



**JAI HIND COLLEGE
BASANTSING INSTITUTE OF SCIENCE
&
J.T.LALVANI COLLEGE OF COMMERCE
(AUTONOMOUS)**

"A" Road, Churchgate, Mumbai - 400 020, India.

**Affiliated to
University of Mumbai**

Program: B.Sc IT

Proposed Courses: T.Y.BSc.IT

Semester VI

**Credit Based Semester and Grading System (CBCS) with effect from
the academic year 2023-24**

T.Y.BSc. IT
Academic year 2023-2024

Semester VI			
Course Code	Course Title	Credits	Lectures /Week
SBIT601	IT Infrastructure Management	2	5
SBIT602	Cloud Computing and Devops	3	5
SBIT603	Machine Learning and Deep Learning	3	5
SBIT604	Big Data with NoSQL	3	5
SBIT605	Cyber Security and Forensics	3	5
SBIT601 PR	Project Dissertation and Implementation	3	3
SBIT602 PR	Cloud Computing and Devops Practical	3	3
SBIT603 PR	Machine Learning and Deep Learning Practical	3	3
SBIT604 PR	Big Data with NoSQL Practical	3	3
SBIT605 PR	Cyber Security and Forensics Practical	3	3

Semester VI – Theory

CourseCode : SBIT601	Course Title: IT Infrastructure Management (Credits: 02 Lectures/Week:05)	
	<p>Objectives:</p> <ul style="list-style-type: none"> <input type="checkbox"/> This course will include a discussion of information technology architectures including software systems, hardware, operating systems, databases, component technologies, networking, and architecture patterns. <input type="checkbox"/> The course also covers management aspects as well. <input type="checkbox"/> To develop a comprehensive knowledge of the functionality of networking hardware; <input type="checkbox"/> To acquire the skills to solve business problems that require IT solutions; and <input type="checkbox"/> To develop the competency to investigate inter-organization and intra-organization <p>Outcomes:</p> <p>Upon completion of this course, students will be able to:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Analyze a business problem and propose an IT enabled solution. <input type="checkbox"/> Explain the principles underlying layered systems architecture and their application to both computers and networks. <input type="checkbox"/> Discuss how IT infrastructure components are organized into infrastructure solutions in different organizational environments. <input type="checkbox"/> Examine the principles underlying operating systems and virtual networks and propose a network operating system given a business scenario. <input type="checkbox"/> Use practical examples to demonstrate how protocols are used to enable communication between computing devices connected to each other. 	
Unit I	<p>Introducing Windows 10: Overview of Deploying Windows 10- Configure Devices and Drivers- Perform Post installation Configuration Task- Managing Apps in Window.</p> <p>MS SCCM Basics- Overview of System Center 2012 R2 Configuration Manager-Planning and Deploying a Stand-Alone Primary Site- Planning and Configuring Role-Based Administration- Planning and Deploying a Multiple-Site Hierarchy- Replicating Data and Managing Content in Configuration Manager 2012-Planning Resource Discovery and Client Deployment- Configuring Internet and Cloud-Based Client Management- Maintaining and Monitoring System Center 2012 Configuration Manager.</p>	15 L
Unit II	<p>Overview of System Center 2012 R2 Operations Manager: Operations Manager Introduction and Basic Concepts- Reason to use Operations Manager- What's New in 2012 R2 Operations Manager- System Requirements- Operations Manager Components.</p> <p>Planning & Installation: Deployment Scenarios-Order of Installation- Installation Process- SQL Server Configuration- Operations Console- Web Console.</p>	15 L
Unit III	<p>Administration : Agent Deployment- Security of manual agent- Agent and Agent less managed systems-Role Based Security- Reporting server- Object Discovery.</p> <p>Management Packs:Management Pack Overview- Pre-Installed Management Packs- Importing Management Packs- Overrides.</p>	15 L

Unit IV	Monitoring Overview- Overriding of MPs- Creating Rules and Monitors- Agentless Monitoring- Demo on Role Based Security- Creating Groups- Configuring Notifications. Operations Manager Reporting: Installing SQL Reporting Services- Installing Operations Manager Reporting- Creating, Viewing and Customizing Reports- Dashboard- Considerations for High Availability and Disaster Recovery.	15 L
Textbook: 1. Kerrie Meyler, Gerry Hampson, “System Center Configuration Manager Current Branch Unleashed System” 1st Edition, 2018. 2. SlawekLigus, “Effective Monitoring and Alerting: For Web Operations” 1st Edition, 2012.		

Evaluation Scheme

[A] Evaluation scheme for Theory courses

I. Continuous Assessment (C.A.) - 40 Marks

(i) C.A.-I : Test – 20 Marks of 40 mins. duration

(ii) C.A.-II :Assignment- 20 Marks

II. Semester End Examination (SEE)- 60 Marks



Course: SBIT602	Course Title: Cloud Computing and Devops (Credits : 03 Lectures/Week: 05)	
	<p>Objectives:</p> <ul style="list-style-type: none"> ➤ To study the importance of cloud in E-commerce. ➤ Exploring reference model for cloud ➤ To study the emergence of cloud as the next generation computing paradigm. ➤ To understand DevOps practices which aims to simplify Software Development Life Cycle <p>Outcomes:</p> <ul style="list-style-type: none"> ➤ Identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc. ➤ Assess cloud Storage systems and Cloud security, the risks involved, its impact and develop cloud application. ➤ Analyze the Cloud computing setup with its vulnerabilities and applications using different architectures ➤ Integrate and deploy tools like Jenkins and Maven, which is used to build, test and deploy applications in DevOps environment 	
Unit I	<p>Cloud Computing Fundamentals: Motivation for Cloud Computing, Defining Cloud Computing, Principles of Cloud computing, Cloud Ecosystem, Requirements for Cloud Services, Cloud Application, Benefits and Drawbacks. Overview of AWS, Azure and GCP cloud.</p> <p>Cloud Computing Architecture and Management: Cloud Architecture, Anatomy of the Cloud, Network Connectivity in Cloud Computing, Applications on the Cloud, Managing the Cloud, Migrating Application to Cloud.</p> <p>Cloud Deployment Models: Private Cloud, Public Cloud, Community Cloud, Hybrid Cloud.</p> <p>Cloud Service Models: Infrastructure as a Service: Python basics for cloud automation, Platform as a Service: Overview of Sales force CRM and Force.com , Software as a Service : Overview of Office 365 and Google apps..</p> <p>Choosing the Right Cloud Service Model: Considerations When Choosing a Cloud Service Model, when to use SaaS, PaaS, IaaS, Common Cloud Use Cases (Cloud Bursting, Archiving/Storage, Data Mining and Analytics, Test Environments).</p>	15 L
Unit II	<p>Cloud Service Providers: EMC, Google, Amazon Web Services, Microsoft, IBM, SAP Labs, Salesforce, Rackspace, VMware, Manjrasoft</p> <p>Open Source Softwares available for the Cloud Deployment: Eucalyptus, OpenNebula, OpenQRM</p> <p>Technological Drivers for Cloud Computing: SOA and Cloud, Virtualization: Virtualization Opportunities, Approaches in Virtualization, Hypervisor and Its Role, Types of Virtualization,</p>	15 L

	From Virtualization to Cloud Computing.	
Unit III	<p>Cloud Security : Introduction, Security Aspects: Data Security, Virtualization Security, Network Security. Platform-Related Security, Audit and Compliance, Regulations in the Cloud, Audit Design Strategies, Overview of tools : cloud conformity</p> <p>Advanced Concepts in Cloud Computing: Intercloud, Cloud Management, Mobile Cloud, Media Cloud , Interoperability and Standards, Cloud Governance , Computational Intelligence in Cloud, Green Cloud, Cloud Analytics.</p> <p>DevOps: DevOps introduction, DevOps architecture, tools for professional DevOps environment, DevOps centered application.</p> <p>DevOps Concepts and Assessment Framework: Need for DevOps: Overview of DevOps- Challenges for the development and operations teams, How can DevOps culture evolve? Agile development DevOps</p>	15 L
Unit IV	<p>Tracking code: Number of repositories, Git repository, structure, branching pattern, Azure repos configuration, Git and Azure</p> <p>Continuous Integration: Installing Jenkins: Global Tool Configuration in Jenkins, Creating and configuring Maven-based JEE web applications, Unit test case results in Jenkins, Master agent architecture in Jenkins, Integrating Jenkins and SonarQube, E-mail notifications in Jenkins, Continuous integration using Visual Studio Team Services: Eclipse and VSTS integration, Continuous integration in VSTS</p> <p>Containers: Overview of Docker containers, Understanding the difference between virtual machines and containers, Installing and configuring Docker, Creating a Tomcat container</p>	15 L
<p>Textbooks:</p> <ol style="list-style-type: none"> 1. “Essentials of CLOUD COMPUTING” by K. Chandrasekaran 2. “Architecting the Cloud” by Michael J. Kavis 3. “Cloud Computing: Concepts, Technology, and Architecture” by Thomas Erl 4. “Cloud Computing Theory and Practice” by Dan C. Marinescu 5. “Cloud Computing from Beginning to End” by Ray J. Rafaels 6. “Cloud Essentials: CompTIA Authorized Courseware for Exam CLO-001” by Hausman, K. K., Cook, S. L., & Sampaio, T. 7. “DevOps Bootcamp” by Mitesh Soni 8. “.NET DevOps for Azure A Developer’s Guide to DevOps Architecture the Right Way” by Jeffrey Palermo 9. “DevOps: A Software Architects’s Perspective” by Len Bass, Ingo Weber, Liming Zhu 		

Evaluation Scheme

[A] Evaluation scheme for Theory courses

I. Continuous Assessment (C.A.) - 40 Marks

(i) C.A.-I : Test – 20 Marks of 40 mins. duration

(ii) C.A.-II :Case Study- 20 Marks

II. Semester End Examination (SEE)- 60 Marks

Course Code: SBIT603	Course Title:Machine Learning and Deep Learning (Credits : 03 Lectures/Week: 05)	
	Objectives: <ul style="list-style-type: none"> ➤ The syllabus will familiarize students with a broad cross-section of models and algorithms for machine learning. ➤ Understanding key concepts related to Deep Learning. Outcomes: <ul style="list-style-type: none"> ➤ Upon completion of the course students will be able to: ➤ Students will have a good understanding of the fundamental issues and challenges of machine learning: data,model selection,model complexity ,etc. ➤ Students will be able to design and implement various machine learning and deep learning algorithms in a range of real world applications. 	
Unit I	<p>Introduction: what is ML; Problems, data and Visualization tools, Types of Learning, Features of machine Learning; data science vs machine learning; Machine learning life cycle; Datasets; training vs testing; data preprocessing, Machine learning Models: Geometric Models, Logical Models, Probabilistic Models. Features: Feature types, Feature Construction and Transformation;</p> <p>Supervised learning: Linear regression with one variable and multiple variable; Assessing performance of regression; Bias and Variance;gradient descent; Overfitting and complexity; Feature selection, polynomial regression.</p>	15 L
Unit II	<p>Classification: Logistic regression, Naïve bayes classification, K-Nearest Neighbour, Support Vector Machine; Assessing performance of classification;</p> <p>Unsupervised learning: clustering, k-means, hierarchical agglomeration, Decision Tree; EM: Bagging, random forests, boosting, Dimensionality reduction, Anomaly Detection,PCA</p>	15 L
Unit III	<p>Introduction to Deep Learning: Artificial Neural Network, Backpropagation, Optimization, Introduction to Convolutional Neural Networks (CNN), Intro to CNNs, Convolution, Correlation, Filtering,</p>	15 L

	CNN architectures, Detection and Segmentation, Visualizing and Understanding, Advanced CNNs for computer vision	
Unit IV	<p>Recurrent Neural networks (RNNs), Advanced RNN: LSTM, Seq2Seq Architecture , The Limitations of RNN,GRU, Generative Adversarial Networks (GANs), Advanced GANs,</p> <p>Image to Image Translation; Long Short-Term Memory Networks (LSTMs), Deep Boltzmann Machine (DBM), Deep Belief Networks (DBN)</p>	15 L
<p>References:</p> <ol style="list-style-type: none"> 1. Understanding Machine Learning:From Theory To Algorithms,2017 By Shai Shalev-Shwartz And Shai Ben-David 2. Introduction To Machine Learning,An Early Draft Of A Proposed Textbook,Nils J. Nilsson Robotics Laboratory Department Of Computer Science Stanford University,Stanford, Ca 94305 3. Machine Learning For Absolute Beginners second edition by Oliver Theobal 4. The Elements of Statistical Learning. Trevor Hastie,Robert Tibshirani and Jerome Friedman. 5. Pattern Recognition & Machine Learning ,Christopher Bishop,Springer 6. Deep Learning Essentials: Your hands-on guide to the fundamentals of deep learning and neural network modeling by Wei Di, Anurag Bhardwaj, Jianing Wei 7. Deep Learning (Adaptive Computation and Machine Learning series) by Ian Goodfellow , Yoshua Bengio, Aaron Courville 		

Evaluation Scheme

[A] Evaluation scheme for Theory courses

I. Continuous Assessment (C.A.) - 40 Marks

(i) C.A.-I : Test – 20 Marks of 40 mins. duration

(ii) C.A.-II : Mini Project- 20 Marks

II. Semester End Examination (SEE)- 60 Marks

Course Code: SBIT604	Course Title: Big Data with NoSQL (Credits : 03 Lectures/Week: 05)	
	<p>Objectives:</p> <ul style="list-style-type: none"> ➤ Technologies used to handle big data. ➤ Explore the origins of NoSQL databases and the characteristics that distinguish them from traditional relational database management systems. ➤ Understand the architectures and common features of the main types of NoSQL databases (key-value stores, document databases, column-family stores, graph databases) <p>Outcome:</p> <ul style="list-style-type: none"> ➤ Students will thoroughly learn basic and advanced analytic techniques for manipulating and analyzing data. 	
Unit I	<p>Introduction to Big Data: Characteristics of Data, Evolution of Big Data, Definition of Big Data, Challenges with Big Data, What is Big Data?, Other Characteristics of Data, Which are not Definitional Traits of Big Data, Why Big Data?, Traditional Business Intelligence (BI) versus Big Data, A Typical Data Warehouse Environment, A Typical Hadoop Environment, What is New Today?, What is Changing in the Realms of Big Data?</p> <p>Introduction to Hadoop: Introducing Hadoop, Why Hadoop?, Why not RDBMS?, RDBMS versus Hadoop, Distributed Computing Challenges, History of Hadoop, Hadoop Overview, Hadoop Distributors, HDFS, Processing Data with Hadoop, Managing Resources and Applications with Hadoop YARN, Interacting with Hadoop Ecosystem.</p>	15 L
Unit II	<p>Introduction to MAPREDUCE Programming: Introduction, Mapper, Reducer, Combiner, Partitioner, Searching, Sorting, Compression</p> <p>Introduction to Hive: What is Hive?, Hive Architecture, Hive Data Types, Hive File Format, Hive Query Language (HQL), RCFile Implementation, SerDe, User-Defined Function (UDF).</p> <p>Introduction to Pig: What is Pig?, The Anatomy of Pig, Pig on Hadoop, Pig Latin Overview, Data Types in Pig, Running Pig, Execution Modes of Pig, HDFS Commands, Relational Operators, Eval Function, Complex Data Types, User-Defined Functions (UDF)</p>	15 L
Unit III	<p>NoSQL: Why NoSQL, Aggregate Data Models</p> <p>MongoDB: MongoDB Basics - Documents, Collections, Databases, Data Types. Creating, Updating, and Deleting Documents - Inserting and Saving Documents, Removing documents, Updating documents. Querying - Introduction to find, Query criteria, Type specific queries, Cursors. Indexing - Introduction, Unique index, Using explain and hint, Index administration. Aggregation - count, distinct, group.</p> <p>Key Value Data stores: From array to key value databases, Essential features of key value Databases, Properties of keys, Characteristics of Values, Key-Value Database Data Modeling Terms, Key-Value</p>	15 L

	Architecture and implementation Terms, Designing Structured Values, Limitations of Key- Value Databases, Design Patterns for Key-Value Databases.	
Unit IV	<p>Column Database: Column-store Architectures: C-Store and Vector-Wise, Column-store internals and, Inserts/updates/deletes, Indexing, Adaptive Indexing and Database Cracking, Compressed Data Late Materialization Joins , Group-by, Aggregation and Arithmetic Operations.</p> <p>Graph Databases: What is Graph ?, The Power of Graph Databases, Options for Storing Data, Data modeling with graph-Querying Graph, A comparison and graph modeling, Cross-Domain models, Common Modeling Pitfalls, Identifying nodes and relationships, Avoiding Anti-Patterns.</p> <p>Introduction to Cassandra: An Introduction, Features of Cassandra, CQL Data Types, CQLSH, Keyspaces, CRUD (Create, Read, Update, and Delete) Operations, Collections.</p>	15 L
<p>Reference Books:-</p> <ol style="list-style-type: none"> 1. Big Data and Analytics, 2ed by Seema Acharya, Subhashini Chellappan. 2. Big Data Analytics, 2ed by Radha Shankarmani, M. Vijayalakshmi, Wiley. 3. Practical MongoDB - Architecting, Developing, and Administering MongoDB by Shakuntala Gupta Edward and Navin Sabharwal 4. MongoDB: The Definitive Guide by Kristina Chodorow and Michael Dirolf , O'REILLY. 5. Daniel Abadi, Peter Boncz and Stavros Harizopoulos, The Design and Implementation of Modern Column-Oriented Database Systems, Now Publishers. 6. Graph Databases by Ian Robinson, Jim Webber & Emil Elifrem , O'Reilly. 7. Next Generation Databases NoSQL, NewSQL and BigData by Guy Harrison. 8. NoSQL Distlled by Pramod J. Sadalage and Martin Fowler. 		

Evaluation Scheme

[A] Evaluation scheme for Theory courses

I. Continuous Assessment (C.A.) - 40 Marks

- (i) C.A.-I: Test – 20 Marks of 40 mins. duration
- (ii) C.A.-II: Assignment - 20 Marks

II. Semester End Examination (SEE)- 60 Marks

Course Code: SBIT605	Course Title: Cyber Security and Forensics (Credits: 03 Lectures/Week:05)	
	<p>Objectives:</p> <ul style="list-style-type: none"> ➤ The purpose of ethical hacking is to evaluate the security of and identify vulnerabilities in systems, networks or system infrastructure. ➤ It includes finding and attempting to exploit any vulnerabilities to determine whether unauthorized access or other malicious activities are possible. ➤ Understand the usage of correct tools for forensic investigations. ➤ Find vulnerabilities and security loopholes that facilitate attackers. ➤ Understand the techniques and strategies utilized by attackers to avert prosecution, and overcome them <p>Outcomes:</p> <p>Upon completion of the course students should be able to:</p> <ul style="list-style-type: none"> ➤ Plan a vulnerability assessment and penetration test for a network. ➤ Execute a penetration test using standard hacking tools in an ethical manner. ➤ Identify legal and ethical issues related to vulnerability and penetration testing. ➤ Identify the process in taking digital evidence. ➤ Develop report findings after investigation. 	
Unit I	<p>Introduction to Ethical Hacking, Ethics, and Legality: Defining Ethical Hacking, How to Be Ethical, Keeping It Legal</p> <p>Gathering Target Information: Reconnaissance, Footprinting, and Social Engineering: Reconnaissance, Information-Gathering Methodology, Social Engineering</p> <p>Gathering Network and Host Information: Scanning and Enumeration: Scanning, Enumeration</p> <p>Cryptography: Describe cryptography and encryption techniques, Define cryptographic algorithms, Describe public and private key generation concepts, Describe digital signature components and usage, Describe cryptanalysis and code-breaking tools and methodologies, List cryptography attacks</p>	15 L
Unit II	<p>System Hacking: Password Cracking, Escalating Privileges, and Hiding Files: The Simplest Way to Get a Password, Types of Passwords, Cracking a Password, Understanding Keyloggers and Other Spyware Technologies, Escalating Privileges, Understanding Rootkits, Hiding Files, Understanding Steganography Technologies, Covering Your Tracks and Erasing Evidence.</p> <p>Trojans, Backdoors, Viruses, and Worms: Trojans and Backdoors, Viruses and Worms</p> <p>Web Hacking: Google, Web Servers, Web Application Vulnerabilities, and Web-Based Password Cracking Techniques: How Web Servers Work, Types of Web Server Vulnerabilities, Web Application Vulnerabilities, Web-Based Password-Cracking Techniques</p> <p>Attacking Applications: SQL Injection and Buffer Overflows: SQL Injection, Buffer Overflows</p>	15 L

Unit III	<p>Introduction to IT Act 2000 and its amendments</p> <p>Computer Forensics: Understanding Computer Forensics, Preparing for Computer Investigations, Understanding Computer Investigations - Taking a Systematic Approach, Procedures for Corporate High-Tech Investigations, Understanding Data Recovery Workstations and Software, conducting an Investigation, Completing the Case.</p> <p>Incident response: What constitutes an incident? What is Incident Response? The Incident Response Process.</p>	15 L
Unit IV	<p>Network Forensics: Introduction, Protocols, Capturing packets – Tcpcmdump/Tshark, Wireshark, taps, port spanning, ARP spoofing, passive Scanning. Packet analysis with Wireshark – packet decoding, filtering, statistics, following streams, gathering files. Network miner.</p> <p>Attacks: Denial of service Attacks – SYN floods, malformed packets, UDP floods, Amplification attacks, distributed attacks, backscatter. Vulnerability exploits, insider threats, evasion, application Attacks. Preparing for attacks – Netflow, Logging, Antivirus, Incident response preparation, security information and event management.</p> <p>Report writing: Understanding the Importance of Reports, Guidelines for Writing Reports, Generating Report Findings with Forensics Software Tools.</p>	15 L
<p>Textbook:</p> <ol style="list-style-type: none"> 1. CEHTM Certified Ethical Hacker STUDY GUIDE by Kimberly Graves, Wiley Publishing, Inc. 2. CEHTM Certified Ethical Hackers All-in-one Exam Guide by Matt Walker, McGraw Hill Education 3. Guide to computer forensics and investigations, Fourth edition by Bill Nelson, Amelia Phillips, Christopher Steuart, Course Technology. 4. Incident Response & Computer Forensics, Third Edition by Jason T. Luttgens and Matthew Pepe, McGraw Hill Publication. 5. Messier Ric Network forensics 2017 Wiley 6. Cyber Law Simplified, Vivek Sood, TMH Education 7. https://eprocure.gov.in/cppp/rulesandprocs/kbadqkdlcswfjdelrquehwuxcfmijmuixngudufgbuubgubfugbububjxcgfvbdihbfgGhdfgFHtyhRtMjk4NzY= 		

Evaluation Scheme

[A] Evaluation scheme for Theory courses

I. Continuous Assessment (C.A.) - 40 Marks

(i) C.A.-I : Test – 20 Marks of 40 mins. duration

(ii) C.A.-II : Mini project- 20 Marks

II. Semester End Examination (SEE)- 60 Mark

Semester VI – Practical

Course Code: SBIT601PR	Practical Title:Project Dissertation and Implementation (Credits : 03 Practicals/Week: 01)
	<p>1.1 PROJECT REPORT:</p> <p>Title Page Original Copy of the Approved Proforma of the Project Proposal Certificate of Authenticated work Role and Responsibility Form Abstract Acknowledgement Table of Contents Table of Figures</p> <p>CHAPTER 1: INTRODUCTION</p> <p>1.1 Background 1.2 Objectives 1.3 Purpose, Scope, and Applicability 1.3.1 Purpose 1.3.2 Scope 1.3.3 Applicability 1.4 Achievements 1.5 Organisation of Report</p> <p>CHAPTER 2: SURVEY OF TECHNOLOGIES</p> <p>CHAPTER 3: REQUIREMENTS AND ANALYSIS</p> <p>3.1 Problem Definition 3.2 Requirements Specification 3.3 Planning and Scheduling 3.4 Software and Hardware Requirements 3.5 Preliminary Product Description 3.6 Conceptual Models</p> <p>CHAPTER 4: SYSTEM DESIGN</p> <p>4.1 Basic Modules 4.2 Data Design 4.2.1 Schema Design 4.2.2 Data Integrity and Constraints 4.3 Procedural Design 4.3.1 Logic Diagrams 4.3.2 Data Structures 4.3.3 Algorithms Design 4.4 User interface design 4.5 Security Issues 4.6 Test Cases Design</p> <p>CHAPTER 5: IMPLEMENTATION AND TESTING</p> <p>5.1 Implementation Approaches 5.2 Coding Details and Code Efficiency 5.2.1 Code Efficiency 5.3 Testing Approach 5.3.1 Unit Testing 5.3.2 Integrated Testing 5.3.3 Beta Testing 5.4 Modifications and Improvements 5.5 Test Cases</p>

	CHAPTER 6: RESULTS AND DISCUSSION 6.1 Test Reports 6.2 User Documentation CHAPTER 7: CONCLUSIONS 7.1 Conclusion 7.1.1 Significance of the System 7.2 Limitations of the System 7.3 Future Scope of the Project REFERENCES GLOSSARY
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Evaluation Scheme

[B] Evaluation scheme for Practical courses-50 Marks

Course: SBIT602PR	Practical Title :Cloud Computing and DevOps Practical (Credits : 03 Practicals /Week: 01)
	<ol style="list-style-type: none"> 1. A simple example showing how to create a datacenter with one host and run one cloudlet on it. 2. A simple example showing how to create two datacenters with one host and a network topology each and run two cloudlets on them. 3. A simple example showing how to create two datacenters with one host each and run cloudlets of two users with network topology on them. 4. An example showing how to create scalable simulations. 5. Practical public cloud - AWS – Actual Implementation <ol style="list-style-type: none"> a) Create public and private network using a /16 CIDR Block b) Launch a Three tier application, Cloud Front – Load Balancer - Database c) Deploy any open source content management system d) Launch Kubernetes cluster e) Deploy single tier docker application 6. To understand Version Control System / Source Code Management, install git and create a GitHub account 7. To Perform various GIT operations on local and Remote repositories using GIT Cheat-Sheet 8. To understand Continuous Integration, install and configure Jenkins with Maven to setup a build Job 9. To Build the pipeline of jobs using Maven in Jenkins, create a pipeline script to Test and deploy an application over the tomcat server. 10. To understand Jenkins Master-Slave Architecture and scale your Jenkins standalone implementation by implementing slave nodes. 11. To install Docker and execute basic command in docker

Evaluation Scheme

[B] Evaluation scheme for Practical courses-50 Marks

Course: SBIT603PR	Practical Title:Machine Learning and Deep Learning Practical (Credits : 03 Practicals/Week: 03)
	<ol style="list-style-type: none"> 1. Perform the data classification using classification algorithm 2. Perform the data clustering using a clustering algorithm. 3. Perform the Linear regression on the given data warehouse data. 4. Perform the logistic regression on the given data warehouse data. 5. Implement decision tree learning algorithm 6. Support Vector Machine: <ol style="list-style-type: none"> 1. Create SVM from scratch 2. Program to perform SVM optimization using python. 7. Implement feed forward back propagation neural network learning algorithm 8. Implement Naive Bayes' learning algorithm. 9. Implement ANN.

Evaluation Scheme

[B] Evaluation scheme for Practical courses-50 Marks.



Course: SBIT6 04PR	Practical Title:Big Data with NoSQL (Credits : 03 Practicals/Week: 01)
	<ol style="list-style-type: none"> 1. Installation of hadoop. 2. Implement the following file management tasks in Hadoop: Adding files and directories , Retrieving files , Deleting files 3. Demonstrate mapreduce programs: <ol style="list-style-type: none"> a. Write a mapreduce program for word count. b. Write a mapreduce program to find maximum temperature. 4. Demonstrate Hive queries on the following: <ol style="list-style-type: none"> a. Built-in operators b. Built-in functions c. Aggregation functions d. User defined function 5. Demonstrate Pig queries on the following <ol style="list-style-type: none"> a. Group operator, order operator, filter operator, joins, User-Defined Functions (UDF). b. Write a pig script to find the number of products sold in each country. 6. Demonstrate MongoDB queries on the following: Databases, Collections, Documents and Aggregation. 7. Demonstrate queries using Redis for Key Value Data Store <ol style="list-style-type: none"> a. String b. Lists c. Sets 8. Demonstrate queries for Column Databases <ol style="list-style-type: none"> a. Insert,update,delete b. Group-by, Aggregation c. Arithmetic Operations. d. Joins 9. Demonstrate queries using Neo4j for GraphDB <ol style="list-style-type: none"> a. Creating relationships between nodes b. Matching Relationships c. Adding/Removing properties to relationships. d. Deleting Relationships e. Aggregate functions 10. Demonstrate CQL CRUD Operation

Evaluation Scheme

[B] Evaluation scheme for Practical courses-50 Marks

Course Code: SBIT605PR	Practical Title: Cyber Security and Forensics Practical (Credits : 3 Practicals /Week: 01) <ol style="list-style-type: none"> 1. Study of different Enumeration tools for different Enumeration techniques such DNS Enumeration, NETBIOS Enumeration, nmap, metasploit and Check using information gathering tools like WHOIS. 2. Study of Social Engineering attacks using Social Engineering Toolkit. 3. Study of Cryptanalysis tools. 4. Study of Web application hacking, password cracking (Brute Force Attack) using Burp Suite. 5. Compromising Web server using file upload vulnerability. 6. Study of SQL injection using Burp Suite. 7. Study of Sniffing and Denial-of-service attack. 8. Using Cookies of any user to perform Session Hijacking. 9. Study of Cross Side Scripting (Reflected, Stored, DOM XSS) 10. To use digital storage media in kali linux for <ol style="list-style-type: none"> a. attaching and mounting media storage devices. b. access for copying files. 11. Study to use forensic image acquisition and burning tools in kali linux. 12. To use cloning tools (guymager) to perform disk cloning in kali linux. 13. Practical using Dumpzilla Package (Browser Forensic Tool)
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Evaluation Scheme

[B] Evaluation scheme for Practical courses-50 Marks

