



**Hindi Vidya Prachar Samiti's
Ramniranjan Jhunjhunwala College of Arts, Science & Commerce
(Empowered Autonomous College)**

**Affiliated to
UNIVERSITY OF MUMBAI**

Syllabus for the T.Y.B.Sc. IT (under NEP)

Vertical under NEP: MAJOR

Program: B.Sc. Information Technology

Program Code: RJMAJIT

Semester V and VI

(REVISED 2025-2026 in alignment with the NEP 2020 facilitating the inter-and multidisciplinary learning and multiple entry and exit of the students)

Level 5.5

(CBCS 2025-2026)

B.Sc. IT Semester V and VI as per NEP 2020
Implemented from the academic year 2025-2026.
Major Subject: Information Technology

Credit Structure for **B.Sc. IT Semester V and VI** as per **NEP 2020** Implemented from the academic year 2025-2026. **Major Subject: Information Technology**

Semester: V

Level 5.5 Major Information Technology

*** As per University Grid**

Courses	Title	Credit	Total Credits
Major DSC (Discipline Specific Course)			
RJDSCIT351	Full Stack Development with MERN Technologies	3	10
RJDSCIT352	Java Programming	3	
RJDSCITP351	MAJ: Major Practical (Full Stack development with MERN Technologies and Java Programming Practical)	2	
RJDSCITP352	Applied Software Project Management Practical	2	
Major DSE (Discipline Specific Elective)			
RJDSEIT351	System Administration with Linux	2	4
RJDSEITP351	System Administration with Linux Practical	2	
RJDSEIT352	Artificial Intelligence and Applications	2	
RJDSEITP352	Artificial Intelligence and Applications Practical	2	
Minor			
RJMINIT351	Design Principles of Internet of Things	2	4
RJMINITP351	Design Principles of Internet of Things Practical	2	
Skill Enhancement Course			
RJSECITP351	Mobile Programming Practical	2	2
Field Project			
RJFPIT351	Major Project	2	2
		Total:	22

Semester: VI
Level 5.5 Major Information Technology

Courses	Title	Credit	Total Credits
Major DSC (Discipline Specific Course)			
RJDSCIT361	Advanced Web Development	3	10
RJDSCIT362	Principles of Information Security	3	
RJDSCITP361	MAJ: Major Practical (Advanced Web Development and Principles of Information Security Practical)	2	
RJDSCIT363	IT Services and Management	2	
Major DSE (Discipline Specific Elective)			
RJDSEIT361	Geographic Information System	2	4
RJDSEITP361	Geographic Information System Practical	2	
RJDSEIT362	Software Testing and Quality Assurance	2	
RJDSEITP362	Software Testing and Quality Assurance Practical	2	
Minor			
RJMINIT361	Business Analytics	2	4
RJMINITP361	Business Analytics Practical	2	
Field Project			
RJOJTIT361	On the Job Training	4	4
Total:			22

*** As per University Grid**

DISTRIBUTION OF TOPICS AND CREDITS

T. Y. B.Sc. Information Technology SEMESTER V – MAJOR COURSES

Course	Nomenclature	Credits	Topics
RJDSCIT351	Full Stack development with MERN Technologies	03	Introduction, MERN overview, Hello World project setup, React Components, React State, Express and GraphQL, MongoDB basics, Architecture and ESLint, Modularization and Webpack, React Router, React Forms, React Bootstrap, Server Rendering, Authentication
RJDSCIT352	Java Programming	03	Introduction to Java, Classes, Inheritance, Interfaces, Multithreading, Packages, Servlet, Working with database, Cookies, Session, Java Server Pages, Java Server Faces
RJDSCITP351	MAJ: Major Practical (Full Stack development with MERN Technologies and Java Programming Practical)	02	MERN Introduction, React Components & State Management, Express.JS & GraphQL Basics, REST API, MongoDB CRUD Operations, Modularization & Webpack Configuration, React-Router & Navigation, route and query parameters, React Forms, API Integration, React-Bootstrap, UI Components, Server Rendering, Authentication & Deployment Java: OOPs Concept, Exception and Event Handling, Multithreading, Servlet, Cookies, Session, JDBC, JSP, JSF
RJDSCITP352	Applied Software Project Management Practical	02	Creating project Proposal, writing project abstract, project document - Introduction - requirements, rationale, project scope, limitations and advantages, survey of technologies, requirements and analysis - hardware and software design, product description, conceptual model, system design - Data design, UI design, Logical design, test case design, presentation and review of the software project.

Semester: V**Level 5.5 Major Information Technology**

Semester V – Major DSC (Discipline Specific Course)			
Course Code	Course Title	Credits	Duration
RJDSCIT351	Full Stack development with MERN Technologies	03	45 Hours
<p>Course Objectives:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Understand the core concepts and architecture of the MERN stack and familiarize with full-stack development environments. <input type="checkbox"/> Develop dynamic and responsive user interfaces using React with state management, routing, and form handling. <input type="checkbox"/> Build and integrate backend services using Express.js and MongoDB, including API development, authentication, and deployment. 			

Unit	Details	Lectures
I	<p>Introduction: MERN Overview, Components (React, Node.js, Express, MongoDB), Tools & Libraries</p> <p>Hello World: JSX, Project Setup, Node.js & npm, Express Basics</p> <p>React Components: Class & Functional Components, Props & Children, Dynamic Composition</p> <p>React State: State Management, Event Handling, Lifting State Up, Stateless Components</p> <p>Express and GraphQL: Express, Routing, Request Object, Response Object, Middleware, REST API, GraphQL Basics.</p>	15
II	<p>MongoDB: MongoDB Basics (Documents, Collections, Databases, Query language, Installation, The Mongo Shell, MongoDB CRUD Operations, MongoDB with Node.js, Schema Initialization)</p> <p>Architecture and ESLint: UI Server, Multiple Environments, Proxy-Based Architecture, ESLint (Stylistic Issues, Best Practices, Errors), ESLint for Front End</p> <p>Modularization and Webpack: Back-end Modules, Front-End Modules & Webpack, Transform & Bundle, Libraries Bundle, Hot Module Replacement,</p> <p>React Router: Simple Routing, Route Parameters, Query Parameters, Links, Programmatic Navigation, Nested Routes</p>	15

III	<p>React Forms: Controlled Components, Filters, Form Handling, Specialized Input Components, API Operations (Update API, Delete API, updating an issue & field, Deleting an issue)</p> <p>React Bootstrap: Installation, UI Elements (Buttons, Navigation Bar, Panels, Tables, Forms, Grid System), Various Forms (Inline, Horizontal), Validations, Toasts</p> <p>Server Rendering: Basic server Rendering, Webpack for the server, HMR for server, server router, hydrate, Data from API</p> <p>Authentication: Sign-In UI, Google Sign-In, Verifying Google Token, JSON Web Tokens, Signing Out, Authorization, Authorization-Aware UI,</p>	15
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Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Pro MERN Stack (Full Stack Web App Development with Mongo, Express, React, and Node)	Vasan Subramanian	Apress	2nd	2019
2.	Full – Stack React Projects	Shama Hoque	Packt Publishing	2 nd	2018
3.	Beginning MERN Stack; Build and Deploy Full Stack React Apps	Greg Lim	Apress	1 st	2021

Course Outcomes	Description (After this course, students will be able to--)	Bloom's Levels	PSO Addressed
CO 1	Develop MERN-based applications with React components, Express routing, and MongoDB integration.	Level III-Apply	PSO 1, PSO 2
CO 2	Implement state management, React Router, and modular design using Webpack and ESLint in frontend development.	Level IV -Analyze	PSO 2
CO 3	Design secure and responsive web apps using React-Bootstrap with authentication via Google Sign-In and JWT-based authorization.	Level V-Evaluate	PSO 2, PSO 3

Semester V –Major DSC (Discipline Specific Course)			
Course Code	Course Title	Credits	Duration
RJDSCIT352	Java Programming	03	45 Hours
Course Objectives: <ul style="list-style-type: none"> <input type="checkbox"/> Comprehensive understanding of Object-Oriented Programming concepts in Java. <input type="checkbox"/> Equip learners with the knowledge and skills to develop multithreaded applications, utilize Java packages and servlets for dynamic content, and work with databases using JDBC. <input type="checkbox"/> In-depth understanding of advanced Java concepts like cookies, session management, Java Server Pages (JSP) and Java Server Faces (JSF). 			

Unit	Details	Lectures
I	Object Oriented Concepts with Java Introduction to Java: Features of Java, Java Development Kit, Java Application Programming Interface, Java Virtual Machine, Java Program Structure. Classes: Types of Classes, this keyword, super keyword, Scope Rules, Access Modifier, constants, static members of a class, garbage collection. Inheritance: Derived Class Objects, Inheritance and Access Control. Interfaces: What Is an Interface? How Is an Interface Different from An Abstract Class? Multiple Inheritance. Multithreading: Thread Creations, Thread Life Cycle, Life Cycle Methods, Synchronization, wait() notify() notify all() methods.	15
II	Core Java Packages: Introduction to predefined packages, User Defined Packages, Access specifier, Java Built-in packages, Array Class, String Class. Servlets: The Need for Dynamic Content, Java Servlet Technology, Why Servlets? What can Servlets do? Servlet API and Lifecycle, Using Annotations instead of Deployment Descriptor. Working with Databases: Introduction, JDBC Architecture, JDBC Drivers, java.sql package, Using Statement, PreparedStatement, CallableStatement, ResultSet.	15
III	Advanced Java Cookies: Kinds Of Cookies, Where Cookies Are Used? Creating Cookies Using Servlet Sessions: What Are Sessions? Lifecycle Of Http Session, Session Tracking With Servlet API	15

	<p>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?,JSP Elements.</p> <p>Java Server Faces: Understanding JSF, Overview of the JavaServer Faces Lifecycle</p>	
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Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Java EE 7 For Beginners	Sharanam Shah Vaishali Shah	SPD		2013
2.	Java Platform, Enterprise Edition: The Java EE Tutorial	Eric Jendrock, Ricardo Cervera-Navarro, Ian Evans, Kim Haase, William Markito	Oracle	7th	2014
3.	Introducing Java EE 7: A Look at What's New	Arun Gupta	O'Reilly Media, Inc		2013
4.	Core Java 8 for Beginners	Vaishali Shah, Sharnam Shah	SPD	1st	2015
5.	Java: The Complete Reference	Herbert Schildt	McGraw Hill	9th	2014

Course Outcomes	Description (After this course, students will be able to--)	Bloom's Levels	PSO Addressed
CO 1	Understand the key components of the Java development environment, such as Java Virtual Machine (JVM), and implement Java's object-oriented principles.	Level II, III -Understand, Apply	PSO1, PSO2
CO 2	Understand and utilize core java concepts to create an interactive web application with database functionality.	Level II, III -Understand, Apply	PSO1, PSO2

CO 3	Understand and develop dynamic web applications using JSP and JSF, and effectively manage the application's user sessions and cookies using servlets.	Level II, VI-Understand,, Create	PSO3
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Semester V – Major DSC (Discipline Specific Course)			
Course Code	Course Title	Credits	Duration
RJDSCITP351	MAJ: Major Practical (Full Stack development with MERN Technologies and Java Programming Practical)	02	60 Hours
<p>Course Objectives:</p> <ul style="list-style-type: none"> <input type="checkbox"/> To understand and apply the core components of the MERN stack to build full-stack web applications. <input type="checkbox"/> To implement CRUD operations and modular architecture using MongoDB, Express, React, and Node.js <input type="checkbox"/> Develop responsive user interfaces with React, Webpack, and Bootstrap. <input type="checkbox"/> To Integrate authentication, server-side rendering, and performance optimization in MERN applications. <input type="checkbox"/> To learn how to implement OOPs concept in Java. <input type="checkbox"/> To develop GUI based applications using core java concepts and various Java frameworks. <input type="checkbox"/> To create a dynamic web application using servlets and database connectivity. 			

Full Stack development with MERN Technologies Practical	
1.	<p>Introduction to MERN & Project Setup</p> <ul style="list-style-type: none"> a. Create a Simple “Hello World” React application using JSX. b. Install and configure Node.js & npm and create a basic Express server. c. Explore and list down the tools and libraries commonly used in MERN development.
2.	<p>React Components & State Management</p> <ul style="list-style-type: none"> a. Create a simple React app demonstrating Class & Form components with Props and Children. b. Implement event handling and state updates using the useState Hook.
3.	<p>Express.JS & GraphQL Basics</p> <ul style="list-style-type: none"> a. Set up a simple Express server with routing and middleware. b. Create a REST API endpoint that returns a list of students.

4.	MongoDB Integration & CRUD Operations a. Set up a MongoDB and perform CRUD operations using the MongoDB shell. b. Create a Node.js application that connects to MongoDB and performs CRUD operations.
5.	Modularization & Webpack Configuration a. Organize a React application into modules and use Webpack for bundling. b. Implement Hot Module Replacement (HMR) in a React.
6.	React-Router & Navigation a. Implement basic navigation using React Router with different route components. b. Use route parameters and query parameters to pass data between pages.
7.	React Forms & API Integration a. Build a form using React-controlled components & validate inputs. b. Integrate the form with an API to store form data in MongoDB.
8.	React-Bootstrap & UI Components a. Create a UI layout using React-Bootstrap components like Navbar, Buttons, and Tables. b. Implement a responsive grid system with Bootstrap.
9.	Server Rendering & Performance Optimization a. Implement server-side rendering (SSR) for a React app and compare performance with client-side rendering. b. Fetch API data on the server and hydrate the React app.
10.	Authentication & Deployment a. Implement Google Sign-In and JWT-based authentication in a MERN app. b. Configure Role-Based Access Control (RBAC) using React Context API.

Java Programming Practical	
1	OOPs concepts in Java – 1 a. Write a program to create a class and implement a default, overloaded and copy constructor. b. Write a program to create a class and implement the concepts of Method Overloading. c. Write a program to create a class and implement the concepts of Static methods.
2	OOPs concepts in Java – 2 a. Write a program to implement the concepts of Inheritance and Method overriding. b. Write a program to implement the concepts of Abstract classes and methods. c. Write a program to implement the concept of interfaces.
3	Exceptions a. Write a program to raise built-in exceptions and raise them as per the requirements.

	b. Write a program to define user defined exceptions and raise them as per the requirements.
4	Multithreading Write a java application to demonstrate 5 bouncing balls of different colors using threads.
5	Layouts and Event Handling using Java Framework <ol style="list-style-type: none"> Design an AWT program to perform various string operations like reverse string, string concatenation etc. Design a Swing application to demonstrate different layouts. Write a java program to implement Java events like Text Events, Mouse Events, Windows Event and so on.
6	Servlet Programming <ol style="list-style-type: none"> 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 <username>” else a message “login failed”.
7	Servlet with Cookies Design a servlet with textboxes for accepting Cookie Name and Cookie Value. On click of a submit button, display the values on the same servlet in a table. Servlet with Session
8	Working with JDBC <ol style="list-style-type: none"> Write a JDBC program that displays the data of a given table in a GUI Table. Write a servlet program to demonstrate simple database connectivity.
9	JSP <ol style="list-style-type: none"> Write a simple JSP program. Request Dispatcher JSP - Design a jsp page to call servlet - welcome servlet and then hello servlet to display data accepted on jsp page. JSP using intrinsic objects - out, request, response, exception etc.
10	JSF Implement a simple JavaServer Faces Application.

Course Outcomes	Description (After this course, students will be able to--)	Bloom's Levels	PSO Addressed
CO 1	Build interactive and modular React applications using JSX, components, forms, routing, and state management techniques.	Level III - Apply	PSO1, PSO2

CO 2	Develop backend services with Express and Node.js, integrate them with MongoDB, and perform CRUD operations.	Level IV - Analyze	PSO1, PSO2
CO 3	Use tools like Webpack, React-Bootstrap, and ESLint to structure, optimize, and enhance the user interface and performance of full-stack applications.	Level III- Apply	PSO2, PSO3
CO 4	Implement fundamental concepts of OOPs, multithreading in java	Level III- Apply	PSO2
CO 5	Build interactive GUI applications using AWT and Swing	Level VI - Create	PSO3
CO 6	Develop dynamic web applications using JSP and JSF, and effectively manage the application's user sessions and cookies using servlets.	Level VI - Create	PSO3

Semester V – Major DSC (Discipline Specific Course)			
Course Code	Course Title	Credits	Duration
RJDSCITP352	MAJ: Applied Software Project Management Practical	02	60 Hours
<p>Course Objectives:</p> <ul style="list-style-type: none"> <input type="checkbox"/> To equip students with the knowledge and skills to effectively plan, develop, execute, and manage software projects. <input type="checkbox"/> To facilitate students to understand different software development process models and implement different phases of SDLC <input type="checkbox"/> To encourage students to explore latest technologies and use in project development <input type="checkbox"/> To motivate students to explore areas of application requirement and build software solution. 			

1.	<p>Project Proposal: Types of project proposals, stakeholders and users of the project, Rationale, Proposed technology, Feasibility to use the proposed technology, system flowchart / Context level DFD</p> <p>Task: Select at least two different topics and write project proposals for the same.</p>
2.	<p>Project Abstract: Introduction, Problem Statement - Scope, objective and outcomes of the project, operational feasibility, review of literature (Available publications,</p>

	<p>websites and mobile applications), methodology, estimation - resource, cost, man hours</p> <p>Task: Write a project abstract for the selected and approved project topic. Format of the documentation is in Appendix I</p>
Documentation	
3.	<p>Introduction: Background, Objectives, Purpose, Scope, and Applicability Survey of Technologies: Available technologies for the selected project, selected technologies with justification. Advantages and limitation of the selected technology Task: Write the project documentation chapter 1 and chapter 2 for the selected and approved project topic. Format of the documentation is in Appendix I</p>
4.	<p>Requirements and Analysis: Problem definition (problem and sub problem), requirement specification - problems in current system, Planning and scheduling: GANTT chart PERT (if applicable), software and hardware requirement, Preliminary Product Description: Identify the requirements and objectives of the new system. Define the functions and operation for selected and approved project topic. Task: Write problem statement, requirement specification, planning and scheduling with GANTT Chart, hardware and software requirement and preliminary product description for the selected and approved project topic Format of the documentation is in Appendix I</p>
5.	<p>System Design: Conceptual Models: Conceptual models and data flow diagram – ER(Data base Design), Object Oriented UML diagrams -Class diagram, , Use case, Sequence Activity, State Machine, Component and Deployment Diagram for relevant projects Such as Gaming Apps, Mobile Apps, Website, IOT, Simulation etc (Diagrams may differ as per the guidance provided by project guides) UI Design : External and internal components and the architecture of user interface. Rough pictorial views of the user interface design and its components. Task: Write about the conceptual model applicable to the selected and approved project topic and Draw relevant flow diagrams for the same. Design UI (draw rough UI designs) for the selected and approved project topic. Format of the documentation is in Appendix I</p>
6.	<p>Testing and Security Issues : Different testing methods that can be used, writing test cases, actual testing process. Real time considerations and security issues with respect to the project. Addressing the Security issues Task : Design test cases for the project. Write the test cases with possible outcomes for the selected and approved project</p>

	List possible security issues, proposed solutions, security protocols to be applied relevant to selected and approved project topic. Format of documentation is in Appendix I
Presentation and Review	
7.	Presentation Understand the project flow and working. Task : Demonstrate the working project and operational flow with visual aids to the project guide
8.	Review Task : Final working project demonstration

Course Outcomes	Description (After this course, students will be able to--)	Bloom's Levels	PSO Addressed
CO 1	Write software project proposals and abstract of the project	Level III - Apply	PSO1, PSO2
CO 2	Analyse the requirements and create a problem statement with problems and sub problems	Level IV - Analyze	PSO1, PSO2
CO3	Design a software solution for the analysed problem.	Level VI Design	PSO 3

DISTRIBUTION OF TOPICS AND CREDITS

T. Y. B.Sc. Information Technology SEMESTER V

Sr. No	Course Code	Course Title	Credit	Total Marks		
Major DSC (Discipline Specific Course)				Internal	External	Total
1.	RJDSCIT351	Full Stack Development with MERN Technologies	3	25	50	75
2.	RJDSCIT352	Java Programming	3	25	50	75
3.	RJDSCITP351	MAJ: Major Practical (Full Stack development with MERN Technologies and Java Programming Practical)	2	20	30	50
4.	RJDSCITP352	Applied Software Project Management_ Practical	2	20	30	30
Major DSE (Discipline Specific Elective)				Internal	External	Total
5.	RJDSEIT351	System Administration with Linux	2	20	30	50
6.	RJDSEITP351	System Administration with Linux Practical	2	20	30	50
7.	RJDSEIT352	Artificial Intelligence and Applications	2	20	30	50
8.	RJDSEITP352	Artificial Intelligence and Applications Practical	2	20	30	50
Minor						
9.	RJMINIT351	Design Principles of Internet of Things	2	20	30	50
10.	RJMINITP351	Design Principles of Internet of Things Practical	2	20	30	50
Skill Enhancement Course						
11.	RJSECITP351	Mobile Programming Practical	2	20	30	50
Field Project						
12.	RJFPIT351	Major Project	2	20	30	50
Total:			22			

DISTRIBUTION OF TOPICS AND CREDITS

T. Y. B.Sc. Information Technology SEMESTER VI

Level 5.5 Major Information Technology

Course	Nomenclature	Credits	Topics
RJDSCIT361	Advanced Web Development	02	Introduction, The C# Language Advanced C# Programming, Web Form Fundamentals Styles, Themes and Master Pages, Understanding Structured Exception Handling, State Management, ASP.NET AJAX, ASP.NET core.
RJDSCIT362	Principles of Information Security	02	Computer Network Security Fundamentals, Security Threats ,Security Assessment, Network Vulnerabilities, Access Control and Authorization, Authentication, Cryptography, Firewalls, System Intrusion Detection and Prevention, Virus and Content Filtering, Security in Wireless Networks and Devices ,Cloud Security, Mobile Security Issues
RJDSCITP361	MAJ: Major Practical (Advanced Web Development and Principles of Information Security Practical)	02	Basic C# programming, Implementing web controls, navigation controls and master pages. Using Data controls and Gridview control. Implementing Cipher and cryptography techniques, Configure Routers, Extended ACLs, IP ACLs to Mitigate Attacks, Configuring a Zone-Based Policy Firewall and Layer 2 Security, Configure and Verify a Site-to-Site IPsec VPN Using CLI
RJDSCIT363	IT Services and Management	02	Introduction, Key concepts of service management, four dimensions of service management, ITIL service value system,ITIL management practices. Drive Stakeholder Value, Create, Delivery and Support (CDS), Value streams for user support, High-Velocity IT, Continual improvement

Semester VI – Major DSC (Discipline Specific Course)			
Course Code	Course Title	Credits	Duration
RJDSCIT361	Advanced Web Development	3	45 Hours
Course Objectives: <ul style="list-style-type: none"> <input type="checkbox"/> To develop a deep understanding of advanced web development techniques using modern technologies, frameworks, and tools. <input type="checkbox"/> To learn techniques for improving web application performance, including efficient use of caching, and optimizing front-end and back-end interactions. <input type="checkbox"/> To study the principles of web application architecture using MVC (Model-View-Controller). 			

Unit	Details	Lectures
I	<p>Introduction: Introduction to .NET and .NET Core Framework, Characteristics of .NET and .NET Core, Understanding C# Programming language. Understanding Common type System, Understanding Common language Specification, Understanding Namespaces, Assemblies and types.</p> <p>The C# Language: C# Language Basics, Variables and Data Types, Variable Operations, Object-Based Manipulation, Conditional Logic, Loops, Methods, about Classes and Objects, Understanding OOP Concepts With C#</p> <p>Advanced C# Programming: Collections and Generics, Delegates and Events.</p>	15
II	<p>Web Form Fundamentals: Using the Page Class, Using Application Events, Web Control Classes, Web Control Events and AutoPostBack, Using the Validation Controls, Rich controls. Website Navigation, The TreeView Control, The Menu Control.</p> <p>Styles, Themes, and Master Pages: Styles, Themes, Master Page Basics, Advanced Master Pages.</p> <p>Understanding Structured Exception Handling : System-Level Exceptions (System.SystemException), Application-Level Exceptions (System.ApplicationException) Throwing a General Exception.</p> <p>State Management: Using View State, Transferring Information Between Pages, Using Cookies, Managing Session State, Configuring</p>	15

	Session State, Using Application State, Comparing State Management Options	
III	<p>Security Fundamentals: Understanding Security Requirements, Authentication and Authorization, Forms Authentication, Windows Authentication.</p> <p>ASP.NET AJAX: Understanding Ajax, Using Partial Refreshes, Using Progress Notification, Implementing Timed Refreshes, Working with the ASP.NET AJAX Control Toolkit.</p> <p>ASP.NET core: Understanding the application and utility framework, First ASP.NET core application, Creating ASP.NET core project, Adding core and content to the project, building and running projects, managing packages, debugging project</p>	15

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Beginning ASP.NET 4.5 in C#	Matthew MacDonald	Apress	First Edition	2012
2.	Pro ASP.NET Core 6	Adam Freeman	Apress	Ninth Edition	2022
3.	Pro ASP.NET MVC 5	Adam Freeman	Apress	Fifth Edition	2014

Course Outcomes	Description (After this course, students will be able to--)	Blooms Levels	PSO Addressed
CO 1	Understand and develop applications using modern technologies.	Level II, III -Understand , Apply	PSO 1, PSO 3
CO 2	Integrating and optimizing web applications using front end and backend technologies.	Level III,IV - Apply, Evaluate	PSO 1, PSO 2, PSO 3

CO 3	Evaluate and analyse secure web application using AJAX toolkit and MVC framework	Level IV, V - Analyse, Evaluate	PSO 2, PSO 3
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Semester VI – Major DSC (Discipline Specific Course)			
Course Code	Course Title	Credits	Duration
RJDSCIT362	Principles of Information Security	03	45 Hours
Course Objectives: <ul style="list-style-type: none"> <input type="checkbox"/> Familiarize students with fundamental principles, models, and mechanisms of computer and network security. <input type="checkbox"/> Explore various cryptography techniques and key management methods for secure communication <input type="checkbox"/> Investigate network security measures by exploring intrusion detection, malicious software detection, and firewall design principles. <input type="checkbox"/> Explore security in IP Protocols, cloud technologies and wireless system 			

Unit	Details	Lectures
I	<p>Computer Network Security Fundamentals: Introduction, Securing the Computer Network, Forms of Protection ,Security Standards</p> <p>Security Threats and Threat Motives to Computer Networks: Sources of Security Threats, Security Threat Motives, Security Threat Management, Security Threat Correlation , Security Threat Awareness</p> <p>Security Assessment, Analysis, and Assurance: System Security Policy, Building a Security Policy, Security Requirements Specification, Threat Identification, Threat Analysis, Vulnerability Identification and Assessment, Security Certification, Security Monitoring and Auditing</p> <p>Introduction to Computer Network Vulnerabilities: Sources of Vulnerabilities, Vulnerability Assessment</p> <p>Scripting and Security in Computer Networks and Web Browsers: Scripting, Scripting Languages, Computer Networks Scripts and Security</p>	15

II	<p>Access Control and Authorization: Access Rights, Access Control Systems, Authorization, Types of Authorization Systems, Authorization Principles, Authorization Granularity</p> <p>Authentication: Multiple Factors and Effectiveness of Authentication, Types of Authentication Methods</p> <p>Cryptography : Symmetric Encryption, Public Key Encryption, Key Management: Generation, Transportation, and Distribution, Public Key Infrastructure (PKI), Hash Function, Digital Signatures</p> <p>Firewalls: Types of Firewalls, Configuration and Implementation of a Firewall, The Demilitarized Zone (DMZ), Firewall Forensics, Firewall Services and Limitations</p> <p>System Intrusion Detection and Prevention: Intrusion Detection Systems (IDSs), Types of Intrusion Detection, Response to System Intrusion, Challenges to Intrusion Detection Systems, Deploying IDS in Switched Environments, Implementing an Intrusion Detection System, Intrusion Prevention Systems (IPSs), Intrusion Detection Tools</p>	15
III	<p>Virus and Content Filtering: Virus Filtering, Content Filtering, Spam</p> <p>Computer Network Security Protocols: Application-Level Security, Security in the Transport Layer, Security in the Network Layer , Security in the Physical Layer</p> <p>Security in Wireless Networks and Devices :Types of Wireless Broadband Networks, Development of Cellular Technology, Other Features of Mobile Cellular Technology, Security Vulnerabilities in Cellular Wireless Networks</p> <p>Cloud Computing Technology and Security: Cloud Computing Infrastructure Characteristics, Cloud Computing Service Models, Cloud Computing Deployment Models, Virtualization and Cloud Computing, Cloud Computing Security, Reliability, Availability, and Compliance Issues</p> <p>Mobile Systems and Corresponding Intractable Security Issues: Current Major Mobile Operating Systems, Security in the Mobile, General Mobile Devices Attack Types, Mitigation of Mobile Devices Attacks, Users Role in Securing Mobile Devices</p>	15

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Guide to Computer Network Security	Joseph Migga Kizza	Springer	Fifth Edition	2020
2.	A Practical Introduction to Enterprise Network and Security Management	Bongsi k Shin	CRC Press		2017
3.	Cryptography and Network Security Principles and Practice	William Stallings	Pearson	Seventh Edition	2017
4.	Principles of Information Security	Michael E. Whitman and Herbert J. Mattord	Cengage Learning	Seventh Edition	2021
5.	Essential Cyber security Science	Josiah Dykstra	O'Reilly	5 th	2017

Course Outcomes	Description (After this course, students will be able to--)	Blooms Levels	PSO Addressed
CO 1	Analyze and evaluate security trends, attacks, and mechanisms Propose effective security solutions for network and web browser vulnerabilities	Level IV, V, VI - Analyze, Evaluate, Propose	PSO 2, PSO 3
CO 2	Evaluate and implement various security measures, such as security intrusion detection systems, and firewall configurations to mitigate threats.	Level IV, VI - Evaluate, implement	PSO 2, PSO 3

CO 3	Analyze and evaluate security threats in IP Protocols, cloud technologies and wireless system	Level IV, V - Analyze, evaluate	PSO 2
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Semester VI – Major DSC (Discipline Specific Course)			
Course Code	Course Title	Credits	Duration
RJDSCITP361	MAJ: Major Practical (Advanced Web Development and Principles of Information Security Practical)	02	30 Hours
<p>Course Objectives:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Enable students to create responsive, and interactive web applications, focusing on integrating front-end and back-end components effectively. <input type="checkbox"/> Learn the practical steps involved in deploying web applications using .NET and .NET core framework. <input type="checkbox"/> Gain knowledge to recognize potential threats and implement security measures <input type="checkbox"/> Mitigate security risk by exploring intrusion detection, firewall design and VPN configuration 			

Advanced Web Development Practical	
1	<p>Working with basic C# and ASP .NET</p> <ol style="list-style-type: none"> 1. Create an application that obtains four int values from the user and displays the product. 2. Create an application that receives the (Student Id, Student Name, Course Name, Date of Birth) information from a set of students. The application should also display the information of all the students once the data entered.
2	<p>Working with Object Oriented C# and ASP .NET</p> <ol style="list-style-type: none"> 1. Create simple application to perform following operations <ol style="list-style-type: none"> i. Finding factorial Value ii. Money Conversion iii. Quadratic Equation iv. Temperature Conversion 2. Create simple application to demonstrate use of following concepts Exception handling 3. Create simple application to demonstrate use of following concepts <ol style="list-style-type: none"> i. Function Overloading ii. Inheritance (all types)
3	Working with Web Forms and Controls

	<ol style="list-style-type: none"> 1. Create a simple web page with various server controls to demonstrate setting and use of their properties. (Example: AutoPostBack) 2. Demonstrate the use of Calendar control to perform following operations. <ol style="list-style-type: none"> i. Display messages in a calendar control ii. Display vacation in a calendar control iii. Selected day in a calendar control using style iii. Difference between two calendar dates 4. Demonstrate the use of Treeview control performs the following operations. <ol style="list-style-type: none"> i. Treeview control and datalist ii. Treeview operations
4	<ol style="list-style-type: none"> 1. Create a Registration form to demonstrate use of various Validation controls. 2. Create Web Form to demonstrate use of Adrotator Control. 3. Create Web Form to demonstrate use of User Controls.
5	<p>Working with Navigation, CSS and Master page.</p> <ol style="list-style-type: none"> 1. Create Web Form to demonstrate use of Website Navigation controls and Site Map. 2. Create a web application to demonstrate use of Master Page with applying Styles and Themes for page beautification
6	<p>Working with Database</p> <ol style="list-style-type: none"> 1. Create a web application bind data in a multiline textbox by querying in another textbox. 2. Create a web application to display Data Binding using dropdown list control. 3. Create a web application for inserting and deleting records from a database. (Using Execute-Non Query).
7	<p>Working with AJAX : Create a web application to demonstrate use of various Ajax controls.</p>
8	<p>Working with GridView control</p> <ol style="list-style-type: none"> 1. Create a web application to demonstrate use of GridView button column and GridView events. 2. Create a web application to demonstrate GridView paging and Create your own table format using GridView.
9	<p>Create a simple ASP.NET core application with database functionality.</p>
10	<p>Develop an ASP.NET core application using MVC.</p>

Principles of Information Security Practical	
1	<p>Write program to implement the following Cipher Techniques:</p> <ol style="list-style-type: none"> 1. Caesar Cipher 2. Monoalphabetic Cipher 3. Vernam Cipher
2	<p>Write program to implement the following Cipher Techniques:</p> <ol style="list-style-type: none"> 1. Playfair Cipher 2. Rail Fence Cipher 3. Vignere Cipher
3	<p>Write program to implement the cryptography techniques:</p> <ol style="list-style-type: none"> 1. Write program to encrypt and decrypt strings using - DES Algorithm - AES Algorithm 2. Write a program to implement an RSA algorithm to perform encryption / decryption of a given string. 3. Write a program to implement the Diffie-Hellman Key Agreement algorithm to generate symmetric keys.
4	<p>Configure Routers</p> <ol style="list-style-type: none"> 1. OSPF MD5 authentication 2. NTP, To log messages to the syslog server 3. To support SSH connections
5	<p>Configure AAA Authentication</p> <ol style="list-style-type: none"> 1. Configure a local user account on Router and configure authenticate on the console and vty lines using local AAA 2. Verify local AAA authentication from the Router console and the PC-A client
6	<p>Configuring Extended ACLs</p> <ol style="list-style-type: none"> 1. Configure, Apply and Verify an Extended Numbered ACL 2. Configure, Apply and Verify an Extended Named ACL
7	Configure IP ACLs to Mitigate Attacks
8	Configuring a Zone-Based Policy Firewall
7	Configure IOS Intrusion Prevention System (IPS) Using the CLI
8	<p>Configure Layer 2 Security</p> <ol style="list-style-type: none"> 1. Assign the Central switch as the root bridge 2. Secure spanning-tree parameters to prevent STP manipulation attacks

	3. Enable port security to prevent CAM table overflow attacks
9	Configure and Verify a Site-to-Site IPsec VPN Using CLI
10	Working with various NMap commands for network scanning and security

Course Outcomes	Description (After this course, students will be able to--)	Blooms Levels	PSO Addressed
CO 1	Design a responsive website and applications applying C# concepts.	Level III, VI - Apply, Create	PSO 2, PSO 3
CO 2	Develop an application using Model View Controller Framework	Level III, VI - Apply, Create	PSO 2, PSO 3
CO 3	Understand and Configure routers for logging ,authenticating and ACLs to mitigate attacks	Level-II, VI Understand, Configure	PSO 1, PSO 3
CO 4	Understand and Configure basic ASA security, firewalls and VPN security settings	Level-II, VI Understand, Configure	PSO 1, PSO 3

Semester VI – Major DSC (Discipline Specific Course)			
Course Code	Course Title	Credits	Duration
RJDSCIT363	IT Services and Management	2	30 Hours
Course Objectives: <ul style="list-style-type: none"> <input type="checkbox"/> Understand the fundamentals of IT service management and the ITIL 4 framework. <input type="checkbox"/> Explore the various management practices in ITIL, including general management, service management, and technical management. <input type="checkbox"/> Develop an understanding of driving stakeholder value and creating value for stakeholders. <input type="checkbox"/> Gain knowledge of creating, delivering, and supporting services within the ITIL service value system. <input type="checkbox"/> Explore the concept of High-Velocity IT and the importance of continual improvement. 			

Unit	Details	Lectures
I	<p>Introduction: IT service management in the modern world, About ITIL 4, The structure and benefits of the ITIL 4 framework.</p> <p>Key concepts of service management : Value and value co-creation, Organizations, service providers, service consumers, and other stakeholders, Products and services, Service relationships, Value: outcomes, costs, and risks.</p> <p>The four dimensions of service management: Organizations and people, Information and technology, Partners and suppliers, Value streams and processes, External factors.</p> <p>The ITIL service value system : Service value system overview, Opportunity, demand, and value, The ITIL guiding principles, Governance, Service value chain, Continual improvement</p> <p>ITIL management practices: General management practices, Service management practices, Technical management practices</p>	15

II	<p>Drive Stakeholder Value: Introduction, The customer journey, Step 1: Explore, Step 2: Engage, Step 3: Offer, Step 4: Agree, Step 5: Onboard, Step 6: Co-create, Step 7: Realize</p> <p>Create, Delivery and Support (CDS): Service value system key concepts and challenges, Using a shift-left approach, Plan and manage resources in the service value system, The use and value of technology across the service value system. Value streams for new services: Reviewing service value chains and service value streams, ITIL practices and value streams for new services, Change enablement, Service design and software development and management, Service validation and testing, Release management and deployment management</p> <p>Value streams for user support: ITIL practices and value streams for user support, Service desk, Incident management, Problem management, Knowledge management, Service level management and Monitoring and event management.</p> <p>How to create, deliver and support services</p> <p>High-Velocity IT : Introduction, Key concepts, culture, techniques</p> <p>Continual improvement</p>	15
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Reference:

1. ITIL Foundation 4 Edition Roman Jouravlev, Akashay Anand, et. al TSO, AXELOS, Second Edition ,2019
2. ITIL 4 High-Velocity IT Akashay Anand, Dan Ashby, et. al TSO, AXELOS, First Edition , 2020
3. ITIL Foundation Essentials ITIL 4 Edition by Claire Agutter (IT Governance publishing)
4. ITIL 4 Drive Stakeholder Value Roman Jouravlev, Pavel Demin, et. al TSO, AXELOS, First edition ,2020
5. ITIL 4 Direct, Plan and Improve Akashay Anand, Mauricio Corona, et. al TSO, AXELOS, First edition, 2020

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Guide to Computer Network Security	Joseph Migga Kizza	Springer	Fifth Edition	2020
2.	A Practical Introduction to Enterprise Network and Security Management	Bongsi k Shin	CRC Press		2017

3.	Cryptography and Network Security Principles and Practice	William Stallings	Pearson	Seventh Edition	2017
4.	Principles of Information Security	Michael E. Whitman and Herbert J. Mattord	Cengage Learning	Seventh Edition	2021
5.	Essential Cyber security Science	Josiah Dykstra	O'Reilly	5 th	2017

Course Outcomes	Description (After this course, students will be able to--)	Blooms Levels	PSO Addressed
CO 1	Design a responsive website and applications applying C# concepts.	Level III, VI - Apply, Create	PSO 2, PSO 3
CO 2	Develop an application using Model View Controller Framework	Level III, VI - Apply, Create	PSO 2, PSO 3
CO 3	Understand and Configure routers for logging ,authenticating and ACLs to mitigate attacks	Level-II, VI Understand, Configure	PSO 1, PSO 3
CO 4	Understand and Configure basic ASA security, firewalls and VPN security settings	Level-II, VI Understand, Configure	PSO 1, PSO 3

Distribution of Marks- Semester V

Sr. No	Course Code	Course Title	Credit	Total Marks		
				Internal	External	Total
Major DSC (Discipline Specific Course)						
1.	RJDSCIT351	Full Stack Development with MERN Technologies	3	25	50	75
2.	RJDSCIT352	Java Programming	3	25	50	75
3.	RJDSCITP351	MAJ: Major Practical (Full Stack development with MERN Technologies and Java Programming Practical)	2	20	30	50
4.	RJDSCITP352	Applied Software Project Management_ Practical	2	20	30	30
Major DSE (Discipline Specific Elective)						
5.	RJDSEIT351	System Administration with Linux	2	20	30	50
6.	RJDSEITP351	System Administration with Linux Practical	2	20	30	50
7.	RJDSEIT352	Artificial Intelligence and Applications	2	20	30	50
8.	RJDSEITP352	Artificial Intelligence and Applications Practical	2	20	30	50
Minor						
9.	RJMINIT351	Design Principles of Internet of Things	2	20	30	50
10.	RJMINITP351	Design Principles of Internet of Things Practical	2	20	30	50
Skill Enhancement Course						
11.	RJSECITP351	Mobile Programming Practical	2	20	30	50
Field Project						
12.	RJFPIT351	Major Project	2	20	30	50
Total:			22			

Distribution of Marks- Semester VI

Sr. No	Course Code	Course Title	Credits	Total Marks		
				Internal	External	Total
Major DSC (Discipline Specific Course)						
1.	RJDSCIT361	Advanced Web Development	3	25	50	75
2.	RJDSCIT362	Principles of Information Security	3	25	50	75
3.	RJDSCITP361	MAJ: Major Practical (Advanced Web Development and Principles of Information Security Practical)	2	20	30	50
4.	RJDSCIT363	IT Services and Management	2	20	30	50
Major DSE (Discipline Specific Elective)						
5.	RJDSEIT361	Geographic Information System	2	20	30	50
6.	RJDSEITP361	Geographic Information System Practical	2	20	30	50
7.	RJDSEIT362	Software Testing and Quality Assurance	2	20	30	50
8.	RJDSEITP362	Software Testing and Quality Assurance Practical	2	20	30	50
Minor						
9.	RJMINIT361	Business Analytics	2	20	30	50
10.	RJMINITP361	Business Analytics Practical	2	20	30	50
Field Project						
11.	RJOJTIT361	On the Job Training	4	40	60	100
Total:			22			

Evaluation and Assessment (Based on the centralized guidelines given by EC under NEP 2020)

Credit based Evaluation – 25 marks evaluation per credit.

Major DSC theory courses – 3 credit theory courses will be evaluated for 75 marks. 25 marks Internal assessment and 50 marks External evaluation (Semester End Examination)

Major DSC practical course – 2 credit practical courses will be evaluated for 50 marks. 20 marks continuous evaluation and 30 marks external evaluation (SEE practical examination)

Minor and Major DSE Theory courses for 2 credits will be evaluated for 50 marks – 20 marks Internal Assessment and 30 marks external evaluation. (Semester End Examination)

Minor, Major DSE and SEC practical courses - 2 credit practical courses will be evaluated for 50 marks. 20 marks continuous evaluation and 30 marks external evaluation (SEE practical examination)

Question Paper format

Internal Assessment – based on Unit I for a 2-credit course and Unit I and half portion from Unit II for a 3-credit course.

(25 marks for Major DSC and 20 marks for Major DSE and Minor courses)

Q1. Attempt any four/five (each question will carry 5 marks)

- A. Knowledge / Understanding
- B. Application / Analysis
- C. Knowledge / Understanding
- D. Application / Analysis
- E. Knowledge / Understanding
- F. Application / Analysis
- G. Knowledge / Understanding
- H. Application / Analysis

Semester End Examination – For 50 Marks (Major DSC 3 credit)

Q1. Attempt any two (each question will carry 6 marks) – Unit I

- A. Knowledge / Understanding
- B. Application / Analysis
- C. Knowledge / Understanding
- D. Application / Analysis

Q2. Attempt any two (each question will carry 6 marks) – Unit II

- A. Knowledge / Understanding

- B. Application / Analysis
- C. Knowledge / Understanding
- D. Application / Analysis

Q3. Attempt any two (each question will carry 6 marks) – Unit III

- A. Knowledge / Understanding
- B. Application / Analysis
- C. Knowledge / Understanding
- D. Application / Analysis

Q4. Attempt any two (each question will carry 7 marks) – All Unit

- A. Knowledge / Understanding
- B. Knowledge / Understanding
- C. Application / Analysis

Semester End Examination – For 30 Marks (Major DSE, Minor 2 credit)

Q1. Attempt any three (each question will carry 5 marks)

- A. Knowledge / Understanding (Unit I)
- B. Application / Analysis (Unit I)
- C. Knowledge / Understanding (Unit II)
- D. Application / Analysis (Unit II)

Q2. Attempt any three (each question will carry 5 marks) – Unit II

- A. Knowledge / Understanding
- B. Application / Analysis
- C. Knowledge / Understanding
- D. Application / Analysis

Evaluation of FP (50 marks – 2 credits) and Major DSC- Software project Management practical (50 marks – 2 credits) will be conducted together in the form of Major Field project viva voce. 20 Marks internal Assessment for both courses will be done in continuous evaluation mode and 30 marks external evaluation will be done in the form of project viva voce by an external examiner.

Mapping of the courses to employability / entrepreneurship / skill development

SEMESTER V

Course Code	Course Title	Unit No. And topics focusing on Employability / Entrepreneurship / Skill development	Employability /Entrepreneurship / Skill development	Specific Activity
MAJOR				
RJDSCIT351	Full Stack Development with MERN Technologies	Skill Enhancement: Unit I: Node JS, React Class & Components, Props React State Management, Express, GraphQL Unit II: MongoDB, MongoShell, Architecture and ESLint, Modularization and Webpack, React Router Unit III: React Forms, React Bootstrap, Server Rendering, Authentication	Topics focuses on skill development to build robust web applications using modern tools like React, Express, GraphQL, and MongoDB	Programming and Database Assignments
RJDSCIT352	Java Programming	Skill Enhancement: Unit I: Classes, Inheritance, Interfaces, Multithreading Unit II: Packages, Servlet, Working with database, Cookies, Session Unit III: Java Server Pages, Java Server Faces	The topic focus on implementing the basic and advanced concepts of Java	Programming Assignments
RJDSCITP351	MAJ: Major Practical (Full Stack development with MERN	Skill Enhancement: Full Stack development with MERN Technologies Practical	The practical exercises are designed to help students develop	Hands on Practical

	Technologies and Java Programming Practical)	<p>Practical 01,02,3 - Implementing React Components, Express JS, GraphQL</p> <p>Practical 04- Performing MongoDB CRUD Operations</p> <p>Practical 05,06 - working with Modularization & Webpack Configuration, React Router, Navigation</p> <p>Practical 07,08 - working with React Forms, React-Bootstrap & UI Components</p> <p>Practical 09,10 - Implementing Server Rendering & Performance Optimization</p> <p>Practical 10- Working with Authentication & Deployment</p> <p>Java Programming practical:</p> <p>Practical 1,2,3 - OPPs concept and multithreading,</p> <p>Practical 4,5,6,7 - Working with graphical interface, Session, cookies,</p> <p>Practical 8,9,10 - Working with database (JDBC) and framework (JSP, JSF)</p>	<p>full-stack development skills, with a focus on the MERN stack.</p> <p>The practical problems facilitate the students to apply core and advanced Java concepts through hands-on implementation</p>	
RJDSCITP352	Applied Software Project	Skill Enhancement : Task 1 -	Tasks were assigned with a focus on	Hands on project dissertation

	<p>Management Practical</p>	<p>Writing project proposal</p> <p>Task 2 – writing Project synopsis</p> <p>Task 3 – Write introduction to topic – background, objective, purpose, scope and survey of technology</p> <p>Task 4 - Write problem statement, requirement specification, planning and scheduling with GANT Chart, hardware and software requirement</p> <p>Task 5 - Write about the conceptual model Draw relevant flow diagrams</p> <p>Task 6 - Design database schema with data integrity constraints, with relevant logic diagrams,</p> <p>Task 7 - List possible security issues, possible solutions, security protocols to be applied relevant to selected and approved project topic.</p> <p>Task 8 - Design test cases for the project. Write the test cases with possible outcomes for the selected and approved project.</p>	<p>implementing key aspects of project development, including planning, programing, execution, monitoring, and delivery.</p>	
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		<p>Task 9 - Demonstrate the working project and operational flow with visual aids to the project guide.</p> <p>Task 10 - Final working project demonstration</p>		
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SEMESTER VI

Course Code	Course Title	Unit No. And topics focusing on Employability / Entrepreneurship / Skill development	Employability/ Entrepreneurship/ Skill development	Specific Activity
Major DSC (Discipline Specific Course)				
RJDSCIT361	Advanced Web Development	<p>Skill Enhancement:</p> <p>Unit I: Introduction to C# programming Language</p> <p>Unit II: Using Web forms and Master pages.</p> <p>Unit III : Understanding exception handling and state management</p> <p>Unit IV: Using AJAX and ASP. Net Core.</p>	The topic focus on understanding and implementing the programming concepts on C# and ASP.NET core basic.	Assignment
RJDSCIT362	Principles of Information Security	<p>Skill Enhancement:</p> <p>Unit I: Security Threats Assessment,</p> <p>Unit II: Access Control and Authorization, Authentication, Firewalls, System Intrusion Detection and Prevention</p> <p>Unit III: Security in Wireless Networks ,Cloud and Mobile Devices</p>	The topics focuses on understanding the concept of Computer and Network Security	Assignment

RJDSCITP361	MAJ: Major Practical (Advanced Web Development and Principles of Information Security Practical)	<p>Skill Development : Advanced Web Development: Practical 1,2,3,4: Basic C# programming, Implementing web controls Practical 5,6,7 : Using navigation controls and master pages. Practicals 8,9,10: Using Data controls and Gridview control.</p> <p>Principles of Information Security Practical 1,2,3: Implementing cryptography techniques Practical 4,5,6,7,8 : ACLs, Firewall Practical 9,10 :VPN</p>	<p>The Practical focuses on using C# basic and using different web controls for designing website and applications.</p> <p>The Practical problems facilitate the students to configure Website Designing and security setting in network</p>	<p>Hands on practicals using C# and ASP.NET Core.</p> <p>Practicals on Topology design to build secure LAN</p>
RJDSCIT363	IT Services and Management	<p>Skill Enhancement: Unit I: Service management Unit II: Drive Stakeholder Value, Create, Delivery and Support (CDS), Value streams for user support, Continual improvement</p>	<p>Topics covered to facilitates students to understand IT service management</p>	<p>Assignments, case study</p>

Integration of Cross cutting Issues

Integration of Cross cutting Issues Class	Course Code	Cross Cutting Issues
TYBSc Information Technology Major	RJDSCIT351, RJDSCIT352 RJDSCITP351, RJDSCITP352 RJDSEIT351, RJDSEIT352 RJDSEITP351, RJDSEITP352 RJMINIT351, RJMINITP351 RJSECITP351, RJFPIT351 RJDSCIT361, RJDSCIT362 RJDSCITP361, RJDSCIT363 RJDSEIT361, RJDSEIT362 RJDSEITP361, RJDSEITP362 RJMINIT361, RJMINITP361 RJOJTIT361	Quality Education, Industry, Innovation and Infrastructure, Reduced inequality, Decent work and economic growth UNSDG 4, 9,10