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Subject Name	L	T	P	Credit
Big Data Analytics and Business Intelligence	2	1	2	4

Objectives:

To have an advanced level of understanding of most recent advancements in Big Data and using insights, statistical models, visualization techniques for its effective application in Business intelligence.

Unit-1

Introduction to Data Analytics: Data and Relations, Data Visualization, Correlation, Regression, Forecasting, Classification, Clustering..

Unit-2

Big Data Technology Landscape: Fundamentals of Big Data Types, Big data Technology Components, Big Data Architecture, Big Data Warehouses, Functional vs. Procedural Programming Models for Big Data.

Unit -3

Introduction to Business Intelligence: Business View of IT Applications, Digital Data, OLTP vs. OLAP, BI Concepts, BI Roles and Responsibilities, BI Framework and components, BI Project Life Cycle, Business Intelligence vs. Business Analytics.

Unit -4

Big Data Analytics: Big Data Analytics, Framework for Big Data Analysis, Approaches for Analysis of Big Data, ETL in Big Data, Introduction to Hadoop Ecosystem, HDFS, Map-Reduce Programming, Understanding Text Analytics and Big Data, Predictive analysis on Big Data, Role of Data analyst.

Unit-5

Business implementation of Big Data: Big Data Implementation, Big Data workflow, Operational Databases, Graph Databases in a Big Data Environment, Real-Time Data Streams and Complex Event Processing, Applying Big Data in a business scenario, Security and Governance for Big Data, Big Data on Cloud, Best practices in Big Data implementation, Latest trends in Big Data, Latest trends in Big Data, Big Data Computation, More on Big Data Storage, Big Data Computational Limitations.

Outcomes:

Effectively utilize the concept and tools for implementation of data analysis and business intelligence

Text books:

1. Michael Minelli, Michele Chambers, Ambiga Dhiraj, Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses, Wiley CIO Series (2013), 1st ed.

Reference books:

1. T. white, Hadoop: The Definitive Guide, O' Reilly Media (2012), 3 rd ed

List of Practicals :

Introduction to most recent advancements in Big Data technology along with their usage and implementation with relevant tools and technologies.

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Subject Name	L	T	P	Credit
Bioinformatics	2	1	0	3

Objective:

The basic objective is to give students an introduction to the basic techniques of bioinformatics. Provide an exposure to application of bioinformatics and biological databases towards problem solving in real research problems. To be familiar with wide variety of internet applications, biological database and apply these methods to research problems.

Unit I

Introduction to bioinformatics: Definition and history of Bioinformatics, Application and research of bioinformatics, finding Bioinformatics data online Bioinformatics, private and future data sources, Meta data, summary and reference systems.

Unit II

Bioinformatics Database: Characteristics and categories of Bioinformatics database, Navigating databases, Information retrieval systems, Sequence database nucleotide(primary and Secondary), Protein sequence, Structure databases: File formats, Protein structure, PDB, MMDB, CATH, Other database Enzyme, MEROPS, BRENDA, Pathway databases

Unit III

Bioinformatics Tools: Need for tools, Industry trends, Data mining tools, Data submission tools: Nucleotide sequence, protein submission tools, Data analysis tools: Nucleotide sequence, protein sequence, Prediction tools: Phylogenetic trees, Gene prediction, Protein structure and Function prediction, modeling tools: 2D and 3D Protein modeling.

Unit IV

Bioinformatics Algorithms: Classification of algorithms, Biological algorithm, Sequence comparison algorithm, Substitution matrices algorithms, Sequence alignment algorithm, Gene prediction algorithm.

Unit V

Bioinformatics Software: Local alignment search tool (BLAST), Purpose of BLAST,BLAST Analysis, Purpose of BLAST II, Scoring metrics, PAM, BLOSUM, Working of BLAST. Introduction of HMMER, Practical example of HMMER.

Outcomes:

1. The students will be able to describe the contents and properties of the most important bioinformatics databases, perform text- and sequence-based searches, and analyze and discuss the results in light of molecular biological knowledge.

2. The students will be able to explain the major steps in pair wise and multiple sequence alignment.

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Text Books :

1. Orpita Bosu and Simminder Kaur Thukral, ″Bioinformatics Databases, Tools and Algorithms″, Oxford University Press 2007.
2. Harshawardhan P.bal, "Bioinformatics Principle and Applications", TMH.
3. Lesk, A.M.2002, "Introduction to Bioinformatics", Oxford University Press.

References :

1. Rastogi, S.C. ,Mendiratta N, "Bioinformatics Concepts, Skill & Applications", CBS Publishers.
2. Claverie, J.M and Notredame C, "Bioinformatics for Dummies", Wiley Edi
3. "An Introduction to Bioinformatics Algorithms" by Jones, Pevzner. MIT Press.

Subject Name	L	T	P	Credit
Cyber Law and Ethics	2	1	0	3

Objective:

To understand the basics of cyber law, its related issues and ethical laws of computer for different countries.

Unit I:

Introduction: Cyber security and its problem, intervention strategies: redundancy, diversity and autarchy. Computers and its impact in society, overview of computer and web technology, need for cyber law, cyber jurisprudence at international and indian level, cyber law,international perspectives un & international telecommunication union (itu) initiatives council of europe - budapest convention on cyber crime, asia-pacific economic cooperation (apec), organization for economic co-operation and development (oecd), world bank, commonwealth of nations.

Unit II:

Cyberspace: Constitutional & Human Rights Issues in Cyberspace Freedom of Speech and Expression in Cyberspace, Right to Access Cyberspace, Access to Internet, Right to Privacy, Right to Data Protection, Cyber Crimes & Legal Framework Cyber Crimes against Individuals, Institution and State, Hacking, Digital Forgery, Cyber Stalking/Harassment, CyberPornography, Identity Theft & Fraud Cyber terrorism, Cyber Defamation.

Unit III:

Cyber law and related legislation: Cyber Torts, Cyber Defamation, Different Types of Civil Wrongs under the IT Act 2000, Intellectual Property Issues in Cyber Space Interface with Copyright Law, Interface with Patent Law, Trademarks & Domain Names Related issues, Patent Law, Trademark Law, Copyright, Software – Copyright or Patented, Domain Names and Copyright disputes, Electronic Data Base and its Protection, IT Act and Civil Procedure Code, IT Act and Criminal.

Unit IV:

Electronic business and legal issues: E-Commerce Concept, E-commerce-Salient Features, Online approaches like B2B, B2C & C2C Online contracts, Click Wrap Contracts, Applicability of Indian Contract Act,1872

Unit V:

Application area & resolution : Business, taxation, electronic payments, supply chain, EDI, E-markets, Emerging Trends, Dispute Resolution in Cyberspace, Concept of Jurisdiction, Indian Context of Jurisdiction and IT Act, 2000. International Law and Jurisdictional Issues in Cyberspace, Dispute Resolutions.

Outcomes

The students of this course will be able to:

1. Understand key terms and concepts in cyber law, intellectual property and cyber crimes, trademarks and domain theft.

2. Determine computer technologies, digital evidence collection, and evidentiary reporting in forensic acquisition.

Text books:

1. Sunit Belapure and Nina Godbole, Cyber Security: Understanding Cyber Crimes, Computer Forensics And Legal Perspectives, Wiley India Pvt. Ltd, 2011.

2. Business, taxation, electronic payments, supply chain, EDI, E-markets, Emerging Trends Text Book.

3. Information Security policy &implementation Issues, NIIT, PHI

References:

1. Chris Reed & John Angel, Computer Law, OUP, New York.

2. Justice Yatindra Singh, Cyber Laws, Universal Law Publishing Co, New Delhi.

3. Verma S, K, Mittal Raman, Legal Dimensions of Cyber Space, Indian Law Institute.

4. Jonthan Rosenoer, Cyber Law, Springer, New York.

5. Sudhir Naib, The Information Technology Act, 2005: A Handbook, OUP, New York

Subject Name	L	T	P	Credit
Entrepreneurship and Skill Development	2	0	0	2

Objectives:

- To develop and strengthen entrepreneurial quality and motivation in students and to impart basic entrepreneurial skills and understanding to run a business efficiently and effectively.

Unit-1

Entrepreneurship:

Entrepreneur, Types of Entrepreneurs, Difference between Entrepreneur and Intrapreneur Entrepreneurship in Economic growth, Factors affecting entrepreneurial growth.

Unit-2

Entrepreneurial Motivation

Major motives influencing an Entrepreneur, Achievement motivation training, self rating, business games, thematic appreciation test, stress management, entrepreneurship development programs, need, objectives.

Unit -3

Entrepreneur Business
Small Enterprises, Definition, Classification, Characteristics, Ownership Structures, Project Formulation, Steps involved in setting up a Business, identifying and selecting a Good Business opportunity, Market Survey and Research, Techno Economic Feasibility Assessment, Preparation of Preliminary Project Reports, Project Appraisal, Sources of Information, Classification of Needs and Agencies.

Unit -4
Finance and Accounting in relation to Entrepreneurship

Need, Sources of Finance, Term Loans, Capital Structure, Financial Institution, Management of working Capital, Costing, Break Even Analysis, and Taxation, Income Tax, GST.

Unit-5

Support to Entrepreneurs

Sickness in small Business, Concept, Magnitude, Causes and Consequences, Corrective Measures, Business Incubators, Government Policy for Small Scale Enterprises, Growth Strategies in small industry, Expansion, Diversification, Joint Venture, Merger and Sub Contracting.

Outcomes:

- After completion of this course, student will be able to gain knowledge and skills needed to run a business successfully.

Text books:

- Khanka. S.S., "Entrepreneurial Development" S.Chand & Co. Ltd.,Ram Nagar, New Delhi, 2013.

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- Donald F Kuratko, "Entreprenuership – Theory, Process and Practice", 9th Edition, Cengage Learning 2014.

Reference books:

- Hisrich R D, Peters M P, "Entrepreneurship" 8th Edition, Tata McGraw-Hill, 2013.
- Mathew J Manimala, "Enterprenuership theory at cross roads: paradigms and praxis" 2nd Edition Dream tech, 2005.
- Rajeev Roy, 'Entrepreneurship' 2nd Edition, Oxford University Press, 2011.
- EDII "Faulty and External Experts – A Hand Book for New Entrepreneurs Publishers: Entrepreneurship Development", Institute of India, Ahmadabad, 1986.

Subject Name	L	T	P	Credit
Machine Learning	2	1	2	4

Objectives:

Students who successfully complete this course will have acquired a sufficient understanding of the basic concepts and methods of machine learning to make use of some elementary machine learning techniques in the design of computer systems. They will also come to possess insights concerning the relative strengths and weaknesses of various common machine learning methods. This course is intended to make the vast machine learning research literature accessible to diligent students. Finally, through the completion of individual term projects, students will gain experience in applying machine learning methods to problems of personal interest.

Unit-1

Introduction of Machine Learning: What is ML? And Why ML?, Introduction to Supervised ML , Introduction to Unsupervised ML , Mathematical Background for ML-Matrix ops Probability Theory (Bayes' Theorem),ML Glossary- Variable types, kfold CV, AUC, F1 score, Overfitting / Underfitting , Data split & hyper parameter.
Regression Techniques: Simple Linear Regression, Multiple Linear Regression.

Unit-2

Supervised Classification:K-Nearest Neighbors (Knn),Naive Bayes, Intro To Logistic Regression, Multivariate Logistic Regression, Model Evaluation, Hyperplanes & SVM
Unsupervised Learning: Clustering: Intro To Clustering, K Means Algorithm, Hierarchical Clustering
Model Selection: Principles Of Model Selection, Model Evaluation.

Unit -3

Decision Trees: Intro To Decision, Algorithms For Decision Tree Construction, Truncation & Pruning.

Neural Networks: Structure Of Neural Networks ,Information Flow In Neural Networks, Training A Neural Network , Training In Batches , Representation Learning Recurrent Neural Networks.

Unit -4

Ensembles: Bagging & Boosting.

Association Rule Mining: Understanding Itemsets, Understanding Association Rules

Dimension Reduction Techniques: Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA

Unit-5

Recommender Systems: Problem Formulation ,Content Based Recommendations , Collaborative Filtering ,Collaborative Filtering Algorithm ,Vectorization: Low Rank Matrix Factorization , Implementational Detail: Mean Normalization.

Outcomes:

After completing the course, the student shall be able to:
- Develop an appreciation for what is involved in learning models from data.
- Understand a wide variety of learning algorithms.
- Explain the relative strengths and weaknesses of different machine learning methods.
- Understand how to evaluate models generated from data.
- Apply machine learning techniques to a selected problem.
- Apply the algorithms to a real-world problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models.

Text books:

1. Ethem Alpaydin, Introduction to Machine Learning, Second Edition

Reference books:

1. Stephen Marsland, Machine Learning: An Algorithmic Perspective. http://www.amazon.com/Machine-Learning-Algorithmic-Perspective-Recognition/dp/1420067184.
2. Christopher M. Bishop, Pattern Recognition and Machine Learning. http://research.microsoft.com/en-us/um/people/cmbishop/prml/.
3. Tom Mitchell, Machine Learning, http://www.cs.cmu.edu/~tom/mlbook.html.
4. https://www.kaggle.com/.
5. http://ai.stanford.edu/people/nilsson/MLBOOK.pdf

List of Practicals :

1. Write a python code to load a .txt file into a pandas DataFrame and draw bar plots in matplotlib. Selecting a column from a DataFrame (subFrame)
2. Write a python code for:
   (i)Reading in a CSV file into a pandas DataFrame (ii) Using histograms, scatter plots and boxplots as exploratory data analysis (iii) Summary statistics (iv) Functions to access a pandas DataFrame.
3. Perform basic operation of NumPy and SciPy.
4. Write a python code for Random Variables and Probability Distributions
5. Write a python code for Linear regression model. Predict housing prices using linear regression model(Link for dataset https://www.kaggle.com/c/boston-housing)
6. Implement K-nearest neighbor Classification using python .
7. Implement Naive Bayes algorithm using python.
8. Implement Logistic Regression using python.
9. Implement support vector using python to understand the perceptron learning rule that can be applied for supervised learning of neural network.

Subject Name	L	T	P	Credit
E Commerce	2	1	0	3

Objectives:

These courses familiarize the students with the concept of e-commerce and e-governance. Assess the impact of the Internet and Internet technology on business, electronic commerce and electronic business. Understanding the legal, security, commercial, economic, marketing and infrastructure issues involved in E Commerce.

Unit-1

Introduction: Introduction to Ecommerce History of Ecommerce, E-business models B2B, B2C, C2B, C2C, ethical issues, value chain and supply chain, advantages and disadvantages of e-commerce, E-Commerce Consumer applications, E-Commerce organization applications. Architectural framework of Electronic Commerce, Web based Ecommerce Architecture.

Unit-2

E Governance:
E-government, Theoretical background of E governance, Issues in e-governance applications, Evolution of e-governance and its scope and content, Benefits and reasons for the introduction of E governance, E governance models broadcasting, critical flow, comparative analysis, mobilization and lobbying, interactive services / G2C2G. Services and applications

Unit -3

Electronic payment systems : Digital Token-Based, Smart Cards, Credit Cards, Characteristics of payment system, 4C payments methods, SET Protocol for credit card payment, E-cash, E-check, Micro payment, System overview of Mondex. E payment threats and protections.
Inter Organizational Commerce (EDI): meaning, benefits, concepts, application, EDI Model, protocols (UN EDI FACT / GTDI, ANSIX – 12EDI, Implementation, Value added networks.

Unit -4

Threats in Computer Systems: Virus, Cyber Crime Network Security: Encryption, Protecting Web server with a Firewall, Firewall and the Security Policy, Network Firewalls and Application Firewalls, Proxy Server. Trust-based security, security through obscurity (STO), password schemes, biometric systems, challenges and approach to e-government security, cryptography, key management, password systems, digital certificates, digital signatures.

Unit-5

E marketing, Home shopping, E marketing, telemarketing, Information based marketing, Advertising on Internet, on-line marketing process, market research. Search Engine Optimization, Search Engine Marketing, Social Media Marketing, Consumer Search and Resource Discovery - Information search and Retrieval, Commerce Catalogues, Information Filtering.
Privacy and Information Rights: Information collected at E-Commerce Websites, The Concept of Privacy, Legal protection,s Intellectual Property Rights, Types of Intellectual Property protection, Cyber Law.

Outcomes:

1. Students can able to explain how businesses sell products and services on the Web.
2. Describe e-commerce payment systems.
3. Understand legal and ethical issues related to e-commerce.

Text books:

1. Daniel Minoli & Emma Minoli, "Web Commerce Technology Handbook". Tata McGraw Hill – 1999.
2. Gary P. Schneider, "E-commerce", Cengage Learning India.

Reference books:

1. C.S.R. Prabhu, "E-governence: concept and case study", PHI Learning Private Limited.
2. V. Rajaraman, "Essentials of E-Commerce Technology", PHI Learning Private Limited.
3. David Whiteley, "E-commerce study , technology and applications", TMH.
4. J. Satyanarayan, "E-government: The science of the possible", PHI Learning Private Limited.
5. P.T. Joseph, "E-Commerce An Indian Perspective", PHI Learning Private Limited.

Subject Name	L	T	P	Credit
Software Project Management	2	1	0	3

Objectives:

This course gives an insight to software project management that will lead to outline the need for software project management. It will highlight different techniques for software cost estimation and activity planning.

Unit-1

Introduction:

Introduction to Software Project Management, Project Definition, Contract Management, Activities covered By Software Project Management, Overview of Project Planning, and Stepwise Project Planning.

Unit-2

Project Evaluation:
Strategic Assessment, Technical Assessment, Cost Benefit Analysis, Cash Flow Forecasting, Cost Benefit Evaluation Techniques, Risk Evaluation.

Unit -3

Activity Planning

Objectives, Project Schedule, Sequencing and Scheduling Activities, Network Planning Models, Forward Pass, Backward Pass, Activity Float, Shortening Project Duration, Activity on Arrow Networks, Risk Management, Nature Of Risk, Types Of Risk, Managing Risk, Hazard Identification , Hazard Analysis, Risk Planning And Control.

Unit -4

Monitoring and Control:

Creating Framework , Collecting The Data , Visualizing Progress , Cost Monitoring , Earned Value , Prioritizing Monitoring , Getting Project Back To Target , Change Control , Managing Contracts , Introduction , Types Of Contract , Stages In Contract Placement , Typical Terms Of A Contract , Contract Management , Acceptance.

Unit-5

Managing People And Organizing Teams:

Introduction, Understanding Behavior, Organizational Behavior: A Background, Selecting The Right Person For The Job, Instruction In The Best Methods, Motivation, The Oldham, Hackman Job Characteristics Model, Working In Groups, Becoming A Team, Decision Making, Leadership, Organizational Structures, Stress, Health And Safety, Case Studies.

Outcomes:

At the end of the course the students will be able to practice Project Management principles while developing a software.

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Text books:

1. Bob Hughes, Mike Cotterell, "Software Project Management", Third Edition, Tata McGraw Hill, 2004.

Reference books:

1. Ramesh, Gopalaswamy, "Managing Global Projects", Tata McGraw Hill, 2001.
2. Jalote, "Software Project Management in Practice", Pearson Education, 2002.
3. Royce, "Software Project Management", Pearson Education, 1999.

Subject Name	L	T	P	Credit
Cloud Computing and Services	2	1	2	4

Objectives:

This course gives an introduction to cloud computing, its techniques, issues and its services that will lead to design and development of a simple cloud service. Students will be able to understand and implement the concept of Virtualization. To develop capabilities across the various cloud service models including IaaS, PaaS, SaaS, and developing cloud based software applications on top of cloud platforms.

Unit-1

Introduction: What is a cloud, Definition of cloud , Why use clouds, Characteristics of cloud computing, Driving factors towards cloud computing, Comparing grid with cloud and other computing systems, Benefits and challenges of cloud computing, Evolution of Cloud Computing, Usage scenarios and Applications, Business models around Cloud, Cloud computing environments, Cloud services requirements, Cloud and dynamic infrastructure. Overview of various cloud based applications: Satellite Image Processing, CRM and ERP, Social networking.

Unit-2

Cloud Computing Architecture:
Cloud Reference Model, Types of Clouds, Cloud Interoperability & Standards, Scalability and Fault Tolerance, Cloud Solutions: Cloud Ecosystem, Cloud Business Process Management, Cloud Service Management. Cloud Offerings: Cloud Analytics, Testing Under Control, Virtual Desktop Infrastructure.
Services and Applications
IaaS :- Basic concept, Workload, partitioning of virtual private server instances, Pods, aggregations, silos. PaaS :- Basic concept, tools and development environment with examples. SaaS:- Basic concept and characteristics, Open SaaS and SOA, examples of SaaS platform.

Unit -3

Cloud Virtualization & Management

Need for Virtualization, Pros and cons of Virtualization. Types of Virtualization, Desktop and application virtualization, System Vm, Process VM, Virtual Machine monitor, Virtual machine properties, Interpretation and binary translation, HLL VM, Hypervisors – Xen, KVM, VMWare, Virtual Box, Hyper-V.

Policies and mechanisms for resource management, Resiliency, Provisioning, Asset management, Concepts of Map reduce, Cloud Governance, High Availability and Disaster Recovery.

Unit -4

Security in cloud computing:
Cloud security reference model: Risks, Security, privacy, Trust. Cloud Information security fundamentals, Cloud security services, Design principles, Secure Cloud Software Requirements, Policy Implementation, Cloud Computing Security Challenges, Virtualization security Management, Cloud Computing Security Architecture.

Unit-5

Services and Applications:

Service Oriented Architecture: Basic concepts of message-based transactions, Protocol stack for an SOA architecture, Event-driven SOA, Enterprise Service Bus, Service catalogs.

Market Based Management of Clouds, Federated Clouds/Inter Cloud: Characterization & Definition, Cloud Federation Stack, Third Party Cloud Services, IBM Smart Cloud, Amazon Web Services, Google Cloud platform, Windows Azure platform, A comparison of Cloud Computing Platforms, Common building Blocks.

Outcomes:

- Understanding the key dimensions of the challenge of Cloud Computing
- Analyze the Cloud computing setup with its vulnerabilities and applications using different architectures.
- To analyze the case studies to derive the best practice model to apply when developing and deploying cloud based applications.
- Assess cloud Storage systems and Cloud security, the risks involved, its impact and develop cloud application
- Development of cloud based applications using various cloud based platforms, Amazon Web service, Google App Engine, Microsoft Azure etc.

Text books:

1. Mastering Cloud Computing by Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi, McGraw Hill Education (India) Private Limited, 2013
2. Cloud Computing: A Practical Approach, Anthony T. Velte, Toby J. Velte, Robert Elsenpeter, McGraw Fill, 2010
3. Cloud Computing - Second Edition by Dr. Kumar Saurabh, Wiley India

Reference books:

1. Dan C. Marinescu, Cloud Computing: Theory and Practice, Elsevier Science, 2013
2. Cloud Computing, A Hands on approach, Arshadeep Bahga, Vijay Madisetti, University Press.

List of Practicals :

1. Create virtual machines that access different programs on same platform.
2. Create virtual machines that access different programs on different platforms.
3. Exploring Google cloud for a) Storage b) Sharing of data c) manage your calendar, to-do lists, d) a document editing tool
4. Exploring Microsoft cloud
5. Exploring Amazon cloud
6. Installation and configuration of Hadoop/Euceliptus etc.
7. Service deployment & Usage over cloud.
8. Management of cloud resources.
9. Performance evaluation of services over cloud

Subject Name	L	T	P	Credit
Web services and service oriented architecture	2	1	0	3

Objectives:

- To gain understanding of the basic principles of service orientation
- To learn service oriented analysis techniques
- To learn technology underlying the service design
- To learn the concepts such as SOAP, registering and discovering services.

Unit-1

Introduction: Evolution and Emergence of Web Services, Evolution of distributed computing. Core distributed computing technologies – client/server, CORBA, JAVA RMI, Micro Soft DCOM, MOM, Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of Web Services and Service Oriented Architecture (SOA). Introduction to Web Services, The definition of web services, basic operational model of web services, tools and technologies enabling web services, benefits and challenges of using web services.

Unit-2

Web Service Architecture: Web services Architecture and its characteristics, core building blocks of web services, standards and technologies available for implementing web services, web services communication, basic steps of implementing web services. Describing Web Services – WSDL introduction, non functional service description, WSDL1.1 Vs WSDL 2.0, WSDL document, WSDL elements, WSDL binding, WSDL tools, WSDL port type, limitations of WSDL.

Unit -3

Brief Overview of XML, XML Document structure, XML namespaces, Defining structure in XML documents, Reuse of XML schemes, Document navigation and transformation.

SOAP : Simple Object Access Protocol, Inter-application communication and wire protocols, SOAP as a messaging protocol, Structure of a SOAP message, SOAP envelope, Encoding, Service Oriented Architectures, SOA revisited, Service roles in a SOA, Reliable messaging, The enterprise Service Bus, SOA Development Lifecycle, SOAP HTTP binding, SOAP communication model, Error handling in SOAP.

Unit -4

Registering and Discovering Services : The role of service registries, Service discovery, Universal Description, Discovery, and Integration, UDDI Architecture, UDDI Data Model, Interfaces, UDDI Implementation, UDDI with WSDL, UDDI specification, Service Addressing and Notification, Referencing and addressing Web Services, Web Services Notification.

Unit-5

SOA and web services security considerations, Network-level security mechanisms, Application-level security topologies, XML security standards, Semantics and Web Services, The semantic interoperability problem, The role of metadata, Service metadata, Overview of

.NET and J2EE, SOA and Web Service Management, Managing Distributed System, Enterprise management Framework, Standard distributed management frameworks, Web service management, Richer schema languages, WS-Metadata Exchange.

Outcomes:

At the end of this course, students are expected to gain the following learning:

- Get the foundations and concepts of service based Computing
- Advocate the importance and means of technology alignment with business
- Understanding the basic operational model of web ervices,
- Gain the knowledge of key technologies in the service oriented computing arena
- Apply and practice the learning through a real or illustrative project/case study.

Text books:

1. Web Services & SOA Principles and Technology, Second Edition, Michael P. Papazoglou.
2. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India.
3. Developing Enterprise Web Services, S. Chatterjee, J. Webber, Pearson Education.

Reference books:

1. XML, Web Services, and the Data Revolution, F.P.Coyle, Pearson Education.
2. Building web Services with Java, 2nd Edition, S. Graham and others, Pearson Education.
3. Java Web Services, D.A. Chappell & T. Jewell, O'Reilly, SPD.
4. McGovern, et al., "Java web Services Architecture", Morgan Kaufmann Publishers, 2005.
5. J2EE Web Services, Richard Monson-Haefel, Pearson Education.