



HYDERABAD (SIND)
NATIONAL COLLEGIATE BOARD

HSNC Board's

Smt. Chandibai Himathmal Mansukhani College (Autonomous)

(Affiliated to the University of Mumbai)

University College Code : 217-JD Office : T14



Principal : Dr. Manju Lalwani Pathak

Ref No: CHM (A) AC/C/01/2025

Date: 18th June 2025

CIRCULAR

The immediate attention of all concerned is invited to this office Circular No. CHM (A) AC 05/2025 dated 19th May, 2025 regarding the Choice Based and Credit Based Syllabus (CBCS) for all subjects of F.Y.B.Sc. & T.Y.B.Sc. in Information Technology SEM - I & SEM - V respectively.

It is hereby communicated that the recommendations of the syllabus made by the Ad-hoc Board of Studies in Information Technology coordinated by the Dean, Faculty of Applied Sciences in the meeting of Academic Council held on 23rd May, 2025 vide item No. 2.2, have been accepted and subsequently passed.

In accordance, therewith, the syllabus as per the CBCS has been brought into force with effect from the academic year 2025 – 2026 and accordingly the same is attached for reference and is available on the College's website www.chmcollege.in

Ulhasnagar - 421 003

18th June, 2025

Dr. Manju Lalwani Pathak

Principal & Chairperson, Academic Council

Copy forwarded for information to:-

- 1) The Dean, Faculty of Humanities.
- 2) The Chairperson, Ad-hoc Board of Studies.
- 3) The Controller of Examination.
- 4) The Registrar



HSNC Board's
Smt. Chandibai Himathmal Mansukhani College, Ulhasnagar
(Autonomous)
Affiliated to the University of Mumbai

T.Y. B.Sc. (IT)
(Self-Financing Course)

Semester – V

Choice Based and Credit Based syllabus
with effect from the Academic Year 2025-2026

PREAMBLE

The B.Sc. Information Technology programme, aims to equip students with industry-relevant knowledge and skills to enhance their employability and prepare them for dynamic careers in the IT sector. The programme emphasizes a balanced blend of theoretical foundations and practical training. Its core objectives are to:

- The curriculum equips students with essential knowledge and practical skills to build successful careers in the IT industry.
- It develops the ability to design robust, scalable, and maintainable technological solutions for real-world challenges.
- Students are trained to think analytically, creatively, and critically to solve complex technical problems effectively.
- The program prepares graduates to lead and manage complex IT projects, considering human, financial, and environmental factors.
- Emphasis is placed on teamwork and collaboration to ensure students can work efficiently toward common goals.
- A strong sense of professional ethics is instilled, encouraging adherence to industry standards and organizational codes of conduct.
- Clear and effective communication skills are developed for engaging with both technical and non-technical audiences.

PROGRAMME SPECIFIC OUTCOME (PSOs)

PSO 1: Graduates will apply core IT knowledge and practical skills to develop and maintain effective, scalable software solutions for real-world challenges.

PSO 2: Graduates will demonstrate strong analytical, creative, and critical thinking abilities to solve complex technical problems efficiently.

PSO 3: Graduates will be capable of planning, leading, and managing IT projects with attention to human, financial, and environmental considerations.

PSO 4: Graduates will work effectively in teams, demonstrating collaboration, leadership, and a strong commitment to professional ethics and standards.

PSO 5: Graduates will communicate technical information clearly and effectively to both technical and non-technical audiences in diverse professional settings.

**Smt. Chandibai Himathmal Mansukhani College
(Autonomous)**

**Third Year B. Sc.
(Information Technology)**

Semester- V

Title: Software Project Management

**with effect from
Academic Year 2025-2026**

Title: Software Project Management**Course Code: CHM(A)USIT501**

Sr. No.	Heading	Particulars
1	Description of the Course:	This course in Software Project Management provides students with a practical and theoretical foundation in managing software projects effectively. It covers essential topics such as project planning, estimation, scheduling, risk management, resource allocation, monitoring, and control. Students will explore software development life cycles, agile methodologies, quality assurance models, and project evaluation techniques like cost-benefit and risk analysis. Emphasis is placed on both technical and human aspects, including team management, communication, leadership, and ethical considerations. The course equips learners with tools and methodologies to handle real-world software projects from initiation to successful closure.
2	Vertical 1	–
3	Type & Teaching Method	Theory + Practicum (Lectures / Problem Solving / Discussion / Presentation / Case Study / Demonstration etc.)
4	Credit	2 Credits
5	Hours allotted	50 Hours
6	Marks allotted	75 Marks
7	Course Objectives: 1. Understanding software development life-cycle phases, project methodologies, and effort estimation techniques for effective project planning and execution. 2. Understanding the basic steps of project evaluation, planning. 3. Understanding the basic steps of activity planning, risk management. 4. Understanding the basic steps of controlling cost, managing contracts, managing people. 5. Understanding how to work in team, maintaining quality and successfully closing the project.	

8	Learning Outcomes: Student will be able to: LO1: Describe the basic concepts of software project management with its life cycle LO2: Apply project estimation and evaluation techniques to real world problem LO3: Apply key project management system techniques like PERT, CPM LO4: Identify project risk, monitor and track project deadlines. LO5: Work in teams to evaluate the different modes of communication among people.
9	Syllabus UNIT I: • Introduction to Software Project Management: Importance of Software Project Management, Project vs. Product vs. Process , Software Projects versus Other Types of Project, Activities Covered by Software Project Management, Plans, Methods and Methodologies, Some Ways of Categorizing Software Projects, Project Charter, Stakeholders, Setting Objectives, Role of the Project Manager, Project Success and Failure, Management and Management Control, Traditional versus Modern Project Management Practices. • Project Evaluation and Programme Management: Business Case, Project Portfolio Management, Cost–benefit Evaluation Techniques, Risk Evaluation, Programme Management, Creating a Programme, Aids to Programme Management, Benefits Management. • An Overview of Project Planning: Introduction to Step Wise Project Planning, Select Project, Identify Project Scope and Objectives, Identify Project Infrastructure, Analyse Project Characteristics, Identify Project Products and Activities, Estimate Effort for Each Activity, Identify Activity Risks, Allocate Resources, Review/Publicize Plan, Execute Plan/Lower Levels of Planning UNIT II: • Life-Cycle Phases: Engineering and Production Stages, Inception Phase, Elaboration Phase, Construction Phase, Transition Phase. • Selection of an Appropriate Project Approach: Choosing Methodologies and Technologies, Incremental Delivery, Agile Methods- Extreme Programming (XP), Atern, Scrum, Lean, Core principles of Agile, Agile values and the Agile Manifesto, Roles and responsibilities in Agile teams, Agile ceremonies (sprints, daily stand-ups, sprint reviews, retrospectives), Scaling Agile methodologies. • Software Effort Estimation: Where are the Estimates Done?, Problems with Over- and Under-Estimates, The Basis for Software Estimating, Software Effort Estimation Techniques, Albrecht Function Point Analysis, COCOMO II: A Parametric Productivity Model, Staffing Pattern, Effect of Schedule Compression, Capers Jones Estimating Rules of Thumb. UNIT III: • Activity Planning: Objectives of Activity Planning, When to Plan, Project Schedules,

Projects and Activities, Sequencing and Scheduling Activities, Network Planning Models, formulating a Network Model, The Forward Pass, Backward Pass, Identifying the Critical Path, Activity Float, Shortening the Project Duration, Identifying Critical Activities, Activity-on-Arrow Networks.

- **Risk Management:** Risk, Categories of Risk, Risk Management Approaches, A Framework for Dealing with Risk, Risk Identification, Risk Assessment, Risk Planning, Risk Management, Applying the PERT Technique, Critical Chain Concepts, Failure Modes and Effects Analysis (FMEA).
- **Resource Allocation:** Nature of Resources, Scheduling Resources, Critical Path Method- Crashing a Project, Resource Loading, Resource Leveling, Constrained Resource Scheduling, Goldratt's Critical Chain.

UNIT IV:

- **Monitoring and Control:** 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:** Types of Contract, Stages in Contract Placement, Typical Terms of a Contract, Contract Management and Acceptance.
- **Managing People in Software Environments:** Organizational Behaviour: A Background, Selecting the Right Person for the Job, Motivation, The Oldham Hackman Job Characteristics Model, Stress, Stress Management, Health and Safety, Some Ethical and Professional Concerns.

UNIT V:

- **Working in Teams:** Becoming a Team, Decision Making, Organization and Team Structures, Coordination Dependencies, Dispersed and Virtual Teams, Communication Genres, Communication Plans, Leadership.
- **Software Quality:** Importance of Software Quality, Defining Software Quality, Software Quality Models, ISO 9126, Product and Process Metrics, Product versus Process Quality Management, Process Capability Models, Techniques to Help Enhance Software Quality, Testing, Software Reliability, Quality Plans.
- **Project Closeout:** Reasons for Project Closure, Project Closure Process, Performing a Financial Closure, Project Closeout Report.

10

Scheme of Examination and Assessment Pattern

Paper – 100 Marks

External Examination: Semester End External - 75 marks Time: 2½ hours

Format of Question Paper

Attempt any 3 out of 6 questions.

Question No	Nature of Questions	Marks
Q1	Theory	15
Q2	Theory	15
Q3	Theory	15
Q4	Theory	15
Q5	Theory	15
		Total 75

Internal Examination: Continuous Evaluation - 25 marks

	Assessment / evaluation	Marks
1.	Class Test	20
2.	Project and presentation / Viva etc.	05

11

REFERENCES:

1. Software Project Management by Bob Hughes, Mike Cotterell, and Rajib Mall, published by Tata McGraw-Hill (TMH), 6th edition, 2018.
2. Project Management and Tools & Technologies – An Overview by Shailesh Mehta, published by SPD, 1st edition, 2017.
3. Software Project Management by Walker Royce, published by Pearson, 2005 edition.
4. Project Management: A Managerial Approach by Jack Meredith and Samuel Mantel, published by John Wiley & Sons, 10th edition, 2017.

**Smt. Chandibai Himathmal Mansukhani College
(Autonomous)**

**Third Year B. Sc.
(Information Technology)**

Semester- V

Title: Internet of Things

**with effect from
Academic Year 2025-2026**

Title: Internet of Things
Course Code: CHM(A)USIT502

Sr. No.	Heading	Particulars
1	Description of the Course:	This course on Internet of Things (IoT) provides a comprehensive understanding of IoT concepts, technologies, and hands-on prototyping. It covers internet communication protocols (IP, TCP, HTTP), embedded platforms like Arduino, Raspberry Pi, and NodeMCU ESP8266, and the integration of various sensors and actuators. Students learn physical prototyping methods such as 3D printing and laser cutting, alongside embedded coding, memory management, and performance optimization. The course also delves into API development, real-time communication, and security considerations. Additionally, it addresses business models, manufacturing processes, and ethical concerns, equipping students to design, develop, and deploy complete IoT solutions.
2	Vertical 1	-
3	Type & Teaching Method	Theory + Practicum (Lectures / Problem Solving / Discussion / Presentation / Case Study / Demonstration etc.)
4	Credit	2 Credits
5	Hours allotted	50 Hours
6	Marks allotted	75 Marks
7	Course Objectives: 1. Understand the core concepts of IoT, including its architecture, communication models, and the evolution of smart, connected devices. 2. Gain hands-on experience in building IoT prototypes using Arduino, NodeMCU, and Raspberry Pi platforms. 3. Learn to interface and program sensors and actuators effectively for data acquisition and device control in IoT setups. 4. Develop embedded programming skills with a focus on real-time communication,	

	memory usage, and performance tuning. 5. Explore practical IoT deployment using cloud platforms like Blynk, ThingSpeak, and MQTT, along with insights into production, certification, and ethical considerations.
8	Learning Outcomes: Student will be able to: LO1: Understand IoT system architecture, components, and communication protocols, and apply foundational networking principles in connected environments. LO2: Prototype real-time embedded solutions using platforms like NodeMCU, Arduino, and Raspberry Pi with appropriate development tools. LO3: Interface sensors and actuators effectively, and write functional code for input/output operations and basic data acquisition. LO4: Develop secure, efficient embedded programs using optimized coding practices suited for resource-constrained IoT devices. LO5: Evaluate key stages of IoT product development—from hardware manufacturing and software testing to deployment, scalability, and ethical use.
9	Syllabus 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?. • 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. • Thinking About Prototyping: Sketching, Familiarity, Costs versus Ease of Prototyping, Prototypes and Production, Changing Embedded Platform, Physical Prototypes and Mass Personalisation UNIT II: • 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. • Prototyping the Physical Design: Preparation, Sketch, Iterate, and Explore, Non digital Methods, Laser Cutting, Choosing a Laser Cutter, Software, Hinges and Joints, 3D Printing, Types of 3D Printing, Software, CNC Milling, Repurposing/Recycling. UNIT III: • 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.

- **Fundamental of NodeMcU, Sensors and Actuators**
- NodeMCU ESP8266: features, specifications, hardware architecture, GPIO pins, NodeMCU communication port: UART, I2C, SPI, **Terms used with NodeMCU:** firmware, Wi-Fi, NodeMCU ESP8266 development board and its pin configuration, Arduino Integrated Development Environment - (IDE), Arduino IDE setup, creating, compiling and uploading programs from Arduino IDE to NodeMCU, Applications using NodeMCU ESP8266 and Arduino IDE. (Use of functions, string, array, timer, I/O function, PWM, interface LED & switch),
- **Sensors:** LDR, PIR, LM35, DHT11, IR, Gas Sensor-MQ.
- **Actuators:** relay, DC motor, stepper motor, buzzer.
- **Programming and Interfacing** sensors and actuators with Node MCU: Interfacing Temperature sensor- LM-35, Gas sensor -MQ 4, Humidity sensor- DHT11, Photo sensors- LDR, PIR, IR with NodeMCU (only technical specifications, pin diagram and working expected)

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 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.

10

Scheme of Examination and Assessment Pattern

Paper – 100 Marks

External Examination: Semester End External - 75 marks Time: 2½ hours

Format of Question Paper

Attempt any 3 out of 6 questions.

Question No	Nature of Questions	Marks
Q1	Theory	15
Q2	Theory	15
Q3	Theory	15
Q4	Theory	15
Q5	Theory	15
		Total 75

Internal Examination: Continuous Evaluation - 25 marks

	Assessment / evaluation	Marks
1.	Class Test	20
2.	Project and presentation / Viva etc.	05

11

REFERENCES:

1. Designing the Internet of Things by Adrian McEwen and Hakim Cassimally, published by Wiley, First Edition, 2014.
2. Internet of Things – Architecture and Design by Raj Kamal, published by McGraw Hill, First Edition, 2017.
3. Getting Started with the Internet of Things by Cuno Pfister, published by O'Reilly, Sixth Edition, 2018.
4. Getting Started with Raspberry Pi by Matt Richardson and Shawn Wallace, published by SPD, Third Edition, 2016.
5. Internet of Things with ESP8266 by Marco Schwartz, published by Packt Publishing, First Edition, 2017.
6. ESP8266 NodeMCU Cookbook by Michael Wright, independently published, First Edition, 2018.
7. Programming the NodeMCU ESP8266 in C++ Using Arduino IDE by UpSkill Learning, independently published, First Edition, 2016.

**Smt. Chandibai Himathmal Mansukhani College
(Autonomous)**

**Third Year B. Sc.
(Information Technology)**

Semester- V

Title: Advanced Web Development

**with effect from
Academic Year 2025-2026**

Title: Advanced Web Development**Course Code: CHM(A)USIT503**

Sr. No.	Heading	Particulars
1	Description of the Course:	This course on Web Application Development using ASP.NET equips students with the skills to build robust, data-driven web applications using C# and the .NET framework. It covers core programming concepts, ASP.NET Web Forms, server controls, state management, error handling, and data access using ADO.NET and LINQ. Students will also learn to create responsive user interfaces with Bootstrap, manage security through authentication and authorization, and enhance user experience using AJAX for partial page updates and asynchronous interactions. The course blends practical coding with modern UI techniques, preparing students for real-world web development.
2	Vertical 1	-
3	Type & Teaching Method	Theory+Practicum (Lectures / Problem Solving /Discussion / Presentation / Case Study / Demonstration etc.)
4	Credit	2 Credits
5	Hours allotted	50 Hours
6	Marks allotted	75 Marks
7	Course Objectives: 1. Build a solid foundation in .NET technologies, focusing on the Common Language Runtime (CLR), C# language basics, and the .NET Class Library. 2. Develop object-based C# programming skills, covering data types, control structures, methods, and reusable components. 3. Design and develop ASP.NET applications with effective use of server controls, validation techniques, event handling, and error management.	

	4. Understand and apply state management strategies in web applications, including view state, cookies, and page transfers. 5. Work with ADO.NET and LINQ to implement data access in both connected and disconnected environments using SQL and data provider models.
8	Learning Outcomes: The learner will be able to: LO1: Learner will explore the foundations of .NET Development, .NET Ecosystem, C# and Fundamental Concepts LO2: Comprehensive Understanding and Practical Application using controls. LO3: ASP.NET Web Development Essentials: Tracing, Debugging, and State Management Techniques LO4: Mastering Data Access in ASP.NET: ADO.NET Essentials and Azure Integration LO5: Securing ASP.NET Applications: Authentication, Authorization, and Advanced Techniques with Ajax and Bootstrap
9	Syllabus UNIT I: .NET Technology and 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, 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. UNIT II: ASP.NET Web Forms, 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. Web Control Classes: Label, TextBox, Button, CheckBox, RadioButton, 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, Website Navigation: Site Maps, The SiteMapPath Control, The TreeView Control, The Menu Control. UNIT III: Tracing, Error Handling, Debugging, Exception Handling, User defined Exceptions, Page Tracing, Client and Server side state management, View State, Transferring Information Between Pages, Cookies- creation, retrieval, reading, Types of Cookies, Using Master Pages and Content Pages UNIT IV: ADO.NET Components, Data Providers, SQL Basic command and queries, Understanding the Data Provider Model, Using Direct Data Access, Using Disconnected Data Access. Working with Data Source Controls, Data Controls: GridView, DetailsView and FormView.

	LINQ basics including query and method syntax, LINQ to Objects, and working with collections and arrays, LINQ to SQL and LINQ to Entities UNIT V: Understanding Security Requirements, Introduction to Authentication and Authorization. Introduction to Bootstrap, Setting up Bootstrap in ASP.NET, Understanding Containers, Rows, and Columns, Bootstrap Grid System, Responsive Breakpoints, and Applying Bootstrap to ASP.NET Server Controls, Bootstrap Typography, Form Styling, Form Groups, Buttons, and Form Layouts, Styling ASP.NET Form Controls, Bootstrap Navbar, Responsive Navigation, Breadcrumbs, Cards for Layout, Alerts, Responsive Tables with GridView, and Integrating SiteMapPath and Menu Controls. Ajax- Using Partial Refreshes, Using Progress Notification, Implementing Timed Refreshes, Working with the ASP.NET AJAX Control Toolkit.																														
10	Scheme of Examination and Assessment Pattern Paper – 100 Marks External Examination: Semester End External - 75 marks Time: 2½ hours Format of Question Paper Attempt any 3 out of 6 questions. <table><tr><th>Question No</th><th>Nature of Questions</th><th>Marks</th></tr><tr><td>Q1</td><td>Theory</td><td>15</td></tr><tr><td>Q2</td><td>Theory</td><td>15</td></tr><tr><td>Q3</td><td>Theory</td><td>15</td></tr><tr><td>Q4</td><td>Theory</td><td>15</td></tr><tr><td>Q5</td><td>Theory</td><td>15</td></tr><tr><td colspan="2"></td><td>Total 75</td></tr></table> Internal Examination: Continuous Evaluation - 25 marks <table><tr><th></th><th>Assessment / evaluation</th><th>Marks</th></tr><tr><td>1.</td><td>Class Test</td><td>20</td></tr><tr><td>2.</td><td>Project and presentation / Viva etc.</td><td>05</td></tr></table>	Question No	Nature of Questions	Marks	Q1	Theory	15	Q2	Theory	15	Q3	Theory	15	Q4	Theory	15	Q5	Theory	15			Total 75		Assessment / evaluation	Marks	1.	Class Test	20	2.	Project and presentation / Viva etc.	05
Question No	Nature of Questions	Marks																													
Q1	Theory	15																													
Q2	Theory	15																													
Q3	Theory	15																													
Q4	Theory	15																													
Q5	Theory	15																													
		Total 75																													
	Assessment / evaluation	Marks																													
1.	Class Test	20																													
2.	Project and presentation / Viva etc.	05																													
11	REFERENCES: 1. Beginning Visual C# 2010 by K. Watson, C. Nagel, and J.H. Padderson, published by Wrox (Wiley), 2010. 2. Murach's ASP.NET 4.6 Web Programming in C# 2015 by Mary Delamater and Anne Boehm, published by SPD, Sixth Edition, 2016. 3. ASP.NET 4.0 Programming by J. Kanjilal, published by Tata McGraw Hill, 2011. 4. Ajax: A Beginner's Guide by Steven Holzner, published in paperback format, 2017. 5. Introducing Bootstrap 4 by Jörg Krause, published by Apress, 2016.																														

**Smt. Chandibai Himathmal Mansukhani College
(Autonomous)**

**Third Year B. Sc.
(Information Technology)**

Semester- V

Title: Linux Server Administration

**with effect from
Academic Year 2025-2026**

Title: Linux Server Administration**Course Code: CHM(A)USIT505**

Sr. No.	Heading	Particulars
1	Description of the Course:	This course provides a practical and hands-on approach to Linux system administration, starting with Linux fundamentals, user and group management, and software handling using RPM and Yum. Students will gain in-depth experience configuring storage using partitions, LVM, and encryption, and setting up key infrastructure services like OpenSSH, DNS, DHCP, and web/file/mail servers. The course also covers critical system monitoring tools, log management with rsyslog, task automation using cron, and securing the server using iptables and cryptographic tools like OpenSSL and GPG. Finally, students will learn to write efficient Bash shell scripts to automate routine administrative tasks, making them job-ready for real-world Linux system management.
2	Vertical 1	-
3	Type & Teaching Method	Theory+Practicum (Lectures / Problem Solving / Discussion / Presentation / Case Study / Demonstration etc.)
4	Credit	2 Credits
5	Hours allotted	50 Hours
6	Marks allotted	75 Marks
7	Course Objectives: 1. To gain a deep understanding of various Linux distributions. 2. To be able to install, configure, and optimize for specific server roles. 3. To develop expertise in securing Linux servers from unauthorized access, attacks, and vulnerabilities. 4. To acquire the skills to monitor server performance, identify bottlenecks, and optimize resource utilization.	

	5. To understand Bash scripting language to automate repetitive tasks and server management processes
8	Learning Outcomes: The learner will be able to: LO1: Demonstrate a comprehensive understanding of various Linux distributions, packages and proficiency in developing effective access control lists to manage users and group accounts. LO2: Acquire the ability to manage storage and partitions, and develop efficiency in configuring network and infrastructure services. LO3: Implement different servers with their server configuration roles and parameters. LO4: Analyze system logs to identify potential problems and security incidents. LO5: Develop expertise in implementing security measures like firewalls, access controls, password policies, and encryption to protect the system and ability to write scripts to automate tasks
9	Syllabus UNIT I: • Introduction: Introduction to Linux, GNU and Linux distributions • Duties of the System Administrator, The Linux System Administrator, Installing and Configuring Servers, Installing and Configuring Application Software, Creating and Maintaining User Accounts, Backing Up and Restoring Files, Monitoring and Tuning Performance, Configuring a Secure System, Using Tools to Monitor Security • Working with Users, Groups, and Permissions: Managing Users and Groups, Commands for User Management, Managing Passwords, Modifying and Deleting User Accounts, Configuration Files, Creating Groups, Using Graphical Tools for User, and Group Management, 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. • Managing Software :Understanding RPM,Understanding Meta Package Handlers, Creating Your Own Repositories, Managing Repositories,RHN and Satellite Installing Software with Yum,Querying Software,Extracting Files from RPM Packages 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 • Infrastructure Services: Services and Daemons- Configuring the default runlevel,

Configuring the Services, Running Services, Additional Resources.

- **OpenSSH-** The SSH Protocol, Configuring OpenSSH, Using OpenSSH certificate authentication, OpenSSH clients, More than a Secure Shell.

UNIT III:

- **Domain Name System:** Understanding DNS, Understanding Types of Domain Servers, Examining Server Configuration Files, Configuring a Caching DNS Server, Configuring a Secondary Master DNS Server, Configuring a Primary Master Server, Checking Configuration
- **Configuring Mail Services:** Tracing the Email Delivery Process, Mail User Agent (MUA), Introducing SMTP, Configuring Sendmail, Using the Postfix Mail Server, Serving Email with POP3 and IMAP, Maintaining Email Security
- **Servers:**
DHCP Servers: Why Use DHCP? Configuring DHCPv4 server, Configuring DHCPv4 Client.
Web Servers – The Apache HTTP server
File Servers – Samba, FTP

UNIT IV:

- **Monitoring and Automation System Monitoring Tools –** Viewing System Processes, Viewing Memory Usage, Viewing CPU Usage, Viewing Block Devices and Filesystems, Viewing Hardware Information, Monitoring Performance with NET-SNMP
- **Viewing and Managing Log Files –** Installing rsyslog, Locating Log files, Basic Configuration of rsyslog, working with queues in rsyslog, configuring rsyslog on a logging server, using rsyslog modules, debugging rsyslog, Managing Log files in graphical environment
- **Automating System Tasks –** Cron and Anacron, At and Batch

UNIT V:

- **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
- **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																														
10	Scheme of Examination and Assessment Pattern Paper – 100 Marks External Examination: Semester End External - 75 marks Time: 2½ hours Format of Question Paper Attempt any 3 out of 6 questions. <table border="1"><thead><tr><th>Question No</th><th>Nature of Questions</th><th>Marks</th></tr></thead><tbody><tr><td>Q1</td><td>Theory</td><td>15</td></tr><tr><td>Q2</td><td>Theory</td><td>15</td></tr><tr><td>Q3</td><td>Theory</td><td>15</td></tr><tr><td>Q4</td><td>Theory</td><td>15</td></tr><tr><td>Q5</td><td>Theory</td><td>15</td></tr><tr><td colspan="2"></td><td>Total 75</td></tr></tbody></table> Internal Examination: Continuous Evaluation - 25 marks <table border="1"><thead><tr><th></th><th>Assessment / evaluation</th><th>Marks</th></tr></thead><tbody><tr><td>1.</td><td>Class Test</td><td>20</td></tr><tr><td>2.</td><td>Project and presentation / Viva etc.</td><td>05</td></tr></tbody></table>	Question No	Nature of Questions	Marks	Q1	Theory	15	Q2	Theory	15	Q3	Theory	15	Q4	Theory	15	Q5	Theory	15			Total 75		Assessment / evaluation	Marks	1.	Class Test	20	2.	Project and presentation / Viva etc.	05
Question No	Nature of Questions	Marks																													
Q1	Theory	15																													
Q2	Theory	15																													
Q3	Theory	15																													
Q4	Theory	15																													
Q5	Theory	15																													
		Total 75																													
	Assessment / evaluation	Marks																													
1.	Class Test	20																													
2.	Project and presentation / Viva etc.	05																													
11	REFERENCES: 1. Red Hat Enterprise Linux 6 Deployment Guide by Red Hat, published by Red Hat Content Services, First Edition, 2021. 2. Linux Bible by Christopher Negus, published by Wiley, Tenth Edition, 2020. 3. Red Hat Linux Networking and System Administration by Terry Collings and Kurt Wall, published by Wiley, Third Edition, 2005. 4. Red Hat Enterprise Linux 6 Administration by Sander van Vugt, published by Sybex, First Edition, 2013. 5. Linux Administration: A Beginner's Guide by Wale Soyinka, published by Tata McGraw-Hill (TMH), Eighth Edition, 2020.																														

**Smt. Chandibai Himathmal Mansukhani College
(Autonomous)**

**Third Year B. Sc.
(Information Technology)**

Semester- V

Title: Advanced Java Technologies

**with effect from
Academic Year 2025-2026**

Title: Advanced Java Technologies**Course Code: CHM(A)USIT506**

Sr. No.	Heading	Particulars
1	Description of the Course:	This course offers a comprehensive foundation in Java EE development, starting with enterprise application architecture, servlets, and container-based deployment using GlassFish. Students will build dynamic web applications using Servlets, JSP, and JSTL, exploring key web features like cookies, sessions, file handling, and non-blocking I/O. The course then delves into Enterprise JavaBeans (EJB), session and message-driven beans, and the Java Naming and Directory Interface (JNDI). It also introduces modern persistence techniques using JPA and Hibernate, guiding students through real-world applications using MySQL. Finally, students are introduced to the Spring framework, emphasizing POJO-based design and modular enterprise development.
2	Vertical 1	-
3	Type & Teaching Method	Theory+Practicum (Lectures / Problem Solving /Discussion / Presentation / Case Study / Demonstration etc.)
4	Credit	2 Credits
5	Hours allotted	50 Hours
6	Marks allotted	75 Marks
7	Course Objectives: 1. To understand the concept of and develop applications using servlets and database connectivity. 2. To develop applications that can handle cookies, sessions and file operations. 3. To understand the concept of and design applications using Java server pages. 4. To understand the concept of and design applications using Enterprise Java Beans. 5. To understand the concepts of persistence, Hibernate and develop JPA applications, Hibernate applications	

8	Learning Outcomes: The learner will be able to: LO1: Proficiently understand and apply servlets concepts to develop dynamic web applications. LO2: Demonstrate the ability to develop applications capable of managing cookies, sessions, and performing file operations effectively. LO3: Proficient in understanding and designing applications using Java Server Pages (JSP), enabling dynamic and interactive web content creation. LO4: Adept at comprehending and designing applications utilizing Enterprise Java Beans (EJB), facilitating the development of scalable and distributed enterprise-level applications. LO5: Possess a thorough understanding of persistence concepts, Hibernate framework, the ability to develop Java Persistence API (JPA) and Spring Framework applications proficiently
9	Syllabus 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. UNIT II: • Request Dispatcher: Request dispatcher Interface, Methods of Request dispatcher, Request dispatcher 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 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 does JSP execute? About Java Server Pages

- **Getting Started With Java Server Pages:** Comments, JSPDocument, JSPElements, JSP GUI Example.
- **Action Elements:** Including other Files, Forwarding JSP Page to Another Page, Passing Parameters for other Actions, Loading a Java bean.
- **Implicit Objects, Scope and El Expressions:** Implicit Objects, Character Quoting Conventions, Unified Expression Language [UnifiedEl], Expression Language.
- **Java Server Pages Standard Tag Libraries:** What is wrong in using JSP Scriptlet Tags? How JSTL Fixes JSP Scriptlet's Short comings? Disadvantages Of JSTL, Tag Libraries.

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, 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:** Creating Database and Tables in Mysql, creating a Web Application, Adding the Required Library Files, creating a Javabeen Class, Creating Persistence Unit [Persistence.Xml], Creating JSP's, 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:** Creating Database and Tables in Mysql, Creating a Web Application, Adding the Required Library Files, Creating a Java bean Class, Creating

	Hibernate Configuration File, Adding a Mapping Class, Creating JSP's, Running The Hibernate Application. • Getting Started with Spring Frameworks: Introduction to Spring Framework, POJO Programming Model, Lightweight Containers																														
10	Scheme of Examination and Assessment Pattern Paper – 100 Marks External Examination: Semester End External - 75 marks Time: 2½ hours Format of Question Paper Attempt any 3 out of 6 questions. <table><tr><th>Question No</th><th>Nature of Questions</th><th>Marks</th></tr><tr><td>Q1</td><td>Theory</td><td>15</td></tr><tr><td>Q2</td><td>Theory</td><td>15</td></tr><tr><td>Q3</td><td>Theory</td><td>15</td></tr><tr><td>Q4</td><td>Theory</td><td>15</td></tr><tr><td>Q5</td><td>Theory</td><td>15</td></tr><tr><td colspan="2"></td><td>Total 75</td></tr></table> Internal Examination: Continuous Evaluation - 25 marks <table><tr><th></th><th>Assessment / evaluation</th><th>Marks</th></tr><tr><td>1.</td><td>Class Test</td><td>20</td></tr><tr><td>2.</td><td>Project and presentation / Viva etc.</td><td>05</td></tr></table>	Question No	Nature of Questions	Marks	Q1	Theory	15	Q2	Theory	15	Q3	Theory	15	Q4	Theory	15	Q5	Theory	15			Total 75		Assessment / evaluation	Marks	1.	Class Test	20	2.	Project and presentation / Viva etc.	05
Question No	Nature of Questions	Marks																													
Q1	Theory	15																													
Q2	Theory	15																													
Q3	Theory	15																													
Q4	Theory	15																													
Q5	Theory	15																													
		Total 75																													
	Assessment / evaluation	Marks																													
1.	Class Test	20																													
2.	Project and presentation / Viva etc.	05																													
11	REFERENCES: 1. Java EE 7 For Beginners by Sharanam Shah and Vaishali Shah, published by SPD, First Edition, 2017. 2. Java EE 8 Cookbook by Elder Moraes, published by Packt, First Edition, 2018. 3. Advanced Java Programming by Uttam Kumar Roy, published by Oxford Press, First Edition, 2015. 4. Java EE 8 Application Development by David R. Heffelfinger, published by Packt, First Edition, 2017. 5. Java EE 7 Essentials by Arun Gupta, published by O'Reilly, First Edition, 2013.																														

**Smt. Chandibai Himathmal Mansukhani College
(Autonomous)**

**Third Year B. Sc.
(Information Technology)**

Semester- V

Title: Project Dissertation

**with effect from
Academic Year 2025-2026**

Title: Project Dissertation
Course Code: CHM(A)USIT5P1

Sr. No.	Heading	Particulars
1	Description of the Course:	This course offers a comprehensive understanding of the Systems Development Life Cycle (SDLC) with a focus on practical application. Students will learn to evaluate system requirements, define problems clearly, and perform detailed feasibility studies including cost-benefit, technical, and operational analyses. Emphasis is placed on fact-finding techniques, creating and assessing data flow diagrams, data dictionaries, and alternative process description tools. The course guides learners through logical and physical system design, including inputs, outputs, user interfaces, and file structures. With strong coverage on database design, normalization, and processing system types, students will also gain skills in project scheduling, coding, documentation, testing, and implementation strategies. The course fosters teamwork, problem-solving abilities, and effective communication, preparing students to deliver quality software solutions aligned with real-world needs and future enhancements.
2	Vertical 1	-
3	Type	Practical
4	Credit	2 Credits
5	Hours allotted	50 Hours
6	Marks allotted	50 Marks
7	Course Objectives:	1. Demonstrate comprehensive understanding of the Systems Development Life Cycle for software project delivery. 2. Analyze and document system requirements, including conducting feasibility studies. 3. Design and validate system components such as data flow diagrams, user interfaces, and databases. 4. Apply project management techniques including scheduling, coding standards, testing, and documentation. 5. Develop effective teamwork and communication skills to deliver quality software solutions.

8	Learning Outcomes: The learner will be able to: LO1: Apply the complete Systems Development Life Cycle to analyze, design, and implement software projects effectively. LO2: Perform detailed feasibility studies and gather system requirements using standard fact-finding techniques. LO3: Construct and evaluate system models such as data flow diagrams, ER diagrams, and design user interfaces and database structures. LO4: Manage project schedules using GANTT and PERT charts, and develop well-documented, tested, and maintainable software. LO5: Collaborate effectively in teams, communicate technical ideas clearly, and deliver quality software solutions.												
9	Syllabus TYPE OF THE PROJECT • The majority of the students are expected to work on a real-life project preferably in some industry/ Research and Development Laboratories/Educational Institution/Software Company. • Students are encouraged to work in the areas listed below. However, it is not mandatory for a student to work on a real-life project. The student can formulate a project problem with the help of her/his Guide and submit the project proposal of the same. Approval of the project proposal is mandatory. If approved, the student can commence working on it, and complete it. Use the latest versions of the software packages for the development of the project. SOFTWARE AND BROAD AREAS OF APPLICATION <table border="1" data-bbox="300 1317 1442 1944"> <tr> <td data-bbox="300 1317 683 1429">Languages</td><td data-bbox="683 1317 1442 1429">C, C++, Java, VC++, C#, R.Python</td></tr> <tr> <td data-bbox="300 1429 683 1541">Front End/Gui Tools</td><td data-bbox="683 1429 1442 1541">Net Technologies. Java</td></tr> <tr> <td data-bbox="300 1541 683 1653">DBMS/Back End</td><td data-bbox="683 1541 1442 1653">Oracle, SQL Plus. MY SQL, SQL Server.</td></tr> <tr> <td data-bbox="300 1653 683 1765">Scripting Languages</td><td data-bbox="683 1653 1442 1765">PHP.JSP, SHELL Scripts (Unix), TeL/TK.</td></tr> <tr> <td data-bbox="300 1765 683 1877">Realtime Operating System/Embedded Skills</td><td data-bbox="683 1765 1442 1877">LINUX, Raspberry Pi, Arduino (NodeMCU/ESP32), 8051</td></tr> <tr> <td data-bbox="300 1877 683 1944">Application Areas</td><td data-bbox="683 1877 1442 1944">Financial Insurance / Manufacturing/ Multimedia/Computer Graphics / Instructional Design/ Database Management System/</td></tr> </table>	Languages	C, C++, Java, VC++, C#, R.Python	Front End/Gui Tools	Net Technologies. Java	DBMS/Back End	Oracle, SQL Plus. MY SQL, SQL Server.	Scripting Languages	PHP.JSP, SHELL Scripts (Unix), TeL/TK.	Realtime Operating System/Embedded Skills	LINUX, Raspberry Pi, Arduino (NodeMCU/ESP32), 8051	Application Areas	Financial Insurance / Manufacturing/ Multimedia/Computer Graphics / Instructional Design/ Database Management System/
Languages	C, C++, Java, VC++, C#, R.Python												
Front End/Gui Tools	Net Technologies. Java												
DBMS/Back End	Oracle, SQL Plus. MY SQL, SQL Server.												
Scripting Languages	PHP.JSP, SHELL Scripts (Unix), TeL/TK.												
Realtime Operating System/Embedded Skills	LINUX, Raspberry Pi, Arduino (NodeMCU/ESP32), 8051												
Application Areas	Financial Insurance / Manufacturing/ Multimedia/Computer Graphics / Instructional Design/ Database Management System/												

Internet/Intranet Software development/ programming	Computer E-Commerce/ /Routing protocols	Networking-Communication ERP/ MRP/ TCP-IP programming/Socket programming.
---	---	--

PROJECT REPORT:

- 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

CHAPTER 1: INTRODUCTION

- 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

CHAPTER 2:

SURVEY OF TECHNOLOGIES

CHAPTER 3: REQUIREMENTS AND ANALYSIS

- 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

CHAPTER 4: SYSTEM DESIGN

- 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

The documentation should use tools like star UML, Visuo for windows, Rational Rose for design as part of Software Project Management Practical Course. The documentation should be spiral bound for semester V and the entire documentation should be hard bound during semester VI.

REFERENCES

GLOSSARY

EXPLANATION OF CONTENTS

Title Page

Original Copy of the Approved Proforma of the Project Proposal

Certificate of Authenticated work

Abstract

This should be one/two short paragraphs (100-150 words total), summarising the project work. It is important that this is not just a re-statement of the original project outline. A suggested flow is background; project aims and main achievements. From the abstract, a reader should be able to ascertain if the project is of interest to them and, it should present results of which they may wish to know more details.

Acknowledgements

This should express student's gratitude to those who have helped in the preparation of project.

Table of Contents

The table of contents gives the readers a view of the detailed structure of the report. The students would need to provide section and subsection headings with associated pages. The formatting details of these sections and subsections are given below. Table of Figures: List of all Figures, Tables, Graphs, Charts etc. along with their page numbers in a table of figures.

Chapter 1: Introduction

The introduction has several parts as given below:

Background: A description of the background and context of the project and its relation to work already done in the area. Summarise existing work in the area concerned with the project work.

Objectives: Concise statement of the aims and objectives of the project. Define exactly what is going to be done in the project; the objectives should be about 30 /40 words.

Purpose, Scope and Applicability: The description of Purpose, Scope, and Applicability are given below:

- **Purpose:** Description of the topic of the project that answers questions on why this project is being done. How the project could improve the system its significance and theoretical framework.
- **Scope:** A brief overview of the methodology, assumptions and limitations. The students should answer the question: What are the main issues being covered in the project? What are the main functions of the project?
- **Applicability:** The student should explain the direct and indirect applications of their work. Briefly discuss how this project will serve the computer world and people.
- **Achievements:** Explain what knowledge the student achieved after the completion of the work. What contributions has the project made to the chosen area? Goals achieved - describes the degree to which the findings support the original objectives laid out by the project. The goals may be partially or fully achieved, or exceeded.
- **Organisation of Report:** Summarizing the remaining chapters of the project report, in effect, giving the reader an overview of what is to come in the project report.

Chapter 2: Survey of Technologies

In this chapter Survey of Technologies should demonstrate the students awareness and understanding of Available Technologies related to the topic of the project. The student should give the detail of all the related technologies that are necessary to complete the project. The should describe the technologies available in the chosen area and present a comparative study of all those Available Technologies. Explain why the student selected the one technology for the completion of the objectives of the project.

Chapter 3: Requirements and Analysis

Problem Definition: Define the problem on which the students are working in the project. Provide details of the overall problem and then divide the problem in to sub-problems. Define each sub- problem clearly.

Requirements Specification: In this phase the student should define the requirements of the system, independent of how these requirements will be accomplished. The Requirements Specification describes the things in the system and the actions that can be done on these things. Identify the operation and problems of the existing system.

Planning and Scheduling: Planning and scheduling is a complicated part of software development. Planning, for our purposes, can be thought of as determining all the small tasks that must be carried out in order to accomplish the goal. Planning also takes into account, rules, known as constraints, which, control when certain tasks can or cannot happen. Scheduling can be thought of as determining whether adequate resources are available to carry out the plan. The student should show the Gantt chart and Program Evaluation Review Technique (PERT).

Software and Hardware Requirements: Define the details of all the software and hardware needed for the development and implementation of the project.

- **Hardware Requirement:** In this section, the equipment, graphics card, numeric co-processor, mouse, disk capacity, RAM capacity etc. necessary to run the software must be noted.
- **Software Requirements:** In this section, the operating system, the compiler, testing tools, linker, and the libraries etc. necessary to compile, link and install the software must be listed.

Preliminary Product Description: Identify the requirements and objectives of the new system. Define the functions and operation of the application/system the students are developing as project.

Conceptual Models: The student should understand the problem domain and produce a model of the system, which describes operations that can be performed on the system, and the allowable sequences of those operations. Conceptual Models could consist of complete Data Flow Diagrams, ER diagrams, Object-oriented diagrams, System Flowcharts etc.

Chapter 4: System Design

Describes desired features and operations in detail, including screen layouts, business rules, process diagrams, pseudocode and other documentation.

Basic Modules: The students should follow the divide and conquer theory, so divide the overall problem into more manageable parts and develop each part or module separately. When all modules are ready, the student should integrate all the modules into one system. In this phase, the student should briefly describe all the modules and the functionality of these modules.

Data Design: Data design will consist of how data is organised, managed and manipulated.

- **Schema Design:** Define the structure and explanation of schemas used in the project.
- **Data Integrity and Constraints:** Define and explain all the validity checks and constraints provided to maintain data integrity.

Procedural Design: Procedural design is a systematic way for developing algorithms or procedurals.

- **Logic Diagrams:** Define the systematical flow of procedure that improves its comprehension and helps the programmer during implementation. e.g., Control Flow Chart, Process Diagrams etc.
- **Data Structures:** Create and define the data structure used in procedures.
- **Algorithms Design:** With proper explanations of input data, output data, logic of processes, design and explain the working of algorithms.

User Interface Design: Define user, task, environment analysis and how to map those requirements in order to develop a "User Interface". Describe the external and internal components and the architecture of user interface. Show some rough pictorial views of the user interface and its components.

	Security Issues: Discuss Real-time considerations and Security issues related to the project and explain how the student intends avoiding those security problems. What are the security policy plans and architecture? Test Cases Design: Define test cases, which will provide easy detection of errors and mistakes with in a minimum period of time and with the least effort. Explain the different conditions in which the students wish to ensure the correct working of the project.																						
10	Scheme of Examination and Assessment Pattern Paper – 50 Marks <table border="1"> <thead> <tr> <th></th><th>Assessment / evaluation</th><th>Marks</th></tr> </thead> <tbody> <tr> <td>1.</td><td>Evaluation of Project Documentation and Viva Voce</td><td></td></tr> <tr> <td></td><td>Introduction and Problem Definition</td><td>10</td></tr> <tr> <td></td><td>Survey of Technologies</td><td>10</td></tr> <tr> <td></td><td>Requirement and Analysis</td><td>10</td></tr> <tr> <td></td><td>System Design</td><td>10</td></tr> <tr> <td></td><td>Viva Voce</td><td>10</td></tr> </tbody> </table>			Assessment / evaluation	Marks	1.	Evaluation of Project Documentation and Viva Voce			Introduction and Problem Definition	10		Survey of Technologies	10		Requirement and Analysis	10		System Design	10		Viva Voce	10
	Assessment / evaluation	Marks																					
1.	Evaluation of Project Documentation and Viva Voce																						
	Introduction and Problem Definition	10																					
	Survey of Technologies	10																					
	Requirement and Analysis	10																					
	System Design	10																					
	Viva Voce	10																					

**Smt. Chandibai Himathmal Mansukhani College
(Autonomous)**

**Third Year B. Sc.
(Information Technology)**

Semester- V

Title: Internet of Things Practical

**with effect from
Academic Year 2025-2026**

Title: Internet of Things Practical**Course Code: CHM(A)USIT5P2**

Sr. No.	Heading	Particulars
1	Description of the Course:	This course provides hands-on experience with Raspberry Pi and NodeMCU, focusing on real-world IoT applications. Students will begin by setting up Raspbian OS and familiarizing themselves with hardware components, progressing to implement LED patterns, time displays, and sensor interfacing. Key projects include WhatsApp-based control, fingerprint authentication, RFID usage, and home automation. The course also integrates camera-based visitor monitoring and introduces cloud connectivity using Blynk, ThingSpeak, and MQTT. Through Arduino IDE and various sensor modules, learners gain practical skills in embedded programming and IoT deployment using both Raspberry Pi and NodeMCU.
2	Vertical 1	-
3	Type	Practical
5	Credit	2 Credits
6	Hours allotted	50 Hours
7	Marks allotted	50 Marks
8	Course Objectives: 1. Familiarize students with Raspberry Pi setup, interface, and basic hardware operations. 2. Implement real-time sensor and actuator control using NodeMCU and Arduino IDE. 3. Develop hands-on IoT projects with Raspberry Pi, including web and WhatsApp-based control. 4. Integrate cloud platforms like Blynk, ThingSpeak, and MQTT with NodeMCU for IoT data exchange. 5. Build functional applications using biometric, RFID, and camera modules for smart monitoring.	
9	Learning Outcomes: The learner will be able to: LO1: Demonstrate the ability to boot and configure Raspbian OS with full hardware interface setup.	

	LO2: Develop LED pattern programs and display time on 7-segment modules using Raspberry Pi. LO3: Build and control IoT-based applications like home automation and WhatsApp-controlled systems. LO4: Integrate and operate biometric, RFID, and camera modules for real-time monitoring solutions. LO5: Connect NodeMCU to cloud platforms (Blynk, ThingSpeak, MQTT) and perform sensor-actuator interfacing.																		
10	Syllabus 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. Controlling Raspberry Pi with WhatsApp. 5. Fingerprint Sensor interfacing with Raspberry Pi 6. IoT based Web Controlled Home Automation using Raspberry Pi 7. Visitor Monitoring with Raspberry Pi and Pi Camera 8. Interfacing Raspberry Pi with RFID. 9. Installing Arduino IDE, Basic Programming of NodeMCU and Interfacing GasSensor, FireSensor, DHT11,Ultraonics sensor, Obstacle , Touch Sensor,LED,Buzzer and Relay to NodeMCU 10. Introduction Blynk, ThnigsSpeak, MQTT. Connection NodeMCU to these cloud platform with Sensor and Actuator interfaced in Above Experiment Raspberry Pi Kits/NodeMCU and components should be made available in the ratio of 1 kit : 3 students minimum.																		
11	Scheme of Examination and Assessment Pattern Paper – 50 Marks <table><tr><th></th><th>Assessment / evaluation</th><th>Marks</th></tr><tr><td>1.</td><td>Practical Examination</td><td></td></tr><tr><td></td><td>Question 1</td><td>20</td></tr><tr><td></td><td>Question 2</td><td>20</td></tr><tr><td></td><td>Viva</td><td>05</td></tr><tr><td></td><td>Journal</td><td>05</td></tr></table>		Assessment / evaluation	Marks	1.	Practical Examination			Question 1	20		Question 2	20		Viva	05		Journal	05
	Assessment / evaluation	Marks																	
1.	Practical Examination																		
	Question 1	20																	
	Question 2	20																	
	Viva	05																	
	Journal	05																	

12	REFERENCES: 1. Designing the Internet of Things by Adrian McEwen and Hakim Cassimally, published by Wiley, First Edition, 2014. 2. Official Raspberry Pi Beginner's Guide by Gareth Halfacre, published by Raspberry Pi Press, First Edition, 2018. 3. Programming the Raspberry Pi by Simon Monk, published by McGraw Hill, Third Edition, 2021. 4. Getting Started with Raspberry Pi by Matt Richardson and Shawn Wallace, published by SPD, Third Edition, 2016.
----	--

**Smt. Chandibai Himathmal Mansukhani College
(Autonomous)**

**Third Year B. Sc.
(Information Technology)**

Semester- V

**Title: Advanced Web Development
Practical**

**with effect from
Academic Year 2025-2026**

Title: Advanced Web Development Practical

Course Code: CHM(A)USIT5P3

Sr. No.	Heading	Particulars
1	Description of the Course:	This practical course is designed to provide students with comprehensive hands-on experience in C# and ASP.NET web development. Starting with foundational programming concepts like loops, series, and delegates in C#, students progressively move on to building interactive web applications using server controls, validation, master pages, and user controls. Emphasis is placed on state management, database connectivity, and working with ADO.NET both in connected and disconnected modes. Students also learn to implement security features, use cookies, handle exceptions, and work with advanced controls like GridView and FormView. The course concludes with integrating modern UI features using Bootstrap and AJAX controls to build dynamic and responsive web applications.
2	Vertical 1	-
3	Type	Practical
4	Credit	2 Credits
5	Hours allotted	50 Hours
6	Marks allotted	50 Marks
7	Course Objectives: 1. To strengthen core programming skills in C# by solving problems such as mathematical operations, loops, and algorithmic series like Fibonacci and prime number detection. 2. To explore object-oriented concepts practically through hands-on applications using boxing, unboxing, delegates, and interfaces to promote clean coding principles. 3. To develop and design interactive ASP.NET web forms using various server controls, validation tools, and user controls for real-time user interface management. 4. To implement web data handling and connectivity techniques using ADO.NET for CRUD operations, GridView controls, and state management in both connected and disconnected modes. 5. To integrate modern web development practices including Bootstrap UI elements, AJAX UpdatePanel, authentication mechanisms, and secure cookie handling for building responsive and secure web applications.	

8	Learning Outcomes: The learner will be able to: LO1: Apply fundamental C# logic to perform operations and generate number patterns. LO2: Demonstrate use of OOP principles like interfaces, delegates, and boxing/unboxing. LO3: Design ASP.NET web forms using server controls, validation, and navigation features. LO4: Perform data operations using ADO.NET with GridView and related controls. LO5: Implement cookies, security, and enhance UI with Bootstrap and UpdatePanel.
	Syllabus Practical 1: Write the program for the following: - Create an application to print on screen the output of adding, subtracting, multiplying and dividing two numbers entered by the user in C#. - Create an application to print Floyd's triangle till n rows in C#. - Create an application to demonstrate following operations i. Generate Fibonacci series. ii. Test for prime numbers. Practical 2: Write the program for the following: - Create a simple application to demonstrate the concepts boxing and unboxing. - Create a simple application to perform addition and subtraction using delegate. - Create a simple application to demonstrate use of the concepts of interfaces. Practical 3: Write the program for the following: - Create a simple web page with various server controls to demonstrate setting and use of their properties. (Example : AutoPostBack) - Create a simple application to demonstrate your vacation using calendar control. - Demonstrate the use of Treeview operations on the web form. Practical 4: Write the program for the following: - Create a Registration form to demonstrate use of various Validation controls. - Create Web Form to demonstrate use of Adrotator Control. - Create Web Form to demonstrate use User Controls Practical 5: Write the program for the following: - Create Web Form to demonstrate use of Website Navigation controls. - Create a web application to demonstrate use of Master Page and content page. - Create a web application to demonstrate various states of ASP.NET Pages. Practical 6: Write the program for the following: - Create a web application for inserting and deleting records from a database. - Create a web application to display Using Disconnected Data Access and Databinding using GridView. Practical 7: Write the program for the following: - Create a web application to demonstrate the use of different types of Cookies. - Create a web application to demonstrate Form Security and Windows Security with proper Practical 8: Write the program for the following: - Create a web application for inserting and deleting records from a database. (Using Execute-Non Query). - Create a web application for user defined exception handling. Practical 9: Write the program for the following: - Create a web application to demonstrate use of GridView button column and GridView

	events along with paging and sorting. b. Create a web application to demonstrate data binding using DetailsView and FormView Control. Practical 10: Write the program for the following: a. Create a web application to demonstrate JS Bootstrap Button. b. Create a web application to demonstrate use of UpdatePanel.																			
	Scheme of Examination and Assessment Pattern Paper – 50 Marks <table border="1"> <thead> <tr> <th></th><th>Assessment / evaluation</th><th>Marks</th></tr> </thead> <tbody> <tr> <td>1.</td><td>Practical Examination</td><td></td></tr> <tr> <td></td><td>Question 1</td><td>20</td></tr> <tr> <td></td><td>Question 2</td><td>20</td></tr> <tr> <td></td><td>Viva</td><td>05</td></tr> <tr> <td></td><td>Journal</td><td>05</td></tr> </tbody> </table>			Assessment / evaluation	Marks	1.	Practical Examination			Question 1	20		Question 2	20		Viva	05		Journal	05
	Assessment / evaluation	Marks																		
1.	Practical Examination																			
	Question 1	20																		
	Question 2	20																		
	Viva	05																		
	Journal	05																		
	REFERENCES: 1. Beginning Visual C# 2010 by K. Watson, C. Nagel, J.H. Padderson, J.D. Reid, and M. Skinner, published by Wrox (Wiley), 2010. 2. Murach's ASP.NET 4.6 Web Programming in C# 2015 by Mary Delamater and Anne Boehm, published by SPD, 2016. 3. ASP.NET 4.0 Programming by J. Kanjilal, published by Tata McGraw Hill, 2011. 4. Programming ML.NET by Dino Esposito and Francesco Esposito, published in paperback format (publication year not specified). 5. Ajax: A Beginner's Guide by Steven Holzner, published in paperback format, 2017. 6. Introducing Bootstrap 4 by Jörg Krause, published by Apress, 2016.																			
10	Scheme of Examination and Assessment Pattern Paper – 50 Marks <table border="1"> <thead> <tr> <th></th><th>Assessment / evaluation</th><th>Marks</th></tr> </thead> <tbody> <tr> <td>1.</td><td>Practical Examination</td><td></td></tr> <tr> <td></td><td>Question 1</td><td>20</td></tr> <tr> <td></td><td>Question 2</td><td>20</td></tr> <tr> <td></td><td>Viva</td><td>05</td></tr> <tr> <td></td><td>Journal</td><td>05</td></tr> </tbody> </table>			Assessment / evaluation	Marks	1.	Practical Examination			Question 1	20		Question 2	20		Viva	05		Journal	05
	Assessment / evaluation	Marks																		
1.	Practical Examination																			
	Question 1	20																		
	Question 2	20																		
	Viva	05																		
	Journal	05																		

**Smt. Chandibai Himathmal Mansukhani College
(Autonomous)**

**Third Year B. Sc.
(Information Technology)**

Semester- V

**Title: Linux Server Administration
Practical**

**with effect from
Academic Year 2025-2026**

Title: Linux Server Administration Practical**Course Code: CHM(A)USIT5P5**

Sr. No.	Heading	Particulars
1	Description of the Course:	This course offers comprehensive hands-on training on RHEL 6.x system administration. Starting with OS installation and bootloader configuration, students will set up essential services like the LAMP stack, manage users, groups, and permissions, and handle package management using RPM and Yum. The course covers storage and network configuration, including file sharing via NFS, Samba, and FTP. Students will also configure DHCP, DNS, and web servers, monitor systems with scheduling tools, secure servers using firewalls and cryptographic services, and develop shell scripts for automation. Practical daily administration tasks, including process management and repository handling, complete the course, preparing learners for real-world Linux server management.
2	Vertical 1	-
3	Type	Practical
4	Credit	Credits
5	Hours allotted	50 Hours
6	Marks allotted	50 Marks
7	Course Objectives: 1. Equip students with practical skills to install and configure RHEL 6.x, including bootloader and LAMP stack setup. 2. Enable effective management of users, groups, permissions, and package installations using RPM and Yum. 3. Develop proficiency in configuring storage, networking, and essential infrastructure services like SSH and file sharing. 4. Train students to set up and manage critical network services such as DHCP, DNS, and web servers. 5. Build capability to automate system tasks through shell scripting, secure servers with firewalls, and perform routine system administration efficiently.	

	Learning Outcomes: The learner will be able to: LO1: Install and configure RHEL 6.x, GRUB, and LAMP stack with confidence. LO2: Manage users, groups, permissions, and software packages effectively. LO3: Configure storage, network services, and secure SSH access. LO4: Set up and administer DHCP, DNS, web servers, and file sharing protocols. LO5: Automate tasks using shell scripting and implement server security with firewalls and cryptographic tools.
10	Syllabus Practical 0: Installation of RHEL6.x Practical 1: GRUB and LAMP Stack - Configuring the GRUB - Setting up LAMP Stack Practical 2: Working with Users, Groups, and Permissions - Creating and Managing Users. - Creating and Managing Groups - Using Permissions and Advanced Permissions Practical 3: Working with Console, RPM, and Yum - Managing Console and Gaining Privileges - Working with RPM Practical 4: Working with Storage, Network and Infrastructure services - Configuring and Managing Storage - Connecting to the Network - Configuring and enabling Infrastructure services - Configuring OpenSSH Practical 5: Configuring Server for File Sharing - Configuring NFS Server and Client - Configuring Samba - Configuring FTP Practical 6: Configuring DHCP, DNS, Web Server - Configuring DHCP server - Configuring DNS server - Configuring Web server Practical 7: Write the program for the following: - Configuring System Monitoring tools - Configuring cron, anacron, At and Batch Utility Practical 8: Firewall and Cryptographic services - Securing Server with iptables - Setting Up Cryptographic Services Practical 9: Write the program for the following: - Programs on Shell scripting - Shell scripts to automate or monitor tasks/processes Practical 10: Perform Daily System Administration tasks - Managing Processes - Working with Storage Devices and Links - Working with repository

11	Scheme of Examination and Assessment Pattern		
	Paper – 50 Marks		
		Assessment / evaluation	Marks
	1.	Practical Examination	
		Question 1	20
		Question 2	20
	Viva	05	
	Journal	05	
12	REFERENCES:		
	1. Red Hat Enterprise Linux 6 Administration by Sander van Vugt, published by Sybex, First Edition, 2013.		
	2. Red Hat Enterprise Linux 6 Deployment Guide by Red Hat, published by Red Hat Content Services, First Edition, 2021.		
	3. Red Hat Linux Networking and System Administration by Terry Collings and Kurt Wall, published by Wiley, Third Edition, 2005.		
	4. Linux Administration: A Beginner's Guide by Wale Soyinka, published by Tata McGraw-Hill (TMH), Eighth Edition, 2020.		
	5. Red Hat Certified System Administrator by William Manning, published by Emero Publishing, Second Edition, 2012.		

**Smt. Chandibai Himathmal Mansukhani College
(Autonomous)**

**Third Year B. Sc.
(Information Technology)**

Semester- V

**Title: Advanced Java Technologies
Practical**

**with effect from
Academic Year 2025-2026**

Title: Advanced Java Technologies Practical
Course Code: CHM(A)USIT5P6

Sr. No.	Heading	Particulars
1	Description of the Course:	This course offers hands-on experience in Java Enterprise technologies, starting with core Servlet and JSP programming to build dynamic web applications. Students will learn session management, cookies, file handling, and form validations. The syllabus progresses to advanced topics including JSTL, Expression Language, and database integration using JPA and Hibernate. Practical exposure to Enterprise Java Beans (EJB) covers real-world applications like currency conversion and shopping carts, along with session and message-driven beans. Finally, the course introduces Spring Framework basics, including dependency injection, enabling students to develop scalable and maintainable enterprise applications.
2	Vertical 1	-
3	Type	Practical
4	Credit	2 Credits
5	Hours allotted	50 Hours
6	Marks allotted	50 Marks
7	Course Objectives: 1. To enable students to develop dynamic web applications using Servlets and JSP, focusing on real-time form handling, session tracking, and validations. 2. To provide hands-on experience in integrating JSTL, EL, and JDBC for building data-driven web solutions. 3. To introduce students to Enterprise JavaBeans (EJB) and its role in building scalable, modular applications like shopping carts and reservation systems. 4. To train students in applying JPA and Hibernate ORM for efficient database operations and object-relational mapping. 5. To familiarize students with the Spring Framework basics, emphasizing Inversion of Control and Dependency Injection for developing loosely coupled applications.	

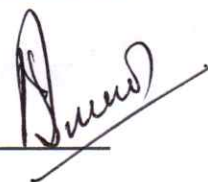
8	Learning Outcomes: The learner will be able to: LO1: Develop interactive web applications using Servlets and JSP with proper handling of sessions, cookies, and form data. LO2: Implement JSP with Expression Language (EL) and JSTL for building dynamic, data-driven web interfaces. LO3: Apply Enterprise JavaBeans (EJB) to create scalable enterprise modules like shopping carts, converters, and visitor statistics. LO4: Use Java Persistence API (JPA) and Hibernate to perform database CRUD operations with ORM and entity relationships. LO5: Utilize Spring Framework concepts such as dependency injection to build maintainable and modular Java applications.
9	Syllabus Practical 1: Implement the following Simple Servlet applications. - Create a simple calculator application using servlet. - Create a servlet for a login page. If the username and password are correct then it says message "Hello " else a message "login failed" Practical 2: Implement the following Servlet applications with Cookies and Sessions. - 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. - Create a servlet that uses Cookies to store the number of times a user has visited servlet. - 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. Practical 3: Implement the Servlet IO and File applications. - Create a Servlet application to upload and download a file. - Create simple Servlet application to demonstrate Non-Blocking Read Operation. Practical 4: Implement the following JSP applications. - Develop a simple JSP application to display values obtained from the use of intrinsic objects of various types. - 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). Practical 5: Implement the following JSP JSTL and EL Applications. - 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. - Create a JSP page to demonstrate the use of Expression language. - Create a JSP application to demonstrate the use of JSTL. Practical 6: Implement the following EJB Applications. - Create a Currency Converter application using EJB. - Develop a Simple Room Reservation System Application Using EJB.

	c. Develop simple shopping cart application using EJB [Stateful Session Bean]. Practical 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]. Practical 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. Practical 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. Practical 10: Implement the following Hibernate applications. a. Develop an application to demonstrate Hibernate One- To -One Mapping Using Annotation. b. Write a program to print “Hello World” using Spring Framework. c. Write a program to demonstrate dependency injection via setter method																		
10	Scheme of Examination and Assessment Pattern Paper – 50 Marks <table><tr><th></th><th>Assessment / evaluation</th><th>Marks</th></tr><tr><td>1.</td><td>Practical Examination</td><td></td></tr><tr><td></td><td>Question 1</td><td>20</td></tr><tr><td></td><td>Question 2</td><td>20</td></tr><tr><td></td><td>Viva</td><td>05</td></tr><tr><td></td><td>Journal</td><td>05</td></tr></table>		Assessment / evaluation	Marks	1.	Practical Examination			Question 1	20		Question 2	20		Viva	05		Journal	05
	Assessment / evaluation	Marks																	
1.	Practical Examination																		
	Question 1	20																	
	Question 2	20																	
	Viva	05																	
	Journal	05																	
11	REFERENCES: 1. Java EE 7 For Beginners by Sharanam Shah and Vaishali Shah, published by SPD, First Edition, 2017. 2. Java EE 8 Cookbook by Elder Moraes, published by Packt, First Edition, 2018. 3. Advanced Java Programming by Uttam Kumar Roy, published by Oxford Press, First Edition, 2015. 4. Java EE 8 Application Development by David R. Heffelfinger, published by Packt, First Edition, 2017. 5. Java EE 7 Essentials by Arun Gupta, published by O&#39;Reilly, First Edition, 2013.																		

Department of B.Sc. (Information Technology):

Sr No	Name of the Faculty	Designation and College	Signature
1.	Mr. Agi Thomas	Assistant Professor, Smt. CHM College, Ulhasnagar	
2.	Dr. Shiji Johnson	Assistant Professor, Smt. CHM College, Ulhasnagar	
3.	Ms. Neha Kambale	Assistant Professor, Smt. CHM College, Ulhasnagar	
4.	Ms. Pooja Gupta	Assistant Professor, Smt. CHM College, Ulhasnagar	

Name & Signature of the Ad-hoc BoS Chairperson: AGI THOMAS



Name & Signature of the Dean: Ms. Ritika Sachdev

