Computer Science & Engineering

O P Jindal University, Raigarh (C.G.)

COMPUTER SCIENCE & ENGINEERING

Syllabus of B Tech VII Semester

S.N.	CODE	Board of Study	SUBJECT	Periods per week				Scheme of Examination and Marks				Credits L+(T+P)/2
								PRE**		ESE*	Total Marks	
				L	T	P	C	Mid Sem	TA			
1	CSE4131	CSE	Artificial Intelligence and Soft Computing	3	1	0	4	30	20	50	100	4
2	CSE4132 (1-4)	CSE	Professional Elective - IV (**CSE Annexure - VI**)	3	0	0	3	30	20	50	100	3
3	CSE4133 (1-4)	CSE	Professional Elective - V (**CSE Annexure -VII**)	3	1	0	4	30	20	50	100	4
4	CSE4134 (1-3)	CSE	Elective Lab – III (**CSE Annexure - VIII**)	0	0	3	2	0	30	20	50	2
5	CSE4135	CSE	Minor Project	0	0	8	6	0	50	50	100	6
6	CSE4136	CSE	Industrial Training and Seminar	0	0	2	1	0	15	10	25	1
7	HSS4104	HSS	Humanities & Social Sciences	1	0	0	1	0	15	10	25	1
8	PFD4107	HSS	Professional Development	0	0	1	1	0	15	10	25	1
TOTAL				**10**	**2**	**14**	**22**	**90**	**185**	**250**	**525**	**22**

O P Jindal University, Raigarh (C.G.)

COMPUTER SCIENCE & ENGINEERING

Professional Elective - IV (CSE Annexure - VI)

Sr. No	Courses	Name of the Courses
1	CSE4132 (1)	Big Data Analytics
2	CSE4132 (2)	Introduction to Robotics
3	CSE4132 (3)	Artificial Neural Network
4	CSE4132 (4)	Advance Web Technology

O P Jindal University, Raigarh (C.G.)

COMPUTER SCIENCE & ENGINEERING

Professional Elective - V (CSE Annexure - VII)

Sr. No	Courses	Name of the Courses
1	CSE4133 (1)	Machine Learning
2	CSE4133 (2)	Advanced Computing Paradigm
3	CSE4133 (3)	Software Testing
4	CSE4133 (4)	Data Mining

O P Jindal University, Raigarh (C.G.)

COMPUTER SCIENCE & ENGINEERING

Elective Lab - III (CSE Annexure - VIII)

Sr. No	Courses	Name of the Courses
1	CSE4134 (1)	Big Data Analysis Lab
2	CSE4134 (2)	Artificial Neural Network (ANN) Lab
3	CSE4134 (3)	Advance Web Technology Lab

Semester: VII **Branch: Computer Science & Engineering**

Subject: Artificial Intelligence and Soft Computing **Code: CSE4131**

.....

Course Description:

A unified and unique mathematical treatment of various soft computing techniques for constructing intelligent systems, in modeling, optimization and control. The course covers the theory and applications of neural networks, fuzzy logic, evolutionary strategies and genetic algorithms in developing intelligent systems with examples and practical applications.

Course objectives:

- Introduce the basic principles of AI towards problem solving, inference, perception, knowledge representation and learning. Fundamentals of artificial and neural networks, fuzzy sets and fuzzy logic and genetic algorithms.
- Investigate applications of AI techniques in intelligent agents, expert systems, artificial neural Networks and other machine learning models.
- Explore the current scope, potential, limitations, and implications of intelligent systems.
- To have a basic proficiency in a traditional AI language including an ability to write simple to intermediate programs and an ability to understand code written in that language.

Syllabus:

Unit - I: Overview & Search Techniques:

Introduction to AI, Problem Solving, State space search, Blind search: Depth first search, Breadth first search, Informed search: Heuristic function, Hill climbing search, Best first search, A* & AO* Search, Constraint satisfaction. Game tree, Evaluation function, Mini-Max search, Alpha-beta pruning, Games of chance.

Unit - II: Knowledge Representation (KR):

Introduction to KR, Knowledge agent, Predicate logic, WFF, Inference rule & theorem proving forward chaining, backward chaining, resolution; Propositional knowledge, Boolean circuit agents. Rule Based Systems, Forward reasoning: Conflict resolution, backward reasoning: Use of Back tracking, Structured KR: Semantic Net - slots, inheritance, Frames- exceptions and defaults attached predicates, Conceptual Dependency formalism and other knowledge representations.

Unit - III: Neural Networks

Neuron, Artificial Neuron and its model, activation functions, Neural network architecture: single layer and multilayer feed forward networks, recurrent networks.

Various learning techniques; perception and convergence rule, Auto-associative and hetro-associative memory. Architecture: perceptron model, solution, single layer artificial neural network, multilayer perception model; back propogation learning methods, effect of learning rule co-efficient ;back propagation algorithm, factors affecting backpropagation training, applications.

Unit - IV: Fuzzy Logic

Basic concepts of fuzzy logic, Fuzzy sets and Crisp sets, Fuzzy set theory and operations, Properties of fuzzy sets, Fuzzy and Crisp relations, Fuzzy to Crisp conversion. Membership functions, interference in fuzzy logic, fuzzy if-then rules, Fuzzy implications and Fuzzy algorithms, Fuzzyfications & Defuzzificataions, Fuzzy Controller, Industrial applications.

Unit - V: Genetic Algorithm

Basic concepts, working principle, procedures of GA, flow chart of GA, Genetic representations, (encoding) Initialization and selection, Genetic operators: Crossover, Mutation, Generational Cycle, GA optimization problem, applications.

Course outcomes: After successful completion of the course, students will be able to:

- Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
- Demonstrate proficiency in applying scientific method to models of machine learning and to building intelligent systems through soft computing techniques.
- Recognize the feasibility of applying a soft computing methodology for a particular problem.
- Develop intelligent machines to provide solutions to real world problems, which are not modeled or too difficult to model mathematically.
- Exploit the tolerance for Approximation, Uncertainty, Imprecision, and Partial Truth in order to achieve close resemblance with human like decision making.

Text Books:-

i. Artificial Intelligence by Elaine Rich and Kevin Knight, Tata MeGraw Hill.
ii. Introduction to Artificial Intelligence and Expert Systems by Dan W.Patterson, Prentice Hall of India.
iii. Principles of Soft Computing- S N Sivanandam, S N Deepa, Wiley India, 2007.
iv. Soft Computing and Intelligent System Design -Fakhreddine 0 Karray, Clarence D Silva, Pearson Edition, 2004.

Reference Books:-

i. Principles of Artificial Intelligence by Nils J.Nilsson, Narosa Publishing house.
ii. Programming in PROLOG by Clocksin & C.S. Melish, Narosa Publishing house.
iii. Rule based Expert Systems-A practical Introduction by M. Sasikumar, S.Ramani, et. al., Narosa Publishing House.
iv. "Neural Netowrks" by Siman Haykin, Prentice Hall of India.
v. "Fuzzy Logic with Engineering Applications" by Timothy J. Ross, Wiley India.
vi. "Neural Networks" by Kumar Satish, Tata Mc Graw Hill.
vii. "Neural Networks,Fuzzy Logic and Genetic Algorithm:Synthesis and Applications" by S. Rajsekaran & G.A. Vijayalakshmi Pai, Prentice Hall of India.

Professional Elective-IV (CSE Annexure - VI)

Semester: VII **Branch: Computer Science & Engineering**

Subject: Big Data Analytics **Code: CSE4132(1)**

.....

Course Description:

This course introduces the concepts Big Data and methods required to analyse Big data. It will also include Hadoop, MapReduce, Apache, Pig, Hive, Flume, Sqoop, Zookeeper, Oozie, Spark, Cassandra, Mongo DB.

Course Objectives:

Learning objectives include:

- To understand the competitive advantages of big data analytics & frameworks
- To learn data analysis methods
- To gain knowledge on Hadoop related tools such as Pig, and Hive for big data analytics

Syllabus:

Unit – I: Introduction to Big Data

History, Handling and Processing, Challenges and Problems, Applications; Big Data Vs Traditional Data, Data Warehouses, Data Mining.

Unit - II: Hadoop

Introduction, ecosystem, HDFS, MapReduce, YARN.

Unit - III: Data Analysis

Cluster Analysis, Types of Data in Cluster Analysis, Clustering Methods, Clustering High Dimensional Data, Big data stack.

Unit – IV: Components in Hadoop

HBase, Hive, Pig, Big Data analytics with R.

UNIT – IV: Machine Learning

Machine Learning with Spark**,** noSQL Research Issues in Big Data

Course Outcomes:

Upon successful completion of this course, the student will be able to:

- Analyze data by utilizing various statistical and data mining approaches.
- Perform analytics on real-time streaming data.
- Understand the various NoSql alternative database models.

Text Books:

i. Radha Shankarmani, M. Vijayalakshmi 'Big Data Analytics' Wiley
ii. SimonWalkowiak 'Big Data Analytics with R'
iii. Holden Karau, Andy Konwinski, Patrick Wendell, Matei Zaharia "'Learning Spark: Lightning-Fast Big Data Analysis'

Reference Books:

i. Dt Editorial Services 'Big Data : Black Book'
ii. Thomas A Runkler 'Data Analytics' Springer
iii. Kenneth Cukier and Viktor Mayer-Schönberger 'Big Data: A Revolution That Will Transform How We Live, Work, and Think'

Semester: VII **Branch: Computer Science & Engineering**
Subject: Introduction to Robotics **Code: CSE4132(2)**

.....

Course Description:

This course is a challenging introduction to basic computational concepts used broadly in robotics. Topics include simulation, kinematics, control, optimization, and probabilistic inference. The mathematical basis of each area is emphasized, and concepts are motivated using common robotics applications and programming exercises.

Course Objectives:

At the end of this course the student should be able to understand

- To provide students the understanding of end effectors and robot controls.
- To gain an insight into how Robot Transformations and Sensors work.
- To enable students exploring and designing robot cell design and applications.
- To provide the understanding of Micro/Nano robotic systems.

Syllabus:

Unit - I:

Robot anatomy-Definition, law of robotics, History and Terminology of Robotics-Accuracy and repeatability of Robotics-Simple problems-Specifications of Robot-Speed of Robot-Robot joints and links-Robot classifications-Architecture of robotic systems-Robot Drive systems-Hydraulic, Pneumatic and Electric system.

Unit - II:

Mechanical grippers-Slider crank mechanism, Screw type, Rotary actuators, cam type-Magnetic grippers-Vacuum grippers-Air operated grippers-Gripper force analysis-Gripper design-Simple problems-Robot controls-Point to point control, Continuous path control, Intelligent robot-Control system for robot joint-Control actions-Feedback devices-Encoder, Resolver, LVDT-Motion Interpolations-Adaptive control.

Unit - III:

Robot kinematics-Types- 2D, 3D Transformation-Scaling, Rotation, Translation-Homogeneous coordinates, multiple transformation-Simple problems. Sensors in robot Touch sensors-Tactile sensor – Proximity and range sensors – Robotic vision sensor-Force sensor-Light sensors, Pressure sensors.

Unit - IV:

Robot work cell design and control-Sequence control, Operator interface, Safety monitoring devices in Robot-Mobile robot working principle, actuation using MATLAB, NXT Software Introductions-Robot applications- Material handling, Machine loading and unloading, assembly, Inspection, Welding, Spray painting and undersea robot.

Unit - V:

Micro/Nanorobotics system overview-Scaling effect-Top down and bottom up approach- Actuators of Micro/Nano robotics system-Nanorobot communication techniques-Fabrication of micro/nano grippers-Wall climbing micro robot working principles-Biomimetic robot-Swarm robot-Nanorobot in targeted drug delivery system.

Course Outcomes:

At the end of the course students will be able to

- Describe the different physical forms of robot architectures.
- Analyze manipulation and navigation problems using knowledge of coordinate frames, kinematics, optimization, control, and uncertainty.
- Compute forward and inverse kinematics for a small serial kinematic chain.
- Consider trade-offs among position control, velocity control, and force control when solving a robot control problem.

Text Books:

i. S.R. Deb, Robotics Technology and flexible automation, Tata McGraw-Hill Education.,2009.

ii. Mikell P Groover & Nicholas G Odrey, Mitchel Weiss, Roger N Nagel, Ashish Dutta, Industrial Robotics, Technology programming and Applications, McGraw Hill, 2012.

iii. Richard D. Klafter, Thomas .A, Chri Elewski, Michael Negin, Robotics Engineering an Integrated Approach, Phi Learning, 2009.

Reference Books:

i. Francis N. Nagy, Andras Siegler, Engineering foundation of Robotics, Prentice Hall Inc., 1987.

ii. P.A. Janaki Raman, Robotics and Image Processing and Introduction, Tata McGraw Hill publishing company Ltd., 1995.

iii. Carl D. Crane and Joseph Duffy, Kinematic Analysis of Robot manipulators, Cambridge University press, 2008.

Semester: VII **Branch: Computer Science & Engineering**
Subject: Artificial Neural Network **Code: CSE4132(3)**

.....

Course Descriptions:

The course covers basic neural network architectures and learning algorithms, for applications in pattern recognition, classification, function approximation and sequential decision problems. Three forms of learning (supervised, unsupervised and reinforcement learning) are introduced and applications of these are discussed.

Course Objectives:

- To introduce the neural networks for classification and regression.
- To give design methodologies for artificial neural networks.
- To provide knowledge for network tuning and over fitting avoidance.
- To offer neural network implementations in any suitable platform.
- To demonstrate neural network applications on real-world tasks.

Syllabus:

Unit - I Introduction and ANN Structure:

Biological neurons and artificial neurons, Model of an ANN, Activation functions used in ANNs, Typical classes of network architectures.

Unit - II Learning mechanisms:

Re-visiting vector and matrix algebra, State-space concepts, Concepts of optimization, Error-correction learning, Memory-based learning, Hebbian learning, Competitive learning.

Unit - III Single layer perceptron:

Structure and learning of perceptrons, Pattern classifier - introduction and Bayes' classifiers, Perceptron as a pattern classifier, Perceptron convergence, Limitations of a perceptrons.

Unit - IV Feedforward ANN:

Structures of Multi-layer feedforward networks, Back propagation algorithm, Back propagation - training and convergence, Functional approximation with back propagation, Practical and design issues of back propagation learning.

Unit - V Radial Basis Function Networks and Support vector machine:

Pattern separability and interpolation, Regularization Theory, Regularization and RBF networks, RBF network design and training, Approximation properties of RBF,

Linear separability and optimal hyperplane, Determination of optimal hyperplane, Optimal hyperplane for nonseparable patterns, Design of an SVM, Examples of SVM.

Course Outcomes:

At the end of the course, the student would be able to:

- Learn basic neural network architecture
- Learn basic learning algorithms
- Understand data pre and post processing
- Learn training, verification and validation of neural network models
- Design Engineering applications that can learn using neural networks

Text Books:

i. Simon Haykin, "Neural Networks: A comprehensive foundation", Second Edition, Pearson Education Asia.

ii. Satish Kumar, "Neural Networks: A classroom approach", Tata McGraw Hill, 2004.

Reference Books:

i. Robert J. Schalkoff, "Artificial Neural Networks", McGraw-Hill International Editions, 1997.

Semester: VII **Branch: Computer Science & Engineering**
Subject: Advance Web Technology **Code: CSE4132 (4)**

.....

Course Description:

The goal of the course is to familiarize students with modern Web technologies that contribute to the efficient use of the Internet as a global resource, which means working with different types of data, structured and unstructured, and the development of Web applications that are accessible to a large number of users using different client applications.

Course Objectives:

- Introduce students to utilization of various parts of IDE.
- Introduce students to describe state management techniques to store and transfer page data.
- Introduce students to apply skin and theme to our web application.
- Students will examine and apply website testing, publishing, and maintenance concepts.
- Students will demonstrate an understanding of the use of databases in site development.

Syllabus:

Unit – I:

Website Development: Introduction, Required skills, Domain Name Registration & Privacy, Configure DNS Record on a Hosting Platform, Publishing & Development Tools.

Unit – II: Internet Marketing:

Introduction, OLM Terminology, Online Advertisements, Mobile Advertisements, Search Engine Marketing, E-mail Marketing.

Search Engine Optimization: Introduction, Search Engine, SEO Copywriting, Search Engine Rank, SEO Techniques, SEO-Relevant Filenames, On- Page Optimization, Off- Page Optimization, Mobile SEO.

Unit - III: Web Analytics:

Introduction, Process, Introducing Google Analytics, Needs, Google Analytics setup, Google Analytics layout, Basic Reporting, Basic Campaign and Conversion Tracking.

Unit - IV: Introduction to CMS:

Introduction to Joomla CMS, Installing and Configuring Joomla, New Features of

Joomla CMS.

Joomla Terminology & Concepts: Joomla Frontend and Backend, Menus, Articles, Sections, Categories, Extensions in Joomla (Frontend & Backend), Modules, Components & Plug-in.

Joomla Admin Settings: Global Configuration Settings, User Management in Joomla, Managing Media with Media Manager.

Unit - V:

Cpanel: Overview of cPanel, cpanel steup, Advantages & disadvantages of cpanel, Statistics & Dashboard, User manager, File Manager & permission, FTP, MySql databases & Wizard, phpMyAdmin, Email account, Filezilla FTP client.

Course Outcomes:

After successful completion of this course, student will be able to

- Develop a dynamic webpage by the use of CMS.
- Use critical thinking skills to design and create dynamic Joomla websites.
- Understand and use open source software.
- Install and configure CMS used in web-site development.
- Use Google Analytics and other metrics and tools to monitor progress in achieving search engine marketing goals.

Text Books:

- Jennifer Marriott, Elin Waring, The Official Joomla! Book, 2nd Edition.
- Gradiva Couzin, Jennifer Grappone, Search Engine Optimization: An Hour a Day, 2nd Edition.
- Justin Cutroni, Google Analytics, O'REILLY.

Reference Books:

- Dan Rahmel, Beginning Joomla, 2nd Edition.
- Cory Webb, Beginning Joomla! Web Site Development, O'Reilly Media.
- Mary E. Tyler, Google Analytics, 3rd Edition.
- Todd Kelsey, Introduction to Google Analytics: A Guide for Absolute Beginners, Apress.
- J.D. Rockefeller, Web Hosting Guide for Beginners.

Professional Elective-V(CSE Annexure -VII)

Semester: VII **Branch: Computer Science & Engineering**

Subject: Machine Learning **Code: CSE4133(1)**

.....

Course Descriptions:

With the increased availability of data from varied sources there has been increasing attention paid to the various data driven disciplines such as analytics and machine learning. In this course we intend to introduce some of the basic concepts of machine learning from a mathematically well motivated perspective. We will cover the different learning paradigms and some of the more popular algorithms and architectures used in each of these paradigms.

Course Objectives:

The student should be able to:

- To provide a broad survey of approaches and techniques in machine learning;
- To develop a deeper understanding of several major topics in machine learning;
- To develop the design and programming skills that will help you to build intelligent systems.
- To develop the basic skills necessary to pursue research in machine learning.

Syllabus:

Unit - I: Introduction

Introduction: Basic definitions, types of learning, hypothesis space and inductive bias, evaluation, cross-validation.

Unit - II: Regression

Introduction, Types of regression (Linear, multiple, logistic), Models of Evaluation, Overfit& Underfit.

Unit - III: Neural Networks and Genetic Algorithms

Neural Network Representation, Problems, Perceptrons, Multilayer Networks and Back Propagation Algorithms, Genetic Algorithms.

Unit - IV: Instant Based Learning

K-Nearest Neighbor Learning, Locally weighted Regression, Radial Bases Functions and Case Based Learning.

Unit - V: Bayesian and Computational Learning

Bayes Theorem, Concept Learning, Maximum Likelihood, Minimum Description Length Principle Bayes Optimal Classifier, Naïve Bayes Classifier, Bayesian Belief

Network, EM Algorithm, Probability Learning, Case Study & project development.

Course Outcomes:

At the end of the course, the student should be able to:

- Have a good understanding of the fundamental issues and challenges of machine learning: data, model selection, model complexity etc.
- Have an understanding of the strengths and weaknesses of many popular machine learning approaches.
- Appreciate the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning.
- Be able to design and implement various machine learning algorithms in a range of real-world applications.

Text Books:

i. Tom M. Mitchell, "Machine Learning", McGraw,Hill edition, 1997.
ii. Ethem Alpaydin, "Introduction to Machine Learning (Adaptive Computation and Machine Learning)", The MIT Press 2004

Reference Books:

i. T. Hastie, R. Tibshirani, J. H. Friedman, "The Elements of Statistical Learning", Springer Verlag, 2001.
ii. Pattern recognition and machine learning by Christopher Bishop, Springer Verlag, 2006.

Semester: VII **Branch: Computer Science & Engineering**
Subject: Advanced Computing Paradigm **Code: CSE4133 (2)**

.....

Course Descriptions:

This course is designed to introduce the concepts of Cloud Computing, Grid computing, cluster computing, quantum computing as a new computing paradigm. The course will expose students to different views of understanding the various types of Computing such as theoretical, technical and commercial aspects.

Course Objectives:

- To provide students with the fundamentals and essentials of Grid, Cluster, Quantum and Cloud Computing.
- To provide students a sound foundation of the Cloud computing so that they are able to start using and adopting Cloud Computing services and tools in their real life scenarios.
- To enable students explore important computing driven commercial systems such as Google Apps, Microsoft Azure and Amazon Web Services and other businesses cloud applications.

Syllabus:

Unit - I Grid and Cluster Computing:

Introduction to Grid Computing, Types of grids, Grid Activities, e governance, Grid Applications, Grid Computing Organizations and their roles, Grid Architecture, Grid computing Applications. Cluster Computing-Definition and Architecture of a cluster, Cluster Programming Environment and Tools.

Unit - II Quantum Computing:

History of molecular electronics, Molecular scale electronic, Quantum mechanics, Quantum Gates and Circuits, Implementation of Quantum Computer, Quantum Algorithms.

Unit - III Nano Computing:

Introduction to Nano Computing, Nano Computing Technology, Nano Information Processing, Physics of Nano Computing, Introduction to Molecular & Optical Computing.

Unit - IV Mobile and Pervasive Computing:

Mobile computing, Adaptability, Mobility Management, Context-Aware Computing and its applications, Introduction to Ad Hoc and Sensor Networks, Approaches to

Security.

Unit - V Cloud Computing:

Overview of Cloud Computing, Cloud Components, Applications, Hardware and Infrastructure, Accessing the cloud, Cloud Storage, Future of Cloud Computing.

Course Outcomes:

At the end of the course, the student would be able to: -

- Differentiate different computing techniques.
- Identify the appropriate cloud services for a given application.
- Compare various cloud computing providers/ Software.
- Handle Open Source Cloud Implementation and Administration.
- Analyze authentication, confidentiality and privacy issues in Cloud computing environment.

Text Books:

i. Cloud Computing Principles and Paradigms, Rajkumar Buyya Wiley.
ii. Grid and Cluster Computing, Prabhu, PHI Pub .
iii. Introduction to Quantum Computing, Bhunia, New Age Int. Pub.
iv. Advance Computing Paradigms, Gaurav Solanki, 1st Edition

Reference Books:

i. Grid Computing, Janaki ram, TMH Pub.
ii. Nano Computing, Vishal Sahani & Goswami, TMH Pub.
iii. Fundamentals of Mobile and Pervasive Computing, Adelstein & Gupta, TMH Pub.
iv. Cloud Computing, Velte, McGraw Hill Pub.

Semester: VII **Branch: Computer Science & Engineering**

Subject: Software Testing **Code: CSE4133 (3)**

.....

Course Description:

This course will cover various techniques for test case design, as used for testing of software artifacts including requirements, design and code. The course will expose students to different views of understanding algorithms and techniques for test case design based on graphs, logic, syntax of programming languages and on inputs. Special techniques for testing object-oriented features and web applications will also be discussed. The course will end with symbolic testing techniques. These broadly will cover test cases for both white-box and black-box.

Course Objectives:

- Understand the theoretical aspects of software testing.
- Demonstrate the knowledge of the existing testing methods.
- Demonstrate the knowledge of static and dynamic analysis methods.
- Demonstrate the knowledge of applying testing and analysis methods in software development and maintenance.

Syllabus:

Unit - I:

Introduction to software testing and analysis, Specification-based testing techniques, Test Tools and Automation.

Unit - II:

Code-based testing techniques, Unit testing, Integration testing, OO-oriented testing, Model-based testing, Black-Box and White-Box Testing.

Unit - III:

Static analysis, Dynamic analysis, Regression testing.

Unit - IV:

Methods of test data generation and validation, Program slicing and its application, Reliability analysis, Formal methods; verification methods.

Unit –V

Case studies, generating test cases & report on the modules or projects.

Course Outcomes:

At the end of the course, the student would be able:-

- Realize the importance of software testing
- Apply modern software testing processes in relation to software development
- Create test strategies and plans, design test cases, prioritize and execute them
- Manage incidents and risks within a project
- Contribute to efficient delivery of software solutions and implement improvements in the software development processes.

Text Books:

i. "Software Testing and Quality Assurance: Theory and Practice", Sagar Naik, Piyu Tripathy ;Wiley.

ii. "Introduction to Software Testing", Paul Ammann and Jeff Offutt, Cambridge University Press, 2nd edition, 2016.

Reference Books:

i. "Software Engineering by Rajib Mall", PHI 2014.

ii. "Software Testing: A Craftsman's Approach", Paul C. Jorgensen, Third Edition.

Semester: VII **Branch: Computer Science & Engineering**
Subject: Data Mining **Code: CSE4133 (4)**

.....

Course Description:

This course is designed to introduce the core concepts of data mining, its techniques, implementation and benefits. It will also identify industry branches which most benefit from DM (such as retail, target marketing, fraud protection, health care and science, web and ecommerce). The course also focusses on business solutions and results by presenting detailed case studies from the real world and finish with implementing leading mining tools on real (public domain) data.

Course Objectives:

Learning objectives include:

1. Learning how to gather and analyze large sets of data to gain useful business understanding.
2. Describing and demonstrating basic data mining algorithms, methods, and tools.
3. Identifying business applications of data mining.
4. Overview of the developing areas - web mining, text mining, and ethical aspects of data mining.

Syllabus:

UNIT – 1: Introduction
Data Warehousing – Introduction, Overview and Concepts: Need for data warehousing, Basic elements of data warehousing, Architecture and Infrastructure, Data Design and Data Representation, OLAP in data warehouse – ROLAP, MOLAP, HOLAP, Various Data Warehouse Schemas.

UNIT – 2: Introduction to Data Mining
Data Mining Primitives, Languages, and System Architectures, Knowledge Discovery in Databases (KDD), Frequent Itemset Generation, Representation of Frequent Itemsets, Association rule Generation, Apriori Algorithm, Tree Based Algorithms etc.

UNIT – 3: Classification
Basics, General approach to solve classification problem, Decision Trees, Rule Based Classifiers, Nearest Neighbor Classifiers, Bayesian Classifiers, Estimating Predictive accuracy of classification methods, Improving accuracy of clarification methods, Evaluation criteria for classification methods, Multiclass Problem.

UNIT – 4: Clustering Techniques
Overview, features of cluster analysis, Types of Data and Computing Distance, Types of Cluster Analysis Methods, Partitional Methods, Hierarchical Methods, Density

Based Methods, Quality and Validity of Cluster Analysis

UNIT- 5: Web Mining
Introduction, Web content mining, Text Mining, Unstructured Text, Text clustering, Mining Spatial and Temporal Databases.

Text Books:

1. J. Han & M. Kamber, Data Mining: Concepts and Techniques, Morgan Kaufmann, 2nd Ed, 2006.
2. Data Mining Techniques – Arun K Pujari, University Press.

Reference Books:

1. W. H. Inmon, "Building the Data Warehouse", 3rd edition.
2. Anahory and Murray,Data warehousing in the real world , Pearson Education/Addison Wesley.
3. Margaret Dunham, Data Mining: Introductory and Advanced Topics, Published by Prentice Hall.

Course Outcome:

Upon successful completion of this course, the student will be able to:

1. Gather requirements for data warehousing.
2. Explain data warehouse architecture.
3. Design a physical and dimensional model for data warehousing.
4. Apply Data Mining Query language for various purposes.
5. Cluster/classify the large data set through various techniques.

Elective Lab -III(CSE Annexure - VIII)

Semester: VII **Branch: Computer Science & Engineering**

Subject: Big Data Analysis Lab **Code: CSE4134(1)**

.....

Course Description:

This course introduces the practical approach to analysis of Big Data. Here we also learn Hadoop, MapReduce, Apache, Pig, Hive, Spark.

Course Objectives:

Learning objectives include:

- To process Big Data using different tools
- To learn data analysis methods
- To work with Hadoop, Spark, other tools of Big Data

Experiments:

Big Data analysis using MapReduce, PIG ,HIVE, Spark, or as recommended by the department time to time.

Semester: VII **Branch: Computer Science & Engineering**

Subject: Artificial Neural Network (ANN) Lab **Code: CSE4134(2)**

.....

Course Descriptions:

Following experiments is to perform in ANN lab:

- Artificial Neural Networks and Activation Functions.
- McCulloch and Pitts's Neuron Model.
- Artificial Neural Networks Unsupervised Learning Rules.
- Artificial Neural Networks Supervised (Perceptron & Delta) Learning Rules.
- Artificial Neural Networks Supervised ( ) Learning Rules.
- The Hopfield Neural Model.
- The Hamming Neural Model.
- Bidirectional Associative Memory (BAM).
- Feed Forward ANN Training by using Back Propagation.
- Adaptive Resonance Theory (ART)

As recommended by the department time to time.

Course Objectives:

The objective of this lab is to:

The objective of this lab is to provide hands-on experience in understanding the basics of ANN models, and the pattern recognition tasks they perform. Some applications of ANN for problems in optimization and other domains will also be explored through these lab experiments.

Course Outcomes:

At the end of course students will be able to:

- Write, test, and debug simple Matlab programs.
- Train different neural network model to solve various problems.
- Test and compare the performance of various models to select the better one.
- Propose customized Neural network model for any problem.

Software Requirements:

- Scientific computing tool.

Semester: VII **Branch: Computer Science & Engineering**
Subject: Advance Web Technology Lab **Code: CSE4134(3)**

.....

Course Description:
This lab is designed who desire to manage a CMS site or a section within one, to explore the use of web-based content management systems such as Drupal, WordPress, Joomla and others. Students should be able to learn the fundamentals of planning and coordinating a content calendar, using CMS, implementing SEO best practices, and integration with social media and internet marketing efforts.

Course Objective:
The objective of this lab is to develop an ability to design and implement static and dynamic website.

The following concepts will be covered in the lab:

- Installation and setting up of CMS (Joomla).
- Apache Web server installation and configuration.
- MySQL database installation and configuration.
- Create Menus, Articles, Sections and Categories.
- Create Modules, Components & Plugins.
- Implementing Article Manager, Section Manager, Category Manager Front page & Menu Manager.
- Customizing Joomla Template & Adding Style to Joomla Template.
- Installing Module, Component & Plugins.
- Managing Joomla users, Creating multiple users, Joomla user role & Managing Files.
- SEO for Joomla website.
- Social Media for joomla.

As recommended by the department time to time.

Course Outcomes:
After successful completion of this lab, student will be able to

- Students are able to develop a dynamic webpage by the use of CMS.
- Use critical thinking skills to design and create dynamic Joomla websites.
- Understand and use open source software.

Reference Books:

- Dan Rahmel, Beginning Joomla, 2nd Edition.
- Gradiva Couzin, Jennifer Grappone, Search Engine Optimization: An Hour a

Day, 2nd Edition.

Required Software:

- Windows / Linux Operating system.
- Internet Browsers: Internet Explorer, Mozilla Firefox, Google Chrome etc.
- IDE: Netbeans, Dream viewer, Notepad++ etc.
- CMS: Joomla version 3.7.5

Semester: VII **Branch: Common to All Branch**

Subject: Professional Development **Code: PD4107**

.....

Course Description:

This course provides employability skills training to Engineering Graduates. The employability skills are non-technical skills which contribute to an individual's effective participation in the workplace. The curriculum framework addresses each of the six core HRD components:

- assessment of an individual's assets and limitations,
- development of a positive self-concept,
- development of employability skills,
- development of communication skills,
- development of problem-solving skills, and
- awareness of the impact of information technology in the workplace.

Course Objectives:

The objectives of this course are:

- to make students understand what is expected of new employees
- to make students learn and practice communications skills
- to make students understand key behaviors to satisfy employer expectations
- to make students learn and practice customer service skills
- to make students learn to deal with conflict effectively
- to make students learn financial skills
- to make students learn to create a job-search-ready resume and portfolio.

Syllabus:

Module 1- The Rewards of Working
Module 2- Know Thyself: Assets, Strengths and Choices
Module 3- Personal Power: responding to Challenges
Module 4- Work Search Planning: Laying the Groundwork in the New Millennium
Module 5- Tools for the Journey: Proposals, Resumes and Correspondence
Module 6- Researching Options and Opportunities
Module 7- Contacting Employers: Taking it to the Streets
Module 8- Interviewing with Ease: Mastering the Art of Self-Presentation
Module 9- Researching Options and Opportunities

Course Outcomes:

After successful completion of this lab, student will be able to

- Students are expected to understand difference between employment and employability.
- Students are expected to about their Inner strength and corresponding Opportunities.
- Students are expected to solve problems regarding finding job opportunities.
- Students are expected to represent themselves in a best impressive way in front of Interviewer

Text Books:

i. "Soft Skills" by Hariharan S. , S. N.Sundararajan, and S.P.Shanmugapriya, Mjp Publishers

ii. "Soft Skills: Know Yourself and Know the World" by Alex

iii. "Making Work Work for the Highly Sensitive Person" by Beverly Jaeger, McGraw-Hill Education

Reference Books:

i."Get your First Job: A companion for getting your first job – A Guide to Employability Skills and Career Planning " by A J Balasubramanian and Dr J Sadakkadulla, Amazon Asia-Pacific Holdings Private Limited

ii." Soft Skills at Work: Technology for Career Success " by Beverly Amer, Course Technology Inc

iii." BEST: Basic Employability Skills Training: Volume 1 " by Sally J. Vonada and JoAnn Brunner, CreateSpace Independent Publishing Platform.

Semester: VII **Branch: Common to All Branch**

Subject: Humanities & Social Sciences **Code: HSS4104**

.....

Course Description:

This course is intended to provide Engineering Graduates an overview of public administration, budgeting and financial management. It will provide an overview of the budget process, including the players and the strategies they employ, as well as provide the basic concepts and principles necessary for sound financial management.

Course Objectives:

The students should be able -

- to understand the basics of public administration and purpose of public administration;
- to understand the organisational structure of a Public Sector Department with specific reference to the levels of authority and protocols;
- to understand the predominant political, economic, and social factors that actively engage in the policymaking process, including expert communities, interest groups, the media, agency bureaucrats, and elected officials; and
- To understand the basics of budget preparation and performance evaluation systems for public sector institutions.

Syllabus:

UNIT-I: PUBLIC ADMINISTRATION

Meaning, Nature, Scope and Significance, Public and Private Administration.

UNIT-II: PRINCIPLES OF ORGANIZATION

Hierarchy, Unity of Command, Span of Control, Centralization and Decentralization, Delegation-Supervision & Control.

UNIT-III: ADMINISTRATIVE BEHAVIOUR

Decision- Making, Leadership, Motivation & Communication.

UNIT-IV: INTRODUCTION TO LOCAL GOVERNMENT

Meaning, Nature and Scope of Local Programmes, Growth and Development of Local Government, Rural Development Programmes (73rd Constitutional Amendment Act), Urban Development Programmes (74th Constitutional Amendment Act).

UNIT-V: INTRODUCTION TO PUBLIC FINANCE

Public Financial Management and Budgeting, Government finance at the centre, state and local levels.

Course Outcomes:

- Students are expected to understand administrative principles and the role of legislation in public administration;
- Students are expected to demonstrate proficiency in communicating ideas and perspectives about public administration matters;
- Students are expected to solve problems and make decisions in public governance;
- Students are expected to understand the basic concepts and principles necessary for sound financial management; articulate and apply a public service perspective.

Text Books:

i. Public administration - Mohit Bhattacharya
ii. Civil Services in India: Indian administration - S.R. Maheswari, State
iii. District and local administration: State administration - J.D. Shukla
iv. District administration -- S. S. Khera

Reference Books:

i. Local Government in India - S.R. Maheshwari
ii. Financial administration: Financial administration of India - M.J.K. Thavaray
iii. Fundamentals of Financial Management , Banerjee Bhabotosh, PHI Learning Private Ltd., 1stEdition2008Effective Financial Management , Brian Finch, Kogan Page Limited, 2012