Dr . BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,

AURANGABAD

PROPOSED

SCHEME AND DETAILED SYLLABUS

of

Final Year Engineering of Computer Science & Engineering BE(CSE)

of

FOUR YEAR DEGREE COURSE IN ENGINEERING

With Effect from Academic Year 2014-2015

Faculty of Engineering and Technology
Board of Studies in Computer Science and Engineering
Curriculum structure of B.E(Computer Science and Engineering)

PART-I

Sub Code	Semester-I	Contact Hrs/Week				Examination Scheme					
	Subject	L	T	P	Total	CT	TH	TW	PR	Total	Duration of The Theory Examination
CSE401	Data Warehousing & Data Mining	4	--	--	4	20	80	--	--	100	**3 Hrs**
CSE402	Parallel & Distributed Computing	4	--	--	4	20	80	--	--	100	**3 Hrs**
CSE403	Principles of Compiler Design	4	--	--	4	20	80	--	--	100	**3 Hrs**
CSE404	Visual Modeling	4	--	--	4	20	80	--	--	100	**3 Hrs**
	Elective – I	4	--	--	4	20	80	--	--	100	**3 Hrs**
CSE421	LAB-I Data Warehousing & Data Mining	--	--	2	2	--	--	--	50	50	
CSE422	LAB-II Principles of Compiler Design	--	--	2	2	--	--	--	50	50	
CSE423	LAB-III Visual Modeling	--	--	2	2	--	--	--	50	50	
CSE424	LAB-IV Elective - I	--	--	2	2	--	--	50	--	50	
CSE425	Project Part-I	--	--	2	2	--	--	25	--	25	
CSE426	Seminar							25	--	25	
	Total	**20**	**--**	**10**	**30**	**100**	**400**	**100**	**150**	**750**	

Elective –I :

Code	Subject
CSE441	Cloud Computing
CSE442	Artificial Intelligence
CSE443	Multicore Computing
CSE444	Open Elective

Dr. U.B. Shinde
Dean, Faculty of Engineering and Technology
Dr.BAMU.

Dr Vijaya B. Musande
Chairman, Board of Studies
Computer Science & Engineering, Dr.BAMU.

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PART – II

Sub Code	Semester-II	Contact Hrs/Week				Examination Scheme					
	Subject	L	T	P	Total	CT	TH	TW	PR	Total	Duration of The Theory Examination
CSE451	Computer System Security and Laws	4	--	--	4	20	80	--	--	100	**3 Hrs**
CSE452	Mobile Computing	4	--	--	4	20	80	--	--	100	**3 Hrs**
CSE453	Soft Computing	4	--	--	4	20	80	--	--	100	**3 Hrs**
	Elective –II	4	--	--	4	20	80	--	--	100	**3 Hrs**
CSE471	LAB-V Computer System Security and Laws	--	--	2	2	--	--	--	50	50	
CSE472	LAB-VI Mobile Computing	--	--	2	2	--	--	--	50	50	
CSE473	LAB-VII Soft Computing	--	--	2	2	--	--	--	50	50	
CSE474	LAB-VIII Elective – II	--	--	2	2	--	--	50	--	50	
CSE375	Project Part – II	--	--	6	6	--	--	50	100	150	
	Total	**16**	**--**	**14**	**30**	**80**	**320**	**100**	**250**	**750**	
	Total of Semester I & II	**36**	**--**	**24**	**60**	**180**	**720**	**250**	**400**	**1500**	

Elective –II :

Code	Subject
CSE491	Remote Sensing & Geographical Information System
CSE492	Green IT
CSE493	Agile Methodology
CSE494	Open Elective

L:Lecture hours per week **T**:Tutorial hours per week **P**:Practical hours per week

CT: Class Test **TH**:University Theory Examination **TW**: Term Work

PR: Practical/Oral Examination

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Final Year Engineering (CSE/IT)
Semester – I

Course Code : CSE401 **Title : Data Warehousing and Data mining (DWDM)**

Teaching Scheme
Theory: 04 Hours/Week

Examination Scheme
Class Test: 20 Marks
Theory Examination (Marks) : 80 Marks
Theory Examination (Duration) :03 Hours

Prerequisite:
Data Base Management System, Discrete Mathematics

Objectives:

- To understand data warehouse
- To understand and implement multidimensional model
- To identify the problems, and apply mining algorithms
- To describe the business intelligence (BI) methodology and concepts

CONTENTS

SECTION-A

Unit 1: **(7 Hrs)**

Introduction to Decision Support System, Data Warehousing and Online Analytical Processing, Data Warehouse: Basic Concepts , Data Warehouse Modeling: Data Cube and OLAP, Data Warehouse Design and Usage, Data Warehouse Implementation.

Unit 2: **(5Hrs)**

Introduction to Data Mining, Integration of Data Mining system with a Database or a Data Warehouse System, Major issues in Data Mining, Applications and Trends in Data Mining .

Unit 3: **(8 Hrs)**

Know your Data **-** Data objects and Attribute Types, Basic Statistical Descriptions of Data, Measuring Data Similarity and Dissimilarity , Data Preprocessing – An Overview.

SECTION-B

Unit 4: **(5 Hrs)**

Mining Frequent Patterns : Mining Frequent Patterns, Associations: Basic Concepts, Apriori Algorithm, association rules from frequent item sets. Cluster Analysis : Types of data in cluster

analysis, classical Partitioning methods : k-Means and k-Medoids.

Unit 5: (8 Hrs)

Introduction to Classification and Prediction, Classification by Decision tree Induction, Bayesian classification, Rule based classification, Prediction: Linear Regression, non-linear regression

Unit 6: (7Hrs)

Introduction to Business Intelligence, Changing Business Environments and Computerized Decision Support , The Business Pressures-Responses- Support Model , A Framework for Business Intelligence (BI) , Intelligence Creation and Use and BI Governance , Transaction Processing versus Analytic Processing , Successful BI Implementation , Major Tools and Techniques of Business Intelligence

Text Books:

1. Jiawei Han and Micheline Kamber, Data Mining: Concepts and Techniques, Third Edition, Elsevier Publication
2. Paulraj Ponniah, Data Warehousing :Fundamentals for IT Professionals, Wiley Publication

Reference Books:

1. C.S.R.Prabhu :Data Warehousing Concepts,Techniques,Products and Applications, Prentice Hallof India.
2. Alex Berson,Stephan J.Smith **:**Data Warehousing ,Data Mining and OLAP, Tata McGraw Hill Edition.
3. Ivan Bayross: SQL, PLSQL:The Programming Language of ORACLE, BPB Publication.
4. Business Intelligence : A Managerial Approach (2nd Ed.) Turban, Sharda, Delen, King , Wiley Publication.

PATTERN OF QUESTION PAPER:

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For 80 marks Paper:

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Final Year Engineering (CSE)
Semester – I

Course Code: CSE402 **Title: Parallel and Distributed Computing (PDC)**

Teaching Scheme:
Theory: 4 Hours/Week

Examination Scheme
Class Test: 20 Marks
Theory Examination (Marks): 80 Marks
Theory Examination (Duration):03 Hrs

Prerequisite:
Fundamentals of Operating System.

Objectives:

- To train the students with the concepts of Parallel Computing because of the need in the availability of growing number of cores on a chip.
- To provide the concept of massive -core GPUs and parallel programming.
- To understand the basic concepts of Distributed Computing.
- To introduce students to one distributed programming framework.

CONTENTS

SECTION-A: Parallel Computing

Unit 1: **(6 Hrs)**

Introduction to Parallel Computing, Scope and applications of Parallel Computing, Parallel Computing Platforms - Implicit Parallelism, limitations of Memory System Performance, Physical organization of Parallel platforms, Communication costs in parallel machines

Introduction to Message Passing Paradigm, Message Passing Interface

Unit 2: **(7 Hrs)**

Principles of Parallel Algorithm Design, Granularity, Concurrency and Task interaction, Recursive Decomposition, Data Decomposition, Parallel Algorithm Models --The Data Parallel Model, The Task Graph Model, The Master-Slave Model

Programming Shared Address Space Platforms- Threads, Why threads, The POSIX Thread API, Thread creation-termination, Synchronization primitives in Pthreads--Mutual Exclusion for shared variables

OpenMP standard for Parallel Programming: Basics, specifying concurrent tasks in OpenMP, Use of various Directives

Unit 3: **(7 Hrs)**

CUDA (Compute Unified Device Architecture) Architecture: Introduction to CUDA GPU (Graphics Processing Unit) architecture, Terms- Grid, Block, Threads. CUDA memory types, CUDA C program structure, CUDA thread organization, Matrix multiplication using multiple blocks Simple programs of merging and sorting

SECTION-B: Distributed Computing

Unit 4 **(7 Hrs)**

Theoretical Foundation for Distributed System: Limitation of Distributed system, Differences between Distributed systems and Parallel systems, Models of distributed computation- Interleaving Model, Happened before Model, Potential Causality Model, Shared memory

Temporal ordering of events, Logical clocks and Vector Clocks (Definition and algorithm)

Mutual Exclusion using Time stamps, Lamport's Algorithm for Mutual exclusion.

Unit 5 **(7 Hrs)**

Distributed Shared Memory (DSM): General architecture of DSM systems, Design and implementation of DSM, Granularity, structure of shared memory space, consistency models, Replacement Strategy, Thrashing, approaches to DSM, and Advantages of DSM

Distributed Objects and Remote Invocation: Communication between distributed objects, Remote procedure call, Events and notifications, Java RMI case study

Unit 6 **(6 Hrs)**

Case study- Hadoop - A distributed programming framework, Building blocks of Hadoop, Setting up SSH for Hadoop cluster, Running Hadoop, Working with Files in HDFS, Anatomy of MapReduce program, Writing basic MapReduce programs

Text Books:

1. Ananth Grama, Anshal Gupta, Greoge Karypis, Vipin Kumar, "Introduction to Parallel Computing", Second Edition, (Pearson Publication)
2. David B. Kirk and Wen-mei W. Hwu, “Programming Massively Parallel Processors - A Hands-on Approach”, Second Edition (MK - Morgan Kaufmann Publication)
3. Vijay K. Garg, "Elements of Distributed Computing" (Wiley Publication)
4. Pradeep K Sinha “Distributed Operating Systems : Concepts and design” , Addison Wesely, 2003

Reference Books:

1. Chuck Lam, "Hadoop in Action" (dreamtech Press)

2. **A.D. Kshemkalyani, M. Singhal, "** Distributed Computing: Principles, Algorithms, and Systems", Cambridge University Press.

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Semester – I

Course Code: CSE403 **Title: Principles of Compiler Design (PCD)**

Teaching Scheme
Theory: 4 Hours/Week

Examination Scheme
Class Test: 20 Marks
Theory Examination (Marks):80 Marks
Theory Examination (Duration):03 Hours

Prerequisite:

- Knowledge of Data structures, Discrete Mathematics and Algorithms.
- Basic Knowledge of Theory of Computation.
- Programming skill in any Programming language like C.

Objectives:

- To get working knowledge of the major phases of compilation, like lexical analysis, parsing, semantic analysis and code generation.
- To use the formal attributed grammars for specifying the syntax and semantics of programming languages.
- To learn and use tools for compiler construction.
- To understand the structure of a compiler, and how the source and target languages influence various choices in the design.

CONTENTS

SECTION-A

Unit 1: Introduction to Compilers **(6 Hrs)**

Compilers & translators, the structure of compilers, Bootstrapping, Compiler construction tools, Programming language basics.

Unit 2: **Lexical Analysis** **(6 Hrs)**

Role of a lexical analyzer, Input buffering, Specification of tokens, Recognition of tokens, Finite automata, Design of a lexical analyzer generator.

Unit 3: Syntax Analysis **(8 Hrs)**

Role of Parser, shift reduce parsing, top down parsing, Predictive parsing – Computation of FIRST & FOLLOW functions and construction of parsing table, LR parsers, the canonical collection of LR (O) items, LALR parser, Automatic parser Generator YACC, YACC programs, Error detection and correction with YACC.

SECTION-B

Unit 4: Intermediate-Code Generation (6 Hrs)

Intermediate code: Postfix notations, parser trees and syntax trees, three address codes – Quadruples and triples, indirect triples.

Unit 5: Syntax Directed Translation (6 Hrs)

Syntax-Directed Definitions, Construction of Syntax Trees, Bottom-Up Evaluation of S-Attributed Definitions, L-Attributed Definitions, Top Down Translation, Bottom-Up Evaluation of Inherited Attributes, Type Checking: Type Systems, Specification of a Simple Type Checker, Equivalence of Type Expressions, Type Conversions.

Unit 6: Code Optimization and Code Generation (8 Hrs)

Principal sources of optimization, loop optimization - Basic blocks, flow graphs, loops, code motion, induction variables , DAG representation of basic blocks, Application of DAGs, Global Data Flow Analysis, Data Flow equations. Loop unrolling, loop jamming, constant folding, Object programs: the environment of code, generator, run-time addresses for names, Problems in code generation, A machine model, working of a simple code generator in brief, Register allocation and assignments, Peephole optimization.

Text Books:

1. A V Aho, R. Sethi, J D Ullman, "Compilers: Principles, Techniques, and Tools", Pearson Education

2. D. M. Dhamdhere, "Compiler Construction – Principles & practices"

Reference Books:

1. A.V. Aho, J.D. Ullman , "Principles of Compiler Design" – (NAROSA)
2. V Raghavan ,"Principles of Compiler Design"-TMH Publications

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Final Year Engineering (CSE)
Semester – I

Course Code: CSE404 **Title: Visual Modeling (VM)**

Teaching Scheme
Theory: 04 Hours/Week

Examination Scheme
Class Test: 20 Marks
Theory Examination (Marks): 80 Marks
Theory Examination (Duration):03 Hours

Prerequisite:

- Students should have prior knowledge of software engineering.
- Students should have idea of software development life cycle.
- Students should have knowledge of object oriented concepts.

Objectives:

- To design a software project using Object Oriented Modeling
- To design a software project using Design Patterns
- To design an Object- Oriented Software

CONTENTS

SECTION-A: Object Oriented Modeling

Unit 1: Introduction **(6 hrs)**

Complexity of Software, Algorithmic and Object-Oriented Decomposition, Software Modeling : Object-Oriented Methods and the Unified Modeling Language, Software Architectural Design : Method and Notation , UML as a Standard , Multiple Views of Software Architecture , Evolution of Software Modeling and Design Methods , Evolution of Object-Oriented Analysis and Design Methods , Survey of Concurrent, Distributed, and Real-Time Design Methods

Unit 2: UML Modeling **(8 hrs)**

Functional Modeling: Basics of Use Cases System, Actors: Finding actors, actors in UML, Relationship between actors , Use case: Finding use cases, use cases in UML, Relationship between use cases, Use Case Description : Types of use cases, elements of use case Description, Guidelines for Creating Use cases descriptions, Organizing use cases, describing use cases, realizing use cases and Use case Diagrams.
Structural Modeling: Structural Models: Classes, attributes, operations, Relationship Class Responsibility Collaboration (CRC Cards) , Class Diagram: Elements of Class Diagram

Unit 3: Behavioral Modeling: **(6 hrs)**

Behavioral Models, Interaction Diagrams: Objects, operations and messages, Sequence diagram, Communication diagram.

Activity Diagram: elements of activity diagram, guidelines for creating Activity diagram, Component diagram, deployment diagram

NOTE: Case Study for Unit 2 & 3:

- ATM System
- Courseware Management System
- Library Management System

SECTION-B: Design Patterns

Unit 4: Introduction to Design Patterns (8 hrs)

Introduction to Design Pattern, The Catalog of Design Patterns, Organizing the Catalog , Creational Design Pattern , Intent, applicability, structure, collaborations, consequence, implementations : Abstract Factory, Prototype, Singleton.

Unit 5: Structural Design Patterns (6 hrs)

Intent, applicability, structure, collaborations, consequence, implementations: Adapter, Decorator, Proxy

Unit 6: Behavioral Design Patterns (6 hrs)

Intent, applicability, structure, collaborations, consequence, implementations: Command, Observer, strategy

NOTE: Case Study for Unit 4, 5 and 6:

- Document Editor

Text Books:

1. Object-Oriented Analysis and Design by Grady Booch, 2nd Edition , Addison Wesley
2. Alan Dennis, Barbara Haley Wixom,David Tegarden ,"System Analysis and Design with UML 2.0 " Wiley India Edition.
3. Software Modeling and Design UML, Use Cases, Patterns, and Software Architectures by Hassan Gomaa.
4. Design Patterns (ISBN: 81-7808-135-0) by Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides (Pearson Education Inc.) (Gang-of Four)

Reference Books:

1. Software Architecture Design – Methodology and Styles ISBN: 1-58874-621-6 Stipes Publishing L.L.C. by Lixin Tao, Xiang Fu and Kai Qian
2. Pattern Oriented Software Architecture (ISBN: 9971-51-421-4) by Frank Bushmann
3. Hank-Erik Eriksson, Magnus Penkar, Brian Lyons, David Fado," UML 2 Tool Kit" OMG Press

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Final Year Engineering (CSE)
Semester – I

Course Code: CSE441 **Title: Elective – I Cloud Computing**

Teaching Scheme
Theory: -- 4hrs/week

Examination Scheme
Class Test: 20 Marks
Theory Examination(Marks):80Marks
Theory Examination (Duration) :03 Hours

Prerequisite:
Computer Network

Objectives:

- To learn and understand Cloud Technologies
- To design, develop and deploy Cloud applications
- To get acquainted with the challenges and security aspects of Cloud Computing.
- To study Mobile Cloud Applications

CONTENTS

SECTION-A

Unit 1: Evolution of Model Computing **(06 Hrs)**

Introduction to Mainframe architecture, Client-server architecture, Cluster Computing, Grid Computing, Parallel Computing and Distributed Computing, Evolution of sharing on the Internet, Introduction of Cloud Computing: Definition of cloud, Cloud Deployment Models, Cloud Service Models, Key Characteristics, Benefits and Risks in Cloud Computing, Service oriented architecture (SOA) and Cloud Computing Reference Architecture by IBM

Unit 2: Services Delivered from the Cloud **(08 Hrs)**

Model architecture, Benefits and Drawbacks: Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), Software-as-a-Service (SaaS), Business-Process-as-a-service (BPaaS), Identity-as-a-service (IDaaS), Communication-as-a-service (CaaS), Monitoring-as-a-service (MaaS), Storage as a service: Traditional storage versus storage cloud, Cloud Service providers: Infrastructure as service: Amazon EC2, Platform as Service: Google App Engine, Force.com.

Unit 3: Cloud Technologies **(06 Hrs)**

Web services: SOAP and REST, SOAP VS REST, Virtualization: Introduction to virtualization, Types of Virtualization, Pros and cons of virtualization, Virtualization applications in enterprises: Server virtualization, Desktop and Application Virtualization, Storage and Network Virtualization.

SECTION-B

Unit 4: Big Data and Analytics (08 Hrs)

Big Data, Challenges in Big Data, Hadoop: Definition, Architechture, Cloud file systems: GFS and HDFS, BigTable, HBase and Dynamo, MapReduce and extensions: Parallel computing, The MapReduce model: Parallel efficiency of MapReduce , Relational operations using MapReduce, Projects in Hadoop: Hive, HBase, Pig, Oozie, Flume, Sqoop

Unit 5: Security in the Cloud (06 Hrs)

Security, Cloud Security Challenges, Infrastructure Security: Network, Host and Application level, Data security and Storage, Security Management in the cloud, Data Privacy, Life cycle of Data, Key Privacy concerns in cloud and Disaster Recovery.

Unit 6: Using Mobile Cloud (06 Hrs)

Adopting mobile cloud applications, Feature phones and the cloud, Using Smartphones with the Cloud: Android, Apple iPhone, Research In Motion BlackBerry, Symbian, Windows Mobile, Working with Mobile Web Services: Mobile interoperability, Performing Service Discovery: Context-aware services, MEMS, Location awareness, Push services, Defining WAP and Other Protocols.

Text Books:

1. Enterprise Cloud Computing: Technology, Architecture, Applications by Gautam Shroff, Cambridge University Press.
2. Cloud Computing Implementation, Management, and Security By John W. Rittinghouse , James F. Ransome , CRC Press.
3. IBM smart storage cloud Red paper by Larry Coyne Mark Bagley Gaurav Chhaunker
4. Cloud Security and Privacy Tim Mather, Subra Kumaraswamy, Shahed Latif

Reference Books:

1. Cloud computing Bible by Barrie Sosinsky, Wiley India Pvt Ltd (2011)
2. Mastering Cloud Computing Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi

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Final Year Engineering (CSE)
Semester – I

Course Code: CSE442 **Title: Elective – I Artificial Intelligence(AI)**

Teaching Scheme
Theory: 4 Hours/week

Examination Scheme
Class Test: 20 Marks
Theory Examination (Marks): 80 Marks
Theory Examination (Duration): 03 Hours

Prerequisites:

Discrete Mathematics, Basic Probability theory and statistics, Knowledge of any programming language and data structures

Objectives

- Introduction to the basic principles and applications of Artificial Intelligence.
- Understanding the basic areas of Artificial Intelligence such as problem solving, knowledge representation, reasoning, planning, perception, vision and learning.
- To understand the key components of intelligent agents.
- To design and implement expert systems of moderate complexity in appropriate Language and evaluate their performance

CONTENTS

SECTION-A

Unit 1: Introduction (6 Hrs)

Introduction to AI, Foundation of AI, History, AI Techniques, AI Problems, Production systems, Problem characteristics, AI Intelligent Agents, AI Application (E-Commerce & Medicine), Issues in design of search algorithms, Future scope of AI.

Unit 2: Heuristic Search Techniques (8 Hrs)

Heuristic search, Hill Climbing, Best firth search, Problem, Reduction, mean and end analysis, Constraint Satisfaction, A* and AO* Algorithm, Knowledge Representation: Basic Concepts, Knowledge representation Paradigms, Propositional Logic, Inference Rules in Propositional Logic, , Knowledge representation using Predicate logic, Predicate calculus, Predicate and arguments, ISA hierarchy, Frame notation, Resolution, Natural Deduction.

Unit 3: Logic Programming (6 Hrs)

Introduction, Logic Programming, Forward and backward reasoning, Forward and backward chaining rules, Knowledge representation using non monotonic logic: TMS (Truth Maintenance system), Matching, Control, fuzzy logic, semantic net, frames, Script, Conceptual dependency.

SECTION-B

Unit 4: Planning (6 Hrs)

Overview, An example domain: The blocks world, component of planning system, goal stack planning, non linear planning using constraint pasting, hierarchical planning, Reactive system

Unit 5 : Advanced AI (6 Hrs)

Game playing: Min max search procedure, Alpha-Beta cutoffs, Natural Language Processing**:** Introduction, syntactic processing, semantic analysis, Discourse & pragmatic processing,

Unit 6: Learning & Expert systems (8 Hrs)

Introduction to learning, Rote learning, learning by taking advice, learning in problem solving, learning from examples: Induction, explanation based learning , Representing and using Domain knowledge, Architecture of expert systems, knowledge acquisition.

Text Books:

1. Elaine rich and Kevin Knight, Shivshankar Nair, "Artificial Intelligence", 3rd Edition, Tata McGraw-Hill, ISBN-10-0070087709, ISBN-13-9780070087705
2. Stuart Russell, Peter Norvig, "Artificial Intelligence-A Modern Approach", 2nd Edition, Pearson Education / Prentice Hall of India, ISBN:01379023952

Reference Books:

1.Eugene Charniak, Drew McDermott, "Introduction to Artificial Intelligence",1. Pearson Education, ISBN 81-7808-033-8

2.Ivan Bratco, "PROLONG: Programming for Artificial Intelligence", Pearson Education, 3rd edition, ISBN 10:0-201-40375-7

3. Saroj Kaushik, "Artificial Intelligence", Cengage learning, ISBN-13:9788131510995
4. Dan W. Patterson, "Introduction to Artificial Intelligence and Expert Systems", Prentice Hall of India, ISBN: 81-203-0777-1
5. Rjschat-Koft "Artificial Intelligence & Engineering Approach ", Tata Mc-Graw Hill

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Final Year Engineering (CSE)
Semester – I

Course Code: CSE443 **Title: Elective-I Multicore Computing**

Teaching Scheme
Theory: 4 Hours/Week

Examination Scheme
Class Test: 20 Marks
Theory Examination (Marks):80 Marks
Theory Examination (Duration):03 Hours

Prerequisite:

Fundamentals of Computer Organization and Operating Systems

Objectives:

- To be able to differentiate between computing in mono core and multi core technology .
- To get acquainted with various challenges while writing code for multi core technology.
- To understand different architectures of multicore systems.
- To understand the design issues in parallel algorithms.

CONTENTS

SECTION-A

Unit 1:Introduction to multicore computing (6 hrs)

Single core, Dual core and quad core processor. Introduction to multicore, Multicore Architecture, The software developers view point,Multiprogramming and multiprocessing ,Multicore application design and implementation .

Unit 2 :Architecture types of multicore systems (7 hrs)

Symmetric and Asymetric multiprocessing,SMP scheduling,AMP scheduling,SMP-AMP,hybrid system,multi kernel operating systems for multicore processors.

Unit 3: Challenges of Multicore programming (7 hrs)

Introduction to sequential model, Concurrency processor architecture, challenges, software development challenges, The harsh realities of parallelization, parallel programming

SECTION-B

Unit 4 :Foundation of Shared memory (7 hrs)

Analytical modeling of parallel programming sources of overhead in parallel programming, Performance Metrics for parallel systems .The effect of granularity on performance, Scalability of parallel systems, Asymptotic analysis of parallel programming.

Unit 5: Principles of parallel algorithm design (7 hrs)

Decomposition , tasks and dependency graphs, granularity concurrency and task interaction. Decomposition techniques, Characteristics of tasks and interaction, Mapping techniques for load balancing.

Unit 6: Role of Operating system (6 hrs)

Decomposition and operating systems's Role, Multicore OS vs multiprocessor OS, Recent Linux OS supporting multicore architecture and Its architecture, Recent Windows OS supporting multi core architecture and its architecture.

Text books

1.Cameron Huges,Tracy Huges," Professional Multi core programming"Wrox publication,2013.

2Anath Grama,Anshul Gupta,George Karypis,"Introduction to Parrelle computing",Pearson Publication second edition,2013.

3.Hardik Joshi,Hushen Savani,"Object Oriented and Multicore Programming,Vishwakarma Publications.

References

1.Rami Matarneh,"Hybrid system,multi Micro kernel Operating systems for Multicore processors"Journal of Computer Science,5(7),pp.493-500,2009.

2.*www.embeded.com/design/mcus-processors-and-socs/4422211/2/…*

PATTERN OF QUESTION PAPER:

Six units in the syllabus shall be divided in two equal parts i.e. 3 units in each part. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no. 1 from section A and Question no. 6 from section B, 10 marks each , will be compulsory.
4. From the remaining questions in section A and B students are supposed to solve any two questions from each section, 15 marks each.

Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
Final Year Engineering (CSE/IT)
Semester – I

Course Code : CSE421 **Title :- LAB-I Data Warehousing and Data Mining**

Teaching Scheme

Practical: 2 Hours/Week

Examination Scheme

Practical /Oral Examination: 50 Marks
Practical /Oral Examination (Duration) :- 03 Hours

List of Practical Assignments:
Minimum 8 assignments should be conducted (04 assignments from each set).

SET I :
Implementation assignments should performed using any appropriate language.

1. Implementation of OLAP operations .
2. Implementation of Varying Arrays.
3. Implementation of Nested Tables .
4. Demonstration of any ETL tool.
5. Write a program of apriori algorithm using any programming language.
6. Write a program of naive Bayesian classification using c.
7. Write a program of cluster analysis using simple k-means algorithm using any programming language.
8. A case study of Business Intelligence in Government sector/Social Networking/Business.

SET II:
Following assignments should be performed in WEKA with detail analysis.

9. Create data-set in arff file format. Demonstration of preprocessing on WEKA data-set.
10. Demonstration of Association rule process on data-set contact lenses.arff /supermarket using apriori algorithm.
11. Demonstration of classification rule process on WEKA data-set using j48 algorithm.
12. Demonstration of classification rule process on WEKA data-set using id3 algorithm.
13. Demonstration of classification rule process on WEKA data-set using naive bayes algorithm.
14. Demonstration of clustering rule process on data-set iris.arff using simple k-means.

Practical Examination:

Practical Examination should be conducted by internal examiner for three hours under the supervision of external examiner. External examiner should evaluate student by checking practical performance and conducting viva.

Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD
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Final Year Engineering (CSE)
Semester – I

Course Code: CSE422 **Title: LAB-II:Principles of Compiler Design**

Teaching Scheme

Practical: 02 Hours/Week

Examination Scheme

Practical /Oral Examination: 50 Marks
Practical /Oral Examination (Duration):- 03 Hours

List of Practical Assignments:
Minimum 8 assignments should be conducted.
Implementation Assignments should be performed in any appropriate Programming Language.

1. Program to convert Non-deterministic finite automaton(NFA) to Deterministic finite automaton(DFA).
2. Program to generate lexical tokens.
3. Study of LEX/FLEX tool and write LEX program to identify tokens : integer numbers, decimal numbers, identifiers, keywords, arithmetic operators, relational operators.
4. Program to implement LR parser.
5. Study of YACC tool.
6. Program to implement any one code optimization technique.
7. Implementation of any one method of Intermediate Code Generator.
8. Implementation of code generator.

Practical Examination:

Practical Examination should be conducted by internal examiner for three hours under the supervision of external examiner. External examiner should evaluate student by checking practical performance and conducting viva.

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Final Year Engineering (CSE)
Semester – I

Course Code:CSE423 **Title: LAB-III Visual Modeling**

Teaching Scheme **Examination Scheme**

Practical: 2 Hours/Week Practical /Oral Examination: 50 Marks
Practical /Oral Examination (Duration):- 03 Hours

List of Practical Assignments
Minimum 8 assignments should be conducted (04 assignments from each set).

SET I: Object Oriented Modeling

(Make use of any UML tool to perform the following list)

1. Choose a hypothetical system of significant complexity and write an SRS for the same.
2. Draw one or more Use Case diagrams for capturing and representing requirements of the system. Use case diagrams must include template showing description and steps of the Use Case for various scenarios.
3. Draw one or more Package diagram to organize and manage your large and complex systems as well as their complex models.
4. Draw activity diagrams to display either business flows or like flow charts.
5. Draw basic class diagrams to identify and describe key concepts like classes, types in your system and their relationships.
6. Draw advanced class diagrams to depict advanced relationships, other classifiers like interfaces.
7. Draw sequence diagrams OR communication diagrams with advanced notation for your system to show objects and their message exchanges.
8. Draw state machine to model the behavior of a single object, specifying the sequence of events that an object goes through during its lifetime in response to events.
9. Draw component diagrams assuming that you will build your system reusing existing components along with a few new ones.
10. Draw deployment diagrams to model the runtime architecture of your system.

SET II: Design Patterns

Write a program in Java to implement the Design patterns of the following

1. Abstract factory
2. Singleton
3. Prototype
4. Adapter
5. Decorator Pattern
6. Observer Patterns
7. Strategy

Practical Examination:
Practical Examination should be conducted by internal examiner for three hours under the supervision of external examiner. External examiner should evaluate student by checking practical performance and conducting viva.

Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD
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Final Year Engineering (CSE)
Semester – I

Course Code : CSE424 **Title :- LAB-I Elective-I Cloud Computing**

Teaching Scheme
Practical: 2 Hours/Week

Examination Scheme
Term Work: 50 Marks

List of Practical Assignments:
Minimum 8 assignments should be conducted.

1. Introduction to cloud computing.
2. Implementation of SOAP Web services in C#/JAVA Applications.
3. Implementation of RESTFul Web services in C#/JAVA Applications.
4. Implementation of Para-Virtualization using VMWare's Workstation/ Oracle's Virtual Box and Guest O.S.
5. Implementation of Full-Virtualization using VMWare's ESXi and Guest O.S.
6. Creating a Warehouse Application in SalesForce.com.
7. Installation and Configuration of Single-Node Setup in Hadoop.
8. Create any Application (Ex: Word Count) Using Hadoop Map/Reduce.
9. To study Cloud security challenges.
10. Case Study: PAAS (Face book, Google App Engine)
11. Case Study : Amazon Web Services.

Term Work:

The term work shall consist of at least 8 experiments/ assignments based on the syllabus above. Assessment of term work should be done as follows

- Continuous lab assessment
- Actual practical performance in Laboratory.

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Final Year Engineering (CSE)
Semester – I

Course Code : CSE424 **Title :- LAB-I Elective-I Artificial Intelligence**

Teaching Scheme
Practical: 2 Hours/Week

Examination Scheme
Term Work: 50 Marks

List of Practical Assignments.
Minimum 8 assignments should be conducted.

1. Study of Prolog
2. Program to generate family tree
3. Program for Water Jug Problem.
4. Program checking a person eligible for voting.
5. Program to calculate factorial of a number
6. Program for generating Fibonacci series
7. Program for generating pyramid
8. Program for Towers of Hanoi puzzle
9. Design an expert system (Ex. Medical Diagnosis System)

Term Work:

The term work shall consist of at least 8 experiments/ assignments based on the syllabus above. Assessment of term work should be done as follows

- Continuous lab assessment
- Actual practical performance in Laboratory.

Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD
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Final Year Engineering (CSE)
Semester – I

Course Code: CSE424 **Title: LAB-IV Elective – I Multicore Computing**

Teaching Scheme **Examination Scheme**

Practical: 02 Hours/Week Term Work : 50 Marks

List of Practical Assignments:
Minimum 8 assignments should be conducted.

1. Survey the recent products of AMD Athlon series and present pros and cons of the products.

2. Survey the recent products of Intel multicore series and present pros and cons of the products.

3. Find and discuss various features of Windows OS such as memory model, IPC mechanism, Resource management, scheduling policies which support multicore operations.

4. Find and discuss various features of Linux OS such as memory model, IPC mechanism, Resource management, scheduling policies which support multicore operation.

5. Discuss how concurrency issues are handled in multi-core architecture. Implement Test and Set based Spin locks for concurrency in multicore computing.

6. What are challenges a typical resource manger of operating system has to face if it is used for multicore architecture . Do some research from IEEE/ACM/Springer/Elsevier conference/journal papers. Study at least one strategy for resource management in multicore computing.

7: Implement at least one strategy for resource management in multicore computing using any appropriate programming language.

8. As the processor's chip is becoming thin and thin, it is affecting on overall reliability of software due to transient faults. Find out the facts through literature survey and suggest the remedy.

Term Work:

The term work shall consist of at least 8 experiments/ assignments based on the syllabus above.
Assessment of term work should be done as follows

- Continuous lab assessment
- Actual practical performance in Laboratory.

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Final Year Engineering (CSE)
Semester – I

Course Code: CSE425 **Title: Project Part I**

Teaching Scheme **Examination Scheme**

Practical: 02 Hours/Week Term Work : 25 Marks

1. Project Group size = maximum 4 students.

2. The project is to be taken up at the start of the semester I and the project must be completed by the end of semester II.

3. While submitting project proposal care is to be taken that project will be completed within the available time of two terms.

4. 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.

5. 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. This data should be used for finding the total man hours and estimating the cost of the project

.6. The group is expected to complete details Literature Survey, 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.

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 as per the guidelines given in the following table.

9. The suggestive format of the report is as follows:

(Only one report should be submitted per group as a part of term work submission.)

Title of the Project:

Names & Roll Numbers of the students:

Name of the guide:

Chapter 1: Introduction

Chapter 2: Literature Survey

Chapter 3: System Development

A) Assessment of project –I Term Work B.E. First Term

Name of the Project:_____

Name of the Guide:_____

Sr. No.	Exam Seat No.	Name of the Student Marks	Assessment by Guide (70 %)					Assessment by Departmental Committee (30 %)			
			Literature Survey	Topic Selection	Documentation	Attendance	Total	Evaluation (10%)	Presentation (20%)	Total	Grand Total
			05	2.5	7.5	2.5	17.5	2.5	5	7.5	25

Sign of Guide Sign of Committee Members Sign of HOD

Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
Final Year Engineering (CSE)
Semester – I

Course Code: CSE426 **Title: Seminar**

Examination Scheme

Term Work : 25 Marks

All the final year students are informed to present a seminar on a topic related to current trends and technologies. Seminar should be evaluated on the following basis:

- PPT prepared and Presentation skills
- Understanding of Topic
- Report preparation

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FACULTY OF ENGINEERING AND TECHNOLOGY
Final Year Engineering (CSE/IT)
Semester – II

Course Code : CSE451 **Title :- Computer System Security and Laws (CSSL)**

Teaching Scheme
Theory: 04 Hours/Week

Examination Scheme
Class Test: 20 Marks
Theory Examination (Marks) : 80 Marks
Theory Examination (Duration) : 03 Hours

Prerequisite:

Fundamentals of Computer Networking

Objectives:

- To understand the five security components and apply them when evaluating a given security mechanism.
- To understand basic cryptography including symmetric and asymmetric cryptography, message digests, digital signatures and digital certificates.
- To understand the basics of system security along-with the mechanisms for authentication and authorization.
- To understand the legal aspect and Forensics in the computer system security.

CONTENTS

SECTION-A

Unit-1 **(06hrs)**

Introduction: Need for Security, security approaches, principles of security, security attacks, security services ,model for network security.

Unit-2 **(06 hrs)**

Authentication and Authorization controls: User-names and password, certificate based authentication, extensible Authentication protocol(EAP), biometric authentication, role based authentication, access control lists(ACL), rule based authentication.

Unit-3 **(08 hrs)**

Securing Communications: Cryptography Techniques, Cryptographic keys, cryptographic hash functions, Digital Signatures, Digital Certificates, RSA, Advanced Encryption Standard(AES). Steganography, Authentication Applications: Kerberos, Firewalls, Intrusion detection.

SECTION-B

Unit-4 **(06 hrs)**

Internet Security Protocols: Introduction, Basic concepts, SSL,Transport Layer Security(TLS), Secure HTTP, Secure Electronic Transaction(SET), Email Security, Wireless Application Protocol Security, Security in GSM, Security in 3G, IEEE 802.11 security.

Unit-5 **(06 hrs)**

Incident Handling Basics: Purpose of Incident Response, Common terms, organizational planning for incident handling, organizational roles, procedures for responding to incidents, types of incidents, stages of incident response, Incident prevention and detection
Information Technology Act 2000: Scope, jurisdiction, offense and contraventions, powers of police, adjudication.

Unit-6 **(08 hrs)**

Cyber Forensics: History of Cyberforensics, Computer forensics and law, cybercrime examples, forensic Evidence Forensics Casework, Preserving integrity of crime scene, Investigative incident response actions,forensics analysis investigative actions, computer forensic tools.

Textbooks:

1. Atul Kahate, Cryptography and Network Security, 3e, McGraw Hill Education
2. John W. Rittinghouse, William M.Hancock, "Cyber security Operations Handbook", Elsevier Pub.
3. Roberta Bragg, Mark Rhodes-Ousley, Keith Strassberg , "The Complete reference – Network Security" , Tata McGraw Hill publication

Reference Books:

1. William Stallings, Cryptography and Network Security, Pearson Education.
2. Behrouz A. Forouzan, Debdeep Mukhopadhyay, Cryptography and Network Security, McGraw Hill Education.

3.Vivek Sood, 'Cyber Law Simplified', McGraw Hill Education.

PATTERN OF QUESTION PAPER:

Six units in the syllabus shall be divided in two equal parts i.e. 3 units in each part. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no. 1 from section A and Question no. 6 from section B, 10 marks each , will be compulsory.
4. From the remaining questions in section A and B students are supposed to solve any two questions from each section , 15 marks each.

Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
Final Year Engineering (CSE/IT)
Semester – II

Course Code: CSE452 **Title: Mobile Computing (MOC)**

Teaching Scheme:
Theory: 04 Hours/Week
Marks

Examination Scheme
Class Test:20

Theory Examination (Marks):80 Marks
Theory Examination (Duration):03 Hours

Prerequisite:

- Knowledge of Computer Network

Objectives:

- To make students familiarize with Wireless Networking. and mobile OS.
- To understand the mobile IP.
- To know the basics of WAP and WML.
- To understand and use open source tools for Mobile Applications.

CONTENTS

SECTION-A

Unit 1: Mobile Operating System **(4 Hrs)**

Features and Technology: Windows mobile os , Symbian ,Black berry, Android, Iphone OS.

Unit 2: Wireless and Mobile Network Architecture **(8 Hrs)**

Principle of Cellular Communication, Overview 1G, 2G, 2.5G and 3G and 4G technologies, GSM Architecture and Mobility management hand off management, Network signaling, Mobile Devices: PDA, first generation phone and smart phone

Unit 3: **Medium Access Control** **(8Hrs)**

Medium Access Control: Motivation for a specialized MAC (Hidden and exposed terminals, SDMA, FDMA, TDMA, CDMA.

SECTION-B

Unit4: Mobile IP Protocol Architecture (8 Hrs)

Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations) , Mobile IPv4 and IP v 6 and its application in mobile computing.. CDPD, VOIP, GPRS architecture and Services, Wireless Local Loop-WLL system

Unit 5: Wireless Application Protocol (WAP) (4 Hrs)

The Wireless Application Protocol application environment, wireless application protocol Client software, hardware and websites, wireless application protocol gateways, Implementing enterprise wireless application protocol strategy.

Unit 6: Wireless Markup Language (8 Hrs)

An Introduction to Wireless Technologies, Markup Languages, An Introduction to XML, Fundamentals of WML. Writing and Formatting Text, Navigating Between Cards and Decks, Displaying Images, Tables, Using Variables, Acquiring User Input ,An Introduction to WMLScript, WMLScript Control Structures, Events, Phone.com

Text Books:

1.Yi Bing Lin, "Wireless and Mobile Networks Architecture", John Wiley
2. JochenSchiller,"MobileCommunications",Addison-Wesley.

Reference Books:

1.Professional Android™ 4 Application Development by Reto Meier
2. Wrox, "The Beginning WML and WML Script", Wrox Publication

Pattern of Question Paper:

Six units in the syllabus shall be divided in two equal parts i.e. 3 units in each part. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:
1. Minimum ten questions
2. Five questions in each section
3. Question no. 1 from section A and Question no. 6 from section B, 10 marks eac , will be compulsory.
4. From the remaining questions in section A and B students are supposed to solve any two questions from each section, 15 marks each.

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FACULTY OF ENGINEERING & TECHNOLOGY
Final Year Engineering (CSE)
Semester – II

Course Code: CSE453 **Title: Soft Computing(SC)**

Teaching Scheme **Examination Scheme**

Theory: 4 Hours/week

Class Test: 20 Marks
Theory Examination (Marks): 80 Marks
Theory Examination (Duration): 03 Hours

Prerequisite:

Image Processing

Objectives:

- To understand the scope of soft computing and pattern recognition tasks that can be performed by some of the basic structures of artificial neural networks
- Analyze feedforward networks and Understand the significance of nonlinear output functions of processing unit in feedback network for pattern storage.
- To describe and explain Core concepts and techniques of fuzzy logic.
- To understand Fuzzy Logic in database System and information. introduction to genetics.

CONTENTS

SECTION-A

Unit – 1 **(7 Hrs)**

Soft Computing : Introduction of soft computing, soft computing vs. hard computing, various types of soft computing techniques, applications of soft computing.

Characteristics of Neural Networks, Structure and Working of a biological neural network, Artificial Neural Network Teminology, models of neurons: MP model, Perceptron model, Adaline model, Topology, Basic Learning laws, What is learning, supervised and unsupervised learning, Functional Units of ANN for pattern recognition task: Pattern Recognition Problem, Basic functional units.

Unit – 2 **(7 Hrs)**

Perceptron learning – single layer and multilayer perceptron, linear and non-linear separability problems, supervised learning algorithms**,** Error correction and Gradient Decent Rules, FFNN, Architecture of FFNN, Backpropagation learning algorithm, pattern classification, pattern association by FFNN

Unit-3 **(6 Hrs)**

Pattern association- auto association and hetero association, feedback NN, architecture of FBNN, energy function, associative memory, bidirectional associative memory.Hopfield network.

SECTION-B

Unit-4 **(7 Hrs)**

Unsupervised learning – pattern clustering, Self-organization map (SOM), Generalized learning laws, Competitive Learning, examples, learning Vector Quantization, self –organizing feature map, Applications of self-organizing feature map.

Unit-5 **(6 Hrs)**

Classical sets, Fuzzy sets, Crisp relations, Fuzzy relations, Examples, Properties of membership functions, fuzzification and Defuzzification to crisp sets,Application of fuzzy control

Unit-6 **(7 Hrs)**

Fuzzy logic in database and information systems, Fuzzy relational data models, Operations in fuzzy relational data models, Design theory for fuzzy relational databases. Fuzzy If-Then Rules, . Fuzzy Linear Programming

Fundamentals of Genetic algorithm, Working principle and application of genetic Alogorithm.

Text Books

1. S.N.Sivanandam & S.N. Deepa, "Principles of Soft Computing", Wiley Publications.
2. B. Yegnanarayana, "Artificial Neural Networks", PHI Publications.
3. John Yen, Reza Langari, "Fuzzy Logic", Pearson Education.
4. S. Rajasekaran, Vijaylakshmi Pai, "Neural Networks, Fuzzy Logic and Genetic algorithms-Synthesis and Applications", PHI Publications.

Reference Books

1. Timothy J Ross , "Fuzzy Logic with Engg. Applications", Wiley Publications.
2. B. Satish Kumar, "Neural Networks - A Classroom Approach", McGrawHill Publications

PATTERN OF QUESTION PAPER:

Six units in the syllabus shall be divided in two equal parts i.e. 3 units in each part. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no. 1 from section A and Question no. 6 from section B, 10 marks each , will be compulsory.
4. From the remaining questions in section A and B students are supposed to solve any two questions from each section, 15 marks each.

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FACULTY OF ENGINEERING AND TECHNOLOGY
Final Year Engineering (CSE)
Semester – II

Course Code: CSE491 **Title: - Elective II Remote Sensing & GIS**

Teaching Scheme
Theory:04 Hours/Week

Examination Scheme
Class Test:20 Marks
Theory Examination (Marks) :80 Marks
Theory Examination (Duration) :03 Hours

Prerequisite:
Students should have prior knowledge of Image processing and Computer Graphics.

Objectives:

- To get acquainted with the concepts of Earth observation and remote data acquisition techniques.
- To understand the concepts of remotely sensed data manipulation, processing, and visualisation.
- To apply data manipulation and visualisation methods.
- To perform appropriate data manipulation and visualisation methods for a number of Earth Science applications, including Geographical Information Systems (GIS).

CONTENTS

SECTION-A

Unit 1: Fundamentals of Remote Sensing (7 hrs)

Principles of Remote sensing, History of Remote sensing, Remote sensing in India, Electromagnetic radiation, Electromagnetic Radiation and Electromagnetic Spectrum, EMR quantities, Nomenclature and Units, Thermal Emission of Radiation, Radiation Principles, Interaction of EMR with the Earth Surface , Spectral signature, Reflectance characteristics of Earths cover type, Remote sensing systems, Human vision colours, Spectral signatures and their interpretation

Unit 2: Remote Sensing platforms and sensors (6 hrs)

Platforms, Types of sensors, Sensor resolutions , Passive and Active Sensors, Optical sensors, Classification of RS, Selection of Sensor Parameter, Spatial Resolution, Spectral Resolution, Radiometric Resolution, Temporal Resolution, Band combinations and optimum index factor, False and pseudo colour composites, Errors in the imaging process.

Unit 3: Visual Image Interpretation (7 hrs)

Elements of image interpretation; interpretation key, Hardware and software aspects of digital image processing, Properties of digital remote sensing data, Concept of geo-referencing , Errors due to

geo-referencing, Physical and mathematical models, hybrid models, Rectification of images, interpolation methods in the rectification of images: nearest neighbour, bilinear and bi-cubic methods, Concept of world file and embedding of projection information in the images.

SECTION-B

Unit 4: Remote Sensing Image Processing (7 hrs)
Image Registration, Image enhancement techniques, The Classification Process, Image classification techniques: supervised & unsupervised techniques

Unit 5: Geographic Information Systems (7 hrs)
Definition of GIS; Elements of a GIS; Coordinate System, Need for GIS, Data Models: Raster and Vector, GIS data acquisition, Date inputs for GIS, Integration of satellite images, aerial photographs and GIS, Concept of Web GIS

Unit 6: Data Exploration & Analysis (6 hrs)
Data Display and Cartography, Data exploration, Vector data analysis, Raster data analysis, Terrain Mapping & analysis.

Text Books:

1. Lillesand, Kiefer, Chipman, Remote Sensing and Image Interpretation, Wiley Publications.
2. Robert A. Schowengerdt, Remote Sensing models & methods for image processing, 3rd edition, Academic press.
3. Kang-tsung Chang, "Introduction to Geographic Information Systems", Tata McGrawHill, Fourth Edition

Reference Books:

1. Fundamentals of Remote Sensing, George Joseph, Universities Press (India) Pvt. Ltd.
2. Remote Sensing – Principles & Applications, Dr. B C Panda, Viva Books Pvt. Ltd.
3. J. B. Campbell and R. H. Wyne, Introduction to Remote Sensing, Guilford Press, 2011

PATTERN OF QUESTION PAPER:

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For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no. 1 from section A and Question no. 6 from section B, 10 marks each, will be compulsory.
4. From the remaining questions in section A and B students are supposed to solve any two questions from each section, 15 marks each.

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Final Year Engineering (CSE/IT)
Semester – II

Course Code: CSE492 **Title: Elective - II Green IT**

Teaching Scheme **Examination Scheme**:

Theory: - 04 Hours/Week Class Test: 20 Marks

Theory Examination (Marks): 80 Marks

Theory Examination (Duration): 03 Hours

Prerequisite:

Understanding of Environmental Science and Business Process

Objectives:

1. Learn to measure computer power usage, minimize power usage, procure sustainable hardware, design green data centers, and recycle computer equipment.
2. Acquire expertise for improving the energy efficiency of personal computers by reducing the power consumption requirements.
3. Evaluate the regulatory and governance issues surrounding IT.
4. Execute a virtualization plan.

CONTENTS

SECTION-A

UNIT 1: Green IT an Overview: (06 Hrs)

Introduction, Environmental Concerns and Sustainable Development, Environmental Impacts of IT, Green IT, Holistic Approach to Greening IT, Greening IT, Enterprise Green IT Strategy, Green IT Burden or opportunity, Life Cycle of a Device or hardware Reuse, Recycle and Dispose.

UNIT 2: Green Software & Sustainable software Development (08 Hrs)

Energy- Saving Software Techniques- Computational Efficiency, Data Efficiency, Context Awareness, Idle Efficiency, Evaluating and Measuring Software Impact to Platform Power, Current practices, Sustainable Software, Software Sustainability Attributes, Software Sustainability Metrics, Sustainable Software methodology, Case Study.

UNIT 3: Green Data Centres and Data Storage: (06 Hrs)

Data centres and Associated Energy Challenges ,Data Centre IT Infrastructure, Data Centre Facility Infrastructure, IT Infrastructure Management, Green Data Centre Metrics, Case study on Data Centre Management Strategies, Storage Media Power Characteristics-Hard Disks, Magnetic Tapes, Solid-State Drives, Energy Management Techniques for Hard Disks-State Monitoring,Caching,Dynamic RPM,System- Level Energy Management.

SECTION-B

UNIT 4: Green Networks and Communication: (06 Hrs)

Introduction, Objectives of Green Network Protocols-Energy-Optimizing Protocol Design, Bit Costs Associated with Network Communication Protocol, Green Network Protocols and Standards-Strategies to Reduce Carbon Emissions, Contributions from the EMAN Working Group, Contributions from Standardization Bodies.

UNIT 5: Green Cloud Computing and environmental Sustainability (06 Hrs)

Cloud Computing, Cloud Computing Energy usage Model, Features of Clouds Enabling Green Computing, Green Cloud Architecture, case Study: IaaS Provider.

UNIT 6: Green Enterprises and Role of IT and Green IT Outlook (08 Hrs)

Organizational and Enterprise Greening, Information Systems in Greening Enterprises, Greening the Enterprise: IT Usage and hardware,Inter-organizational, Enterprise Activities and Green Issues, Enablers and Making the Case for IT and the green Enterprise, Awareness to implementation, Greening by IT, Green IT Megatrend, Seven-step approach to Creating Green IT Strategy, Research and Development Directions.

Text Books:

1. San Murugesan, and G. R. Gangadharan "Harnessing Green IT: Principles and Practices", *IEEE* Wiley publication.

2. Adrian Sobotta and Irene Sobotta ,"Greening IT - How Greener IT Can Form a Solid Base For a Low Carbon Society", Creative Commons Publication, 2009. (greening it_isbn - 9788791936029.pdf).

Pattern of Question Paper:

Six units in the syllabus shall be divided in two equal parts i.e. 3 units in each part. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions

2. Five questions in each section

3. Question no. 1 from section A and Question no. 6 from section B, 10 marks each, will be compulsory.

4. From the remaining questions in section A and B students are supposed to solve any two questions from each section, 15 marks each.

Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
Final Year Engineering (CSE/IT)
Semester – II

Course Code: CSE493 **Title: Elective - II Agile Methodology (AM)**

Teaching Scheme:
Theory: 04 Hours/Week

Examination Scheme
Class Test:20 Marks
Theory Examination (Marks):80 Marks
Theory Examination (Duration):03 Hours

Prerequisite:

- Awareness of basics of software engineering concepts and waterfall methodology.
- Exposure to any object oriented programming language such as Java, C#.

Objectives:

- To understand the background and driving forces for taking an Agile approach to software development.
- To understand the business value of adopting agile approaches.
- To understand the Agile development practices.
- To drive development with unit tests using Test Driven Development.
- To Apply design principles and refactoring to achieve Agility.
- To deploy automated build tools, version control and continuous integration.

CONTENTS

SECTION-A

Unit 1: Fundamentals of Agile **(6 hrs)**

The Genesis of Agile, Introduction and background, Agile Manifesto and Principles, Overview of Scrum, Extreme Programming, Feature Driven development, Lean Software Development, Agile project management, Design and development practices in Agile projects, Test Driven Development, Continuous Integration, Refactoring, Pair Programming, Simple Design, User Stories, Agile Testing, Agile Tools.

Unit 2: Agile Scrum Framework **(6 hrs)**

Introduction to Scrum, Project phases, Agile Estimation, Planning game, Product backlog, Sprint backlog, Iteration planning, User story definition, Characteristics and content of user stories, Acceptance tests and Verifying stories, Project velocity, Burn down chart, Sprint planning and

retrospective, Daily scrum, Scrum roles – Product Owner, Scrum Master, Scrum Team, Scrum case study, Tools for Agile project management.

Unit 3: Agile Testing **(8 hrs)**

The Agile lifecycle and its impact on testing, Test-Driven Development (TDD), x Unit framework and tools for TDD, Testing user stories - acceptance tests and scenarios, Planning and managing testing cycle, Exploratory testing, Risk based testing, Regression tests, Test Automation, Tools to support the Agile tester.

SECTION-B

Unit 4: Agile Software Design and Development **(6 hrs)**

Agile design practices, Role of design Principles including Single Responsibility Principle, Open Closed Principle, Liskov Substitution Principle, Interface Segregation Principles,

Unit 5: Agile Software Design Principles **(6 hrs)**

Dependency Inversion Principle in Agile Design, Need and significance of Refactoring, Refactoring Techniques, Continuous Integration, Automated build tools, Version control.

Unit 6: Industry Trends **(8 hrs)**

Market scenario and adoption of Agile, Agile ALM, Roles in an Agile project, Agile applicability, Agile in Distributed teams, Business benefits, Challenges in Agile, Risks and Mitigation, Agile projects on Cloud, Balancing Agility with Discipline, Agile rapid development technologies.

Text Books:

1. Agile Software Development with Scrum by Ken Schawber, Mike Beedle Publisher: Pearson Published: 21 Mar 2008.
2.Agile Testing: A Practical Guide for Testers and Agile Teams by Lisa Crispin, Janet Gregory Publisher: Addison Wesley Published: 30 Dec 2008.

Reference Books

1.Agile Software Development, Principles, Patterns and Practices by Robert C. Martin Publisher:Prentice Hall Published: 25 Oct 2002.

Pattern of Question Paper:

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For 80 marks Paper:

1. Minimum ten questions
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Final Year Engineering (CSE/IT)
Semester – II

Course Code : CSE471 **Title :- LAB-V Computer System Security and Laws**

Teaching Scheme
Practical: 2 Hours/Week

Examination Scheme
Practical /Oral Examination:50 Marks
Practical /Oral Examination (Duration) :- 03 Hours

List of Practical Assignments:
Minimum 08 assignments should be conducted.

1. Installation and demonstration of nmap tool.
2. Perform an experiment to demonstrate use of nmap tool for Port Scanning.
3. Installation and demonstration of Wireshark Network Analyzer tool.
4. Perform an experiment to demonstrate the use of wireshark network analyzer to sniff for router traffic.
5. Installation and demonstration of jcrypt tool.
6. Use jcrypt tool (or any other equivalent) to demonstrate asymmetric, symmetric crypto algorithm, hash and digital signatures
7. Case study : Kerberos.
8. Implementation of RSA algorithm using any appropriate Programming Language.
9. Demonstrate any tool for Intrusion Detection System (IDS)
10. Study of IT Act 2000.

Practical Examination:

Practical Examination should be conducted by internal examiner for three hours under the supervision of external examiner. External examiner should evaluate student by checking practical performance and conducting viva.

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Semester – II

Course Code: CSE472 **Title: LAB - VI Mobile Computing**

Teaching Scheme:
Practical: 2 Hours/Week

Examination Scheme
Practical /Oral Examination:50 Marks
Practical /Oral Examination (Duration): 03 Hours

List of Practical Assignments:
Minimum 08 assignments should be conducted.

1. Write a program to show how to use UI elements, layouts by using ADT.
2. Write a program to show Linking of activities.Broadcast receiver in Android.
3. Write a Program to develop simple application to show activity life cycle.
4. Write a Program work with Google services
5. Write a program for Broadcast receiver in Android.
6. Write a program by using <p>,line braking,fonts and formatting of text in WML
7. Write a program for Navigation between cards, deck, and formatted text.
8. Write a program Displaying of Image,table using WML
9. Write a program for anchor links, variables.
10. Write a program Methods of acquiring user inputs in WML
11. Write a program WML scripts basics by using conditional or loop statement
12. Write an assignment on latest Open Source Operating Systems for Mobile.

Practical Examination:

Practical Examination should be conducted by internal examiner for three hours under the supervision of external examiner. External examiner should evaluate student by checking practical performance and conducting viva.

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Semester – II

Course Code: CSE473 **Title: LAB VII Soft Computing**

Teaching Scheme **Examination Scheme**

Practical: 2 Hours/Week Practical /Oral Examination:50 Marks
Practical /Oral Examination (Duration) :- 03 Hours

List of Practical Assignments:
Minimum 08 implementation assignments and two study assignments should be conducted.

1. Write a program to implement MP-model
2. Write a program for solving linearly separable and nonlinearly separable problems with single layer and multilayer perception
3. Write a program to solve pattern recognition problem with FFNN using back propagation algorithm
4. Write a program solve pattern storage problem with feedback NN
5. Write a program to Solve pattern clustering problem by unsupervised learning method using self organizing map (SOM)
6. Write a program to solve pattern recognition problem with learning vector quantization (LVQ)
7. Write a program to solve Face recognition problem using ANN as a classifier
8. Write a program to solve character recognition problem (or classification for medical database) .
9. Write a program to implement Fuzzy set operation and properties .Write a program to implement Fuzzy Set operation and properties
10. Write a program to perform Max-Min composition of two matrices obtained from Cartesian Product.
11. Write a program to solve an optimization problem using Fuzzy If-Then Rules

Practical Examination:

Practical Examination should be conducted by internal examiner for three hours under the supervision of external examiner. External examiner should evaluate student by checking practical performance and conducting viva.

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Final Year Engineering (CSE)
Semester – II

Course Code:CSE474 **Title: - LAB VIII Remote Sensing & GIS**

Teaching Scheme **Examination Scheme**

Practical: 2 Hours/Week Term Work: 50 Marks

List of Practical Assignments.
Minimum 08 assignments should be conducted.

(Software : ILWIS / GRASS / QGIS / ArcGIS)

1. Reading and importing a raster dataset into RS/GIS s/w and creating a subset.
2. Image processing filters: smoothing and edge detection filtering
3. Image classification: Unsupervised classification
4. Image classification: Supervised classification
5. Image classification: Accuracy assessment
6. Image geo-referencing and understanding projections
7. Image fusion with images of two different resolutions
8. Digitization of point, line and polygon features
9. Composition of maps

Term Work:

The term work shall consist of atleast 8 experiments/ assignments based on the syllabus above.
Assessment of term work should be done as follows

- Continuous lab assessment
- Actual practical performance in Laboratory.

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Semester – II

Course Code: CSE474 **Title: LAB VIII Elective - II Green IT**

Teaching Scheme:
Practical: 2 Hours/Week

Examination Scheme:
Term work: 50 Marks

List of Practical Assignments:
Minimum 08 assignments should be conducted.

1. Case study on Climate change and low carbon society
2. Study types of Carbon Management Systems (CMS), their features and limitation.
3. Green IT and Disaster management
4. Green IT and Decision support system
5. Tools most useful in developing green software, developer perspective.
6. Case study on Data Center Management Strategies.
7. Cloud computing as Green IT initiative through visualization.
8. Case study on Smart Grid.

Term Work:

The term work shall consist of at least 8 experiments/ assignments based on the syllabus above.
Assessment of term work should be done as follows

- Continuous lab assessment
- Actual practical performance in Laboratory.

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Final Year Engineering (CSE/IT)
Semester – II

Course Code: CSE474 **Title: Lab - VIII Elective - II Agile Methodology**

Teaching Scheme: **Examination Scheme**
Practical: 2 Hours/Week Term Work: 50 Marks

List of Practical Assignments:
Minimum 08 assignments should be conducted.

1. Understand the background and driving forces for taking an Agile approach to software development.

2. Understand the business value of adopting Agile approaches.

3. Understand the Agile development practices.

4: Drive development with unit tests using Test Driven Development.

5: Apply design principles and refactoring to achieve Agility.

6 & 7: Deploy automated build tools, version control and continuous integration.

8: Perform testing activities within an agile project.

Term Work:
The term work shall consist of at least 8 experiments/ assignments based on the syllabus above.
Assessment of term work should be done as follows

- Continuous lab assessment
- Actual practical performance in Laboratory.

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Final Year Engineering (CSE)
Semester – II

Course Code: CSE475 **Title: Project Part II**

Teaching Scheme **Examination Scheme**

Term Work : 50 Marks

Practical: 06 Hours/Week Practical /Oral Examination:100 Marks

Practical /Oral Examination (Duration) :- 03 Hours

1. The guide should be internal examiner for oral examination.

2. 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.

3. The evaluations at final oral examination should be done jointly by the internal and external examiner.

4. The same project group of Part I should continue the work in Part – II as well. The project group should complete the project work taken in Part I. It should complete the rest of the work from stage III onwards till the conclusion. The performance Analysis chapter should consist of various testing methods used along with sample test cases. It should also include how better the system is performing as compared to other similar systems. The final examination will consist of the demonstration of work which will be judged by two examiners (one internal and one external) and the marks will be given accordingly. The suggestive format of the report is as follows:

(Only one report should be submitted per group as a part of term work submission)

Title of the Project:

Names & Roll Numbers of the students:

Name of the guide:

Chapter 1: Introduction

Chapter 2: Literature Survey

Chapter 3: System Development
(This chapter will include the entire design process with necessary DFDs, other diagrams, design methodologies and other design and implementation details.)

Chapter 4: Performance Analysis

Chapter 5: Conclusions
(Detailed format of the project report is to be made available by the Dept.)