ADIKAVI NANNAYA UNIVERSITY
Course Structure
IV B.Tech – I Semester CSE

(From the admitted batch of 2016-2017 under CBCS Scheme)

Sub Code	SUBJECT	Hrs/Week		Max Marks		Total Marks	Credi
		Theory	Lab	Internal	External		
BTCSE701	WEB TECHNOLOGIES	4	--	25	75	100	4
BTCSE702	BIG DATA ANALYTICS	4	--	25	75	100	4
BTCSE703	ELECTIVE-II (SOFT COMPUTING/ GRID COMPUTING/ CLOUD COMPUTING)	4	--	25	75	100	4
BTCSE704	ELECTIVE-III (SOFTWARE TESTING AND QUALITY ASSURANCE/ CYBER SECURITY AND FORENSICS/ SOCIAL NETWORK ANALYSIS)	4	--	25	75	100	4
BTCSE705	WEB TECHNOLOGIES LAB	--	3	50	50	100	2
BTCSE706	DATA ANALYTICS LAB	--	3	50	50	100	2
BTCSE707	*INDUSTRIAL TRAINING ASSESSMENT	--	--	100	-	100	-
	TOTAL	16	6	300	400	700	20

*Industrial Training Assessment marks will not be considered for SGPA/CGPA calculation.

IV B.Tech – II Semester CSE

(From the admitted batch of 2016-2017 under CBCS Scheme)

Sub Code	SUBJECT	Hrs/Week		Max Marks		Total Marks	Cre
		Theory	Lab	Internal	External		
BTCSE801	BUSINESS INTELLIGENCE AND VISUALIZATION	4	-	25	75	100	4
BTCSE802	ELECTIVE-IV INTERNET OF THINGS/ MACHINE LEARNING/ BLOCK CHAIN TECHNOLOGIES	4	-	25	75	100	4
BTCSE803	PROJECT	-	-	100	100	200	8
	TOTAL	8	-	150	250	400	16

DEAN
Academic Affairs
Adikavi Nannaya University
RAJAHMUNDRY-533 296.

BTCSE701 WEB TECHNOLOGIES

Theory	: 4 Hrs/week	**Credits**	: 4
Int Marks	: 25	**Ext Marks**	: 75

UNIT- I

Introduction: The World Wide Web, Web Browsers, Web Servers, Uniform Resource Locators, Introduction and Web Development Strategies, History of Web and Internet, Protocols governing Web, Connecting to Internet, Introduction to Internet services and tools, Introduction to client-server computing.

Introduction to HTML/XHTML: Origins and Evolution of HTML and XHTML, Basic Syntax of HTML, Standard HTML Document Structure, Basic Text Markup, Images, Hypertext Links, Lists, Tables, Forms, HTML5, Syntactic Differences between HTML and XHTML.

Introduction to Java Script: Objects in Java Script. Dynamic HTML, Java Script – declaring variables, scope of variables, functions, even handlers (onclick, onsubmit....etc). form validations

UNIT- II

XML: Introduction to XML, Defining XML tags, their attributes and values, Document Type Definition, XML Schemes, Document Object Model, XHTML Parsing XML Data – DOM and SAX Parsers in java. XML AJAX A New Approach: Introduction to AJAX. Consuming WEB services in AJAX: (SOAP, WSDL).

Introduction to PERL: Perl language elements, Interface with CGI- A form to mail program, Simple page search

UNIT- III

Introduction to Servlets: Common Gateway Interface (CGI), Life cycle of a Servlet, deploying a servlet, The Servlet API, Reading Servlet parameters, Reading Initialization parameters, Handling Http Request & Responses, Using Cookies and Sessions, connecting to a database using JDBC.

Introduction to JSP: The Anatomy of a JSP Page, JSP Processing, Declarations, Directives, Expressions, Code Snippets, implicit objects, Using Cookies and session for session tracking, connecting to database in JSP.

UNIT- IV

Introduction to PHP: Declaring variables, data types, arrays, strings, operators, expressions, control structures, functions, Reading data from web form controls like text boxes, radio buttons, and lists etc., Handling File Uploads. Connecting to database (MySQL as reference), executing simple queries, handling results, Handling sessions and cookies

File Handling in PHP: File operations like opening, closing, reading, writing, appending, deleting etc. on text and binary files, listing directories.

TEXT BOOKS:

1. Deitel H.M. and Deitel P.J., "Internet and World Wide Web How to program", Pearson International, 2012, 4th Edition. (Ch-1,4,5,6,12,14,26,27)
2. Programming the World Wide Web, Robet W Sebesta, 7ed, Pearson.
3. Advanced Java 2 Platform How to Program, Deitel/Deitel/Santry 3.
4. Java Server Pages –Hans Bergsten, SPD O'Reilly
5. The Complete Reference PHP — Steven Holzner, Tata McGraw-Hill

BTCSE702: BIG DATA ANALYTICS

Theory	: 4 Hrs/week	Credits	: 4
Int Marks	: 25	Ext Marks	: 75

UNIT - I

Introduction to Big Data: Big Data-definition, Characteristics of Big Data (Volume, Variety, Velocity, Veracity, Validity), Importance of Big Data , Patterns for Big Data Development, Data in the Warehouse and Data in Hadoop.
Introduction to Hadoop: Hadoop- definition, Understanding distributed systems and Hadoop, Comparing SQL databases and Hadoop, Starting Hadoop - The building blocks of Hadoop, NameNode, DataNode, Secondary NameNode, JobTracker and Task Tracker.

UNIT II

Real Time Analytics- Examles, What is Apache Spark, Why Spark when Hadoop is there, Spark Features, Getting started with Spark, Spark Eco System, Architecture and its working, Data Structures of Spark, Spark components, Using Spark with Hadoop, Usecase.
MapReduce Programming: Writing basic Map Reduce programs - Getting the patent data set, constructing the basic template of a Map Reduce program, Counting things.

UNIT III

Streaming in Spark, Streaming features, Streaming Fundamentals. Use case on streaming. Machine Learning, Spark MLlib Overview, Tools, Algorithms-Classification, Regression, Clustering, Dimensionality Reduction, Feature Extraction.
MapReduce Advanced Programming- Chaining Map Reduce jobs, joining data from different sources. Usecase.

UNIT IV

Graph Representation in MapReduce: Modeling data and solving problems with graphs, Shortest Path Algorithm, Friends-of-Friends Algorithm, PageRank Algorithm, Bloom Filters.
Graph Analytics in Spark, Spark GraphX, GraphX features, GraphX Examples, Usecase.
Programming with RDDs-Baiscs, Creating RDDs, Operations, Passing Functions to Spark, Common Transformations and Actions, Persistence, Adding Schemas to RDDs, RDDs as Relations, Creating Pairs in RDDs, Transformations and actions on RDDs.
Spark SQL, Overview, Libraries, Features, Querying using Spark SQL.

TEXT BOOKS:

1. Understanding Big Data Analytics for Enterprise Class Hadoop and Streaming Data by Dirk deRoos, Chris Eaton, George Lapis, Paul Zikopoulos, Tom Deutsch, 1st Edition, TMH,2012.
2. Learning Spark: Learning Big Data Analysis: Karau etc., O'reilly Publications. Hadoop in Action by Chuck Lam, MANNING Publishers.
3. Hadoop in Practice by Alex Holmes, MANNING Publishers

REFERENCE BOOKS:

1. Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'reilly
2. Big Java Fourth Edition Cay Horstmann Wiley, John Wiley & Sons
3. Mining of massive datasets, AnandRajaraman, Jeffrey D Ullman, Wiley Publications.

BTCSE703 SOFT COMPUTING(Elective-II)

Theory	: 4 Hrs/week	Credits	: 4
Int Marks	: 25	Ext Marks	: 75

UNIT I

Soft Computing: Introduction to Fuzzy Computing, Neural Computing, Genetic Algorithms, Associative Memory, Adaptive Resonance Theory, Different Tools and Techniques, Usefulness and Applications.

Fuzzy Sets and Fuzzy Logic: Introduction, Fuzzy Sets Versus Crisp Sets, Operations on Fuzzy Sets, Extension Principle, Fuzzy Relations and Relation Equations, Fuzzy Numbers, Linguistic Variables, Fuzzy Logic, Linguistic Hedges, Applications.

UNIT II

Interference in fuzzy logic: fuzzy if-then rules, Fuzzy implications and Fuzzy algorithms, Fuzzifications and Defuzzification, Fuzzy Controller, Fuzzy Controllers, Fuzzy Pattern Recognition, Fuzzy Image Processing, Fuzzy Database.

Artificial Neural Network: Introduction, Artificial Neuron and its model, activation functions, Neural network architecture: single layer and multilayer feed forward networks, re-current networks. Various learning techniques, perception and convergence rule, Auto-associative and hetro-associative memory , Hebb's Learning, Adaline, Perceptron.

UNIT III

Multilayer Feed Forward Network: Back Propagation Algorithms, Different Issues Regarding Convergence of Multilayer Perceptron, Competitive Learning, Self-Organizing, Feature Maps, Adaptive Resonance Theory, Associative Memories, Applications.

Evolutionary and Stochastic Techniques: Genetic Algorithm (GA), Genetic Representations, (Encoding) Initialization and Selection, Different Operators of GA, Analysis of Selection Operations, Hypothesis of Building Blocks, Schema Theorem and Convergence of Genetic Algorithm, Simulated Annealing and Stochastic Models, Boltzmann Machine, Applications.

UNIT IV

Rough Set: Introduction, Imprecise Categories Approximations and Rough Sets, Reduction of Knowledge, Decision Tables and Applications.

Hybrid Systems: Neural-Network-Based Fuzzy Systems, Fuzzy Logic-Based Neural Networks, Genetic Algorithm for Neural Network Design and Learning, Fuzzy Logic and Genetic Algorithm for Optimization, Applications

TEXT BOOKS:
1. Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis and Applications, S. Rajsekaran and G.A. VijayalakshmiPai, Prentice Hall of India.
2. Rough Sets, Z.Pawlak, Kluwer Academic Publisher, 1991.
3. Intelligent Hybrid Systems, D. Ruan, Kluwer Academic Publisher, 1997

REFERENCE BOOKS:
1. Artificial Intelligence and Intelligent Systems, N.P.Padhy, Oxford University Press.
2. Neural Fuzzy Systems, Chin-Teng Lin & C. S. George Lee, Prentice Hall PTR.
3. Learning and Soft Computing, V. Kecman, MIT Press, 2001
4. Fuzzy Sets and Fuzzy Logic, Klir& Yuan, PHI, 1997

BTCSE703 GRID COMPUTING(Elective-II)

Theory : 4 Hrs/week
Int Marks : 25

Credits : 4
Ext Marks : 75

UNIT I

Introduction : Evolution of Distributed computing: Scalable computing over the Internet – Technologies for network based systems – clusters of cooperative computers – Grid computing Infrastructures – cloud computing – service oriented architecture – Introduction to Grid Architecture and standards – Elements of Grid – Overview of Grid Architecture.

UNIT II

Grid Services and virtualization : Introduction to Open Grid Services Architecture (OGSA) – Motivation – Functionality Requirements – Practical & Detailed view of OGSA/OGSI – Data intensive grid service models – OGSA services. Cloud deployment models: public, private, hybrid, community

Categories of Cloud Computing: Everything as a service: Infrastructure, platform, software – Pros and Cons of cloud computing – Implementation levels of virtualization – virtualization structure – virtualization of CPU, Memory and I/O devices – virtual clusters and Resource Management – Virtualization for data centre automation.

UNIT III

Programming Model : Open source grid middleware packages – Globus Toolkit (GT4) Architecture , Configuration – Usage of Globus – Main components and Programming model – Introduction to Hadoop Framework – Mapreduce, Input splitting, map and reduce functions, specifying input and output parameters, configuring and running a job – Design of Hadoop file system, HDFS concepts, command line and java interface, dataflow of File read & File write.

UNIT IV

Security: Trust models for Grid security environment – Authentication and Authorization methods – Grid security infrastructure – Cloud Infrastructure security: network, host and application level – aspects of data security, provider data and its security, Identity and access management architecture, IAM practices in the cloud, SaaS, PaaS, IaaS availability in the cloud, Key privacy issues in the cloud.

TEXT BOOKS:
1. Kai Hwang, Geoffery C. Fox and Jack J. Dongarra, "Distributed and Cloud Computing: Clusters, Grids, Clouds and the Future of Internet", First Edition, Morgan Kaufman Publisher, an Imprint of Elsevier, 2012.

REFERENCE BOOKS:
1 . Jason Venner, "Pro Hadoop- Build Scalable, Distributed Applications in the Cloud", A Press, 2009
2. Tom White, "Hadoop The Definitive Guide", First Edition. O□Reilly, 2009.
3. Bart Jacob (Editor), "Introduction to Grid Computing", IBM Red Books, Vervante, 2005
4. Ian Foster, Carl Kesselman, "The Grid: Blueprint for a New Computing AA
5.Frederic Magoules and Jie Pan, "Introduction to Grid Computing" CRC Press. 2009.

BTCSE703 CLOUD COMPUTING(Elective-II)

Theory	: 4 Hrs/week	Credits	: 4
Int Marks	: 25	Ext Marks	: 75

UNIT - I

Introduction: Overview, Peer-to-Peer Systems, Cloud Computing-Delivery Models. services, Ethical Issues and Vulnerabilities, Overview of Parallel and Distributed Systems.
Cloud Infrastructure: Cloud Computing (At Amazon, At Google, Microsoft Windows Azure), Private Clouds, Cloud Storage, Cloud Computing Interoperability (The Intercloud), Responsibility Sharing Between User and Cloud Service Provider.
Cloud Computing (Applications and Paradigms): Challenges, Architectural Styles, Workflows, The Zoo Keeper, The MapReduce Programming Model, High Performance Computing on Cloud.

UNIT - II

Cloud Resource Virtualization: Layering and Virtualization, Virtual Machines. Full Virtualization and Para virtualization, Hardware Support for Virtualization.
Cloud Resource Management and Scheduling: Policies and Mechanisms for Resource Management, Applications of Control Theory to Task Scheduling on a Cloud, Stability of a Two-Level Resource Allocation Architecture, Resource Bundling(Combinatorial Auctions for Cloud Resources), Scheduling Algorithms for Computing Clouds, Fair Queuing, Start-Time Fair Queuing, Cloud Scheduling Subject to Deadlines, Scheduling MapReduce Applications Subject to Deadlines.

UNIT - III

Storage System: The Evolution, Storage Models, File Systems, and Databases, Distributed File Systems, General Parallel File Systems, Google File Systems, Apache Hadoop, Locks and Chubby, BigTable, Megastore.
Cloud Security: Security Risks, Security (The Top Concern for Cloud Users), Privacy and Privacy Impact Assessment, Trust, OS Security, VM Security, Security of Virtualization. Xoar: Breaking the Monolithic Design of the TCB.

UNIT -IV

Cloud Application Development: Amazon Web Services: EC2 Cloud Application. How to install Hadoop in Eclipse on a Windows System, Cloud-Based Simulation of a Distributed Trust Algorithm.
Case Study: The GrepTheWeb Application, Xen, a VMM Based on Para virtualization, Migrating an enterprise IT System to IaaS.

TEXT BOOKS:
1. Cloud Computing: Theory and Practice, Dan C. Marinescu, Morgan Kaufmann, Elsevier.

REFERENCE BOOKS:

1. Distributed and Cloud Computing, Kai Hwang, Geoffrey C.Fox, Jack J.Dongarra. Morgan Kaufmann, 1st Edition, 2011.
2. Cloud Computing-A Practical Approach, Anthony T. Velte, Toby J. Velte. Robert Elsenpeter. McGrawHill.

BTCSE704 SOFTWARE TESTING AND QUALITY ASSURANCE(Elective-III)

Theory   : 4 Hrs/week   Credits   : 4

Int Marks   : 25   Ext Marks   : 75

UNIT I

Basic concepts of quality and testing: Quality revolution, Software Quality, Role of testing, Verification and validation, Failure, Error, Fault and Defect, Objectives of testing, What is a Testcase, Expected Outcome, Testing activities, Test Levels, Sources of information for Test Case selection.

Unit testing: Unit testing basics, Static Unit testing, Defect prevention, Dynamic unit testing, Mutation Testing, Debugging, Unit testing in extreme programming, Tools for unit testing.

Control flow testing: Outline of Control flow testing, Control flow graph and Paths, Path Selection Criteria: All-path coverage criterion, Statement coverage criterion, Branch coverage criterion, Predicate coverage criterion, Generating test input, test data selection.

UNIT II

Data flow testing: General idea, Data flow anomaly, Data flow graph, Data flow terms, Data flow testing criteria.

Domain testing: Domain error, Testing for domain errors, Sources of domains, Types of domain errors, ON and OFF points, Test selection criterion.

Integration testing: Concept of integration testing, Different types of interfaces and interface errors, System integration techniques: Incremental, Top down, Bottom up, Sandwich and Big Bang, Test plan for system integration, Off-the-shelf component integration.

UNIT III

Software Quality Assurance (SQA): The uniqueness of SQA, The environments for which SQA methods are developed, what is software, Software errors, faults and failures, classification of the causes of software errors, software quality-definition, SQA -definition and objectives.

Software quality factors: Classification of software requirements into software quality factors: Product operation, product revision, Product transition.

Software quality assurance system: The SQA system-an SQA architecture: Pre-project components, Software project life cycle components, Infrastructure components, Management SQA components.

UNIT IV

CASE tools for software quality: What is a CASE tool? The contribution of CASE tools to software product quality, The contribution of CASE tools to improved project management.

Software quality metrics: Objectives of measurement, Classification of quality metrics, Process metrics, Product metrics, Implementation of quality metrics, Limitations of metrics.

Quality management standards:
The scope of quality management standards, ISO 9001 and ISO 9000-3, Capability maturity models-CMM and CMMI assessment methodology, The Bootstrap methodology, The SPICE project and the ISO/IEC 15504 software process assessments standard.

Text books:
1. Software Testing and Quality Assurance. Kshirasagar Nail, PriyadarshiTripathy, John Wiley Publication.
2. Software Quality Assurance: From theory to implementation. Daniel Galin, Pearson Adison Wesley Publication.

BTCSE704 CYBER SECURITY AND FORENSICS(Elective-III)

Theory : 4 Hrs/week
Int Marks : 25

Credits : 4
Ext Marks : 75

UNIT I

Network and Security Concepts-Information Assurance Fundamentals, Basic Cryptography, Symmetric Encryption, Public Key Encryption, The Domain Name System (DNS), Firewalls, Virtualization, Radio-Frequency Identification.

Microsoft Windows Security Principles-Windows Tokens, Window Messaging, Windows Program Execution, Windows Firewall

UNIT II

Attacker Techniques and Motivations-How Hackers Cover Their Tracks (Antiforensics), Tunneling Techniques.

Fraud Techniques- Phishing, Smishing, Vishing and Mobile Malicious Code, Rogue antivirus, Click fraud, Threat infrastructure.

UNIT III

Exploitation- Techniques to Gain a Foothold- Shellcode, Integer Overflow Vulnerabilities, Format String Vulnerabilities, SQL Injection, Malicious PDF Files, Web Exploit Tools, DoS Conditions, Brute Force and Dictionary Attacks.

Misdirection, Reconnaissance, and Disruption Methods- Cross-Site Scripting (XSS), Social Engineering, WarXing, DNS Amplification Attacks.

UNIT IV

Computer Forensics-Introduction, The History of Forensics, The Objectives of Computer Forensics, Computer-Facilitated Crimes, Reasons for Cyber Attacks, Computer Forensic Flaws and Risks, Computer Forensics, The Computer Forensics Lab, Laboratory Strategic Planning for Business, Elements of Facilities Build-out, Electrical and Power Plant Considerations, Essential Laboratory Tools.

TEXT BOOKS:

1. Cyber Security Essentials, James Graham, Ryan Olson & Richard Howard, CRC Press, Taylor & Francis group
2. The Official CHFI Study Guide for Computer Hacking Forensic Investigator by Dave Kleiman

REFERENCE BOOKS:

1. Security Engineering, Ross J Anderson, 2/e , Wiley Publishing Inc.
2. Computer Forensics Investigating Network intrusion & Cyber crime, EC-Council Press.
3. Digital Forensics with Open Source Tools, Cory Altheide, Harlan Carvey, Ray Davidson.

BTCSE704 SOCIAL NETWORK ANALYSIS(Elective-III)

Theory	: 4 Hrs/week	Credits	: 4
Int Marks	: 25	Ext Marks	: 75

UNIT I

INTRODUCTION : Introduction to Semantic Web: Limitations of current Web - Development of Semantic Web - Emergence of the Social Web - Social Network analysis: Development of Social Network Analysis - Key concepts and measures in network analysis - Electronic sources for network analysis: Electronic discussion networks, Blogs and online communities - Web-based networks - Applications of Social Network Analysis.

UNIT II

MODELLING, AGGREGATING AND KNOWLEDGE REPRESENTATION : Ontology and their role in the Semantic Web: Ontology-based knowledge Representation - Ontology languages for the Semantic Web: Resource Description Framework - Web Ontology Language - Modelling and aggregating social network data: State-of-the-art in network data representation - Ontological representation of social individuals - Ontological representation of social relationships - Aggregating and reasoning with social network data - Advanced representations.

UNIT III

EXTRACTION AND MINING COMMUNITIES IN WEB SOCIAL NETWORKS : Extracting evolution of Web Community from a Series of Web Archive - Detecting communities in social networks - Definition of community - Evaluating communities - Methods for community detection and mining - Applications of community mining algorithms - Tools for detecting communities social network infrastructures and communities - Decentralized online social networks - MultiRelational characterization of dynamic social network communities.

UNIT IV

PREDICTING HUMAN BEHAVIOUR AND PRIVACY ISSUES : Understanding and predicting human behaviour for social communities - User data management - Inference and Distribution - Enabling new human experiences - Reality mining - Context - Awareness - Privacy in online social networks - Trust in online environment - Trust models based on subjective logic - Trust network analysis - Trust transitivity analysis - Combining trust and reputation - Trust derivation based on trust comparisons - Attack spectrum and countermeasures. **VISUALIZATION AND APPLICATIONS OF SOCIAL NETWORKS :** Graph theory - Centrality - Clustering - Node-Edge Diagrams - Matrix representation - Visualizing online social networks, Visualizing social networks with matrix-based representations - Matrix and Node-Link Diagrams.

TEXT BOOKS:

1. Peter Mika, ―Social Networks and the Semantic Web‖ , First Edition, Springer 2007.
2. Borko Furht, ―Handbook of Social Network Technologies and Applications‖ . 1st Edition, Springer, 2010

REFERENCES:

1. Guandong Xu ,Yanchun Zhang and Lin Li, ―Web Mining and Social Networking – Techniques and applications☐, First Edition, Springer, 2011.
2. Dion Goh and Schubert Foo, ―Social information Retrieval Systems: Emerging Technologies and Applications for Searching the Web Effectively☐, IGI Global Snippet, 2008.
3. Max Chevalier, Christine Julien and Chantal Soulé-Dupuy, ―Collaborative and Social Information Retrieval and Access: Techniques for Improved user Modelling☐. IGI Global Snippet, 2009.
4. John G. Breslin, Alexander Passant and Stefan Decker, ―The Social Semantic Web☐, Springer, 2009.

BTCSE705 WEB TECHNOLOGIES LAB

		Credits	: 2
Theory	: 4 Hrs/week	Ext Marks	: 50
Int Marks	: 50		

List of Experiments:

1. Create web pages for an application demonstrating the working of different features of HTML and DHTML.
2. Demonstrate the use of CSS in organizing the layout of WebPages

Implement at least two Java Script programs to demonstrate the working of

3. Conditional statements
4. Looping statements.
5. Arrays
6. Functions.
7. Event handling
8. Validation controls.

Develop simple applications for the following

9. Exercise client server programming using Java Script, Servlets, ASP, JSP
10. Create a web application with database connectivity and work on different queries for data manipulation.
11. Implement the following:

Perl scripting

PHP

Python.

REFERENCE BOOKS:

1. Web Technologies, Godbole, Kahate, 2nd Ed., TMH
2. Internet & World Wide Web How to program, Dietel & Deitel Fourth Edition, PHI
3. Web Programming, building internet applications, 2nd Ed., Chris Bates, Wiley Dream tech
4. The complete Reference HTML and DHTML, Thomas A. Powey
5. Core Servlets and Java Server Pages, Marty Hall Larry Brown, Sec

BTCSE706 DATA ANALYTICS LAB

Theory   : 4 Hrs/week   Credits   : 2
Int. Marks   : 50   Ext. Marks : 50

List of Experiments:

1. Install Hadoop
2. Install Spark on top of Hadoop
3. Learn Basic commands and functions in Spark
4. Execute a Word Count example in Spark Shell by creating RDDs.
5. Design a Real Time Earthquake Detection Model to send life saving alerts, which should improve its machine learning to provide near real-time computation results.
6. Design a Twitter Sentiment Analysis System where we populate real-time sentiments for crisis management, service adjusting and target marketing.
7. Build a Movie Recommendation System which recommends movies based on a user's preferences using Apache Spark.
8. Write a User Defined Function to convert a given text to Uppercase.
9. Analyse Real-Time Flight data using Spark GraphX, provide near real-time computation results.
10. Use Google Data Studio to visualize above analysis. Google Data Studio is a product under Google Analytics 360 Suite. Use Geo Map service to map the Airports on their respective locations on the USA/India map and display the metrics quantity.

1. Display the total number of flights per Airport
2. Display the metric sum of Destination routes from every Airport
3. Display the total delay of all flights per Airport

Course Structure and Syllabus

IV BTech – II Semester CSE

(From the admitted batch of 2016-207 under CBCS Scheme)

Sub Code	SUBJECT	Hrs/Week		Max Marks		Total Marks	Credits
		Theory	Lab	Internal	External		
BTCSE801	BUSINESS INTELLIGENCE AND VISUALIZATION	4	-	25	75	100	4
BTCSE802	ELECTIVE-IV (INTERNET OF THINGS/ MACHINE LEARNING/ BLOCK CHAIN TECHNOLOGIES)	4	-	25	75	100	4
BTCSE803	PROJECT	-	-	100	100	200	8
	TOTAL	8	-	150	250	400	16

BTCSE 801 BUSSINESS INTELLIGENCE AND VISUALIZATION

Theory :4 Hrs/Week

Internal:25

Credits :4

External : 75 Marks

UNIT I

Business intelligence

Effective and timely decisions – Data, information and knowledge – Role of mathematical models – Business intelligence architectures: Cycle of a business intelligence analysis – Enabling factors in business intelligence projects – Development of a business intelligence system – Ethics and business intelligence.

UNIT II

Knowledge delivery

The business intelligence user types, Standard reports, Interactive Analysis and Ad Hoc Querying, Parameterized Reports and Self-Service Reporting, dimensional analysis, Alerts/Notifications, Visualization: Charts, Graphs, Widgets, Scorecards and Dashboards, Geographic Visualization, Integrated Analytics, Considerations: Optimizing the Presentation for the Right Message.

UNIT III

Efficiency

Efficiency measures – The CCR model: Definition of target objectives- Peer groups – Identification of good operating practices; cross efficiency analysis – virtual inputs and outputs – Other models. Pattern matching – cluster analysis, outlier analysis

UNIT IV

Business intelligence applications

Marketing models – Logistic and Production models – Case studies.

Future of business intelligence

Future of business intelligence – Emerging Technologies, Machine Learning, Predicting the Future, BI Search & Text Analytics – Advanced Visualization – Rich Report, Future beyond Technology.

TEXT BOOK:
1. Efraim Turban, Ramesh Sharda, Dursun Delen, "Decision Support and Business Intelligence Systems", 9th Edition, Pearson 2013.

REFERENCE BOOKS:
1. Larissa T. Moss, S. Atre, "Business Intelligence Roadmap: The Complete Project Lifecycle of Decision Making", Addison Wesley, 2003.
2. Carlo Vercellis, "Business Intelligence: Data Mining and Optimization for Decision Making", Wiley Publications, 2009.
3. David Loshin Morgan, Kaufman, "Business Intelligence: The Savvy Manager's Guide", Second Edition, 2012.
4. Cindi Howson, "Successful Business Intelligence: Secrets to Making BI a Killer App", McGraw-Hill, 2007.
5. Ralph Kimball , Margy Ross , Warren Thornthwaite, Joy Mundy, Bob Becker, "The Data Warehouse Lifecycle Toolkit", Wiley Publication Inc.,2007.

BTCSE 802 INTERNET OF THINGS (Elective-IV)

Theory	:4 Hrs/week	Credits	:4
Int Marks	:25	Ext Marks	:75

Introduction to Internet of Things: Definition & Characteristics of IoT, Physical Design of IoT Logical Design of IoT, IoT Enabling Technologies, IoT Levels & Deployment Templates IoT Use cases: Home, Government, Cities, Environment, Energy systems, Logistics, Agriculture, Health & Lifestyle

UNIT – II

IOT & M2M: Introduction, M2M, Difference between IoT and M2M, SDN and NFV for IoT, 1 Need for IoT Systems Management, Simple Network Management Protocol (SNMP), Limitations of SNMP, Network Operator Requirements, NETCONF, YANG, IoT Systems Management with NETCONF-YANG

UNIT – III

IoT Platforms Design Methodology: IoT Design Methodology, Case Study on IoT System for Weather Monitoring, Motivation for Using Python, IoT Systems - Logical Design using Python , Installing Python , Python Data Types & Data Structures ,Control Flow , Functions, Modules, Packages , File Handling l, Date/Time Operations , Classes ,Python Packages of Interest for IoT

UNIT – IV

IoT Physical Devices & Endpoints: Raspberry Pi , About the Board , Linux on Raspberry Pi , Raspberry Pi Interfaces , Programming Raspberry Pi with Python , Other IoT Devices, IoT Physical Servers & Cloud Offerings , Introduction to Cloud Storage Models & Communication APIs , WAMP - AutoBahn for IoT , Xively Cloud for IoT , Python Web Application Framework - Django .

TEXT BOOK:
1. Internet of Things, A.Bahgya and V.Madisetti, Univesity Press, 2015

REFERENCE BOOK:
1. Fundamentals of Python, K.A.Lambert and B.L.Juneja, Cengage Learning, 2012

BTCSE802: MACHINE LEARNING (Elective-IV)

Theory : 4 Hrs/week
Int Marks : 25
Credits : 4
Ext Marks : 75

UNIT - I

Introduction - Well-posed learning problems, Designing a learning system, Perspectives and issues in machine learning Concept learning and the general to specific ordering – Introduction, A concept learning task, Concept earning as search, Find-S: finding a maximally specific hypothesis, Version spaces and the candidate elimination algorithm, Remarks on version spaces and candidate elimination, Inductive bias

UNIT - II

Decision Tree learning – Introduction, Decision tree representation, Appropriate problems for decision tree learning, The basic decision tree learning algorithm, Hypothesis space search in decision tree learning, Inductive bias in decision tree learning, Issues in decision tree learning
Artificial Neural Networks – Introduction, Neural network representation. Appropriate problems for neural network learning, Perceptions, Multilayer networks and the back propagation algorithm, Remarks on the back propagation algorithm, An illustrative example face recognition Advanced topics in artificial neural networks

UNIT - III

Bayesian learning – Introduction, Bayes theorem, Bayes theorem and concept learning, Maximum likelihood and least squared error hypotheses, Maximum likelihood hypotheses for predicting probabilities, Minimum description length principle, Bayes optimal classifier, Gibs algorithm, Naïve Bayes classifier, An example learning to classify text, Bayesian belief networks The EM algorithm
Instance-Based Learning - Introduction, k -Nearest Neighbour Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Remarks on Lazy and Eager Learning

UNIT - IV

Genetic Algorithms – Motivation, Genetic Algorithms, An illustrative Example. Hypothesis Space Search, Genetic Programming, Models of Evolution and Learning, Parallelizing Genetic Algorithms
Learning Sets of Rules – Introduction, Sequential Covering Algorithms, Learning Rule Sets: Summary, Learning First Order Rules, Learning Sets of First Order Rules: FOIL. Induction as Inverted Deduction, Inverting Resolution

TEXT BOOKS:
1.Machine Learning – Tom Mitchell, McGraw Hill Education; First edition (1 July 2017) ISBN-10:1259096955
2.Machine Learning: An Algorithmic Perspective, Second Edition, Stephen Marsland. Taylor & Francis (CRC) 2014. ISBN-13: 978-1-4665-8333-7 (eBook - PDF)

REFERENCE BOOKS:
1.Machine Learning Methods in the Environmental Sciences, Neural Networks, William WHsieh, Cambridge Univ Press. 2009. ISBN-13 978-0-511-59557-8
2.R ichard o. Duda, Peter E. Hart and David G. Stork, pattern classification, John Wiley & SonsInc., 2001. ISBN: 978-0-471-05669-0
3.Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press. 1995.ISBN-10: 0-387-31073-8
4.Machine Learning by Peter Flach, Cambridge. 2012. ISBN 978-1-107-09639

BTCSE802: BLOCKCHAIN TECHNOLOGY AND APPLICATIONS (Elective-IV)

Theory : 4 Hrs/week	Credits : 4
Int Marks : 25	Ext Marks : 75

UNIT – I

Introduction to Blockchain: The History of Blockchain,, Decentralisation of Blockchain. Block In a Blockchain, Distributed Ledger, Permission less and Permissioned Blockchains. The Longest Chain of Blockchain, Basic Distributed System Concepts, Distributed Consensus, Byzantine Fault Tolerant Consensus Methods.

UNIT – II

Cryptography in Blockchain: Objectives of Cryptography, Properties of a Hash Function, Cryptographic Hash Function, Hash Pointer, Merkle Tree, Symmetric Key Cryptography – DES, AES; Asymmetric Key Cryptography – RSA; Digital Signatures, SHA256, Elliptic Curve Cryptography Algorithm

UNIT – III

Bitcoin-Cryptocurrency : Bitcoin Transaction Life Cycle, Types of Transaction. UTXO, The Genesis Block, Mining, Task of Miners, Proof of Work, Mining Algorithm, Bitcoin Network, Bitcoin Scripts, Bitcoin Payments, Alternative Coins

Hyperledger Fabric: Architecture, Transaction Flow in Fabric, Channels in Fabric, Fabric Network setup.

UNIT – IV

Usecases of Blockchain: Blockchain in Financial Service, Blockchain inSupply chain, Blockchain in Healthcare, Blockchain in Energy Markets, Blockchain In Media. Preventing Cybercrime through Blockchain, Blockchain for e-Governance, Blockchain for Tax payments, Blockchain for Land Registry Records, Blockchain in IoT

TEXT BOOK:
1.S Shukla, M Dhawan, S Sharma, S Venkatesan, "Blockchain Technology: Cryptocurrency and Applications" Oxford University Press, 2019
2. Aravind Narayanan, Joseph B, Edward F, "Bitcoin and Cryptocurrency Technologies", Princeton University Press.
3. Imran Bashir, "Mastering Blockchain" Packt Publishing, Birmingham, UK
3. Blockchain Architecture Design and Usecases, NPTEL Course

REFERENCE BOOKS:
1. Josh Thompson, "The Blockchain for Beginnings, Guild to Blockchain Technology and Blockchain Programming" , Create Space Independent Publishing Platform, 2017.
2. Andreas Antonopoulus, "Mastering Bitcoin: Unlocking Digital Cryptocurrencies"
3. Hyperledger Fabric www.hyperledger.org/projects

ADIKAVI NANNAYA UNIVERSITY

UNIVERSITY COLLEGE OF ENGINEERING

MOOCS Guidelines for B.Tech Course

1. A student shall select any one course of his/her choice from the list of courses specified in the course structure as approved of 30 Hrs or 4 weeks duration.

2. A student can complete the course at his/her own place, under the guidance of a faculty member.

3. The assessment of MOOC is through continuous internal assessment for 50 Marks with the breakup as follows.

   a. Assignment - 5M

   b. Online quiz - 10M (Organized by the concerned faculty)

   c. Certification – 10M (NPTEL, Swayam, Edx, Course era, Udemy or any other MOOC Platform) or participation certificate in any workshop/conference in IITs/ NITs/Premier Institute/Industry of not less than 3 days.

   d. Internal Assessment – 25M (Exam to be conducted at the end of the course)

4. Marks acquired by the students will be submitted along with the Internal Marks of Practical Exams duly signed by concerned faculty and Head of the Department.

5. Though 2 credits of 50 marks are allotted for MOOCS Course they are not included in SGPA Calculation

6. Producing of Course Completion Certificate is mandatory by every student by the end of semester where the MOOCS Course is opted

7. As MOOC aligns closer with Practical Exam, Pass or Fail status in the MOOC will be same as those of Practical Exam.

8. It is not mandatory to specify in the marks memo the course in which certification is obtained as the courses change from year to year.

9. The above guidelines are subject to change from time to time to comply with the UGC/AICTE guidelines, any other academic regulatory body at the state/center and academic body of the University.

ADIKAVI NANNAYA UNIVERSITY

UNIVERSITY COLLEGE OF ENGINEERING

Industrial Internship/Technical Course Guidelines for B.Tech

1. After the end semester examination of III-II every student should complete 30 - 45 days Industrial Internship or Technical Course. The documentation work will be submitted at the end of IV-I which is for internal evaluation of 100 marks which are not included in SGPA calculation.

2. A student shall select any one course/industrial internship of his/her choice from reputed Industries/companies like Steel plants, Power plants, other Government Organizations, Infosys, Cognizent, Research institutes (Like DRDO, ISRO, IBM) etc. Wipro, TCS.

3. Student should submit the **Indemnity Bond** from parents in the Department and same Xerox copy should be submitted in industry/company also.

4. The assessment of Industrial Internship/Technical Course for 100 Marks with the following breakup.

a. Certificate-   25M

b. Documentation-   50M

c. PPT Presentation –   25M

5. Marks acquired by the students will be submitted along with the Internal Marks of Practical Exams duly signed by concerned faculty and Head of the Department, at the end IV – I semester

6. Producing of Course/ Industrial Internship Completion Certificate is mandatory by every student by the end of IV-I semester, failing which the student will not be allowed for project work in IV -- II

7. As Course/ Industrial Internship aligns closer with Practical Exam, Pass or Fail status in the Course/ Industrial Internship will be same as those of Practical Exam.

8. The above guidelines are subject to change from time to time to comply with the UGC/AICTE guidelines, any other academic regulatory body at the state/centre and academic body of the University.

ADIKAVI NANNAYA UNIVERSITY

UNIVERSITY COLLEGE OF ENGINEERING

Project guidelines for B.Tech

Project guidelines:

1. All the students should complete the Project Work in IV-II as part of their B.Tech course completion. Students are advised to take individual or team (3-4 Students), if it is team work, minimum 2 modules should be developed by each student.
2. Project work is done throughout the semester with 200 Marks (100 – Internal + 100 – External) with 8 Credits.
3. All the students should follow the Project schedule given by the department at that time
4. All the students are advised to do their Project within the Campus. In case of doing the project outside i.e. in reputed Industries like Steel plants, Power plants, other Government Organizations, Infosys, Cognizant, Research institutes (Like DRDO, ISRO, IBM) etc., student should take prior permission from Principal/HOD by submitting the Internship offer Letter
5. Students with Internship Projects will Work under two Guides, External Guide from the Industry/Company, Internal Guide from the University
6. Every student is required to submit ABSTRACT within the given schedule.
7. The Guide shall monitor the progress of the project work from time to time.
8. The Guide shall evaluate the project based on all the reviews, progress, presentations and quality of work. Internal evaluation is for 100 marks.
9. The student should attend the reviews and final viva voice with project report work and PowerPoint presentation.
10. One Paper should be published in Reputed Journals approved by UGC
11. 75% of attendance compulsory for every student.

Internal evaluation: 100 marks

- Reviews should be done in presence of guide, Head of the Department & all the faculty members of the Department.
- Reviews should be in terms of PowerPoint presentation and updated report sheet should be submitted by the student signed by guide in every review.
- Total numbers of reviews are 3 to 4

External evaluation: 100 marks

- Evaluation is done in the presence of External Examiner, Guide and Head of the department and all faculty members of the department.
- Evaluation is based on nature of work, project report submitted by the student/s, hardware / software implementation and presentation.
- Total four copies of project report with prescribed format should be submitted to the university college of engineering.

NOTE: Every student should complete the project in the said semester without this the course completion certificate / provisional certificate will not be issued