Shri Vaishnav Vidyapeeth Vishwavidyalaya

B.Tech.(CSE- Artificial Intelligence -IBM)
Choice Based Credit System (CBCS) 2018-19
SEMESTER V

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTCS504	**UG**	**Software Engineering and Project Management**	3	0	2	4	60	20	20	30	20

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:
The student will have ability to:
1. Get the knowledge of basic software engineering methods and practices.
2. Define software requirements and requirement engineering.
3. Apply approaches for various design and their principle.
4. Explore testing in various domain.
5. Development of significant teamwork and project based experience.

Course Outcomes:
On completion of the subject, students will be able to:
1. Compare various software process models and identify where these models are applicable.
2. Define and analyze software project management, the framework and the dimensions of software project management.
3. Comprehend System modeling using UML.
4. Identify software testing strategies by using testing tools.
5. Analyze software risks and risk management strategies.

SYLLABUS

UNIT–I
Nature of Software: Software Engineering, Software Process, A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models- Waterfall Model, Incremental Models, Evolutionary Models, Concurrent Models, Specialized Process Model, Unified Process, Personal and Team process Models, Process technology, Agile development.

UNIT–II
Functional and Non-functional Requirements: Requirement Sources and Elicitation Techniques, Analysis Modeling for Function-oriented and Object-oriented Software Development, Use case Modeling, System and Software Requirement Specifications, Requirement Validation, Traceability.

UNIT–III
The Software Design Process: Design Concepts and Principles, Software Modeling and UML, Architectural Design, Architectural Views and Styles, User Interface Design, Function-oriented Design, SA/SD Component Based Design, Design Metrics.

UNIT–IV

Software Testing Strategies-Approach: Issues, Validation Testing and Their Criteria, System Testing, Alpha-Beta Testing, Debugging, Testing Conventional Applications, Testing Object Oriented Applications ,Testing Web Applications.

UNIT–V

Need and Types of Maintenance: Software Configuration Management (SCM), Software Change Management, Version Control, Change control and Reporting, Program Comprehension Techniques, Re-engineering, Reverse Engineering, Tool Support. Project Management Concepts, Feasilibility Analysis, Project and Process Planning, Resources Allocations, Software efforts, Schedule, and Cost estimations, Project Scheduling and Tracking, Risk Assessment and Mitigation, Software Quality Assurance(SQA). Project Metrics.

Text Books:
1. Roger S. Pressman, "Software Engineering – A Practitioner's Approach", Tata McGraw-Hill, Seventh edition, 2009.
2. Richard Fairley, "Software Engineering Concepts" –, Tata Mcgraw Hill, 2008.
3. Pankaj Jalote ,"An Integrated Approach to Software Engineering", Narosa Pub, 2005**.**
4. Richard H.Thayer,"Software Enginerring & Project Managements",Willey India

Reference Books:
1. Bernd Bruegge, Allen H. Dutoit," Object-Oriented Software Engineering" Using UML, Patterns, and Java, PEARSON Third Edition, 2017.
2. Waman S.Jawadekar,"Software Enginerring", TMH
3. Ian Sommerville, "Software Engineering", Seventh Edition, Pearson Education Asia, 2007.
4. Rajib Mall, "Fundamentals of Software Engineering" Second Edition, PHI Learning.

List of Practical:
Select a topic of the project, then make the report on following points

1. System Analysis
    1.1. Identification of Need
    1.2. Preliminary Investigation
2. Feasibility Study
    2.1. Technical Feasibility
    2.2. Economical Feasibility
    2.3. Operational Feasibility
3. Literature Survey
    3.1. Work done by other
    3.2. Benefits
    3.3. Proposed Solution
    3.4. Technology used
4. Software Engineering Approach
    4.1. Software Engineering paradigm Applied
        4.1.1. Description
        4.1.2. Advantage & Disadvantages
        4.1.3. Reasons for use

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4.2 Requirement Analysis
    4.2.1 Software Requirement Specification
    4.2.1.1 Glossary
    4.2.1.2 Supplementary Specifications
    4.2.1.3 Use Case Model
    4.2.1.4 Comparative analysis documents
    4.2.2 Conceptual Level Activity Diagram
4.3 Planning Managerial Issues
    4.3.1 Planning Scope
    4.3.2 Project Resources
    4.3.3 Team Organization
    4.3.4 Project Scheduling
    4.3.5 Estimation
    4.3.6 Risk Analysis
    4.3.7 Security Plan
 4.4 Design
   4.4.1. Design Concept
   4.4.2. Design Technique
   4.4.3. Modeling
      4.4.3.1. ER Model
      4.4.3.2. DFD Model
        4.4.3.2.1. DFD Model Level-0 and 1
        4.4.3.2.2. DFD Model Level 2 and 3
      4.4.3.3. Data Dictionary
      4.4.3.4. Activity Diagram
      4.4.3.5. Software Architecture
4.5 Implementation Phase
   4.5.1. Language Used Characteristics
   4.5.2. Coding
4.6 Testing
   4.6.1. Testing Objectives
4.6.2. Testing Methods & Strategies used along with test data and the error listed for each test case for each function provided by the system.

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SEMESTER V

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	THEORY		PRACTICAL		
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTCS503	UG	**Computer Graphics and Multimedia**	3	0	2	4	60	20	20	30	20

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:
The student will have ability to:
1. Understood basic concepts of computer graphics.
2. Acquire knowledge about drawing basic shapes such as lines, circle ellipse, polygon.
3. Shall be able to perform processing of basic shapes by various processing algorithms /techniques.
4. Acquire knowledge about two and three dimensional transformations.
5. Shall be able to apply the transformation algorithms to the basic shapes.
6. Shall be able to perform Multimedia Operation.

Course Outcomes:
Upon completion of the subject, students will be able to:
1. Understood basic concepts of computer graphics
2. Acquire knowledge about drawing basic shapes such as lines, circle ellipse, polygon and shall be able to perform processing of basic shapes by various processing algorithms /techniques.
3. Acquire knowledge about two and three dimensional transformations and shall be able to apply the transformation algorithms to the basic shapes.
4. Shall have the basic knowledge of windowing and clipping and shall be able to apply various algorithms of clipping.
5. Acquire knowledge about Visible Surface Detection methods, Illumination Models and Surface Rendering
6. Acquire knowledge to apply advanced techniques such as fractals, introduction to open GL and Multimedia Systems.

SYLLABUS
UNIT I
Introduction to Computer Graphics:- What is Computer Graphics?, Where Computer Generated pictures are used, Elements of Pictures created in Computer Graphics Graphics display devices,Graphics input primitives and Devices.**Introduction to openGL:-** Getting started Making pictures, Drawing basic primitivesSimple interaction with mouse and keyboard

UNIT II
Points and Lines, Antialiasing**Line Drawing Algorithm:-**DDA line drawing algorithm,
parallel drawing algorithmBresenham's drawing algorithm with example.

Circle and Ellipse generating algorithms:-Mid-point Circle algorithm with example
Mid-point Ellipse algorithmMid-point Ellipse algorithm with example **Parametric Cubic Curves:-**Bezier curvesB-Spline curves
Filled Area Primitives:-Scan line polygon fill algorithm, Pattern fill algorithm
Inside-Outside Tests, Boundary fill algorithms, Flood fill algorithms

UNIT III
2D Geometric Transformations
Basic transformation, Matrix representation and Homogeneous Coordinates Composite transformationOthertransformations.Transformation between coordinated systems.Window to Viewport coordinate transformation,
Clipping operations – Point clipping, Line clipping:-Cohen – Sutherland line clippingLiang – Barsky line clippingMidpoint subdivision
Polygon Clipping-Sutherland – Hodgeman polygon clippingWeiler – Atherton polygon clipping.3D object representation methods B-REP , sweep representations , CSG
Basic transformations-Translation,Rotation, Scaling
Other transformations-Reflection,Rotation about an arbitrary axis Composite transformations Projections – Parallel and Perspective 3D clipping

UNIT IV
3D Geometric Transformations and 3D Viewing Classification of Visible Surface Detection algorithm:-Translation,Rotation, Scaling
Other transformations:-Reflection,Rotation about an arbitrary axis Composite transformations Projections,Back Surface detection method Depth Buffer method Scan line method BSP tree method, Area Subdivision method.

UNIT V
Multimedia System: An Introduction, Multimedia hardware, Multimedia System Architecture. Data & File Format standards.i.e RTF, TIFF, MIDI, JPEG, DIB, MPEG,Audio: digital audio, MIDI, processing sound, sampling, compression. Video: Avi, 3GP,MOV, MPEG , compression standards, compression through spatial and temporal redundancy. Multimedia Authoring .

TEXT BOOKS:
1. Sinha and Udai , "Computer Graphics", Tata McGraw Hill
2. Parekh "Principles of Multimedia" Tata McGraw Hill
3. Prabhat k Andleigh, KiranThakral , "Multimedia System Design " PHI Pub.
4. Donald Hearn and M.P. Becker "Computer Graphics" Pearson Pub.

REFERENCES:
1. Computer Graphics, C Version, 2e Paperback – 2002
2. Foley, Vandam, Feiner, Huges, "Computer Graphics: Principles & Practice", Pearson Education, second edition 2003.
3. Judith Jeffcoate, "Multimedia in practice technology and Applications", PHI, 1998.
4. David F Rogers, "Procedural elements for Computer Graphics", Tata McGraw Hill, Second Edition.
5. Foley, VanDam, Feiner and Hughes, "Computer Graphics Principles & Practice in C", Second edition, Pearson Education.
6. David Hillmaa, "Multimedia Technology & Applications, Delmar, 1998.

LIST OF EXPERIMENTS:

1. Implement DDA Line Drawing algorithm
2. Implement Bresenham's line drawing algorithm.
3. Implement Mid-Point circle drawing algorithm.
4. Implement Mid-Point ellipse drawing algorithm.
5. Implement cubic Bezier curve.
6. Implement a menu-driven program for 2D transformations.
7. Implement Line clipping algorithm using Cohen-Sutherland.
8. Implement Polygon Clipping using Sutherland Hodgeman.
9. Implement Scan line fill algorithm.
10. Study of Multimedia and Program for Flash.

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SEMESTER V

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY		PRACTICAL		
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTIT611	UG	Information Storage and Management	2	1	0	3	60	20	20	0	0

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:
1. An ability to understand various storage architecture & technologies.
2. An ability to understand various technologies used to provide backup & recovery.
3. An ability to understand various techniques used to provide security.
4. Ability to identify information storage system requirements.
5. An ability to develop policy for information storage system.
6. An ability to develop policy for backup& recovery.

Course Outcomes:
On completion of the course students will be able to:
1. Describe & apply storage technologies.
2. Identify storage technologies that provide cost effective IT solution for medium to large scale businesses & data centers.
3. Manage Virtual Server & Storage between Remote locations.
4. Design analysis and manage clusters of resources.

Syllabus

Unit-I:
Introduction: Digital data and its types, Information storage, Key characteristics of data center, Evolution of computing platforms. Introduction to storage technology: Data Proliferation, evolution of various storage technologies, Overview of storage infrastructure components, Information life Cycle Management, Data categorization.

Unit-II:
Storage System Architecture: Intelligent disk subsystems overview, Contrast of integrands modular array, Component Architecture of Intelligent disk subsystems, Disk physical structure components, properties, performance, and specifications, RAID levels & parity algorithms, hot sparing, Front end to host storage provisioning, mapping and operation.

Unit-III:
Introduction to network storage: JBOD, DAS, NAS, SAN & CAS evolution and comparison, Applications, Elements, Connectivity, standards, management, security and limitations of DAS, NAS, CAS & SAN

Unit-IV:
Hybrid storage solutions and virtualization: memory, network, server, storage & appliances.

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Data centre concepts & requirements, Backup and disaster recovery. Industry Management standards, standard framework applications, Key management metrics.

Unit-V:

Information storage on clouds: concept of cloud, cloud computing, storage on cloud, Cloud benefits, Cloud computing evolution. Application & services on cloud, cloud service providers, cloud deployment models, Essential characteristics of cloud computing.

TEXT BOOK:
1. G.Somasundaram & Alok Shrivastava editors, ISM: Storing, Managing, and Protecting Digital Information; Wiley India

REFERENCE BOOKS:
1. Saurabh; Cloud Computing : Insight into New era Infrastructure; Wiley India.
2. Ulf Troppens, Wolfgang Mueller-Friedt, Rainer Erkens, Rainer Wolafka, Nils Haustein; Storage Network explained: Basic and application of fiber channels, SAN, NAS, ISESI, INFINIBAND and FCOE, Wiley India.
3. Sosinsky, Cloud Computing Bible, Wiley India.

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SEMESTER V

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	THEORY END SEM University Exam	THEORY Two Term Exam	THEORY Teachers Assessment*	PRACTICAL END SEM University Exam	PRACTICAL Teachers Assessment*
BTIT513	UG	Management Information System	2	1	0	3	60	20	20	0	0

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:
1. To Understand types of MIS applications in organizations
2. To discuss the development of management information systems in organizations.
3. To Select and design MIS systems appropriate to meet management requirements.
4. To Critically evaluate MIS contributions to the strategic management of organizations

Course Outcomes:
1. To understand MIS in both the wider managerial context and in the narrower confines of the selection, support, design and development of computer applications
2. To focus on the concepts a manager's needs to understand, in order to make effective use of, computerized information systems

SYLLABUS

UNIT–I
Organizations and Computing: Introduction, Modern Organization-IT enabled- Networked- Dispersed- Knowledge Organization, Information Systems in Organizations- what are information systems?, Brief history of computing- ENIAC: Way to commercial computers- Advent of artificial intelligence- advent of personal computing-Free Software Movement- Advent of Internet, The role of internet- Internet and Web: they are different-the internet changes everything

UNIT–II
Managing Information Systems in Organizations: Introduction, Managing in the Internet Era, Managing Information Systems in Organization-the IT interaction model, Challenges for the manager-what information to build?-how much to spend on information systems?-what level of capabilities should be created with information systems?-how centralized should the services be?-what security levels are required?-what is technology road map for the organization?

UNIT–III
Data and Information: Introduction, data and information- measuring data, information as a resource, information in organizational functions, types of information technology, types of information systems- transaction processing systems-management information system.

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UNIT–IV

Decision making and communication: Introduction, Decision making with MIS-Tactical decisions-operational decisions-strategic decisions, communication in organizations- types of communication- examples of communications in organizations- decision making with communication technology

UNIT–V

Strategy: Introduction, Information goods-properties-technology lock-in and switching costs-network externalities-positive feedback-tippy markets, information systems and competitive strategy- value chain, the Role of CIO-information system's plan-vendor coordination-technology updates-return on investment on technology.

TEXT BOOKS:
1. Kenneth C. Laudon& Jane P. Laudon, Essentials of Management Information Systems, Tenth Edition, Pearson Prentice, Hall, 2012
2. Terry Lucey, Management Information Systems, Ninth Edition, 2005, Thompson.

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SEMESTER V

| COURSE CODE | CATEGORY | COURSE NAME | L | T | P | CREDITS | THEORY | | | PRACTICAL | |
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTIT603	UG	Cyber and Network Security	2	1	0	3	60	20	20	0	0

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:
The student will have ability to:
1. To gain a fundamental knowledge of Cybercrime and Network Security.
2. To gain a fundamental understanding of a Cyber-attack and Challenges in identify and prevent them from occurring.
3. To gain a fundamental knowledge of Tools and Methods used in Cybercrime for prevention.
4. To understand the need of Cyber law and thefundamental concepts of Cyber Forensic.
5. To provide the fundamental skills and understanding needed to identify Cyber Security threats.

Course Outcomes:
Upon completion of the subject, students will be able to:
1. Identify physical points of vulnerability in simple networks and security needs of an organization.
2. Evaluate the Legal Perspective of Cybercrime and Cyber Security.
3. Formulate, update and communicate short- and long-term organizational cyber-security strategies and policies.
4. Troubleshoot, maintain and update an enterprise-level information security system.
5. Investigate the Cybercrime with the help of Cyber Forensic.

Syllabus

UNIT–I
Computer Security Concepts,The OSI Security Architecture, Security Attacks, Security Services, Security mechanism, Fundamental Security Design Principles, Attack Surface and Attack trees, A Model for Network Security. Introduction to Cybercrime, Cybercrime and Information Security, Classification of Cybercrimes, Cybercrime: The Legal Perspective, Cybercrime: An Indian Perspective.

UNIT–II
Introduction to Cyber offence, How Criminal plan the attack, Social Engineering, Cyber stalking, Cybercafé and cybercrime, Botnets: The fuel of cybercrime, Attack vector, cloud computing. Cybercrime: Mobile and Wireless devices, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Setting for Mobile Devices, Authentication Service Security, Attack on Mobile Phones.

UNIT–III
Tools and Methods Used in Cybercrime, Proxy Server and Anonymizers, Phishing and Identity Theft, Password Cracking, Keylogger and Spyware, Virus and Worms, Trojan Horse and Backdoors, Steganography DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attack on Wireless Networks.

UNIT–IV.

Cybercrime and the Legal Landscape around the World, Why Do We Need Cyber laws, The Indian IT Act,Challenges to Indian Law and Cybercrime Scenario in India, Information Technology Act, Digital Signature and the IT Act, Cybercrime and Punishment. Introduction to Cyber Forensics, Historical Background of Cyber Forensics, Cyber Forensics and Digital Evidence, Forensic Analysis of E-Mail, Digital Forensic Life Cycle, Approaching Computer Forensic Investigation, Relevance of OSI Model to Computer Forensic, Challenges in Computer Forensic.

UNIT–V

Network Access Control and Cloud Security, Transport- Level Security, Wireless Network Security, Electronic Mail Security, IP Security.

TEXT BOOKS:

1. William Stallings, "Cryptography and Network Security: Principles and Practice",7th EditionPearson,2017
2. Sunit Belapure, Nina Godbole"Cyber Security",1st edition, Wiley Publication, 2011

REFERENCES:

1. Carl Endorf, Eugene Schultz, Jim Mellander"Intrusion Detection&Prevention",1 st Edition,TMH,2007
2. Neal, Krawetz, Introduction to Network Security,1st Edition ,Cengage Learning,2006
3. AtulKahate,"Cryptography and Network Security",McGraw Hill,,2009
4. Charlie Kaufman, Radia Perlman, Mike Speciner, Michael Speciner, " Network Security -Private communication in a public world" ,2nd Edition,TMH,2002
5. Fourozon, "Cryptography & Network Security" 4thEdition ,TMH,2005
6. MayankBhushan "Fundamentals of Cyber Security",1st Edition ,BPB Publication,2017

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COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	THEORY END SEM University Exam	THEORY Two Term Exam	THEORY Teachers Assessment*	PRACTICAL END SEM University Exam	PRACTICAL Teachers Assessment*
							TEACHING & EVALUATION SCHEME				
BTIT511	UG	Wireless Communication Networks	2	1	0	3	60	20	20	0	0

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:
The student will have ability to:
1. Understand the fundamental of wireless communication system.
2. Describes radio propagation models and wireless channel effects.
3. Knows fundamental concept of cellular radio concepts.
4. Explains various wireless communication network systems, standards and applications.

Course Outcomes:
On completion of the subject, students will be able to:
1. Demonstrate wireless communication systems design and working.
2. Investigate various advanced techniques for wireless communications.
3. Constructs design architectures for different Wireless Systems.
4. Evaluates the emerging trends in Wireless communication.

SYLLABUS

UNIT–I
Introduction to Wireless Communication System: Evolution of mobile communications, Mobile Radio System around the world, Types of Wireless communication System, Comparison of Common wireless system, Trend in Cellular radio and personal communication. Second generation Cellular Networks, Third Generation (3G) Wireless Networks ,Wireless Local Loop(WLL),Wireless Local Area network(WLAN),

UNIT–II
The Cellular Concept- System Design Fundamentals: Cellular system, Hexagonal geometry cell and concept of frequency reuse, Channel Assignment Strategies Distance to frequency reuse ratio, Channel &co-channel interference reduction factor, S/I ratio consideration and calculation for Minimum Co-channel and adjacent interference, Hand off Strategies, Umbrella Cell Concept, Trunking and Grade of Service, Improving Coverage & Capacity in Cellular System-cell splitting, Cell sectorization, Repeaters, Micro cell zone concept, Channel antenna system design considerations.

UNIT–III
Mobile Radio Propagation Model, Small Scale Fading and diversity: Large scale path loss:- Free Space Propagation loss equation, Path-loss of NLOS and LOS systems, Reflection, Ray ground reflection model, Diffraction, Scattering, Link budget design, Max. Distance Coverage

formula, Empirical formula for path loss, Indoor and outdoor propagation models, Small scale multipath propagation, Impulse model for multipath channel, Delay spread, Feher's delay spread, Types of small scale Fading, Rayleigh and rician distribution.

UNIT–IV

Multiple Access Techniques: Introduction, Comparisons of multiple Access StrategiesTDMA, CDMA, FDMA, OFDM, CSMA Protocols. Mobile Network And Transport Layers :Mobile IP , Dynamic Host Configuration Protocol, Mobile Ad Hoc Routing Protocols, Multicast routing,TCP over Wireless Networks , Indirect TCP , Snooping TCP , Mobile TCP .Wireless Systems: GSM system architecture, Radio interface, Protocols, Localization and calling, Handover, Authentication and security in GSM, GSM speech coding, Concept of spread spectrum, CDMA forward channels, CDMA reverse channels, Soft hand off, CDMA features, Power control in CDMA, Performance of CDMA System, GPRS system architecture.

UNIT–V

Introduction to Wi-Fi, WiMAX, Zig-Bee Networks, Software Defined Radio, UWB Radio, Wireless Adhoc Network and Mobile Portability, Security issues and challenges in a Wireless network. Application Layer :WAP Model, Mobile Location based services ,WAP Gateway ,WAP protocols wireless bearers for WAP , WML ,WMLScripts.

TEXT BOOKS:
1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education,
2. William Stallings, "Wireless Communications and Networks", Pearson Education.
3. William D Stanley : Network Analysis with Applications, Pearson Education.
4. Roy Choudhary D: Network and systems, New Age Publication.
5. Wireless Communication, Theodore S. Rappaport, Prentice hall

REFERENCE BOOKS:

1. Kaveh Pahlavan, Prasanth Krishnamoorthy, "Principles of Wireless Networks", First Edition, Pearson Education, 200UNIT III.
2. Uwe Hansmann,Lothar Merk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, 200UNIT III.
3. C.K.Toh, "AdHoc Mobile Wireless Networks", First Edition, Pearson Education, 2002.
4. Wireless digital communication, Kamilo Fether PH.

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SEMESTER V

| | | | | | | | TEACHING & EVALUATION SCHEME | | | | |
| | | | | | | | THEORY | | | PRACTICAL | |
COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTIBMB601	**UG**	**Big Data Technologies**	3	0	2	4	60	20	20	30	20

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:

The objectives of this course are to make the students to:

1. Introduction to Big Data and its importance in business world Problems.
2. Understanding the conceptualization and summarization of big data trivial data versus big data, big data computing technologies, watson studio.
3. Understanding the challenges posed by distributed applications.
4. Understanding how ZooKeeper is designed to handle challenges posed by distributed applications.

Course Outcomes:

At the end of the course, students shall be able to:

1. Develop an understanding of the complete open-source Hadoop ecosystem and its near term future directions
2. Explain the IBM Watson Studio .
3. Describe the core issues of cloud computing such as security, privacy, and interoperability.
4. Review the Java code required to handle the Mapper class, the Reducer class, and the program driver needed to access MapReduce.
5. Understand the MapReduce model v1.
6. Limitations of Hadoop 1 and MapReduce 1.

Syllabus:

Unit I: Introduction to Big Data

Traditional way of working in IT, Traditional IT Challenges, Future Trend in IT, What is Cloud Computing Cloud Characteristics, service and Delivery models, Cloud Computing helps overcome IT challenges, Traditional On-premises Core IT, Cloud Service, IBM Cloud – IAAS, PAAS and SAAS,IBM cloud Infrastructure (Iaas) Offerings,IBM Cloud Platform as a service offerings, Cloud Delivery models,Private Cloud,Public Cloud

Unit II: Hadoop and HDFS

The basic need for a big data strategy in terms of parallel reading of large data files and internode network speed in a cluster, Hadoop Distributed File System (HDFS),function of the Name Node and Data Nodes in an Hadoop cluster, files are stored and blocks ("splits") are replicated. Hive , Sqoop.

Unit III: Introduction to Hortonworks and its components

Apache Ambari- The purpose of Apache Ambari in the HDP stack, the overall architecture of Ambari and Ambari's relation to other services and components of a Hadoop cluster, the functions of the main components of Ambari, initiating start and stop services from Ambari Web Console.

Overview about Hortonworks Data Platform - HDP -The functions and features of HDP, the IBM value-add components, what IBM Watson Studio is, a brief description of the purpose of each of the value-add components

Unit IV: Data Processing and Management - **MapReduce and YARN**

MapReduce model v1, the limitations of Hadoop 1 and MapReduce, review the Java code required to handle the Mapper class the, Reducer class and the program driver needed to access MapReduce, the YARN model, compare Hadoop 2/YARN with Hadoop 1.

Unit V: Data Processing and Management- ZooKeeper, Slider, and Knox

The challenges posed by distributed applications and how ZooKeeper is designed to handle them, the role of ZooKeeper within the Apache Hadoop infrastructure and the realm of Big Data management, the generic use cases and some real-world scenarios for ZooKeeper, the ZooKeeper services that are used to manage distributed systems, use the ZooKeeper CLI to interact with ZooKeeper services

TEXT BOOKS:
1. Introduction to Infosphere BigInsights, IBM Career Education
2. Changing Business with Data Insight, IBM Career Education
3. Big Insights Analytics for Business Analysts, IBM Career Education

REFERENCES:
1. Big Data: A Revolution That Will Transform How We Live, Work, and Think; Kenneth Cukier, Viktor Mayer-Schönberger; Mariner Books; Edition (2014)
2. Big Data: Using Smart Big Data, Analytics and Metrics to Make Better; Bernard Marr; Wiley; Edition 1st (2015)

LIST OF PRACTICALS:
1. Implement the following file management tasks in Hadoop: Adding files and directories
   - Retrieving files
   - Deleting files
   - Hint: A typical Hadoop workflow creates data files (such as log files) elsewhere and copies them into HDFS using one of the above command line utilities.
2. Install and Run Hive then use Hive to create, load, alter, and drop databases, tables.
3. Implement Hive Partitioning with data set.
4. Implement Hive bucketing with data set.
5. Implement sqoop commands .
6. Working on POC with data set.
7. Implement Hbase commands with data set. and Explore Ambari.
8. Install and Run Pig then write Pig Latin scripts to sort, group, join and filter your data.
9. Explore Zookeeper.
10. Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm with data set.

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SEMESTER V

| | | | | | | | TEACHING & EVALUATION SCHEME | | | | |
| | | | | | | | THEORY | | | PRACTICAL | |
COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTIBMA501	**UG**	**Predictive Modelling**	3	1	2	5	60	20	20	30	20

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:

1. Understand the evolution and relevance of Analytics in the world today.
2. Explore end-to-end analytics industry use cases using the data analytics lifecycle.
3. Understand the scientific method for analytics, use cases, and the analytics team key roles.
4. Acquire technical expertise using popular open source analytics frameworks including Jupyter notebooks and Python.
5. Gain a competitive edge using low-code cloud-based platform for Analytics using IBM Watson Studio.
6. Data engineering and data modeling practices using machine learning.
7. Explore data science industry case studies: transportation, automotive, human resources, aerospace, banking and healthcare.
8. Experience teamwork agile industry practices using design thinking.
9. Engage in role-playing challenge-based scenarios to propose real-world solutions.

SYLLABUS

Unit 1- Define Data Analytics with real time uses
Introduction of Analytics, Different Job role in analytics, Data Analytics in Practice, Methods of Analytics Process, Integrated Environment for Analytics projects, Lifecycle of Cloud Based Analytics.

Unit 2- Data Preparation
Phases of Data analytics: Business Understanding, Data Exploring & Preparation, Different tools of Statistics, Tools for Data Transformation, Visualization Methods & types of Data. CRISP-DM, KDD.

Unit 3- Visualization and Presentation of Data:
Decision-centered visualization, Fundamentals of Visualization, Different Types of Graphs like Bar, scatter, box plot, histogram, Pie chart, Common tools of visualization and representation of data.

Unit 4 – Model Deployment
Introduction of different techniques of modeling and Machine Learning, Confusion Matrix:

Accuracy, Precision & Recall. Model Selection and Deployment.

Unit 5 – Deep Dive into ML

Introduction of Machine Learning, Types of learning: Supervised, Unsupervised & Reinforcement Learning, Types of Regression like Linear & Logistics, Neural Networks, Decision Tree Classifier, XGB Classifier, Different Frameworks of Machine Learning.

References:

1. https://developer.ibm.com/articles/cc-beginner-guide-machine-learning-ai-cognitive/
2. http://bigdatauniversity.com/bdu-wp/ bdu-course/data-science-methodology
3. Wikipedia, "Cross Industry Standard Process for Data Mining," http:// en.wikipedia.org/wiki/Cross_Industry_Standard_Process_for_Data_ Mining, http://the-modeling-agency.com/crisp-dm.pdf
4. https://www.ibm.com/blogs/business-analytics/descriptive-analytics-101-what-happened/
5. https://www.weforum.org/agenda/2015/02/a-brief-history-of-big-data-everyone-should-read/
6. https://medium.com/ibm-watson/introducing-ibm-watson-studio-e93638f0bb47
7. https://keyskill-clms.mylearnerportal.com/mod/lesson/view.php%3Fid=2808
8. https://www.ibm.com/design/language/experience/data-visualization/

List of Practical:

Lab 1: IBM Cloud and Watson Studio

Lab 2: Explore and Understand Data: Implementing Data Assets from files.
Lab 3: Data Preparation by cleaning Data, analyzing and Conversion of data.
Lab 4: Visualize data on Watson studio.
Lab 5: Implement below hypothesis
  - Hypothesis1: Loss Claim After Expired Policy
  - Hypothesis2: Loss Claim After Expired License
  - Hypothesis3: Excessive (Over $10,000) Claim Amount

Lab 6: Building and Deploying Models with AutoAI.
Lab 7: Auto Insurance Fraud Analyzed in Jupyter Notebooks.
Lab 8: Predicating Insurance Fraud using Images.
Lab 9: Hands on Lab to Analyze Facebook Usage.
Lab 10: Hands on implementing Prediction of wildfire Intensity.

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							THEORY		PRACTICAL		
COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTCS407	UG	**Programming with Python**	0	0	4	2	0	0	0	60	40

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
*__Teacher Assessment__ shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:
1. To develop proficiency in creating based applications using the Python Programming Language.
2. To be able to understand the various data structures available in Python programming language and apply them in solving computational problems.
3. To be able to do testing and debugging of code written in Python.
4. To be able to draw various kinds of plots using PyLab.
5. To be able to use generators for generating series like fibonacci.

Course Outcomes:
Upon completion of this course, the student will be able apply technical knowledge and perform specific technical skills, including:
1. Ability to create robust applications using the Python programming language.
2. Ability to test and debug applications written using the Python programming language.
3. Ability to create applications for solving computational problems using the Python Programming Language.

SYLLABUS

UNIT–I
Introduction to Python: The basic elements of Python, Branching programs, Strings and Input, Iteration. Functions, Scoping and Abstraction: Functions and Scoping, Specifications, Recursion, Global variables, Modules, Files.

UNIT–II
Testing and Debugging: Testing, Debugging. Structured Types, Mutability and Higher order Functions: Tuples, Lists and Mutability, Functions as Objects, Strings, Tuples and Lists, Dictionaries.

UNIT–III
Exceptions and assertions: Handling exceptions, Exceptions as a control flow mechanism, Assertions. Classes and Object oriented Programming: Abstract Data Types and Classes, Inheritance, Encapsulation and information hiding.

UNIT–IV
Some simple Algorithms and Data Structures: Search Algorithms, Sorting Algorithms,

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Indore

Hashtables. Plotting and more about Classes: Plotting using PyLab, Plotting mortgages and extended examples.

UNIT–V
Dynamic Programming: Fibonacci sequence revisited, Dynamic programming and the 0/1 Knapsack algorithm, Dynamic programming and divide and conquer.

TEXT BOOKS:
1. John V Guttag. "Introduction to Computation and Programming Using Python", Prentice Hall of India
2. Allen Downey, Jeffrey Elkner and Chris Meyers "How to think like a Computer Scientist, Learning with Python", Green Tea Press.
3. Mark Lutz "Learning Python" O'Reilly Media; 5 edition.
4. David Beazley "Python Cookbook, Third edition" O'Reilly Media

REFERENCES:
1. Python Essential Reference, 4th Edition Addison-Wesley Professional.
2. Mark Lutz "Programming Python: Powerful Object-Oriented Programming "David Beazley "Python Cookbook" Third edition, O'Reilly Media

LIST OF EXPERIMENTS:
1. Write a Python Program to Print Hello world!
2. Write a Program to Add Two Numbers.
3. Write a Program to Find the Square Root.
4. Write a Program to Calculate the Area of a Triangle.
5. Write a Program to Solve Quadratic Equation.
6. Write a Program to Swap Two Variables.
7. Write a Program to Generate a Random Number.
8. Write a Program to Convert Kilometers to Miles.
9. Write a Program to Convert Celsius To Fahrenheit.
10. Write a Program to check if a number is positive, negative or zero.
11. Write a Program to Check if a Number is Odd or Even.
12. Write a Program to Check Leap Year.
13. Write a Program to Find the Largest Among Three Numbers.
14. Write a Program to Check Prime Number.
15. Write a Program to Print all Prime Numbers in an Interval.
16. Write a Program to Find the Factorial of a Number.
17. Write a Program to Display the multiplication Table.
18. Write a Program to Print the Fibonacci sequence.
19. Write an English sentence with understandable semantics but incorrect syntax. Write another English sentence which has correct syntax but has semantic errors.
20. Create a program that prompts the user for a number of gallons of gasoline. Reprint that value along with its conversion equivalent number of liters.
21. Write a program that allows a user to enter his or her two favorite foods. The program should then print out the name of a new food by joining the original food names together.
22. Write a Tipper program where the user enters a restaurant bill total. The program should then display two amounts: a 15 percent tip and a 20 percent tip.

23. Write a Car Salesman program where the user enters the base price of a car. The program should add on a bunch of extra fees such as tax, license, dealer prep, and destination charge. Make tax and license a percent of the base price. The other fees should be set values. Display the actual price of the car once all the extras are applied.

24. Create a program with a function that calculates the area of a circle by taking a radius from the user.

25. Write your own sum function called my Sum that takes a list as a parameter and returns the accumulative sum.

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COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	THEORY END SEM University Exam	THEORY Two Term Exam	PRACTICAL Teachers Assessment*	PRACTICAL END SEM University Exam	PRACTICAL Teachers Assessment*
BTCS607	UG	Scripting Languages	0	0	4	2	0	0	0	60	40

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:
The student will have ability to:
1. To understand different types of scripting languages.
2. To gain knowledge about client side scripts and server side scripting.
3. To learn about PHP, PERL and Python languages and their usage in implementation.
4. To build web application project using scripting languages.

Course Outcomes:
Upon completion of the subject, students will be able to:
1. Student will be Able to understand difference between scripting languages.
2. Student will be able to create programs using functions, control structures.
3. Student will learn implementation of scripting languages on different tools
4. Student can apply knowledge of scripting languages for creating a web application project using scripting languages implementation.

SYLLABUS

UNIT–I
Introduction of scripting languages, need of scripting, characteristics of scripting languages, uses of scripting languages, Introduction of client side scripting languages like JavaScript, VBScript, HTML5 (Structure), CSS3 (Designing), AJAX, jQuery, Server side scripting languages like PHP, ASP.NET (C# OR Visual Basic), C++ , Java and JSP, Python, Ruby on Rails.

UNIT–II
PHP basic features, Embedding php code in your web pages, outputting the data to the browser, data types, variables, constants, expressions, string interpolation, control structure, function, creating a function, function library, Arrays, String & regular expression, Web forms, Files, Authentication, Uploading file with PHP, sending email using PHP.

UNIT–III
Python: Introduction to python languages, python syntax, statements, functions, build-in functions, methods, module in python, exception handling, integrated web application in python- Building small, efficient python web system, web application framework.

UNIT–IV
Introduction to Perl and scripting, scripts, programs, Web scripting and PERL names , values, variable, scalar expression, control structures, arrays, list, hashes, strings, patterns, and regular

expression, subroutine.

UNIT–V
Introduction of Angular JS, Industrial usage of angular JS.benefits of Angular JS, Creation of Web application project using database, scripting, HTML, & CSS.

TEXT BOOKS:
1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Python Web Programming, Steve Holden and David Beazley, New Riders Publications.
3. Beginning PHP and MySQL, 3" Edition, Jason Gilmore, Apress Publications (Dream tech.).

REFERENCES:
1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Pen and PHP, J.Lee and B.Ware(Addison Wesley) Pearson Education.
2. Programming Python,M.Lutz,SPD.
3. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.
4. PHP 5.1,l.Bayross and S.Shah, The X Team, SPD.
5. Core Python Programming, Chun, Pearson Education.
6. Guide to Programming with Python, M.Dawson, Cengage Learning.
7. Pen by Example, E.Quigley, Pearson Education.
8. Programming Perl,Larry Wall, T.Christiansen and J.Orwant,O'Reilly, SPD.
9. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.
10. PHP and MySQL by Example, E.Quigley, Prentice HalI(Pearson).
11. Perl Power, J.RFlynt, Cengage Learning.
12. PHP Programming solutions, V.Vaswani, TMH.

LIST OF EXPERIMENTS:
1. Javascript program to generate Fibonacci series and to look for motifs and patterns in sequences.
2. Javascript program to find out frequency of characters existing in nucleotide and protein sequences 6 Javascript's implementation to generate dynamic HTML pages.
3. Write PHP programs to do basic operations to deal with strings, and arrays, and to implement various mathematical functions.
4. Development of an PHP program to take set of sequences and find out conserved sequences.
5. Create a MySQL database tables and execute all SQL queries.
6. Write a PHP program to connect MySQL database and execute all SQL commands.
7. Construct a PHP interface for a given Web page and to produce its overall connectivity.
8. Implement database and server site connectivity all together to generate complete dynamic web based applications through PHP, HTML and MySQL.
9. Write programs in Perl to implement string handling and other functions to be implemented to deal with biological data management.
10. Write PHP programs to do basic server side programming.