JAI HIND COLLEGE AUTONOMOUS

Syllabus for T.Y.BSc

Course :Information Technology

Semester : V

Credit Based Semester & Grading System

With effect from Academic Year 2018-19

List of Courses

Course: Information Technology **Semester: V**

SR. NO.	COURSE CODE	COURSE TITLE	NO. OF LECTURES / WEEK	NO. OF CREDITS
TYBSc IT				
1	SBIT501	Software Project Management	5	2
2	SBIT502	Internet of Things	5	2
3	SBIT503	Advanced Web Programming	5	2
4	SBIT504	Linux System Administration	5	2
5	SBIT505	Enterprise Java	5	2
6	SBIT501 PR	Project Dissertation	3	2
7	SBIT502 PR	Internet of Things Practical	3	2
8	SBIT503 PR	Advanced Web Programming Practical	3	2
9	SBIT504 PR	Linux Administration Practical	3	2
10	SBIT505 PR	Enterprise Java Practical	3	2

Semester V – Theory

Course: SBIT501	**Software Project Management (Credits : 02 Lectures/Week:05)**	
	Objectives: ➢ **Manage the selection and initiation of individual projects and of portfolios of projects in the enterprise.** ➢ **Conduct project planning activities that accurately forecast project costs, timelines, and quality. Implement processes for successful resource, communication, and risk and change management.** ➢ **Demonstrate effective project execution and control techniques that result in successful projects.** ➢ **Conduct project closure activities and obtain formal project acceptance.** ➢ **Demonstrate a strong working knowledge of ethics and professional responsibility.** ➢ **Demonstrate effective organizational leadership and change skills for managing projects, project teams, and stakeholders.** **Outcomes:** **To introduce how software management is different from ordinary project management**	
Unit I	**Introduction to Software Project Management:** Introduction, Why is Software Project Management Important? What is a Project? Software Projects versus Other Types of Project, Contract Management and Technical Project Management, Activities Covered by Software Project Management, Plans, Methods and Methodologies, Some Ways of Categorizing Software Projects, Project Charter, Stakeholders, Setting Objectives, The Business Case, Project Success and Failure, What is Management? Management Control, Project Management Life Cycle, Traditional versus Modern Project Management Practices. **Project Evaluation and Programme Management**: Introduction, Business Case, Project Portfolio Management, Evaluation of Individual Projects, Cost–benefit Evaluation Techniques, Risk Evaluation, Programme Management, Managing the Allocation of Resources within Programmes, Strategic Programme Management, Creating a Programme, Aids to Programme Management, Some Reservations about Programme Management, Benefits Management. **An Overview of Project Planning**: Introduction to Step Wise Project Planning, Step 0: Select Project, Step 1: Identify Project Scope and Objectives, Step 2: Identify Project Infrastructure, Step 3: Analyse Project Characteristics, Step 4: Identify Project Products and Activities, Step 5: Estimate Effort for Each Activity, Step 6: Identify Activity Risks, Step 7: Allocate Resources, Step 8: Review/Publicize Plan, Steps 9 and 10: Execute Plan/Lower Levels of Planning	**12 L**
Unit II	**Selection of an Appropriate Project Approach:** Introduction, Build or Buy? Choosing Methodologies and Technologies, Software Processes and Process Models, Choice of Process Models, Structure versus Speed of Delivery, The Waterfall Model, The Spiral Model, Software Prototyping, Other Ways of Categorizing Prototypes, Incremental Delivery, Atern/Dynamic Systems Development Method, Rapid Application	**12 L**

	Development, Agile Methods, Extreme Programming (XP), Scrum, Lean Software Development, Managing Iterative Processes, Selecting the Most Appropriate Process Model. **Software Effort Estimation:** Introduction, Where are the Estimates Done? Problems with Over- and Under-Estimates, The Basis for Software Estimating, Software Effort Estimation Techniques, Bottomup Estimating, The Top-down Approach and Parametric Models, Expert Judgement, Estimating by Analogy, Albrecht Function Point 12 6 Analysis, Function Points Mark II, COSMIC Full Function Points, COCOMO II: A Parametric Productivity Model, Cost Estimation, Staffing Pattern, Effect of Schedule Compression, Capers Jones Estimating Rules of Thumb.	
Unit III	**Activity Planning: Introduction,** Objectives of Activity Planning, When to Plan, Project Schedules, Projects and Activities, Sequencing and Scheduling Activities, Network Planning Models, Formulating a Network Model, Adding the Time Dimension, The Forward Pass, Backward Pass, Identifying the Critical Path, Activity Float, Shortening the Project Duration, Identifying Critical Activities, Activity-on-Arrow Networks. **Risk Management**: Introduction, Risk, Categories of Risk, Risk Management Approaches, A Framework for Dealing with Risk, Risk Identification, Risk Assessment, Risk Planning, Risk Management, Evaluating Risks to the Schedule, Boehm's Top 10 Risks and Counter Measures, Applying the PERT Technique, Monte Carlo Simulation, Critical Chain Concepts. **Resource Allocation**: Introduction, Nature of Resources, Identifying Resource Requirements, Scheduling Resources, Creating Critical Paths, Counting the Cost, Being Specific, Publishing the Resource Schedule, Cost Schedules, Scheduling Sequence	**12 L**
Unit IV	**Monitoring and Control:** Introduction, Creating the Framework, Collecting the Data, Review, Visualizing Progress, Cost Monitoring, Earned Value Analysis, Prioritizing Monitoring, Getting the Project Back to Target, Change Control, Software Configuration Management (SCM). **Managing Contracts:** Introduction, Types of Contract, Stages in Contract Placement, Typical Terms of a Contract, Contract Management, Acceptance. **Managing People in Software Environments:** Introduction, Understanding Behaviour, Organizational Behaviour: A Background, Selecting the Right Person for the Job, Instruction in the Best Methods, Motivation, The Oldham–Hackman Job Characteristics Model, Stress, Stress Management, Health and Safety, Some Ethical and Professional Concerns	**12 L**
Unit V	**Working in Teams**: Introduction, becoming a Team, Decision Making, Organization and Team Structures, Coordination Dependencies, Dispersed and Virtual Teams, Communication Genres, Communication Plans, Leadership. **Software Quality:** Introduction, The Place of Software Quality in Project Planning, Importance of Software Quality, Defining Software Quality, Software Quality Models, ISO 9126, Product and Process Metrics, Product versus Process Quality Management, Quality Management Systems, Process Capability Models, Techniques to Help Enhance	**12 L**

	Software Quality, Testing, Software Reliability, Quality Plans. **Project Closeout:** Introduction, Reasons for Project Closure, Project Closure Process, Performing a Financial Closure, Project Closeout Report	

Textbook:

1. Software Project Management Bob Hughes, Mike Cotterell, Rajib Mall TMH 6 th 2018
2. Project Management and Tools & Technologies – An overview Shailesh Mehta SPD 1st 2017
3. Software Project Management Walker Royce Pearson 2005

Course: SBIT502	Internet of Things **(Credits : 02 Lectures/Week:05)**	
	Objectives: ➢ **Learning use of database** ➢ **Understanding web development** **Outcomes:** **Conceptual development of software and hardware for automation**	
Unit I	**The Internet of Things:** An Overview: The Flavour of the Internet of Things, The "Internet" of "Things", The Technology of the Internet of Things, Enchanted Objects, Who is Making the Internet of Things? **Design Principles for Connected Devices**: Calm and Ambient Technology, Magic as Metaphor, Privacy, Keeping Secrets, Whose Data Is It Anyway? Web Thinking for Connected Devices, Small Pieces, Loosely Joined, First-Class Citizens on The Internet, Graceful Degradation, Affordances. **Internet Principles:** Internet Communications: An Overview, IP, TCP, The IP Protocol Suite (TCP/IP), UDP, IP Addresses, DNS, Static IP Address Assignment, Dynamic IP Address Assignment, IPv6, MAC Addresses, TCP and UDP Ports, An Example: HTTP Ports, Other Common Ports, Application Layer Protocols, HTTP, HTTPS: Encrypted HTTP, Other Application Layer Protocols	**12 L**
Unit II	**Thinking About Prototyping:** Sketching, Familiarity, Costs versus Ease of Prototyping, Prototypes and Production, Changing Embedded Platform, Physical Prototypes and Mass Personalisation, climbing into the Cloud, Open Source versus Closed Source, Why Closed? Why Open? Mixing Open and Closed Source, Closed Source for Mass Market Projects, Tapping into the Community. **Prototyping Embedded Devices:** Electronics, Sensors, Actuators, Scaling Up the Electronics, Embedded Computing Basics, Microcontrollers, System-on-Chips, Choosing Your Platform, Arduino, developing on the Arduino, Some Notes on the Hardware, Openness, Raspberry Pi, Cases and Extension Boards, Developing on the Raspberry Pi, Some Notes on the Hardware, Openness.	**12 L**
Unit III	**Prototyping the Physical Design:** Preparation, Sketch, Iterate, and Explore, Nondigital Methods, Laser Cutting, Choosing a Laser Cutter, Software, Hinges and Joints, 3D Printing, Types of 3D Printing, Software, CNC Milling, Repurposing/Recycling. **Prototyping Online Components:** Getting Started with an API, Mashing Up APIs, Scraping, Legalities, writing a New API, Clockodillo, Security, implementing the API, Using Curl to Test, Going Further, Real-Time Reactions, Polling, Comet, Other Protocols, MQ Telemetry Transport, Extensible Messaging and Presence Protocol, Constrained Application Protocol.	**12 L**
Unit IV	**Techniques for Writing Embedded Code**: Memory Management, Types of Memory, Making the Most of Your RAM, Performance and Battery Life, Libraries, Debugging. **Business Models**: A Short History of Business Models, Space and Time, From Craft to Mass Production, The Long Tail of the Internet, Learning from History, The Business Model Canvas, Who Is the Business Model For? Models, Make Thing, Sell Thing, Subscriptions, Customisation, be a	**12 L**

	Key Resource, Provide Infrastructure: Sensor Networks, take a Percentage, Funding an Internet of Things Startup, Hobby Projects and Open Source, Venture Capital, Government Funding, Crowdfunding, Lean Startups.	
Unit V	**Moving to Manufacture:** What Are You Producing? Designing Kits, Designing Printed circuit boards, Software Choices, The Design Process, Manufacturing Printed Circuit Boards, Etching Boards, Milling Boards. Assembly, Testing, Mass-Producing the Case and Other Fixtures, Certification, Costs, Scaling Up Software, Deployment, Correctness and Maintainability, Security, Performance, User Community. **Ethics:** Characterizing the Internet of Things, Privacy, Control, Disrupting Control, Crowdsourcing, Environment, Physical Thing, Electronics, Internet Service, Solutions, The Internet of Things as Part of the Solution, Cautious Optimism, The Open Internet of Things Definition.	**12 L**

Textbook:

1. Designing the Internet of Things Adrian McEwen, Hakim Cassimally WILEY First 2014
2. Internet of Things – Architecture and Design Raj Kamal McGraw Hill First 2017
3. Getting Started with the Internet of Things Cuno Pfister O'Reilly Sixth 2018
4. Getting Started with Raspberry Pi Matt Richardson and Shawn Wallace SPD Third 2016

Course: SBIT503	Advanced Web Programming **(Credits : 02 Lectures/Week:05)**	
	Objectives: ➢ **Understand the .NET framework** ➢ **Develop a proficiency in the C# programming language** ➢ **Proficiently develop ASP.NET web applications using C#** ➢ **Use ADO.NET for data persistence in a web application** ➢ **To develop web sites and applications with *XML AND AJAX*** **Outcomes:** **This course is designed to provide the knowledge of Dot Net Frameworks along with ASP.Net and C#.**	
Unit I	**Introducing .NET:** The .NET Framework, C#, VB, and the .NET Languages, The Common Language Runtime, The .NET Class Library. **The C# Language**: C# Language Basics, Variables and Data Types, Variable Operations, Object-Based Manipulation, Conditional Logic, Loops, Methods. **Types, Objects, and Namespaces:** The Basics About Classes, Building a Basic Class, Value Types and Reference Types, Understanding Namespaces and Assemblies, Advanced Class Programming	**12 L**
Unit II	**Web Form Fundamentals:** Writing Code, Using the Code-Behind Class, Adding Event Handlers, Understanding the Anatomy of an ASP.NET Application, Introducing Server Controls, Using the Page Class, Using Application Events, Configuring an ASP.NET Application. **Form Controls:** Stepping Up to Web Controls, Web Control Classes, List Controls, Table Controls, Web Control Events and AutoPostBack, Validation, Understanding Validation, Using the Validation Controls, Rich Controls, The Calendar, The AdRotator, Pages with Multiple Views, User Controls and Graphics, User Controls, Dynamic Graphics, The Chart Control, Website Navigation: Site Maps, URL Mapping and Routing, The SiteMapPath Control, The TreeView Control, The Menu Control.	**12 L**
Unit III	**Error Handling, Logging, and Tracing**: Avoiding Common Errors, Understanding Exception Handling, Handling Exceptions, Throwing Your Own Exceptions, Using Page Tracing **State Management:** Understanding the Problem of State, Using View State, Transferring Information Between Pages, Using Cookies, Managing Session State, Configuring Session State, Using Application State, Comparing State Management Options **Styles, Themes, and Master Pages:** Styles, Themes, Master Page Basics, Advanced Master Pages	**12 L**
Unit IV	**ADO.NET Fundamentals**: Understanding Databases, Configuring Your Database, Understanding SQL Basics, Understanding the Data Provider Model, Using Direct Data Access, Using Disconnected Data Access. **Data Binding:** Introducing Data Binding, Using Single-Value Data Binding, Using Repeated-Value Data Binding, Working with Data Source Controls, **Data Controls**: The GridView, Formatting the GridView, selecting a GridView Row, Editing with the GridView, Sorting and Paging the GridView, Using GridView Templates, The DetailsView and FormView	**12 L**
	XML: XML Explained, The XML Classes, XML Validation, XML Display and Transforms.	**12 L**

Unit V	**Security Fundamentals:** Understanding Security Requirements, Authentication and Authorization, Forms Authentication, Windows Authentication. **ASP.NET AJAX:** Understanding Ajax, Using Partial Refreshes, Using Progress Notification, Implementing Timed Refreshes, Working with the ASP.NET AJAX Control Toolkit.	

Textbook:

1. Beginning ASP.NET 4.5 in C# Matthew MacDonald Apress 2012
2. C# 2015 Anne Bohem and Joel Murach Murach Third 2016
3. Murach's ASP.NET 4.6 Web Programming in C#2015 Mary Delamater and Anne Bohem SPD Sixth 2016
4. ASP.NET 4.0 programming J. Kanjilal Tata McGrawHill 2011
5. Programming ASP.NET D.Esposito Microsoft Press (Dreamtech) 2011
6. Beginning Visual C# 2010 K. Watson, C. Nagel, J.H Padderson, J.D. Reid, M.Skinner Wrox (Wiley) 2010

Course: SBIT504	Linux System Administration **(Credits : 02 Lectures/Week: 05)**	
	Objectives: ➢ **To get a good foundation in many open source technologies.** **Outcomes:** ➢ **Install, upgrade and uninstall Debian binary packages** ➢ **Find packages containing specific files or libraries which may or may not be installed** ➢ **Install and configure a boot loader such as GRUB Legacy** ➢ **Perform basic configuration changes for GRUB 2** ➢ **Able to use the basic Linux commands to manage files and directories.** ➢ **Able to edit text files using vi. This objective includes vi navigation, basic vi modes, inserting, editing, deleting, copying and finding text.**	
Unit I	**Introduction to Red Hat Enterprise Linux:** Linux, Open Source and Red Hat, Origins of Linux, Distributions, Duties of Linux System Administrator. **Command Line**: Working with the Bash Shell, Getting the Best of Bash, Useful Bash Key Sequences, Working with Bash History, Performing Basic File System Management Tasks, Working with Directories, Piping and Redirection, Finding Files **System Administration Tasks**: Performing Job Management Tasks, System and Process Monitoring and Management, Managing Processes with ps, Sending Signals to Processes with the kill Command, using top to Show Current System Activity, Managing Process Niceness, Scheduling Jobs, Mounting Devices, Working with Links, Creating Backups, Managing Printers, Setting Up System Logging, Setting Up Rsyslog, Common Log Files, Setting Up Logrotate **Managing Software:** Understanding RPM, Understanding Meta Package Handlers, Creating Your Own Repositories, Managing Repositories, Installing Software with Yum, Querying Software, Extracting Files from RPM Packages	**12 L**
Unit II	**Configuring and Managing Storage:** Understanding Partitions and Logical Volumes, Creating Partitions, Creating File Systems, File Systems Overview, Creating File Systems, Changing File System Properties, Checking the File System Integrity, Mounting File Systems Automatically Through fstab, Working with Logical Volumes, Creating Logical Volumes, Resizing Logical Volumes, Working with Snapshots, Replacing Failing Storage Devices, Creating Swap Space, Working with Encrypted Volumes **Connecting to the Network:** Understanding NetworkManager, Working with Services and Runlevels, Configuring the Network with NetworkManager, Working with system-config-network, NetworkManager Configuration Files, Network Service Scripts, Networking from the Command Line, Troubleshooting Networking, Setting Up IPv6, Configuring SSH, Enabling the SSH Server, Using the SSH Client, Using PuTTY on Windows Machines, Configuring KeyBased SSH Authentication, Using Graphical Applications with SSH, Using SSH Port Forwarding, Configuring VNC Server Access **Working with Users, Groups, and Permissions**: Managing Users and	**12 L**

	Groups, Commands for User Management, Managing Passwords, Modifying and Deleting User Accounts, Configuration Files, Creating Groups, Using Graphical Tools for User, and Group Management, Using External Authentication Sources, the Authentication Process, sssd, nsswitch, Pluggable Authentication Modules, Managing Permissions, the Role of Ownership, Basic Permissions: Read, Write, and Execute, Advanced Permissions, Working with Access Control Lists, Setting Default Permissions with umask, Working with Attributes	
Unit III	**Securing Server with iptables:** Understanding Firewalls, Setting Up a Firewall with system-config-firewall, Allowing Services, Trusted Interfaces, Masquerading, Configuration Files, Setting Up a Firewall with iptables, Tables, Chains, and Rules, Composition of Rule, Configuration Example, Advanced iptables Configuration, Configuring Logging, The Limit Module, Configuring NAT **Setting Up Cryptographic Services:** Introducing SSL, Proof of Authenticity: The Certificate Authority, Managing Certificates with openssl, Creating a Signing Request, Working with GNU Privacy Guard, Creating GPG Keys, Key Transfer, Managing GPG Keys, Encrypting Files with GPG, GPG Signing, Signing RPM Files **Configuring Server for File Sharing**: What is NFS? Advantages and Disadvantages of NFS, Configuring NFS4, Setting Up NFSv4, Mounting an NFS Share, Making NFS Mounts Persistent, Configuring Automount, Configuring Samba, Setting Up a Samba File Server, Samba Advanced Authentication Options, Accessing Samba Shares, Offering FTP Services.	
Unit IV	**Configuring DNS and DHCP**: Introduction to DNS, The DNS Hierarchy, DNS Server Types, The DNS Lookup Process, DNS Zone Types, Setting Up a DNS Server, Setting Up a Cache-Only Name Server, Setting Up a Primary Name Server, Setting Up a Secondary Name Server, Understanding DHCP, Setting Up a DHCP Server **Setting Up a Mail Server**: Using the Message Transfer Agent, the Mail Delivery Agent, the Mail User Agent, Setting Up Postfix as an SMTP Server, Working with Mutt, Basic Configuration, Internet Configuration, Configuring Dovecot for POP and IMAP **Configuring Apache on Red Hat Enterprise Linux:** Configuring the Apache Web Server, creating a Basic Website, Understanding the Apache Configuration Files, Apache Log Files, Working with Virtual Hosts, Securing the Web Server with TLS Certificates, Configuring Authentication, Setting Up Authentication with .htpasswd, Configuring LDAP Authentication, Setting Up MySQL	**12 L**
Unit V	**Introducing Bash Shell Scripting:** Introduction, Elements of a Good Shell Script, Executing the Script, Working with Variables and Input, Understanding Variables, Variables, Subshells, and Sourcing, Working with Script Arguments, Asking for Input, Using Command Substitution, Substitution Operators, Changing Variable Content with Pattern Matching, Performing Calculations, Using Control Structures, Using if...then...else, Using case, Using while, Using until, Using for, Configuring booting with GRUB. **High-Availability Clustering**: High-Availability Clustering, The Workings of High Availability, High-Availability Requirements, Red Hat High-Availability Add-on Software, Components, Configuring Cluster-	**12 L**

	Based Services, Setting Up Bonding, Setting Up Shared Storage, Installing the Red Hat High Availability Add-On, Building the Initial State of the Cluster, Configuring Additional Cluster Properties, Configuring a Quorum Disk, Setting Up Fencing, Creating Resources and Services, Troubleshooting a Nonoperational Cluster, Configuring GFS2 File Systems **Setting Up an Installation Server:** Configuring a Network Server as an Installation Server, Setting Up a TFTP and DHCP Server for PXE Boot, Installing the TFTP Server, Configuring DHCP for PXE Boot, Creating the TFTP PXE Server Content, creating a Kickstart File, Using a Kickstart File to Perform an Automated, Installation, Modifying the Kickstart File with, system-config-kickstart, Making Manual Modifications to the Kickstart File	

Textbook:

1. Red Hat Enterprise Linux 6 Administration Sander van Vugt John Wiley and Sons 2013
2. Red hat Linux Networking and System Administration Terry Collings and Kurt Wall Wiley 3 rd
3. Linux Administration: A Beginner's Guide Wale Soyinka TMH Fifth Edition

Course: SBIT505	Enterprise Java **(Credits : 02 Lectures/Week: 05)**	
	Objectives: ➢ **Learning use of database** ➢ **Understanding web development** **Outcomes:** **Advanced concepts and frameworks for web development**	
Unit I	**Understanding Java EE**: What is an Enterprise Application? What is java enterprise edition? Java EE Technologies, Java EE evolution, Glassfish server **Java EE Architecture, Server and Containers:** Types of System Architecture, Java EE Server, Java EE Containers. **Introduction to Java Servlets:** The Need for Dynamic Content, Java Servlet Technology, Why Servlets? What can Servlets do? Servlet API and Lifecycle: Java Servlet API, The Servlet Skeleton, The Servlet Life Cycle, A Simple Welcome Servlet **Working with Servlets:** Getting Started, Using Annotations Instead of Deployment Descriptor. **Working with Databases**: What Is JDBC? JDBC Architecture, Accessing Database, The Servlet GUI and Database Example.	**12 L**
Unit II	**Request Dispatcher:** Resquestdispatcher Interface, Methods of Requestdispatcher, Requestdispatcher Application. **COOKIES:** Kinds of Cookies, Where Cookies Are Used? Creating Cookies Using Servlet, Dynamically Changing the Colors of A Page **SESSION**: What Are Sessions? Lifecycle of Http Session, Session Tracking With Servlet API, A Servlet Session Example **Working with Files:** Uploading Files, Creating an Upload File Application, Downloading Files, Creating a Download File Application. **Working with Non-Blocking I/O:** Creating a Non-Blocking Read Application, Creating The Web Application, Creating Java Class, Creating Servlets, Retrieving The File, Creating index.jsp	**12 L**
Unit III	**Introduction To Java Server Pages:** Why use Java Server Pages? Disadvantages Of JSP, JSP v\s Servlets, Life Cycle of a JSP Page, How does a JSP function? How doesJSP execute? AboutJava Server Pages **Getting Started With Java Server Pages:** Comments, JSP Document, JSP Elements, JSP GUI Example. **Action Elements:** Including other Files, Forwarding JSP Page to Another Page, Passing Parameters for other Actions, Loading a Javabean. **Implicit Objects, Scope and El Expressions**: Implicit Objects, Character Quoting Conventions, Unified Expression Language [Unified El], Expression Language. **Java Server Pages Standard Tag Libraries**: What is wrong in using JSP Scriptlet Tags? How JSTL Fixes JSP Scriptlet's Shortcomings? Disadvantages OfJSTL, Tag Libraries.	**12 L**
Unit IV	**Introduction To Enterprise Javabeans**: Enterprise Bean Architecture, Benefits of Enterprise Bean, Types of Enterprise Bean, Accessing Enterprise Beans, Enterprise Bean Application, Packaging Enterprise Beans **Working with Session Beans:** When to use Session Beans? Types of Session Beans, Remote and Local Interfaces, Accessing Interfaces,	**12 L**

	Lifecycle of Enterprise Beans, Packaging Enterprise Beans, Example of Stateful Session Bean, Example of Stateless Session Bean, Example of Singleton Session Beans. **Working with Message Driven Beans:** Lifecycle of a Message Driven Bean, Uses of Message Driven Beans, The Message Driven Beans Example. **Interceptors:** Request and Interceptor, Defining An Interceptor, AroundInvoke Method, Applying Interceptor, Adding An Interceptor To An Enterprise Bean, Build and Run the Web Application. **Java Naming and Directory Interface:** What is Naming Service? What is Directory Service? What is Java Naming and Directory interface? Basic Lookup, JNDI Namespace in Java EE, Resources and JNDI, Datasource Resource Definition in Java EE	
Unit V	**Persistence, Object/Relational Mapping And JPA:** What is Persistence? Persistence in Java, Current Persistence Standards in Java, Why another Persistence Standards? Object/Relational Mapping, **Introduction to Java Persistence API:** The Java Persistence API, JPA, ORM, Database and the Application, Architecture of JPA, How JPA Works? JPA Specifications. **Writing JPA Application:** Application Requirement Specifications, Software Requirements, The Application Development Approach, Creating Database and Tables in Mysql, creating a Web Application, Adding the Required Library Files, creating a Javabean Class, Creating Persistence Unit [Persistence.Xml], Creating JSPS, The JPA Application Structure, Running the JPA Application. **Introduction to Hibernate:** What is Hibernate? Why Hibernate? Hibernate, Database and The Application, Components of Hibernate, Architecture of Hibernate, How Hibernate Works? **Writing Hibernate Application:** Application Requirement Specifications, Software Requirements, The Application Development Approach, Creating Database and Tables in Mysql, creating a Web Application, Adding the Required Library Files, creating a Javabean Class, Creating Hibernate Configuration File, Adding a Mapping Class, Creating JSPS, Running The Hibernate Application.	**12 L**

Textbook:

1. Java EE 7 For Beginners Sharanam Shah, Vaishali Shah SPD First 2017
2. Java EE 8 Cookbook: Build reliable applications with the most robust and mature technology for enterprise development Elder Moraes Packt First 2018
3. Advanced Java Programming Uttam Kumar Roy Oxford Press 2015

Semester V – Practical

Course: SBIT501 PR	Project Dissertation **(Credits : 02 Practicals/Week:03)**

1. INTRODUCTION

a) Background
b) Objectives
c) Purpose, Scope, and Applicability
d) Achievements
e) Organisation of Report

2. SURVEY OF TECHNOLOGIES

3. REQUIREMENTS AND ANALYSIS

a) Problem Definition
b) Requirements Specification
c) Planning and Scheduling
d) Software and Hardware Requirements
e) Preliminary Product Description
f) Conceptual Models

4. SYSTEM DESIGN

a) Basic Modules
b) Data Design
c) Schema Design
d) Data Integrity and Constraints
e) Procedural Design
f) Logic Diagrams
g) Data Structures
h) Algorithms Design
i) User interface design
j) Security Issues
k) Test Cases Design

5. IMPLEMENTATION AND TESTING

a) Implementation Approaches
b) Coding Details and Code Efficiency
c) Testing Approach
d) Modifications and Improvements
e) Test Cases

6. RESULTS AND DISCUSSION

a) Test Reports
b) User Documentation

7. CONCLUSIONS

a) Conclusion
b) Significance of the System
c) Limitations of the System
d) Future Scope of the Project

REFERENCES

GLOSSARY

Course: SBIT502 PR	Internet of Things Practical **(Credits : 02 Practicals/Week:03)**
	1. Starting Raspbian OS, Familiarising with Raspberry Pi Components and interface, Connecting to ethernet, Monitor, USB. 2. Displaying different LED patterns with Raspberry Pi. 3. Displaying Time over 4-Digit 7-Segment Display using Raspberry Pi 4. Raspberry Pi Based Oscilloscope 5. Controlling Raspberry Pi with WhatsApp 6. Setting up Wireless Access Point using Raspberry Pi 7. Fingerprint Sensor interfacing with Raspberry Pi 8. Raspberry Pi GPS Module Interfacing 9. IoT based Web Controlled Home Automation using Raspberry Pi 10. Visitor monitoring with Raspberry Pi and Pi Camera. 11. Interfacing Raspberry Pi with RFID 12. Building Google Assistant with Raspberry Pi. 13. Installing Windows 10 IOT core on Raspberry Pi.

Course: SBIT503 PR	**Advanced Web Programming (Credits : 02 Practicals/Week:03)**

1. Working with basic C# and ASP.NET

a) Create an application that obtains four int values from the user and displays the product.

b) Create an application to demonstrate String Operations

c) Create an application that receives the following information from a set of students:StudentId,StudentName,CourseName,Date of Birth. The application should also display the information of all the students once the data entered

d) Create an application to perform the following operations

i. Generate Fibonacci series.
ii. Test for prime numbers.
iii. Test for vowels.
iv. Use of foreach loop with arrays.
v. Reverse a number and find sum of digits of a number

2. Working with Object Oriented C# and ASP.NET

a) Create simple application to perform following operations

i. Finding Factorial Value
ii. Money Conversion
iii. Quadratic Equation
iv. Temperature Conversion

b) Create a simple application to perform following operations

i. Function Overloading
ii. Inheritance (all types)
iii. Constructor overloading
iv. Interfaces

c) Create a simple application to demonstrate use of following concepts

i. Using Delegates and events
ii. Exception handling

3. Working with Web forms and Controls

a) Create a simple web page with various server controls to demonstrate setting and use of their properties (Example: AutoPostBack)

b) Demonstrate the use of Calendar Control perform following operations

i. Display messages in a calendar control
ii. Display vacation in a calendar control

4. Working with Form Controls

i. Create a registration form to demonstrate use of various Validation Controls
ii. Create a web form to demonstrate use of Adrotator Control
iii. Create a web form to demonstrate use of User Control

5. Working with Navigation, Beautification and Master page

i. Create a web form to demonstrate use of Website navigation and SiteMap
ii. Create a web application to demonstrate use of Master Page and

	applying styles and Themes for page beautification iii. Create a web application to demonstrate various states of ASP.NET pages **6. Working with Database** i. Create a web application to bind data in a multiline textbox using dropdownlist ii. Create a web application to display records by using databases iii. Demonstrate the use of Datalist Link Control **7. Working with Database** i. Create a web application to display Databinding using dropdown list control ii. Create a web application for to display the phone no of an author using database iii. Create a web application for inserting and deleting record from a database (Using Execute-Non Query) **8. Working with Data Controls** i. Create a web application to demonstrate various uses and properties of Sql data source ii. Create a web application to demonstrate data binding using Details view and form view control iii. Create a web application for to display disconnected data access and data binding using Grid view **9. Working with Grid View Control** i. Create a web application to demonstrate use of GridView control template and GridView hyperlink ii. Create a web application to demonstrate use of GridView button column and GridView events iii. Create a web application to demonstrate use of GridView paging and creating own table format using GridView **10. Working with AJAX and XML** i. Create a web application to demonstrate use of reading and writing operation with XML ii. Create a web application to demonstrate form Security and Window security with Authentication and Authorization Properties iii. Create a web application to demonstrate use of various AJAX controls **11. Program to create and use DLL**

Course: SBIT504 PR	**Linux Administration Practical (Credits : 02 Practicals/Week:03)**

1. Graphical user interface and command line interface and processes

a) Exploring the graphical desktop.

b) The command line interface

c) Managing processes

2. Storage devices and links, backup and repository

a) Working with Storage devices and links

b) Making a back up

c) Creating a repository

3. Working with RPM, storage and networking

a) Using query options

b) Extracting files from RPM

c) Configuring and managing storage

d) Connecting to the network

4. Working with users, groups and permissions

5. Firewall and cryptographic services

a) Securing server with IPtables

b) Setting up cryptographic services

6. Configuring for file sharing

a) Configuring NFS server and client

b) Configuring samba

c) Configuring FTP

7. DNS DHCP and Mail server

1) Configuring DNS

2) Configuring DHCP

3) Configuring Mail server

8. Web server

a) Configuring apache on Red Hat Enterprise LINUX

b) Writing a script to monitor activity on the apache web server

c) Using the select command

9. Shell scripting and high availability clustering

a) Writing shell scripts

b) Configuring booting with GRUB

c) Configuring high availability clustering

10. Setting up an installation server

a) Configuring Network server as an Installation server

b) Setting up TFTP and DHCP server for PXB Boot

Course: SBIT505 PR	**Enterprise Java Practical (Credits : 02 Practicals/Week:03)**

1. **Implement the following Simple Servlet Applications**
   a. Create a simple calculator application using servlet.
   b. Create a servlet for a login page. If the username and password are correct then it says message"Hello<username>" else a message "login failed"
   c. Create a registration servlet in java using JDBC.Accept the details such as Username, Password ,Email and Country from the user using HTML Form and store the registration details in the database.

2. **Implement the following servlet application with cookies and sessions**
   a. Using Request Dispatcher Interface create a servlet which will validate the password entered by the user, if the user has entered "Servlet" as Password., then he will be forwarded to Welcome Servlet else the user will stay on the index.html page and an error message will be displayed.
   b. Create a servlet that uses cookies to store the number of times a user has visited servlet.
   c. Create a servlet demonstrating the use of session creation and destruction. Also check whether the user has visited this page first time or has visited earlier also using sessions

3. **Implement the servlet IO and file applications**
   a. Create a servlet application to upload and download a file.
   b. Develop Simple Servlet question Answer Application using Database.
   c. Create simple servlet application to demonstrate Non-Blocking Read operation.

4. **Implement the following JSP applications.**
   a. Develop a simple JSP application to display values obtained from the use of intrinsic objects of various types.
   b. Develop a simple JSP application to pass values from one page to another with validations(Name-txt, age-txt, hobbies-checkbox, email-txt, gender-radio button)
   c. Create a registration and login JSP application to register and authenticate the user based on username and password using JDBC.

5. **Implement the following JSP JSTL and EL Applications.**
   a. Create an html page with fields, eno,name,age,desg,salary. Now on submit this data to a JSP page which will update the employee table of database with matching eno.
   b. Create a JSP page to demonstrate the use of Expression Language.
   c. Create a JSP application to demonstrate the use of JSTL.

	6. Implement the following EJB applications a. Create a currency converter application using EJB. b. Develop a simple Room Reservation System Application Using EJB. c. Develop a simple shopping cart application using EJB(stateful session bean) **7. Implement the following EJB applications with different types of beans.** a. Develop simple EJB application to demonstrate servlet hit count using singleton session Beans. b. Develop simple visitor statistics application using Message Driven Bean[stateless session Bean c. Develop simple Marks Application to demonstrate accessing Database using EJB. **8. Implement the following JPA applications** a. Develop a simple Inventory Application using JPA. b. Develop a GuestBook Application using JPA. c. Create simple JPA application to store and retrieve Book details. **9. Implement the following JPA applications with ORM and Hibernate.** a. Develop a JPA application to demonstrate use of ORM associations. b. Develop a hibernate application to store feedback of website visitor in MySQL database. c. Develop a hibernate application to store and retrieve employee details in MySQL database. **10. Implement the following hibernate applications** a. Develop an application to demonstrate hibernate one-to-one mapping using annotation. b. Develop hibernate application to enter and retrieve course details with ORM mapping. c. Develop a five page application site using any two or three java EE technologies.

Evaluation Scheme

[A] Evaluation scheme for Theory courses

I. Continuous Assessment (C.A.) - 25 Marks

(i) Internal: Test – 20 Marks of 40 mins. Duration

(ii) Class Participation : 05 Marks

II. Semester End Examination (SEE)- 75 Marks

Q.1	**Answer any 2**	**10 Marks**
Q.2	**Answer any 2**	**10 Marks**
Q.3	**Answer any 2**	**10 Marks**
Q.4	**Answer any 2**	**10 Marks**
Q.5	**Answer any 2**	**10 Marks**
Q.6	**Answer any 3**	**15 Marks**

[B] Evaluation scheme for Practical courses

Practical Exam – 50 marks of 2 hours 30 mins duration