PROPOSED
SCHEME AND DETAILED SYLLABUS

of
Final Year Engineering of Information Technology BE (IT)

of
FOUR YEAR DEGREE COURSE IN ENGINEERING

With Effect from Academic Year 2014-2015
## Curriculum structure of B.E. (Information Technology)

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<th>Sub Code</th>
<th>Subject</th>
<th>Contact Hrs/Week</th>
<th>Examination Scheme</th>
<th>Duration of The Theory Examination</th>
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<td>Semester-I</td>
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<td>CSE401</td>
<td>DataWarehousing &amp; Data Mining</td>
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<tr>
<td>ITD402</td>
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<td>ITD403</td>
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### Elective I:

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<td>Artificial Neural Network &amp; Fuzzy Logic</td>
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<td>ITD442</td>
<td>Compiler Construction</td>
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<td>ITD443</td>
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<td>ITD444</td>
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Faculty of Engineering and Technology  
Board of Studies in Information Technology  
Curriculum structure of B.E. (Information Technology)
<table>
<thead>
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<th>Sub Code</th>
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<th>Examination Scheme</th>
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**Elective II:**

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<th>Code</th>
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<td>Image Processing &amp; Pattern Recognition</td>
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<td>CSE492</td>
<td>Green IT</td>
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<td>CSE493</td>
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<td>Open Elective</td>
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**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

Dr Vijaya B. Musande  
Chairman Board of Studies  
Computer Science & Engineering
Course Code: CSE401  Title: Data Warehousing and Data Mining (DWDM)

Teaching Scheme:  Examination Scheme:
Theory: 4 Hours/Week  Class Test: 20 Marks

Prerequisite:
Data Base Management System, Discrete Mathematics.

Objectives:
1. To understand data warehouse.
2. To understand and implement multidimensional model.
3. To identify the problems and apply mining algorithms.
4. 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: (5 Hrs)
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)**

**Text Books:**
1. Jiawei Han and Micheline Kamber, Data Mining: Concepts and Techniques, Third Edition, Elsevier Publication.

**Reference Books:**

**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, 15 marks each
Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
Final Year Engineering (IT)
Semester – I

Course Code: ITD402
Teaching Scheme: Theory: 4hrs/week

Title: Cloud Computing (CC)
Examination Scheme:
Class Test: 20 Marks
Theory Examination (Marks): 80Marks
Theory Examination (Duration): 03Hours

Prerequisite:
- Awareness of basics of Data Base Management Systems and Operating Systems concepts.

Objectives:
1. To know the difference between cloud and virtualization.
2. To learn and understand Cloud Technologies.
3. To know cloud application domains and platforms.
4. To design, develop and deploy Cloud applications.
5. To know the functional use of the cloud.

CONTENTS

SECTION-A

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

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: Data Processing Technologies: (08 Hrs)
Big Data, Challenges in Big Data, Hadoop: Definition, Architecture, 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 Google web Services: (06 Hrs)
Using Google Web Services Exploring Google Applications, Surveying the Google Application Portfolio, Indexed search, The dark Web, Aggregation and intermediation, Productivity applications and services, Enterprise offerings, AdWords, Google Analytics, Google Translate, Exploring the Google Toolkit, The Google APIs, Working with the Google App Engine

Text Books:
3. IBM smart storage cloud Red paper by Larry Coyne Mark Bagley Gaurav Chhaunker.

Reference Books:
1. Cloud computing Bible by Barrie Sosinsky Publisher Wiley India Pvt Ltd (2011).

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, 15 marks each.
Course Code: ITD403
Title: Geographical Information System (GIS)

Teaching Scheme:
Theory: 04 Hours/Week

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

Prerequisite:

Objectives:
1. To understand the importance of GIS.
2. To understand the use of GIS in developing new locations in a city or village, developing new cities, environment conservation, etc.
3. To expose students to theoretical and fundamental concepts of GIS, its applications and various tasks of it.
4. To understand and learn the issues involved in capturing, processing, manipulating, storing and retrieving spatial and non-spatial data from GIS.
5. To introduce students to the characteristics and design methodologies of any GIS project.

CONTENTS

SECTION-A

Unit 1: GIS – An Overview (6 hrs)
Introduction, Defining GIS, Components of GIS, Spatial Data, Maps & their Influence on the Character of Spatial Data, Thematic Characters, Other Sources of Spatial Data.

Unit 2: Spatial Data Modeling and Database Management (6 hrs)
Spatial Data Modeling, Entity Definition, Spatial Data Models, Spatial Data Structures, Modeling Surfaces Modeling, Networks, Building, Computer Worlds, Modeling the Third and Fourth Dimension.

Unit 3: Database Management and Data Editing (8 hrs)
Database Approach, Attribute Data in GIS, Relational Model, Attribute Data Entry, Manipulation of Fields and Attribute Data, GIS Database Applications, Web GIS, Developments in Databases, Data Input and Editing, Methods of Data Input, Data Editing, Integrated Database.
SECTION-B

Unit 4: Data Analysis (6 hrs)
Measurements in GIS- Lengths, Perimeters, Areas, Queries, Reclassification, Buffering and Neighborhood Functions, Map Overlay, Spatial Interpolation, Analysis of Surfaces, Network Analysis.

Unit 5: Modeling and Output (6 hrs)

Unit 6: Remote Sensing and Applications (8 hrs)

Text Books:

Reference Books:

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, 15 marks each.
Course Code: ITD404
Title: E Business Management (EBM)

Teaching Scheme:
Theory: 04 Hours/Week

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

Prerequisite:
- Concepts of Website Development.
- Concepts of Online Shopping.

Objectives:
1. To introduce to the students the concepts of e-Business.
2. To focus on elements of e-Business.
3. To expose student to theoretical working of e-Business and the techniques involved.
4. To make the student understand the concepts of on-line shopping websites and what happens at the back-end.

CONTENTS

SECTION A:

Unit 1: Overview of e-Business and its Strategy: (06 Hrs)

Unit 2: e-Business Models and Architecture: (06 Hrs)

**Unit 3: CRM and Selling Chain Management: (08 Hrs)**

**Customer Relationship Management:** Basics, Definitions, Phases of CRM, CRM Process Competencies, Building a CRM Infrastructure.

**Selling Chain Management:** Basics, Definitions and goals of Selling Chain Management, Order Acquisition Process, Elements of Selling Chain Infrastructure.

**SECTION B:**

**Unit 4: ERP and SCM: (06Hrs)**

**Enterprise Resource Planning:** Basics and Elements, ERP Decision, Software Decision, Capabilities of COTS ERP Solutions, ERP Implementations.

**Supply Chain Management:** Basics, Definitions, Interenterprise Integration, Supply Chain Planning, Supply Chain Execution, e-Supply Chain Fusion, Diagnosing Root Causes of Supply Chain Problems, Fixing Root Causes, Management Issues in E-Supply Chain Fusion.

**Unit 5: e-Procurement and KM: (06Hrs)**

**e-Procurement:** e-Procurement models, B2E: Purchasing and Requisitioning Applications, Corporate Procurement Portals, e-Procurement Infrastructure: Integrating Ordering, Fulfilment and Payment.

**Knowledge Management:** Elements of Knowledge Management Applications, Data Organization and Collection, Analysis and Segmentation, Real-Time Personalization, Infrastructure for Broadcast, Retrieval and Interaction, Performance Monitoring and Measurement, Three-Layer BI Solutions Architecture, Overview of Enterprise Application Integration.

**Unit 6: BP, E-Markets and Security: (08 Hrs)**


**Security and Reliability for e-Business:** Reliability and Quality Considerations, Quality Requirements, Trust, e-Business Risks, e-Business Security.
Text Books:
3. en.wikipedia.org/wiki/Business_process

References:
1. Daniel Amor, E-business (R) evolution

Note: Case Studies from the books and/or e-Tendering, e-Office, mahaonline from e-Governance project undertaken by Government of Maharashtra can be considered for giving examples.

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, 15 marks each.
Teaching Scheme:  
Theory: 4 Hours/Week

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

Prerequisite:

- Image Processing.

Objectives:

1. To know the basic structures of artificial neural networks.
2. Analyze feed-forward networks and understand the significance of nonlinear output functions of processing unit in feedback network for pattern storage.
3. Describe and explain core concepts and techniques of fuzzy logic.
4. To understand Fuzzy Logic in database System and modeling.

CONTENTS

SECTION-A

Unit 1: Soft Computing: (7 Hours)

Unit 2: Perceptron Learning: (7 Hours)
Single layer and multilayer perceptron, linear and non-linear separability problems, supervised learning algorithms, Error correction and Gradient Decent Rules, FFNN, Architecture of FFNN, Back-propagation learning algorithm, pattern classification, pattern association by FFNN.

Unit 3: Pattern Association: (6 Hours)

SECTION -B

Unit 4: Unsupervised learning: (7 Hours)
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: Fuzzy Logic: (6 Hours)
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: Fuzzy Systems: (7 Hours)

Text Books:
2. B. Yegnanarayana, “Artificial Neural Networks”, PHI Publications.

Reference Books:
3. MATLAB, 7.8.0.347 (R2009a), Wavelet Toolbox, Fuzzy Logic Toolbox.

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, 15 marks each.
Course Code: ITD442
Title: Elective - I Compiler Construction (CC)

Teaching Scheme:
Theory: 4 Hours/Week

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

Prerequisite:
2. Basic Knowledge of subject Theory of Computation.
3. Programming skill in basic programming language like C

Objectives:
1. To understand the major phases in the design of a compiler.
2. To learn and use tools for construction of a compiler.
3. In particular students will understand the structure of a compiler, and how the source and target languages influence various choices in the design.

SECTION A

Unit 1: Introduction: (06 Hrs)
Introduction to compilers & translators, Phases of compilers, bootstrapping, compiler construction tools.
Lexical analysis: Role of LA, Finite automata as recognizer, Language for specifying LEX Programs, The syntactic specification of programming languages: Context free grammars, derivations & parse trees, Ambiguity

Unit 2: (07 Hrs)
Syntax Analyzers (or Parsers): Parsing techniques, shift reduce parsing, top down parsing. Recursive Descent parsing left factoring, Predictive parsing – FIRST & FOLLOW functions, LR parsers, LR grammars, the canonical collection of LR (O) items, LALR parser, Automatic parser Generator YACC, YACC program.

Unit 3: Syntax Directed Translation (SDT): (07 Hrs)
SDT schemes, SDT schemes for desks calculator, intermediate code, Postfix notations, syntax trees, three address code – Quadruples and triples, indirect triples. SDT scheme for translation of following types of statement – assignment statements, Boolean expressions, Boolean expressions with control flow method, if then else statement, while do statement, procedure calls, variable declarations, CASE statements

SECTION B

Unit 4: Symbol tables: (07 Hrs)
Contents of symbol table, data structures for symbol table: lists, Self organizing lists, search trees, hash tables, Representing scope information.

Run – time storage Administration: Implementation of simple stack – allocation scheme, implementation of block structured languages – displays.

Error detection & Recovery: Types of errors, sources of errors, panic mode of recovery, error recovery in LR passing, and automatic error recovery in YACC.

Unit 5: Code Optimization: (07 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.

Unit 6: Code Generation: (06 Hrs)
Object programs, the environment of code generator, runtime addresses for names, problems in code generation, working of a simple code generator in brief, register allocation and assignments, peephole optimization

Text Books:

Reference Books:
3. Dr.O.G.Kakde, “Compiler Design”, University Science Press
**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, 15 marks each.
Course Code: ITD443, Title: Elective - I Object Oriented Analysis & Modelling (OOAM)

Teaching Scheme: Theory: 4 Hours/Week

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

Prerequisite:
- Software Engineering, Object Oriented programming languages.

Objectives:
1. To provide a sound understanding of the fundamental concepts of the object model.
2. To understand how large, complex software systems are developed using modern software engineering methods and models.
3. To understand the frame work for software engineering to collaborate in the design and development process.
4. To know the realistic application of object oriented development within a variety of problem domains.

CONTENTS

SECTION-A

Unit 1: Complexity and The Object Model: (6 hrs)

Unit 2: Classes and Objects: (6 hrs)
The Nature of an Object, Relationships Among Objects, The Nature of a Class, Relationships Among Classes, The Interplay of Classes and Objects, On Building Quality Classes and Objects. The importance of proper classification, Identifying Classes and Objects, Key Abstraction and Mechanism.

Unit 3: The Notation and Pragmatics: (8 hrs)
Elements of the Notation, Use case Diagram, Class Diagram, State Transition Diagrams, Object Diagrams, Intersection Diagram, Module Diagrams, Process Diagrams, Applying the Notation,


SECTION-B

Unit 4: Introduction to Design Patterns: (8 hrs)
What is a 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:
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:
3. Hank-Erik Eriksson, Magnus Penkar, Brian Lyons, David Fado, ”UML 2 Tool Kit” OMG Press.

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, 15 marks each.
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 4 should be conducted from each set.
Minimum 8 assignments should be conducted (04 assignments from each set).

SET I:

Implementation of assignments should be 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.

SET II:

Following assignments should be performed in WEKA with detail analysis.
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
FACULTY OF ENGINEERING AND TECHNOLOGY
Final Year Engineering (IT)
Semester – I

Course Code: ITD422
Title: LAB-II Cloud 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 8 assignments should be conducted.

1. Introduction to cloud computing.
2. Implementation of SOAP Web services in JAVA Applications.
3. Implementation of RESTFul Web services in 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.
9. To study Cloud security challenges.
10. Case Study: PAAS (Face book, Google App Engine)

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.
Course Code: ITD423  Title: LAB - III Geographical Information System

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. Introduction to GIS with study of one GIS application in detail.
2. Study of overview of Open source Quantum GIS.
3. Importing Raster Layer and Vector Layer in GIS using Quantum GIS
4. Demonstrating the concept of Symbolism in GIS using Quantum GIS.
5. Demonstrating the concept of Labeling in GIS using Quantum GIS.
6. Demonstrating the concept of Overlaying in GIS using Quantum GIS.
7. Drawing map of our institute using Map Maker.
8. Study of Databases in GIS.

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.
Course Code: ITD424  
Title: LAB - IV Elective - I Compiler Construction

Teaching Scheme:  
Practical: 2 Hours/Week

Examination Scheme:  
Term Work: 50 Marks

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

1. Program to convert nondeterministic finite automata to deterministic finite automata.
2. Program to generate lexical tokens.
3. Study of LEX/FLEX and write LEX program to identify tokens: integer, 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.
8. Implementation of code generator.

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.
Course Code: ITD424       Title: LAB - IV Elective - I Object Oriented Analysis & Modelling

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

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

SECTION-A:
To develop a mini-project following the 12 exercises listed below by using any UML tool.
1. To develop a problem statement.
2. Develop SRS document. Also develop risk management and project plan (Gantt chart).
3. Identify Use Cases and develop the Use Case model.
4. Identify the business activities and develop an UML Activity diagram.
5. Identity the conceptual classes and develop a domain model with UML Class diagram.
6. Using the identified scenarios find the interaction between objects and represent them using UML Interaction diagrams.
7. Draw the State Chart diagram.
8. Identify the User Interface, Domain objects, and Technical services. Draw the partial layered, logical architecture diagram with UML package diagram notation.
9. Implement the Technical services layer.
10. Implement the Domain objects layer.
11. Implement the User Interface layer.
12. Draw Component and Deployment diagrams.

SECTION B:
Write a program in Java to implement any Four Design patterns of the following
1) Abstract factory
2) Singleton
3) Prototype
4) Adapter
5) Decorator Pattern
6) Observer Patterns
7) Strategy

**Suggested domains for Mini-project:**
1. Passport automation system.
2. Book bank
3. Exam Registration
4. Stock maintenance system.
5. Online course reservation system
6. E-ticketing
7. Software personnel management system
8. Credit card processing
9. e-book management system
10. Recruitment system
11. Foreign trading system
12. Conference Management System
13. BPO Management 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.
Title: LAB – IV Elective – I Artificial Neural Network & Fuzzy Logic

Teaching Scheme: 
Practical: 2 Hours/Week

Examination Scheme: 
Term Work: 50 Marks

List of Practical Assignments:

Minimum 8 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.
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

Note: Students should perform minimum 10 experiments out of which eight to be implemented and two can be study experiments.

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.
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 Information Technology.
OR
Investigation of the latest development in a specific field of Information Technology.
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: ________________________________

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Exam Seat No.</th>
<th>Name of the Student Marks</th>
<th>Assessment by Guide (70 %)</th>
<th>Assessment by Departmental Committee (30 %)</th>
<th>Literature Survey</th>
<th>Topic Selection</th>
<th>Documentation</th>
<th>Attendance</th>
<th>Total</th>
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</tbody>
</table>

Sign of Guide                      Sign of Committee Members                      Sign of HOD
Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
Final Year Engineering (IT)
Semester – I

Course Code: ITD426                      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 subject
- Report preparation
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: 
1. Understand the five security components and apply them when evaluating a given security mechanism.
2. Understand basic cryptography including symmetric and asymmetric cryptography, message digests, digital signatures and digital certificates.
3. To understand the basics of system security along-with the mechanisms for authentication and authorization.
4. To understand the legal aspect and Forensics in the computer system security.

CONTENTS

SECTION-A

Unit 1: Introduction: (06 hrs)
Need for Security, security approaches, principles of security, security attacks, security services, model for network security.

Unit 2: Authentication and Authorization controls: (06 hrs)
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: Securing Communications: (08 hrs)
SECTION-B

Unit 4: Internet Security Protocols: (06 hrs)

Unit 5: Incident Handling Basics: (06 hrs)
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


Unit 6: Cyber Forensics: (08 hrs)
History of Cyber forensics, 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

**Reference Books:**


**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, 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 (MC)

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 Computer Network

Objectives:
1. To make students familiarize with Wireless Networking.
2. To make student familiarize with mobile OS.
3. To make student familiarize with mobile IP.
4. To know the basics of WAP and WML.
5. To familiarize students with open source tools for Mobile Applications.

CONTENTS

SECTION-A

Unit 1: Mobile Operating System (4 Hrs)
Features and Technology: - Windows mobile os, Symbian, Blackberry, 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 (8 Hrs)
Medium Access Control: Motivation for a specialized MAC (Hidden and exposed terminals, SDMA, FDMA, TDMA, CDMA.

SECTION-B

Unit 4: 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:**
2. Jochen Schiller, “Mobile Communications”, 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 each, will be compulsory.
4. From the remaining questions in section A and B students are supposed to solve any two questions, 15 marks each.
Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
Final Year Engineering (IT)
Semester – II

Course Code: ITD453
Title: Big Data Analytics (BDA)

Teaching Scheme:
Theory: 4 Hours/Week

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

Prerequisite:
Students should have the knowledge of Database Management Systems and Data warehousing & Data Mining.

Objectives:
1. To understand the basic concepts of big data from both a technical and a business perspective.
2. To introduce the major concepts and components of big data.
3. To understand technical and business professionals who need to understand the different types of big data components and the underlying technology concepts that support big data.
4. To understand concepts of Hadoop, MapReduce, Hadoop filesystems (HDFS).
5. To understand the practical steps needed to develop a MapReduce application and Analytics platforms of Hadoop

CONTENTS

SECTION-A

Unit 1: Fundamentals of Big Data: (06 hours)

Unit 2: Technology Foundations for Big Data: (08 hours)
Digging into Big Data Technology Components: Exploring the Big Data Stack, Layer 0: Redundant Physical Infrastructure, Layer 1: Security Infrastructure, Layer 2: Operational
Virtualization and How It Supports Distributed Computing: Understanding the Basics of Virtualization, Managing Virtualization with the Hypervisor, Abstraction and Virtualization, Implementing Virtualization to Work with Big Data.

**Unit 3: Analytics and Big Data: (06 hours)**
Using Big Data to Get Results, Modifying Business Intelligence Products to Handle Big Data, Studying Big Data Analytics Examples, Big Data Analytics Solutions.
Understanding Text Analytics and Big Data: Exploring Unstructured Data, Understanding Text Analytics, Analysis and Extraction Techniques, Putting Your Results Together with Structured Data, Putting Big Data to Use, Text Analytics Tools for Big Data.
NoSQL Data Management for Big Data: What is NoSQL?, “Schema-less Models”: Increasing Flexibility for Data Manipulation, Key Value Stores, Document Stores, Tabular Stores, Object Data Stores, Graph Databases.

**SECTION-B**

**Unit 4: Hadoop and Map Reduce: (07 hours)**
1. Meet Hadoop, Data, Data Storage and Analysis, Comparison with Other Systems, A Brief History of Hadoop, Apache Hadoop and the Hadoop Ecosystem.
MapReduce: A Weather Dataset, Analyzing the Data with Unix Tools, Analyzing the Data with Hadoop, Scaling Out, Hadoop Streaming, Hadoop Pipes.

**Unit 5: The Hadoop Distributed File system: (06 hours)**

**Unit 6: Framework: (07 hours)**
Pig: Execution Types, Running Pig Programs, Grunt, Pig Latin Editors, An Example, Comparison with Database, Data Processing Operators.
Hive: Hive Services, HiveQL, Tables, Querying Data, Basics of HBase, Zookeeper, Case Studies: Hadoop Usage at Last.fm, Hadoop and Hive at Facebook.

**Text Books:**

2. David Loshin, Big Data Analytics, From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph, Morgan Kaufmann, 2013.
Reference Books:

2. CHUCK LAM, Hadoop in Action, MANNING, Greenwich, 2011

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, 15 marks each.
Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
Final Year Engineering (IT)
Semester – II
Course Code: ITD491, Title: Elective - II Image Processing & Pattern Recognition (IP&PR)

Teaching Scheme:  
Theory: 4 Hours/Week

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

Prerequisite:
The students should have knowledge of Elements of Visual Perception, Basic linear algebra, Fourier transforms, Probability and set theory.

Objectives:
1. Students should be able to understand fundamental concepts of digital image processing and pattern recognition.
2. To provide an introduction to methodologies for digital image processing.
3. Students should understand basic image transforms.
4. Students should get acquainted with real world fields in which pattern recognition is widely used.

CONTENTS

SECTION-A

Unit 1: Digital Image Fundamentals: (8 hrs)

Unit 2:- Image Enhancement: (06 hrs)
Filtering, Using First Order Derivative for (Nonlinear) Image sharpening: The Gradient Image Enhancement by Frequency Domain Methods: Basic steps for Filtering in Frequency Domain. Frequency Domain low pass (Smoothing) and high pass (Sharpening) Filters.

**Unit 3: Image Transforms (06 hrs)**
Introduction, Need for transform, Image transforms, Fourier transform, 2D Discrete Fourier transform, Walsh transform, Hadamard transform, Haar transform, Discrete Cosine transform, KL transform, Singular value decomposition, Comparison of different transforms.

**SECTION-B**

**Unit 4: Image Segmentation: (08 hrs)**
Fundamentals : Point , Line and Edge Detection, Detection of Isolated Points, Line Detection, Edge Models, Basic Edge detection, Canny edge detector classification of edges, edge detection, edge linking, Thresholding: Foundation, Basic Global Thresholding, Optimal global thresholding Multiple Thresholds, Variable , Multivariable Thresholding, Region-Based Segmentation Methods: Region Growing, Region Splitting and Merging, Morphology: Preliminaries, Erosion and Dilation, Opening and Closing. Segmentation Using Morphological Watersheds

**Unit 5: Introduction to Pattern Recognition: (06 hrs)**
Pattern recognition systems, the design cycle, learning and adaption Pattern recognition applications, Pattern Recognition Approaches: The statistical pattern recognition approach, The syntactic pattern recognition approach, the neural pattern recognition approach, Comparing and relating statistical, syntactic and neural approach, Bayes Decision Theory

**Unit 6: Recognition of 2D objects: (06 hrs)**
Image Representation and Description: Representation, Boundary Descriptors, Regional Descriptors, Object Recognition: Introduction, Need for object recognition system, automated object recognition system, Relationship between image processing and object recognition. Pattern and Pattern classes, Selection of measurement parameters, Template-matching based object recognition.

**Text Books:**


Reference Books:

2. B Chanda & Dutta Majumdar, “Digital Image Processing and Analysis”, PHI
3. Earl Gose, Richard Johnsonbaugh, Steve Jost, “Pattern Recognition and Image Analysis”, PHI.

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

Course Code: CSE492
Teaching Scheme:
Theory: - 04 Hours/Week

Title: Elective - II Green IT
Examination Scheme:
Class Test: 20 Marks
Theory Examination (Marks): 80 Marks
Theory Examination (Duration): 03 Hours

Prerequisite
1. 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)

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)

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

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:

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

CONTENTS  

SECTION-A  

Unit 1: Fundamentals of Agile: (6 hours)  

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

**Unit 6: Industry Trends (8 hours)**
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 Schwaber, Mike Beedle Publisher: Pearson Published: 21 Mar 2008.

**Reference Books**


**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, 15 marks each.
Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
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 wire shark 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)

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.
Course Code: 472

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.
Course Code: ITD 473
Title: LAB - VII Big Data Analytics

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: Hadoop: Installation of single node cluster.
2: Hadoop: Installation of multi node cluster.
3: Map Reduce: Write a java program to count a word from the given text.
4: Write a program for text analytics using any one big data analytic tool.
5: NoSQL using Hive Scripting.
6: NoSQL using Pig Scripting.
7: Data Modeling and Visualization.
8: Case study: Hadoop usage at last.fm.
9: Case study: Hadoop and Hive at Facebook.

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

Course Code: ITD474
Title: LAB - VIII Elective - II Image Processing & Pattern Recognition

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

List of experiments:
Minimum 08 assignments should be conducted.
Develop and implement the following programs using C/C++/MATLAB/ JAVA/ .NET on LINUX/Windows environment.

1. Program for Image enhancement using basic intensity operations and Histogram processing.
2. Program to filter an image using averaging, median low pass filter in spatial domain
3. Program to sharpen an image using 2-D Laplacian high pass filter in spatial domain
4. Program for detecting edges in an image using Roberts cross-gradient operator and Sobel operator
5. Program to smooth an image using low pass filter in frequency domain
6. Program to sharpen an image using high pass filter in frequency domain
7. Program for Image transforms
8. Programs for Image segmentations using thresholding,
9. Programs for chain code.

Note: A group of two students will prepare case study and give presentation on any pattern recognition application.

Suggestive list for case study can be
1. Fingerprint Recognition
2. Face Recognition
3. Iris Recognition
4. Mammogram Analysis.
5. ECG Pattern Recognition.
6. EEG Pattern Recognition.
7. Crop forecasting
8. Cloud Pattern Recognition

Term Work:
The term work shall consist of at least 8 experiments/assignments based on the syllabus above and a group of 2 students must prepare case study on any PR application. Assessment of term work should be done as follows

- Continuous lab assessment
- Actual practical performance in Laboratory.
Course Code: ITD474  Title: LAB VIII Elective - II Green IT

Teaching Scheme:  Examination Scheme:
Practical: 2 Hours/Week  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.
Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
Final Year Engineering (IT)
Semester – II

Course Code: ITD474 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.
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.)