SPI, SCI, I2C, CAN etc

Unit – II **(10 Hrs. 20 Marks)**

System Architecture

Introduction to ARM core architecture, ARM extension family, instruction set, thumb Instruction set, Pipeline, memory management, Bus architecture, study of on-chip peripherals like I/O ports, timers, counters, interrupts, on-chip ADC, DAC, RTC modules, WDT, PLL, PWM, USB etc.

Unit – III **(10 Hrs. 20 Marks)**

Interfacing and Programming

Basic embedded C programs for on-chip peripherals studied in system architecture. Need of interfacing, interfacing techniques, interfacing of different displays including Graphic LCD (320X240), interfacing of input devices including touch screen etc, interfacing of output devices like thermal printer etc., embedded communication using CAN and Ethernet, RF modules, GSM modem for AT command study etc.

Unit – IV **(10 Hrs. 20 Marks)**

Real time Operating System Concept

Architecture of kernel, task scheduler, ISR, Semaphores, mailbox, message queues, pipes, events, timers, memory management, RTOS services in contrast with traditional OS. Introduction to uCOSII RTOS, study of kernel structure of uCOSII, synchronization in uCOSII, Inter-task communication in uCOSII, memory management in uCOSII, porting of RTOS.

Unit – V **(10 Hrs. 20 Marks)**

Embedded Linux
Introduction to the Linux kernel, Configuring and booting the kernel, the root file system, Root file directories, /bin, /lib etc., Linux file systems, Types of file system: Disk, RAM, Flash, And Network. Some debug techniques- Syslog and strace, GDB, TCP/IP Networking- Network configuration, Device control from user space- Accessing hardware directly, Multi processing on Linux and Inter Process Communication- Linux process model and IPCs, Multithreading using pThreads - Threads vs. Processes and pThreads, Linux and Real-Time- Standard kernel problems and patches.

Reference Books:

1. Rajkamal, “Embedded Sytems “, TMH.
2. David Simon, “Embedded systems software primer”, Pearson
3. Steve Furber, “ARM System-on-Chip Architecture”, Pearson
4. DR.K.V.K.K. Prasad, “Embedded /real time system”, Dreamtech
5. Iyer,Gupta, “Embedded real systems Programming“, TMH

Laboratory exercise

- Integrated Development Environment Overview (Project creation, down load & debug)
- Study of JTAG Debugger/on-board debugger-emulator.
- ARM Instructions execution (Barrel Shifter, LDR/STR, SMT/LDM)

Term Work:

Group - A
1) Writing basic C-programs for I/O operations
2) C-Program to explore timers/counter
3) C-programs for interrupts
4) Program to demonstrate UART operation

Group - B
5) Program to demonstrate I2C Protocol.
6) Program to demonstrate CAN Protocol.

Group - C
7) Program to interface LCD
8) Program to interface Keyboard and display key pressed on LCD
9) Program to interface stepper motor

Group - D
10) Program to demonstrate RF communication
11) Program to implement AT commands and interface of GSM modem
12) Implementation of USB protocol and transferring data to PC.
13) Implementation of algorithm /program for the microcontroller for low power modes.
uCOSII /Embedded Linux RTOS Examples

Group - E
14) Interfacing 4 x 4 matrix keyboards and 16 x 2 character LCD display to microcontroller / microprocessor and writing a program using RTOS for displaying a pressed key.
15) Writing a scheduler / working with using RTOS for 4 tasks with priority. The tasks may be keyboard, LCD, LED etc. and porting it on microcontroller/ microprocessor.

Group - F
16) Implement a semaphore for any given task switching using RTOS on microcontroller board.
17) Create two tasks, which will print some characters on the serial port, Start the scheduler and observe the behavior.

Group – G
18) RTOS based interrupt handling using Embedded Real Time Linux.

19) Program for exploration of (Process creation, Thread creation) using Embedded Real Time Linux.

Group – H

20) Program for exploring Message Queues using Embedded Real Time Linux.
21) Ethernet Based Socket Programming using Embedded Real Time Linux.

Note: 1) At least one practical should be performed from each group.
2) Two practicals should be performed using the JTAG debugger/on-board Debugger-emulator.

Term work will be based on above list.

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TERM – I

Elective – I
Image Processing

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25
Oral: 25

Unit – I **(10 Hrs. 20 Marks)**

Introduction - What is digital image processing?, Fundamental steps in digital image processing, A simple Image formation model, Image sampling and quantization , Representing Digital Images, Basic relationship between pixels,

Image Enhancement in the spatial domain: Basic Gray level transformations, Histogram Processing(Equalization, Matching), Basics of spatial filtering, Smoothing spatial filters, Sharpening spatial filters.

Unit – II **(10 Hrs. 20 Marks)**

Image Enhancement in the frequency domain: Fourier Transform and Frequency domain, Filtering in the frequency domain, Basics of filtering in the frequency domain, Basic filters and their properties, Smoothing Frequency domain filters, Sharpening Frequency domain filters, Homomorphic Filtering
Properties of 2 D Fourier Transform, The Convolution and Correlation Theorems

Unit – III **(10 Hrs. 20 Marks)**

Image Restoration: Model Of Image Restoration/ Degradation Process, Noise Models, Restoration in the presence of Noise- Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Filtering Techniques to restore image.

Image Compression- Compression models- Lossy Compression- Lossless Compression.

Unit – IV **(10 Hrs. 20 Marks)**

Color Image Processing : Color Fundamentals, Color Models, Converting Colors from different color models, Gray Level to Color Transformations, Color Transformations, Color Slicing, Color Image Smoothing.

Morphological Image Processing
Basic Concepts, Dilation, Erosion, Thinning, Thickening, Pruning, Gray level Morphology

Unit – V **(10 Hrs. 20 Marks)**

Segmentaion- Edge linking and Boundary detection, Thresholding, Region Based Segmentation, Histogram Analysis,

Application of Image Processing,
Introduction to Content Based Image Retrieval.

Reference Books:

1. R.C. Gonzalez, R.R. Woods, Digital Image Processing Person Education, Pearson Education
2. B. Chanda, D.Datta Mujumdar, "Digital Image Processing And Analysis", PHI ,
3. William Pratt, "Digital Image Processing", John Willey & Sons
4. Anil Jain, "Fundamentals Of Digital Image Processing", PHI

Term work:

1. Develop C/C++ code to create a simple image and save the same as bitmap image in .bmp file.
2. Develop C/C++ code to implement basic gray level transformations(Any One)
3. Develop C/C++ code to perform basic image enhancement operations
4. Develop C/C++ code to implement image histogram processing (Equalization or Matching)
5. Develop C/C++ code to find basic relationship between pixels.(Any One)
6. Develop C/C++ code to implement image compression (any one algorithm)
7. Implement gray scale thresholding to blur an image.
8. Implement C/C++ code to implement an algorithm for edge detection.
9. Implement C/C++ code to implement image morphological operations.(Any One)

The term work will be based on any 5 assignments from above list.

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TERM – I

Artificial Intelligence

Teaching Scheme:
Lectures: 4 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25

Unit – I **(10 Hrs. 20 Marks)**

Introduction to Artificial Intelligence: Definition, AI Problems, physical symbol system and hypothesis, AI Technique, Turing test, Problem as a state space search, production system, Problem characteristics, breadth first search, depth first search, AI representation, Properties of internal Representation, Heuristic search techniques, Best files search, A* and AO* Algorithms, Mean and ends analysis

Unit – II **(10 Hrs. 20 Marks)**

Knowledge Representation using Predicate Logic: Predicate calculus, Predicates and Arguments, ISA hierarchy, Frame notation, Resolution, Natural deduction.

Knowledge Representation using Non-monotonic Logic: TMS (Truth Maintenance System), Statistical and probabilistic reasoning, Fuzzy Logic, Knowledge representation, Semantic Net, Frames, Script, Conceptual dependency.

Unit – III **(10 Hrs. 20 Marks)**

Planning: Types of planning, Block world, strips, Implementation using goal stack, Nonlinear planning with goal stacks, Hierarchical planning, List commitment strategy.

Perception: Action, Robot architecture, Vision, Texture and images, Representing and recognizing scenes, Walzs algorithm, Constraint determination, Trihedral and Nontrihedral figures labeling.

Unit – IV **(10 Hrs. 20 Marks)**

Learning: By training neural networks, Introduction to neural networks, Neural net architecture and

applications.
Natural Language Processing and understanding, Pragmatic, Syntactic, and Semantic analysis, Finite State Machine, ATN, Understanding sentences.

Unit – V **(10 Hrs. 20 Marks)**

Expert System: Utilization and functionality, architectures of Expert system, Knowledge representation, Two case studies on expert systems.
Game Playing: Minimize search procedure, Alpha-beta cutoffs, Waiting for Quiescence, Secondary search.

Reference Books:

1. Elaine Rich, Kerin Knight, "Artificial Intelligence". TMH
2. B. Yegnanarayana, “Artificial Neural Network”, PHI
3. Dan W. Patterson, “Introduction to artificial intelligence and expert system”, PHI
4. Timothy J Ross, “Fuzzy Logic with Engineering Application”, TMH

Term Work:

Assignments based on:

1. Implementation of single perceptron training algorithm.
2. Implementation of fuzzy membership function.
3. Implementation of Unification Algorithm.
4. Hill Climbing Algorithm.
5. Game playing with Min/Max Search.
6. Implementation of Dynamic database.
7. Parsing method implementation.
8. Development of Mini Expert System using Prolog.
9. Application development using Neural Network.
10. Development of Intelligent Perception System.

Any six lab assignments should be framed by concern staff member based on above list.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

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TERM – I

Advanced Unix Programming*

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25
Practical: 25

Unit – I **(10 Hrs. 20 Marks)**

UNIX System Overview – Introduction, UNIX Architecture, Logging In, Files and Directories, Input and Output, Programs and Processes, Error Handling, User Identification, Signals, Time Values, System Calls and Library Functions.

File I/O – Introduction, File Descriptors, open Function, creat Function, close Function, lseek Function, read Function, write Function, I/O Efficiency, File Sharing, Atomic Operations, dup and dup2 Functions, sync, fsync, and fdatasync Functions, fcntl Function, ioctl Function, /dev/fd.

Files and Directories – Introduction, stat, fstat, and lstat Functions, File Types, Set-User-ID and Set-

Group-ID, File Access Per missions, Ownership of New Files and Directories, access Function, umask Function, chmod and fchmod Functions, Sticky Bit, chown, fchown, and lchown Functions, File Size, File Truncation, File Systems, link, unlink, remove, and rename Functions, Symbolic Links, symlinkand readlink Functions, File Times, utime Function, mkdirand rmdir Functions, Reading Directories, chdir, fchdir, and getcwd Functions, Device Special Files, Summary of File Access Per mission Bits.

Unit – II **(10 Hrs. 20 Marks)**

System Data Files and Information – Introduction, Password File, Shadow Passwords, Group File, Supplementary Group Ids, Implementation Differences, Other Data Files, Login Accounting, System Identification, Time and Date Routines.

Process Environment – Introduction, main Function, Process Termination, Command-Line Arguments, Environment List, Memory Layout of a C Program, Shared Libraries, Memory Allocation, Environment Variables, setjmp and longjmp Functions, getrlimit and setrlimit Functions.

Process Control – Introduction, Process Identifiers, fork Function, vfork Function, exit Functions, wait and waitpid Functions, waitid Function, wait3 and wait4Functions, Race Conditions, exec Functions, Changing User IDs and Group IDs, Interpreter Files, system Function, Process Accounting, User Identification, Process Times.

Unit – III **(10 Hrs. 20 Marks)**

Signals – Introduction, Signal Concepts, signal Function, Unreliable Signals, Interrupted System Calls, Reentrant Functions, SIGCLD Semantics, Reliable-Signal Terminology and Semantics, kill and raise Functions, alarm and pause Functions, Signal Sets, sigprocmask Function, sigpending Function, sigaction Function, sigsetjmp and siglongjmp Functions, sigsuspend Function, abort Function, system Function, sleep Function, Job-Control Signals, Additional Features.

Advanced I/O – Introduction, Nonblocking I/O, Record Locking, STREAMS, I/O Multiplexing, 2 poll Function, Asynchronous I/O, readv and writev Functions, readn and written Functions, Memory-Mapped I/O.

Unit – IV **(10 Hrs. 20 Marks)**

Threads – Introduction, Thread Concepts, Thread Identification, Thread Creation, Thread Termination, Thread Synchronization.

Thread Control – Introduction, Thread Limits, hread Attributes, Synchronization Attributes, Reentrancy, Thread-Specific Data, Cancel Options, Threads and Signals, Threads and fork, Threads and I/O.

Daemon Processes – Introduction, Daemon Characteristics, Coding Rules, Error Logging, Single-Instance Daemons, Daemon Conventions, Client-Server Model.

Unit – V **(10 Hrs. 20 Marks)**

Interprocess Communication – Introduction, Pipes, popen and pclose Functions, Coprocesses, FIFOs, XSI IPC, Message Queues, Semaphores, Shared Memory, Client-Server Properties.

Network IPC: Sockets – Introduction, Socket Descriptors, Addressing, Connection Establishment, Data Transfer, Socket Options, Out-of-Band Data, Nonblocking and Asynchronous I/O.

Advanced IPC – Introduction, STREAMS-Based Pipes, Unique Connections, Passing File Descriptors, An Open Server, Version 1, An Open Server, Version 2.

Reference Books:

1. W. Richard Stevens and Stephen A. Rago, Advanced Programming in the UNIX Environment, 2/E, Pearson Education
2.W. Richard Stevens, Unix Network Programming - Interprocess Communications, Volume 2, 2/E, Pearson Education

Term Work:

Concerned staff members should suitably frame the term work (at least 6) based on above syllabus and implementation of Unix commands using library functions as well as implementation of shell scripts.

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TERM – I

Object Oriented Modeling and Design

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practicals: 2 Hrs./Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25 Marks
Oral: 25 Marks

Unit – I **(10 Hrs. 20 Marks)**

Review of Object Modeling, New Paradigms, Object Oriented Thinking, UML Concepts: Overview of UML.
UML 2.0 New Features.
Rational Unified Process emphasizing Inception, Elaboration, Construction, Transition Phases. 4+1 View architecture, Architectural approaches: Use case Centric, Architecture driven, Iterative approach, OO Concepts Review.

Unit – II **(10 Hrs. 20 Marks)**

Introduction to UML. UML MetaModel. Extensibility mechanisms like stereotypes, tagged values, constraints and profiles. OCL. Overview of all diagrams in UML 2.0.

Unit – III **(10 Hrs. 20 Marks)**

Object diagrams, CRC method, Review of OO concepts. Class diagrams, Classes and Relationships, Interfaces and ports, Templates, Active Objects, Advanced relationships generalization, association, aggregation, dependencies. Composite structure diagrams including composite structures, collaborations.

Unit – IV **(10 Hrs. 20 Marks)**

Interaction diagrams. Interaction Overview diagrams including interactions, signals, exceptions, regions, partitions, Sequence diagrams, Communication diagrams.
State Machine diagrams, States, encapsulation of states, transitions, submachine, state generalization. Timing diagrams, Activity diagrams, Activities, sub activities, signals, exceptions, partitions, regions.

Unit – V **(10 Hrs. 20 Marks)**

Support for modeling Architecture in UML. Package diagrams, Component diagrams, Deployment diagrams. Applications of UML in embedded systems, Web applications, commercial applications.

Reference Books:

1. Grady Booch, James Rumbaugh, Ivar Jacobson “Unified Modeling Language User Guide”, Addison-Wesley
2. Joseph Schmuller “SAMS Teach yourself UML in 24 Hours”, Third edition.
3. Martin Fowler, “UML Distilled: A Brief Guide to the Standard Object Modeling Language”, Third Edition (Paperback) ,Addision Wesley
4. Dan Pilone, Neil Pitman “UML 2.0 in a Nutshell”, O'Reilly
5. Rambaugh, “Object Oriented Modeling and Designing”. PHI

6. Bouch. “Object Oriented Analysis and Design with Applications”. Addison Wesley.
7. Schah, “Introduction to OOAD with UML and Unified Process”, TMH

Term Work:
Concerned staff members should suitably frame the term work at least 5 assignments based on above syllabus. Each assignment must consider definition, analysis, design and modeling of a project.

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TERM – I

Advanced Computer Network

Teaching Scheme:
Lectures: 4 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)

Unit – I **(10 Hrs. 20 Marks)**

Introduction to wireless Networking: Why Wireless? What makes Wireless Network different? A Network by Any other name.
Overview of 802.11 Networks: IEEE 802 Network Technology Family tree, 802.11 Nomenclature and design, 802.11 Network Operation, Mobility Support.

802.11 MAC Fundamentals: Challenges for the MAC,MAC Access Modes and Timing, Contention-Based Access Using the DCF, Fragmentation and Reassembly, Frame Format, Encapsulation of Higher-Layer Protocols Within 802.11,Contention-Based Data Service, Frame Processing and Bridging.

802.11 Framing in Detail: Data Frames, Control Frames, Management Frames, Frame Transmission and Association and Authentication States

Unit – II **(10 Hrs. 20 Marks)**

Management Operations: Management Architecture, Scanning, Authentication, Pre-authentication, Association, Power Conservation, Timer Synchronization, Spectrum Management

Contention-Free Service with the PCF: Contention-Free Access Using the PCF, Detailed PCF Framing, Power Management and the PCF

Physical Layer Overview: Physical-Layer Architecture , The Radio Link , RF Propagation with 802.11, RF Engineering for 802.11

Unit – III **(10 Hrs. 20 Marks)**

The Frequency-Hopping (FH) PHY: Frequency-Hopping Transmission ,Gaussian Frequency Shift Keying (GFSK) FH PHY Convergence Procedure (PLCP), Frequency-Hopping PMD Sublayer, Characteristics of the FH PHY

The Direct Sequence PHYs: DSSS and HR/DSSS (802.11b): Direct Sequence Transmission, Differential Phase Shift Keying (DPSK), The "Original" Direct Sequence PHY, Complementary Code Keying, High Rate Direct Sequence PHY
802.11a and 802.11j: 5-GHz OFDM PHY: Orthogonal Frequency Division Multiplexing (OFDM), OFDM as Applied by 802.11a, OFDM PLCP, OFDM PMD Characteristics of the OFDM PHY

Unit – IV **(10 Hrs. 20 Marks)**

Wired Equivalent Privacy (WEP): Cryptographic Background to WEP, WEP Cryptographic Operations, Problems with WEP, Dynamic WEP

User Authentication with 802.1X: The Extensible Authentication Protocol, EAP Methods, 802.1X: Network Port, Authentication, 802.1X on Wireless LANs
802.11i: Robust Security Networks, TKIP, and CCMP: The Temporal Key Integrity Protocol (TKIP), Counter Mode with CBC-MAC (CCMP), Robust Security Network (RSN) Operations

Unit – V **(10 Hrs. 20 Marks)**

Ad Hoc Wireless Networks: Introduction, Issues in Ad Hoc Wireless Networks, Ad Hoc Wireless Internet
Routing Protocols for Ad Hoc Wireless Networks: Introduction, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classifications of Routing Protocols, Table-Driven Routing Protocols, On Demand Routing Protocols, Hybrid Routing Protocols, Routing Protocols with Efficient Flooding Mechanisms, Hierarchical Routing Protocols, Power-Aware Routing Protocols
Wireless Sensor Networks: Introduction, Sensor Networks Architecture, Data Dissemination, Data Gathering, MAC Protocols for Sensor Networks, Location Discovery, Quality of a Sensor Network.

Reference Books:

1. Matthew Gast, 802.11 Wireless Networks: The Definitive Guide, Second Edition, O'Reilly
2. C.Siva Ram Murthy, B.S. Manoj, Ad Hoc Wireless Networks: Architectures and Protocols, Pearson

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TERM – I

Seminar

Teaching Scheme:
Practical: 2 Hrs./ Week

Examination Scheme:
Term Work: 25 Marks

1. For seminar every student will individually study a topic assigned to him / her and submit a report and shall deliver a short lecture / Seminar on the topic at the end of term.
2. Selection of topic should be done by students in consultation with concerned guide
    a. Topic should be related to branch but it should be extended part of the branch (latest and advance topic).
    b. The topic should be such that the student can gain latest knowledge. Student should preferably refer at least one research paper
3. Seminar topic should not be repeated in the department and registration of the same should be done on first come first served basis
4. Seminar report should be submitted in paper bound copy prepared with computer typing
    a. Size of report depends on advancement of topic.
    b. Student should preferably refer minimum 5 reference books / magazines.
    c. Format of content
        i. Introduction.
        ii. Literature survey.
        iii. Theory
            1. Implementation
            2. Methodology
            3. Application
            4. Advantages, Disadvantages.
        iv. Future scope.
        v. Conclusion.
5. ASSESSMENT OF SEMINAR for TERM WORK

Title of seminar : _____
Name of guide : _____

Sr. No.	Exam Seat No.	Name of Student	Assessment by examiners					Grand Total
			Topic Selection 5	Literature Survey 5	Report Writing 5	Depth of understanding 5	Presentation 5	25

6. Assessment of Literature survey will be based on
    a. collection of material regarding history of the topic,
    b. implementation,
    c. recent applications.

7. Assessment of Depth of understanding will be based on
    a. Questioning by examiners.
    b. Questioning by students.
    c. What the student understands i.e. conclusion regarding seminar.

8. Assessment of presentation will be based on;
    a. Presentation time (10 minutes)
    b. Presentation covered (full or partial)
    c. Way of presentation
    d. Questioning and answering (5 minutes)
9. Examiners should be a panel of two one of them must be guide. Examiner must have experience at least 3 years. Examiners will be appointed by HOD in consultation with Principal.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

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TERM – I

Project - I

Teaching Scheme:
Practical: 2 Hrs./ Week

Examination Scheme:
Term Work: 25
Oral: 25

1. Every student individually or in a group (group size is of 3 students. However, if project complexity demands a maximum group size of 4 students, the committee should be convinced about such complexity and scope of the work) shall take a project in the beginning of the (B.E. first Term) seventh term in consultation with the guide and the project must be completed in the (B.E. Second Term) eighth term.

2. The project proposal must be submitted in the institute in the beginning of the (B.E. first Term) seventh term. While submitting project proposal care is to be taken that project will be completed within the available time of two term i.e 2 Hrs per week for (B.E. first Term) seventh term and 4 Hrs per week for (B.E. Second Term) eighth semester (total time become 12*2 + 12*4 = 72 Hrs per project partner). The final title of

the project work should be submitted at the beginning of the (B.E. Second Term) eighth semester. .

3. Project title should be precise and clear. Selection and approval of topic:
   Topic should be related to real life or commercial application in the field of Computer Engineering

OR

Investigation of the latest development in a specific field of Computer Engineering

OR

Commercial and Interdisciplinary projects should be encouraged. The examination will be conducted independently in respective departments.

4. The group should maintain a logbook of activities. It should have entries related to the work done, problems faced, solution evolved etc., duly signed by guide.
5. The group is expected to complete details system/problem definition, analysis, design, etc. in (B.E. first Term) seventh term, as a part of term work in the form of a joint report. Project report must be submitted in the prescribed format only. No variation in the format will be accepted.
6. One guide will be assigned at the most three project groups.
7. The guides should regularly monitor the progress of the project work.
8. Assessment of the project for award of term work marks shall be done by the guide and a departmental committee (consisting of minimum two teachers with experience more than three years) as per the guidelines given in the following table.

A) ASSESSMENT OF PROJECT I TERMWORK B.E. FIRST TERM

NAME OF THE PROJECT: _____
NAME OF THE GUIDE: _____

Sr No	Exam Seat No	Name Of Student Marks	Assessment by guide (70%)					Assessment by Departmental committee (30%)			Grand Total	Out of 25 Marks
			Literature survey	Topic Selection	Docum-entation	Attendance	Total	Evaluation (10%)	Pres-ntaion (20%)	Total		
			10	05	15	05	35	05	10	15	50	25

Sign of Guide Sign. of Committee Members Sign. of H. O. D.

9. The guide should be internal examiner for oral examination (If experience is greater than three years).
10. The external examiner should be from the related area of the concerned project. He should have minimum of five years of experience at degree level / industry.
11. The evaluations at final oral examination should be done jointly by the internal and external examiners.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING)
(w.e.f. 2008-09)

TERM – II

Elective – II
Fuzzy Logic and Neural Networks

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25
Oral: 25

Unit – I **(10 Hrs. 20 Marks)**

Introduction to Biological Neurons: Neurons, Axon, Synaptic links, Dendrites, Working,
Artificial Neuron Model: McCulloch-Pitts Neuron Model, Neuron Modeling for Artificial Neural Systems, Activation Functions.
Models of Artificial Neural Networks: Feed forward Network, Feedback Network, Neural Processing, Learning and Adaptation, Supervised and Unsupervised Learning.

Unit – II **(10 Hrs. 20 Marks)**

Neural Network Learning Rules: Hebbian Learning, Perceptron Learning, Delta Learning, Widrow-Hoff Learning, Correlation Learning, Winner-Take-All Learning, Single Layer Perceptron Classifier: Classification Model, Features, Decision Regions, Discriminants Functions, Linear Machine and Minimum Distance Classification, Nonparametric Training Concept.

Unit – III **(10 Hrs. 20 Marks)**

Training and Classification using Discrete Perceptron, Single Layer Continuous Perceptron Networks for Linearly Separable Classifications, Multi-category Single Perceptron Networks.
Multilayer Feedforward Networks: Linearly Nonseparable Pattern Classification, Delta Learning Rule for Multiperceptron Layer, Generalized Delta Learning Rule.

Unit – IV **(10 Hrs. 20 Marks)**

Feed Forward Recall and Error Back Propagation Training, Learning Factors, Single Layer Feedback Networks, Basic Concepts, Hopfield Networks, Boltzmann Machine, Kohonens self organizing maps.
Applications of Neural Networks: Pattern Recognition, Classification and clustering.

Unit – V **(10 Hrs. 20 Marks)**

Fundamentals of 'Fuzzy System, Crisp Sets, Membership Functions, Fuzzy Sets, Fuzzy Set Properties and Manipulation, Linguistic Variables, Fuzzy System Architecture, Fuzzy System Design and implementation.
Fuzzy Neural Networks: Introduction to Neuro – Fuzzy Systems, Types of Fuzzy-Neural Nets, Nero-Fuzzy Systems Design and implementation.

Reference Books:

1. Robert J. Schalkoff, "Artificial Neural Networks", McGraw – Hill
2. B. Yegnarayan, " Artificial Neural Networks", PHI
3. Timoty J Ross, "Fuzy Logic with Engineering Applications", McGraw-Hill
4. Satish Kumar, "Neural Network:A Classroom Approach", TMH
5. J. M. Zurada, "Introduction to Artificial Neural Networks", Jaico Publishing House.

Term Work:

1. Implementation of basic learning rules using single neuron
2. Implementation of Single layer discrete perceptron

3. Implementation of Single layer continues perceptron
4. Implementation of operations of fuzzy sets
5. Design and Implementation of fuzzy sets and its membership functions
6. Mini application development using fuzzy sets
7. Mini application development using neural network

Any six-lab assignments should be frame by the concern staff based on above list.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING/IT)
(w.e.f. 2008-09)

TERM – II

Elective – II
Mobile Network

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25
Oral: 25

Unit – I **(10 Hrs. 20 Marks)**

Introduction – PCS Architecture, Cellular Telephony, Cordless Telephony and Low-tier PCS, Third Generation wireless system

Mobility Management – Handoff, Inter - BS handoff, Intersystem handoff, Roaming management, Roaming management under SS7 and Roaming management for CT2.

Handoff Management – Detection and Assignments, Handoff detection, Strategies for handoff detection, Mobile controlled handoff, Network controlled handoff, Mobile assisted handoff, Handoff failure, Channel assignment, Non- prioritized scheme and Reserved channel scheme, Queuing priority scheme, Sub rating scheme, Implementation issues, Hard handoff – MCHO link transfer, MAHO/NCHO link transfer, Sub rating MCHO link transfer, Soft handoff – adding new BS, dropping a BS.

Unit – II **(10 Hrs. 20 Marks)**

GSM Overview – GSM Architecture, location tracking and call setup, Security, Data Services – HSCSD, GPRS, Unstructured supplementary service data.
GSM Network Signaling – GSM MAP service frame work, MAP protocol machine, MAP dialogue.
GSM Mobility management – GSM location update, Mobility databases, Failure restoration, VLR Identification algorithm, VLR Overflow control.

Unit – III **(10 Hrs. 20 Marks)**

GSM short message service – SMS architecture, SMS protocol hierarchy, Mobile originated messaging, Mobile terminated Messaging.
International Roaming for GSM – International GSM call setup, Reducing the International call delivery cost
GSM Operations, Administration, and Maintenance – Call recording functions, Performance Measurement and Management, Subscriber and Service data Management.
Mobile number portability – Fixed network number portability, Number portability for Mobile networks, Mobile number portability mechanism.

Unit – IV **(10 Hrs. 20 Marks)**

VoIP Service for mobile networks – GSM on the Net, iGSM wireless VoIP solution, iGSM procedures and Message flows.

General Packet Radio Services – Architecture, Network nodes, Interfaces, Procedures, Billing, Evolving from GSM to GPRS.

Unit – V **(10 Hrs. 20 Marks)**

Wireless Application Protocol – WAP Model, WAP Gateway, WAP Protocol – WDP, WTLS, WTP, WSP, WAE, Mobile station Application execution environment.

Third Generation Mobile Services – Paradigm shifts in 3G Systems, W-CDMA, cdma 2000, Improvements on core network, Quality of service in 3G, Wireless Operating System for 3G Handset.

Paging Systems – Paging Network Architecture, User Access Interface – Telocator Alphanumeric Input Protocol (TAP), Telocator Message Entry Protocol (TME), Intersystem Interface.

Wireless Local Loop – WLL Architecture, WLL technologies.

Reference Books:

1. Yi-Bing Lin and Imrich Chlamtac "Wireless and Mobile Network Architecture", Wiley Publication.
2. Kasera Sumit, Narang Nishit, "3G Networks: Architecture, Protocols and Procedures", TMH

Term Work:

1. Setting up wireless network with and without infrastructure support.
2. Configuring Access Point with bridging mode (Point to Point and Point to Multi Point).
3. Configuring Routing between wired and wireless Networks.
4. Configuring Security in wireless network with and without infrastructure support.
5. At least 3 lab assignments based on above syllabus using any network simulator such as NS2, OPNET, OMNET etc.

Concerned staff members should suitably frame the term work (at least 6) based on above syllabus. Oral will be conducted based on the above syllabus and the term work submitted in the form of journal.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING)
(w.e.f. 2008-09)

TERM – II

Elective – II
Compiler Construction

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25
Oral: 25

Unit – I **(10 Hrs. 20 Marks)**

Introduction to Compiling: System software's introduction: Assembler, Loader, Linker. The phases of compiler, preprocessors, overview of simple one pass compiler.

Lexical Analysis: Role of lexical analyzer, input buffering, token specification, token recognition, language for lexical analysis specification, Finite Automata, NFA to DFA, RE to NFA, RE to DFA, state minimization of DFA. LEX tools

Unit – II **(10 Hrs. 20 Marks)**

Syntax Analysis: The role of the parser, context free grammar, ambiguity in grammar and it's elimination, Top down parsing: recursive descent, predictive, LL(1) parsers. Construction of predictive parsing tables, FIRST and FOLLOW, LL(1) grammar, Error recovery in Predictive parsing . Bottom up parsing: Handle pruning, stack implementation and conflicts of shift reduce parsing, LR parsers: LR parsing algorithm, constructing SLR, canonical LR, LALR parsing tables. Error recovery in LR parsing, YACC tools.

Unit – III **(10 Hrs. 20 Marks)**

Syntax Directed Translation: Syntax directed definition, inherited attributes, construction of syntax tree, directed acyclic graphs for expressions, Bottom up evaluation of S-attributed definitions, L-attributed definitions, top down translation, bottom up evaluation of inherited attributes.

Intermediate Code Generation: Intermediate language, various intermediate forms, TAC, syntax directed translation into TAC, Declaration, Assignment statements, Boolean expressions, case statements, Back patching, Procedure calls.

Unit – IV **(10 Hrs. 20 Marks)**

Code generation: Design issues of code generation, the target machine, run time storage management, basic blocks and flow graphs, a simple code generator, the DAG representation of basic blocks, Peephole optimization, Generating code for DAGs.

Code Optimization: Criteria for code improving transformation, code optimization sources: Local and global common sub-expression elimination, dead code elimination, Induction variable reduction, loop invariant computation, Optimization of basic blocks, loops in flow graph, reducible flow graph, code improving transformations.

Unit – V **(10 Hrs. 20 Marks)**

Run time environments: activation trees, control stacks, storage organization, subdivision of run time memory, activation records, storage allocation strategies: static allocation, stack allocation, heap allocation, symbol table management: hash tables, dynamic storage allocation techniques, explicit allocation of fixed size and variable size blocks.

Reference Books:

1. Aho, Sethi, Ulman, “Compilers Principles, Techniques and Tools”, Addision Wesley
2. Dhamdhere, “Compiler Construction- Principles and Practices”, MacMillan India.
3. Andrew Appel, “Modern Compiler Implementation in C”, Cambridge University Press
4. J.P.Bennett, “Introduction to Compiling Techniques”, TMH
5. Holub A.J., “Complier Design In ‘C’”, Prentice Hall

Term Work:

1. Study of LEX and YACC.
2. Calculator (text or graphics) using LEX and YACC.
3. Lexical analyzer for a subset of a C using LEX.
4. Design of a Predictive parser.
5. Implementation of code generator
6. Implementation of code optimization for
   Common sub-expression elimination, Loop invariant code movement.

Any 5 laboratory assignments should be framed by concern staff member based on above list.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING/IT)
(w.e.f. 2008-09)

TERM – II

Data Warehousing and Mining

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25

Oral: 25

Unit – I **(10 Hrs. 20 Marks)**

Evolution of database technology, What is data mining?, Data Mining Applications, Steps in Knowledge Discovery, Architecture of typical data mining System, Data mining- On What kind of data, Data mining Functionalities, Classification of data mining systems, Major Issues in Data Mining.

What is Data Warehouse? Difference between Operational Database systems and Data Warehouse (OLTP and OLAP), Why Separate Data Warehouse?
A Multidimensional Data Model, Schemas for Multidimensional Databases: Stars, Snowflakes, and Fact Constellations. Measures, Concept Hierarchies, OLAP Operations in the Multidimensional Data Model.

Unit – II **(10 Hrs. 20 Marks)**

Data Warehouse Architecture, Process of Data Warehouse design, A Three tier Data Warehouse Architecture., Types Of OLAP servers.
Data Preprocessing: Why Preprocess Data? Data Cleaning Techniques, Data Integration and Transformation, Data Reduction Techniques, Discretization and Concept Hierarchy Generation for numeric and categorical data.
Data mining Primitives, A Data Mining Query Language.

Unit – III **(10 Hrs. 20 Marks)**

Concept Description: What is Concept Description? Data Generalization and Summarization-Based Characterization, Attribute Oriented Induction, Analytical Characterization: Attribute Relevance Analysis, Methods, Mining Descriptive Statistical Measures in Large Databases.
Mining Association Rules: Association Rule Mining, Market Basket Analysis, Association Rule classification, Mining Single-Dimensional Boolean Association Rules from Transactional Databases, The Apriori Algorithm, Mining Multilevel Association Rules, Constraint-Based Association Mining.

Unit – IV **(10 Hrs. 20 Marks)**

Classification and Prediction: What is Classification and Prediction? Data Classification Process, Issues Regarding Classification and Prediction., Classification by Decision Tree Induction, Bayesian Classification, , Classification by Back propagation, A Multilayer Feed Forward Neural Network, Classification Based on Association Rule Mining, Other Classification Methods
Cluster Analysis: What is Cluster Analysis? Types of Data in Cluster Analysis, A Categorization of Clustering Methods, Partitioning Methods, Hierarchical Methods, Density Based Methods, Grid Based Methods, Model Based Clustering Methods.

Unit – V **(10 Hrs. 20 Marks)**

Cluster Analysis: What is Cluster Analysis? Types of Data in Cluster Analysis, A Categorization of Clustering Methods, Partitioning Methods, Hierarchical Methods, Density Based Methods, Grid Based Methods, Model Based Clustering Methods
Mining Complex Types Of Data: Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Mining Multimedia Databases, Mining Text Databases, Mining the World Wide Web.

Reference Books:

1. Han and Kamber, “Data Mining: Concepts and Techniques”, Morgan Kaufmann Publishers
2. Alex and Berson, “Data warehousing, Data Mining and OLAP”, TATA McGraw Hill

Term Work:

1. Develop a application to construct a multidimensional data model (Star, Snowflake or Fact constellations)
2. Develop a application to perform OLAP operations.
3. Develop a application to implement data preprocessing techniques.
4. Develop a application to implement data integration techniques.
5. Develop a application to implement data generalization and summarization techniques
6. Develop a application to extract association mining rules.
7. Develop a application for classification of data.
8. Develop a application for implementing one of the clustering technique.
9. Study of commercial data mining tools.

Any 6 laboratory assignments should be framed by concern staff member based on above list.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING / IT)
(w.e.f. 2008-09)

TERM – II

Software Metrics and Quality Assurance

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25
Oral: 25

Unit – I **(10 Hrs. 20 Marks)**

Software Measurements: Measurement in Software Engineering, Scope of Software Matrices, The representational theory of measurements, Measurement and Models, Measurements Scales and scale types, Meaningfulness in measurement, Classifying software measures, Applying the framework, Software measurement validation.

Unit – II **(10 Hrs. 20 Marks)**

Measuring internal product attributes: Size- Aspects of software size, Length, Reuse, Functionality, Complexity.

Measuring internal product attributes: Structure- Types of structural measures, Control-flow structure, Modularity and information flow attributes, Data structure, Difficulties with general "complexity" measures.

Measuring internal product attributes: Modeling software quality, Measuring aspects of quality.

Unit – III **(10 Hrs. 20 Marks)**

Software Reliability: Basics of reliability theory, software reliability problem, parametric reliability growth models, predictive accuracy, importance of operational environment.

Good estimates, cost estimation: problems and approaches, models of effort and cost, problem with existing modeling methods, dealing with problems of current estimation methods, implication for process predictions.

Unit – IV **(10 Hrs. 20 Marks)**

Software documentation, Standards, Practices, Conventions and metrics, The software inspection process, The walkthrough process, Audit process, Document verification, The ISO 9000 Quality Standards, Comparison of the ISO 9000 model with SEI's CMM.

Unit – V **(10 Hrs. 20 Marks)**

Cleanroom Software Engineering: The cleanroom approach, Functional Specification, Cleanroom design, Cleanroom testing.

Reengineering: Business process reengineering, Software reengineering, Reverse reengineering, Reconstructing, Forward engineering, The economics of reengineering.

Reference Books:

1. Flanton, Pfleeger, "Software Metrics- A Rigorous and Practical Approach", Thompson Learning
2. Mordechai Ben-menachem/Garry S.Marliss, "Software Quality", Thompson Learning
3. Roger S. Pressman, "Software Engineering- A Practitioner's Approach", TMH
4. Swapna Kishore and Rajesh Naik, "ISO 9001:2000 for Software Organizations", TMH

Term Work:

Concerned staff members should suitably frame the term work at least 5 assignments based on above

syllabus.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING)
(w.e.f. 2008-09)
TERM – II

Advanced Computer Architecture

Teaching Scheme:
Lectures: 4 Hrs./ Week
Practical: 2 Hrs./ Week

Examination Scheme:
Theory Paper: 100 Marks (03 Hrs.)
Term Work: 25

Unit – I **(10 Hrs. 20 Marks)**

Introduction to Parallel Processing: Evolution of computer Systems, Parallelism in uni-processor Systems, Parallel Computer Structure, Architectural Classification Schemes, Clock rate and CPI, performance factors, system Attributes MIPS rate ,Throughput rate, Implicit parallelism, Explicit parallelism, Parallel processing applications.
Program and Network Properties: Condition of Parallelism, Program partitioning and Scheduling, Program flow mechanism, system Interconnect architectures.

Unit – II **(10 Hrs. 20 Marks)**

Processor and Memory Hierarchy: Design space of processors, Instruction set architectures, CISC scalar processors, RISC scalar Processors, Super scalar and Vector Processors.
Inclusion, coherence and Locality, memory capacity planning. Bus, cache and shared memory.
Back, plane Bus System: Back plane bus specification, addressing and timing protocol, Arbitration and Interrupt, shared memory organization: Interleaved memory organization, Bandwidth and fault tolerance, memory allocation schemes.
Principles of Pipelining: Principles of Linear pipelining, classification of pipeline processor, General pipelines and Reservation tables.

Unit – III **(10 Hrs. 20 Marks)**

Pipelining and Super scalar Techniques: Linear pipeline processors, nonlinear pipeline processors, Instruction pipeline design, Arithmetic pipeline design, Super scalar and Super pipeline design.
Array Processors: SIMD Array processors: SIMD Computer Organization, Masking and data Routing Mechanism, Inter-PE Communications SIMD Interconnection networks.
Parallel Algorithms for array processor: SIMD Matrix Multiplication, Parallel sorting.
Associated array processing: Associative search Algorithms.

Unit – IV **(10 Hrs. 20 Marks)**

Multiprocessor Architecture: Loosely Coupled Multiprocessors, Tightly Coupled multiprocessors, Processor characteristics for multiprocessing.
Parallel Algorithms for Multiprocessing: Classification of parallel Algorithms, Synchronized and Asynchronous parallel Algorithms, Multiprocessor OS.
Vector Processing: Vector processing principles , vector access memory schemes, characteristics of vector processing.

Unit – V **(10 Hrs. 20 Marks)**

Data Flow Computers: Data driven computing and languages, data flow computer architectures.
Principles of Multithreading: Issues and solution, multiple context processor, Multidimensional Architectures, Multithreading.
Parallel Programming Modules: Shared-variable model, message- passing model, data- parallel model, object- oriented model, Functional and logic models.
Parallel languages: languages features for parallelism, parallel language construction.

Reference Books:

1. Kai Hwang, "Advance Computer Architecture, Parallelism, Scalability, Programmability", Mc-Graw Hill Publication
2. Kai Hwang and Faye A Briggs, "Computer Architecture and Parallel Processing"

Term Work:

Any five lab assignments should be framed by concern staff member based on above syllabus.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

BE (COMPUTER ENGINEERING)
(w.e.f. 2008-09)

TERM – II

Industrial Visit / Case Study

Teaching Scheme:

Examination Scheme:
Term Work: 25

EDUCATION TOUR / TECHNICAL VISITS / CASE STUDY AND ITS EVALUATION

1. During (B.E. First Term / Second Term) seventh and / or eighth terms or during vacation between (B.E. First Term / Second Term) seventh and eighth terms, every student; shall visit minimum two industries, factories arranged by colleges and accompanied by teachers. There shall be at least one teacher for a group of 20 students and at least one non-teaching staff accompanied with the students.

2. The colleges should obtain appropriate certificates of visit from the concerned organizations just after the visits.

3. Students should submit written report about the visits individually at the end of (B.E. Second Term) eighth term.

4. The report should contain information about the following points:

   (a) The organization - activities of organization and administrative setup technical personnel and their main duties.
   (b) The project / industry brief description with sketches and salient technical information.
   (c) The work / processes observed with specification of materials, products, equipments etc. and role of engineers in that organization.
   (d) Suggestions (if any) for improvement in the working of those organizations.

5. The evaluation of the report of technical visits will be made by panel of two teachers appointed by principal based on following points:

   (a) Coverage aspect: All above points should be covered.
   (b) Detailed observations: System / Process / Product explained with data, diagram specifications.
   (c) Quality of presentation: Report should be very objective and should consist of clear

and systematic organization of topics and information.

(d) Viva - voce: A viva -voce shall be conducted on the technical visit report by the teachers to assess the specific knowledge gained by the students for technical applications.

6. The case study should include the study problem in Computer Engineering branch.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

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TERM – II

Project - II

Teaching Scheme:
Practical: 6 Hrs./ Week

Examination Scheme:
Term Work: 100
Oral: 50

1. The Project group in (B.E. first Term) seventh term will continue the project work in (B.E. Second Term) eighth term and complete project.
2. The group should maintain a logbook of activities. It should have entries related to the work done, problems faced, solution evolved etc., duly signed by guide.
3. The guides should regularly monitor the progress of the project work.
4. The project work along with project report should be submitted as part of term work in (B.E. Second Term) eighth term on or before the last day of the (B.E. Second Term) eighth term.
5. Project report must be submitted in the prescribed format only. No variation in the format will be accepted.
6. Assessment of the project for award of TW marks shall be done by the guide and a departmental committee (consisting of minimum two teachers with experience more than three years) as per the guidelines given in the following table.

B) ASSESSMENT OF PROJECT II TERMWORK (B.E. SECOND TERM)

NAME OF THE PROJECT: _____
NAME OF THE GUIDE: _____

Sr. No	Exam. Seat No	Name Of Students	Assessment by guide (70%)						Assessment by department (30%)			Grand Total
			Fabrication /software / actual work	Execution of project	Project report	Scope/ Cost / Utility	Attende-nece	Total	Evaluation (10%)	Prese-ntaion (20%)	Total	
		Marks	20	10	20	10	10	70	10	20	30	100

Sign of Guide Sign. of Committee Members Sign. of H. O. D.

7. The guide should be internal examiner for oral examination (If experience is greater than three years).
8. The external examiner should be from the related area of the concerned project. He should have minimum of five years of experience at degree level / industry.
9. The evaluation at final oral examination should be done jointly by the internal and external examiners.
10. The Project work should be kept in department for one academic year after University Examination.