



**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: Skill Enhancement Course (SEC)**

**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 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**

<b>Courses</b>	<b>Title</b>	<b>Credit</b>	<b>Total Credits</b>
<b>Major DSC (Discipline Specific Course)</b>			
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	
<b>Major DSE (Discipline Specific Elective)</b>			
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	
<b>Minor</b>			
RJMINIT351	Design Principles of Internet of Things	2	4
RJMINITP351	Design Principles of Internet of Things Practical	2	
<b>Skill Enhancement Course</b>			
RJSECITP351	Mobile Programming Practical	2	2
<b>Field Project</b>			
RJFPIT351	Major Project	2	2
<b>Total:</b>			22

**Level 5.5 Major Information Technology**

\* As per University Grid

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

<b>Courses</b>	<b>Title</b>	<b>Credit</b>	<b>Total Credits</b>
<b>Major DSC (Discipline Specific Course)</b>			
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	
<b>Major DSE (Discipline Specific Elective)</b>			
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	
<b>Minor</b>			
RJMINIT361	Business Analytics	2	4
RJMINITP361	Business Analytics Practical	2	
<b>Field Project</b>			
RJOJTIT361	On the Job Training	4	4
<b>Total:</b>			22

\* As per University Grid

## DISTRIBUTION OF TOPICS AND CREDITS

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

<b>Skill Enhancement Course</b>			
<b>Course</b>	<b>Nomenclature</b>	<b>Credits</b>	<b>Topics</b>
RJSECITP351	Mobile Programming Practical	02	Introduction User Interface components, Activity and Intent, Working with Layout, Introduction to Widgets, resource folders, Menu option, Notifications, Android Speech, Database Programming with SQLite, Working with Map, Xamarin, UI Design & Navigation

<b>Semester V – Skill Enhancement Course</b>			
<b>Course Code</b>	<b>Course Title</b>	<b>Credits</b>	<b>Duration</b>
RJSECITP351	Mobile Programming Practical	02	60 Hours
<p><b>Course Objectives:</b></p> <ul style="list-style-type: none"> <li>➤ Understand mobile app development by learning UI components, layouts, activities, intents, and menus using Android Studio.</li> <li>➤ Explore cross-platform mobile development using Xamarin</li> <li>➤ Gaining knowledge on databases and advanced mobile features like SQLite, notifications, speech processing, and maps integration.</li> </ul>			

<b>Practical No:</b>	<b>Details</b>
<b>1</b>	<p><b>Introduction to Android studio and User Interface components</b></p> <ol style="list-style-type: none"> <li>1. Design an app to demonstrate use of different views (ButtonView, TextView etc)</li> <li>2. Design “Hello World” application. That will display “Hello World” in the middle of the screen in the red color with white background.</li> </ol>

2	<p><b>Introduction to Activity and Intent</b></p> <p>Create a sample application with a login module. (Check username and password) On successful login, go to the next screen and on failed login, alert the user using Toast. Also pass the username to the next screen.</p> <ol style="list-style-type: none"> <li>1. Create an application to pass numeric values from one screen to another.</li> </ol>
3	<p><b>Working with Layout</b></p> <ol style="list-style-type: none"> <li>1. Create a calculator app that performs addition, subtraction, division and multiplication operations on numbers using Linear Layout.</li> <li>2. Design an app for the Kilometer Converter using Absolute layout.</li> </ol>
4	<p><b>Introduction to Widgets</b></p> <ol style="list-style-type: none"> <li>1. Design a simple application with datepicker widget in android.</li> <li>2. Design a simple application with TimePicker widget in android.</li> </ol>
5	<p><b>Understand resource folders:</b></p> <p>Create a spinner application to use strings taken from the resource directory.</p>
6	<p><b>Understand Menu option.</b></p> <ol style="list-style-type: none"> <li>1. Create an application that will change the background image of the screen, based on selected options from the menu.</li> <li>2. Create an application using a menu with 5 options. The selected option should appear in the textbox.</li> </ol>
7	<p><b>Working with Notifications and Speech</b></p> <ol style="list-style-type: none"> <li>1. Create an application that will display toast (Message) on a specific interval of time</li> <li>2. Create an application that converts entered text into speech.</li> <li>3. Create an application that converts entered text into speech and shows a toast message every few seconds while the text is being spoken.</li> </ol>
8	<p><b>Database Programming with SQLite – Part I</b></p> <p>Create an application that will insert user name and email into a SQLite database and view all records in a ListView.</p>
9	<p><b>Database Programming with SQLite – Part II</b></p> <ol style="list-style-type: none"> <li>1. Extend the above application to update a user’s email by entering their name and the new email address.</li> <li>2. Delete a user record by entering their name.</li> </ol>
10	<p><b>Working with Map</b></p> <p>Design the mobile app working with Map.</p>

<b>11</b>	<p><b>Introduction to Xamarin &amp; First App</b></p> <p><b>1. Introduction to Xamarin &amp; Cross-Platform Development</b>  Overview of Xamarin, Xamarin.Forms, Xamarin.Android, and Xamarin.iOS  Setting up the Xamarin development environment (Visual Studio, SDKs, Emulators)</p> <p><b>2. Creating Your First Xamarin App</b>  Understanding the structure of a Xamarin.Forms project  Designing a simple UI using XAML  Running the app on an Android emulator</p>
<b>12</b>	<p><b>UI Design &amp; Navigation</b></p> <p><b>1. Layouts and Controls in Xamarin.Forms</b>  StackLayout, Grid, AbsoluteLayout, FlexLayout  Common controls: Button, Label, Entry, ListView</p> <p><b>2. Navigation and Data Passing</b>  NavigationPage and TabbedPage  Passing data between pages</p>

<b>Books and References:</b>					
<b>Sr. No.</b>	<b>Title</b>	<b>Author/s</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year</b>
1.	Head First Android Development: A Brain-Friendly Guide	David Griffiths	O'Reilly	Second	2017
2.	Android Programming for Beginners	John Horton	Packt Publishing	Second	2018
3.	Xamarin.Forms Essentials: First Steps Toward Cross-Platform Mobile Apps	Gerald Versluis	Apress	First	-

<b>Course Outcomes</b>	<b>Description (After this course, students will be able to--)</b>	<b>Blooms Levels</b>	<b>PSO Addressed</b>
<b>CO 1</b>	Develop Android applications using UI components, layouts, widgets, intents, and menus in Android Studio	Level III - Apply	PSO 1
<b>CO 2</b>	Build cross-platform mobile apps using Xamarin with XAML-based UI, navigation, and data passing.	Level VI - Create	PSO 2
<b>CO 3</b>	Implement databases and advanced mobile features like SQLite, notifications, speech processing, and maps.	Analyze (Level 4) & Apply (Level 3)	PSO 3
<b>CO 4</b>	Work with mobile development tools and frameworks to build interactive and efficient applications.	Apply (Level 3) & Create (Level 6)	PSO 1, PSO 2

## DISTRIBUTION OF TOPICS AND CREDITS

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

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

<b>I</b>	<p><b>Introduction:</b> IT service management in the modern world, About ITIL 4, The structure and benefits of the ITIL 4 framework.</p> <p><b>Key concepts of service management :</b> 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><b>The four dimensions of service management:</b> Organizations and people, Information and technology, Partners and suppliers, Value streams and processes, External factors.</p> <p><b>The ITIL service value system :</b> Service value system overview, Opportunity, demand, and value, The ITIL guiding principles, Governance, Service value chain, Continual improvement</p> <p><b>ITIL management practices:</b> General management practices, Service management practices, Technical management practices</p>	<b>15</b>
----------	---	-----------

<b>II</b>	<p><b>Drive Stakeholder Value:</b> 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><b>Create, Delivery and Support (CDS):</b> 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><b>Value streams for user support:</b> 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><b>How to create, deliver and support services</b></p> <p><b>High-Velocity IT :</b> Introduction, Key concepts, culture, techniques</p> <p><b>Continual improvement</b></p>	<b>15</b>
-----------	--	-----------

**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

<b>Books and References:</b>					
<b>Sr. No.</b>	<b>Title</b>	<b>Author/s</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year</b>
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 <sup>th</sup>	2017

<b>Course Outcomes</b>	<b>Description (After this course, students will be able to--)</b>	<b>Blooms Levels</b>	<b>PSO Addressed</b>
<b>CO 1</b>	Design a responsive website and applications applying C# concepts.	Level III, VI - Apply, Create	PSO 2, PSO 3
<b>CO 2</b>	Develop an application using Model View Controller Framework	Level III, VI - Apply, Create	PSO 2, PSO 3
<b>CO 3</b>	Understand and Configure routers for logging ,authenticating and ACLs to mitigate attacks	Level-II, VI Understand, Configure	PSO 1, PSO 3
<b>CO 4</b>	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
<b>Major DSC (Discipline Specific Course)</b>						
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
<b>Major DSE (Discipline Specific Elective)</b>						
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
<b>Minor</b>						
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
<b>Skill Enhancement Course</b>						
11.	RJSECITP351	Mobile Programming Practical	2	20	30	50
<b>Field Project</b>						
12.	RJFPIT351	Major Project	2	20	30	50
<b>Total:</b>			22			

### Distribution of Marks- Semester VI

Sr. No	Course Code	Course Title	Credits	Total Marks		
				Internal	External	Total
<b>Major DSC (Discipline Specific Course)</b>						
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
<b>Major DSE (Discipline Specific Elective)</b>						
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
<b>Minor</b>						
9.	RJMINIT361	Business Analytics	2	20	30	50
10.	RJMINITP361	Business Analytics Practical	2	20	30	50
<b>Field Project</b>						
11.	RJOJTIT361	On the Job Training	4	40	60	100
<b>Total:</b>			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)

### 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
<b>SEC</b>				
RJSECITP351	Mobile Programming Practical	Skill Enhancement: Unit I: Unit II: Unit III: Unit IV:	Practicals focus on android Application Development for smartphones	Hands on practical with application development with User Interface Design

### Integration of Cross cutting Issues

<b>Integration of Cross cutting Issues Class</b>	<b>Course Code</b>	<b>Cross Cutting Issues</b>
TYBSc Information Technology Major	RJSECPIT351	Quality Education, Industry, Innovation and Infrastructure, Reduced inequality, Decent work and economic growth UNSDG 4, 9,10