SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar, Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.25)
Syllabus with effect from the Academic Year 2022-2023

PROGRAMME STRUCTURE

Master of Science (Information Technology) Semester: III

Programme Outcome (PO) - For MSC(IT) Programme	Master of Science program provides extended theoretical and practical knowledge of different science subjects. Master of Science programme at Sardar Patel University is designed keeping the overall back ground preparation in mind for the student to either seek a job or to become an entrepreneur. The students, after completion of Bachelor of Science can select the master's programme in the subject they have had at the final year or in a related discipline (depending upon eligibility criteria prescribed by university). **Programme outcomes: At the end of the program, the students will be able to** 1. Have a deep understanding of both the theoretical and practical concepts in the respective subject. 2. Understand laboratory processes and use scientific equipments and work independently. 3. Develop research temperament as a consequence of their theory and practical learning. 4. Communicate scientific information in oral and written form. 5. Understand the issues related to nature and environmental contexts and think rationally for sustainable development. 6. The students are able to handle unexpected situations by critically analyzing the problem.
Programme Specific Outcome (PSO) - For MSC(IT) Semester - III	The objective of the M.Sc. (IT) programme is to prepare post-graduates for software industry, corporate sector, government organizations and academics by providing skill-based education in the core and emerging areas of Information Technology. The programme emphasizes on giving the students a sound background in theoretical and skill-oriented courses relevant to the latest trends in software development.

To Pass	At least 40% Marks in the University Examination in each paper and 40% Marks in aggregate of University and Internal Examination in each course of Theory, Practical & 40% Marks in Viva-voce.

Course Type	Course Code	Name Of Course	Theory/ Practical	Credit	Exam Duration in hrs	Component of Marks		
						Internal Total	External Total	Total
Core Course	PS03CINT51	Mobile Application Development using Android	T	4	3	30	70	100
	PS03CINT52	Web Application Development Technology	T	4	3	30	70	100
	PS03CINT53	Computer Graphics and Multimedia	T	4	3	30	70	100
	PS03CINT54	Trends in ICT	T	4	3	30	70	100
	PS03CINT55	Practicals	P	5	3	30	70	100
Elective Course (Any One)	PS03EINT51	Software Testing	T	4	3	30	70	100
	PS03EINT52	Web Application Frameworks	T	4	3	30	70	100

Master of Science (Information Technology)
M.Sc. (Information Technology) Semester-III

Course Code	PS03CINT51	Title of the Course	Mobile Application Development using Android
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	1. To learn fundamentals of the Android Technology and its applications. 2. To understand how to work with activities and user interface design using Android. 3. To learn how to work with content provider and SQLite Database. 4. To acquire basic knowledge of multimedia and system services

Course Content		
Unit	Description	Weightage* (%)
1.	**Introduction to Android** – Introduction to Android – Standard development environment for Android applications – Installing Android – Creating Hello World and running application on Emulator – Android Architectural Overview and Android Development Framework – Introduction to Android Studio – Structure of Android application – Components of Android	25%
2.	**Introduction to Activities and User Interface Design** – Introduction to activity – Activity lifecycle phases – Introducing Toast – Introduction to Views and layouts and Common UI components – Input and Selection components – Adapters – Menus and Dialogs – Working with Intents – Types of Resources	25%
3.	**Introduction to Content Provider and Sqlite Database** – File systems – Persistent storage in Android – Android databases – Storing and retrieving data – Content provider Classes	25%

4.	**Multimedia and System Services** – Notifications – Using images, audio, video – Accessing the camera using intent – Using text messages (SMS) – Performing tasks in background – Accessing files and data from a server – Introduction to geolocation and location aware applications	25%

Teaching-Learning Methodology	Blended learning approach incorporating traditional classroom teaching and online /ICT-based teaching practices.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to develop	
1.	Understanding of the fundamentals of Android Technology and its applications.
2.	Ability to understand how to work with activities and user interface design using Android.
3.	Ability to describe how to work with content provider and SQLite Database.
4.	Basic knowledge of multimedia and system services.
5.	Ability to develop applications using Android Technology.

Suggested References:	
Sr. No.	References
1.	Wei-Meng Lee: Beginning Android 4 Application Development, Wiley Publishing, Inc, Wrox Programmer to Programmer, 2013.
2.	J. F. DiMarzio: Beginning Android Programming with Android Studio, Wiley Publishing, Inc, 2017.
3.	Meier Reto : Professional Android 2 Application Development, Wiley Publishing, Inc., 2010.
4.	Documentation of relevant software packages.
5.	Darwin I. A. : Android Cookbook, O'Reiley Media, Inc., 2012.
6.	Mew K. M. : Android 3.0 Application Development Cookbook, Packt Publishing, 2011.
7.	Conder Shane, Darcey Lauren : Android Wireless Application Development, 2nd Edition, Addition Wesley, 2011.

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Master of Science (Information Technology)
M.Sc. (Information Technology) Semester-III

Course Code	PS03CINT52	Title of the Course	Web Application Development Technology
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	1. To study basics of the ASP.NET technology and its features. 2. To acquire basic knowledge of user interface design, database programming, Web services and MVC framework. 3. To learn development of Web applications using ASP.NET.

Course Content		
Unit	Description	Weightage* (%)
1.	**Basics of ASP.NET** – Introduction to ASP.NET, ASP.NET architecture – Introduction to Website and WebApplication – ASP.NET Web Application Project – introduction, creation – The ASP.NET Page structure, ASP.NET Page Directives – ASP.NET Web form - introduction, creating web forms – ASP.NET Page – layout, lifecycle – State Management in ASP.NET : Client-side and Server-side	25%
2.	**User Interface Design** – ASP.NET standard controls, navigation controls, validation controls – Adding server controls to a Web Form, adding event procedures to Web Server Controls, Implementing code-behind pages – Creating Master Pages – Working with Themes and skins	25%
3.	**Database Programming and Web Services** – Accessing Data with ADO.NET – Dataview Controls – Authentication and Authorization – Web Application Security – ASP.NET Configuration	25%

4.	**MVC Framework** – MVC Framework – introduction and architecture – Creating sample web application with MVC – Web Services – overview, creation and calling – Web Services	25%

Teaching-Learning Methodology	Blended learning approach incorporating traditional classroom teaching and online /ICT-based teaching practices.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	receive basic knowledge of the ASP.NET technology and its features.
2.	develop applications using ASP.NET and MVC Framework
3.	understand of user interface design, database programming, Web services and MVC framework.

Suggested References:	
Sr. No.	References
1.	Danny Goodman, Machael Morrison , "JavaScript Bible", 3rd edition.
2.	Matthew MacDonald, "Beginning ASP.NET 3.5 in C# 2008", 2nd Edition, Apress,
3.	Mathew MacDonald & Maria Szpuszta, "Pro ASP.NET 3.5 in C# 2008", Second Edition, Apress, 2007.
4.	G. Andrew Duthie, "ASP.NET programming with Microsoft Visual C#.NET Step by Step", version 2003, Prentice-Hall of India.

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Master of Science (Information Technology)
M.Sc. (Information Technology) Semester-III

Course Code	PS03CINT53	Title of the Course	Computer Graphics and Multimedia
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	1. To learn fundamentals of computer graphics and multimedia technology. 2. To understand the concepts related to output primitives, 2-D transformation and clipping. 3. To learn various 3D concepts and image operations. 4. To acquire basic knowledge of virtual reality using multimedia.

Course Content		
Unit	Description	Weightage* (%)
1.	**Introduction, Output Primitives, 2-D transformation & Clipping** – Introduction of Computer Graphics & Graphics functions – Algorithms for output primitives (Line, Circle, Character Generation) – Attributes of output primitives – Basic transformations: Translation, Rotation (about origin and about pivot point), Scaling (related to a fixed point), Reflection and Shear with examples – Viewing pipeline – Windowing & Clipping – Window to view port transformation, Point, Line, polygon and text clipping algorithms	25%
2.	**3D Concepts** – 3D coordinate systems – 3D display methods: Parallel projection, perspective projection – Introduction of 3D Object representations. – 3D transformations (translation, rotation and scaling) – 3D viewing: Viewing pipeline – Visible Surface detection methods: Back face detection methods and the Z- Buffer algorithm – Introduction and need of Illumination models and surface-rendering methods	25%

3.	**Image Operations** – Image Representation: Graphics Formats (GIF (Graphics Interchange Format), Microsoft Windows Bitmap (BMP), JPEG File Interchange Format,TIFF (Tag Image File Format), PNG (Portable Network Graphic Format)) – Introduction, applications and components of Image processing system, Human vision system, – Digitization: Sampling & Quantization – Image Enhancement: Contrast Intensification (with examples) and smoothing (with examples), Sharpening and noise reduction – Introduction of: Image restoration and Image compression (Lossy & Loss-less compression), – Multi-Valued Image processing (Multi-spectral & Multi-modal) with applications – Introduction of Image analysis (Segmentation, Edge & Line detection, Feature extraction, Image description & Recognition) – Color models (RGB, CMY, YIQ, YCbCr and HSI) and conversion between different models	25%
4.	**Virtual Reality using Multimedia** – Introduction to Multimedia with its applications – Multimedia hardware/software essentials, Details about each facets of multimedia like- Audio, Texts, Graphics, Animation and Video – Multimedia project development including project design concepts, Multimedia authoring and Multimedia programming.	25%

Teaching-Learning Methodology	Blended learning approach incorporating traditional classroom teaching and online /ICT-based teaching practices.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	understand basic knowledge of computer graphics and multimedia technology.
2.	understand the concepts related to output primitives, 2-D transformation and clipping.
3.	understand various 3D concepts and image operations.
4.	acquire basic knowledge of virtual reality using multimedia.
5.	develop applications using multimedia and virtual reality.

Suggested References:

Sr. No.	References
1.	Donald Hearn & M. Pauline Baker: Computer Graphics. PHI, 1995.
2.	Foley J. D., Van Dam A.: Fundamentals of Interactive Computer Graphics, Addison-Wesley, 1982.
3.	S. Gokul: Multimedia Magic, BPB Publication, 1998.
4.	B. Chanda, D. Dutta Majumder: Digital Image Processing and Analysis, PHI, 2000.
5.	Newman W., Sproul R. F. : Principles of Interactive Computer Graphics, McGraw-Hill, 1980.
6.	F. S. Hill, J. R. : Computer Graphics. MacMillan Publishing Company,1990.
7.	Rafael C. Gonzalez & Richard E. Woods: Digital Image Processing, Addision-Wesley Publishing Company, 1993.

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Master of Science (Information Technology)
M.Sc. (Information Technology) Semester-III

Course Code	PS03CINT54	Title of the Course	Trends in ICT
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	1. To acquire knowledge about recent trends in Information and Communication Technology. 2. To study the basic concepts related to Internet of Things (IoT), cloud computing, e-commerce and machine learning.

Course Content		
Unit	Description	Weightage* (%)
1.	**Internet of Things** – Introduction to IoT – Applications of IoT – IoT Microcontrollers and boards – Introduction to using Arduino and Raspberry Pi – Different types of sensors used in IoT – Controlling other devices – Communication using different protocols – Security issues in IoT	25%
2.	**Cloud Computing** – Cloud Computing Methodologies Service Oriented Architecture Virtualization – The Cloud Architecture and Cloud Deployment Techniques – Cloud Services – Cloud Applications – Issues with Cloud Computing – Public, Private and Hybrid Clouds – Cloud Ecosystem and Enabling Technologies – Infrastructure-as-a-Service (IaaS), – Platform-as-a-Service (PaaS) and – Software-as-a-Service (SaaS)	25%
3.	**e-Commerce** – Introduction to e-Commerce and e-Business – 5C model of e-Commerce: Commerce, Collaboration, Communication, Connection, Computation – Applications of e-Commerce, Advantages and disadvantages,	25%

	Ecommerce Models: B2B, B2C, C2C, C2B, and Hybrid Models – Electronic Payment procedures: Cash on Delivery, e-Cash, Credit Card, Debit Card, e-Wallet, etc. – Technical and Economical Challenges	
4.	**Machine Learning** – Supervised Machine Learning, Example of Supervised Learning, Classification Model using Back Propagation – Introduction to Deep Learning – Unsupervised Learning Algorithms, Introduction to Clustering Algorithms: K-means, K-mediods and Agglomerative Algorithms, Introduction to Apriori Algorithm – Hybrid Soft Computing Systems: Neuro-Fuzzy Systems, Neuro-Genetic Systems and Neuro-Fuzzy-Genetic systems	25%

Teaching-Learning Methodology	Blended learning approach incorporating traditional classroom teaching and online /ICT-based teaching practices.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	acquire basic knowledge of the recent trends in Information and Communication Technology.
2.	understand of the basic concepts related to Internet of Things (IoT), cloud computing, e-commerce and machine learning.

Suggested References:

Sr. No.	References
1.	Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014.
2.	Kai Hwang, Jack Dongarra Geoffrey Fox": "Distributed and Cloud Computing :",1st Edition, Parallel Morgan Kaufmann Publishers Inc., San Francisco, CA, USA.
3.	Lizhe Wang, Rajiv Ranjan, Jinjun Chen, Boualem Beriatallah: "CLOUD COMPUTING Methodology, Systems and Applications, 1st Edition, CRC Press.
4.	Marvin Kutz, Introduction to e-Commerce: Combining Business and Information Technology, Bookboon Publishing, 1st Edition, 2016.
5.	Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das, "Machine Learning", Pearson Education.
6.	Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013.
7.	Barrie Sosinky, "Cloud Computing Bible", John Wiley & Sons.
8.	Bernard Golden : "Amazon Web Services for Dummies", 1st Edition, John Wiley & Sons.
9.	CunoPfister, Getting Started with the Internet of Things, O"Reilly Media, 2011, ISBN: 978-1-44939357-1.
10.	Akerkar RA and Sajja P S, Knowledge-Based Systems, Jones & Bartlett Publishers, Sudbury, MA, USA, 2009.

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Master of Science (Information Technology)
M.Sc. (Information Technology) Semester-III

Course Code	PS03CINT55	Title of the Course	Practicals
Total Credits of the Course	5	Hours per Week	10

Course Objectives:	1. To enable students to develop mobile applications. 2. To enable students to develop web application.

Course Content	
Description	Weightage* (%)
Practical	100%

Teaching-Learning Methodology	Hands on training and programming using computer.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	develop mobile based applications.
2.	develop web applications..

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Master of Science (Information Technology)
M.Sc. (Information Technology) Semester-III

Course Code	PS03EINT56	Title of the Course	Software Testing
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	1. To study fundamentals of software testing. 2. To understand functional testing and structural testing. 3. To acquire basic knowledge of test cases and testing tools.

Course Content		
Unit	Description	Weightage* (%)
1.	**Basics of Software Testing** – Introduction and Need of Testing – Basic Concepts in Testing – Levels of Testing – Testing Process – Software Testing Life Cycle Model	25%
2.	**Functional Testing and Structural Testing** – Introduction – Functional (Black Box) Testing : Meaning, Techniques - Boundary Value Analysis, Equivalence Class Partitioning, Decision Table Based Testing, Cause-Effect Graphing – Structural (White Box) Testing : Meaning, Techniques - Control Flow Testing, Data Flow Testing, Slice Based Testing, Mutation Testing – Black-box Testing Vs. White-box Testing	25%
3.	**Test Cases** – Test Cases – Meaning, Typical Test Case Parameters, Examples – Test Case Selection Criteria – Test Case Design Techniques, Test Suite – Generating Test Cases – Automated Test Data Generation	25%
4.	**Testing Tools** – Introduction to Testing Tools, Examples – Advantages and disadvantages of using Testing Tools – Types of Testing Tools – Open Source Software Testing Tools	25%

Teaching-Learning Methodology	Blended learning approach incorporating traditional classroom teaching and online /ICT-based teaching practices.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to develop	
1.	Ability to understand software testing process.
2.	Ability to perform software testing using testing tools.

Suggested References:	
Sr. No.	References
1.	S. A. Kelkar : "Software Quality and Testing", Prentice Hall of India, 2012.
2.	M G LIMAYE : "Software Testing : Principles, Techniques and Tools", Tata McGraw-Hill Education Pvt. Ltd., 2011.

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Master of Science (Information Technology)
M.Sc. (Information Technology) Semester-III

Course Code	PS03EINT57	Title of the Course	Web Application Frameworks
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	1. To learn client-side Web application framework. 2. To understand MVVM architecture and MVC architecture. 3. To learn basics of CodeIgniter and its features.

Course Content		
Unit	Description	Weightage* (%)
1.	**Client-side Web Application Framework - I** – Introduction to Angular framework – Setting up Project, project organization and management – Directives, Expressions, Controllers, Filters – Templates	25%
2.	**Client-side Web Application Framework - II** – MVVM Architecture – Data binding – Dependency injection – Routing – Modules, Forms, Includes, Views – Angular Applications	25%
3.	**CodeIgniter Framework-I** – Introduction to MVC – Introduction to CodeIgniter, Features and Objectives – Applications Flowcharts – Models, Views and Controller – Overview of Libraries – Helpers	25%
4.	**CodeIgniter Framework-II** – Database Handling – URL Routing – Error Handling – Form validation – Session management – Active record	25%

Teaching-Learning Methodology	Blended learning approach incorporating traditional classroom teaching and online /ICT-based teaching practices.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Develop applications using different Web application frameworks.

Suggested References:	
Sr. No.	References
1.	Brad Green and Syham Seshadri, "AngularJS", O'Reilly.
2.	Beginning AngularJS - Andrew Grant,Apress.
3.	CodeIgniter for Rapid PHP Application Development - David Upton, packtpub.
4.	Thomas Myer: Professional CodeIgniter – Wrox Publication.
5.	Internet reference for the relevant topics.

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Master of Science (Information Technology)
M.Sc. (Information Technology) Semester-IV

Course Code	PS04CINT51	Title of the Course	Project Work
Total Credits of the Course	25	Hours per Week	48

Course Objectives:	1. To enable students to develop solution for real-life problems. 2. To enable students to gain IT industry exposure for software development.

Course Content	
Description	Weightage* (%)
Training on Software Development.	100%

Teaching-Learning Methodology	Project-based learning approach in which students acquire skills on design, development, analysis, critical thinking, decision making, evaluation and testing of software systems.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	University Examination	100%

Course Outcomes: Having completed this course, the learner will be able to	
1.	develop solution for real-life problems.

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Master of Science (Information Technology)
M.Sc. (Information Technology) Semester-III

Course Code	PS03EINT56	Title of the Course	Software Testing
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	1. To study fundamentals of software testing. 2. To understand functional testing and structural testing. 3. To acquire basic knowledge of test cases and testing tools.

Course Content		
Unit	Description	Weightage* (%)
1.	**Basics of Software Testing** – Introduction and Need of Testing – Basic Concepts in Testing – Levels of Testing – Testing Process – Software Testing Life Cycle Model	25%
2.	**Functional Testing and Structural Testing** – Introduction – Functional (Black Box) Testing : Meaning, Techniques - Boundary Value Analysis, Equivalence Class Partitioning, Decision Table Based Testing, Cause-Effect Graphing – Structural (White Box) Testing : Meaning, Techniques - Control Flow Testing, Data Flow Testing, Slice Based Testing, Mutation Testing – Black-box Testing Vs. White-box Testing	25%
3.	**Test Cases** – Test Cases – Meaning, Typical Test Case Parameters, Examples – Test Case Selection Criteria – Test Case Design Techniques, Test Suite – Generating Test Cases – Automated Test Data Generation	25%
4.	**Testing Tools** – Introduction to Testing Tools, Examples – Advantages and disadvantages of using Testing Tools – Types of Testing Tools – Open Source Software Testing Tools	25%

Teaching-Learning Methodology	Blended learning approach incorporating traditional classroom teaching and online /ICT-based teaching practices.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to develop	
1.	Ability to understand software testing process.
2.	Ability to perform software testing using testing tools.

Suggested References:	
Sr. No.	References
1.	S. A. Kelkar : "Software Quality and Testing", Prentice Hall of India, 2012.
2.	M G LIMAYE : "Software Testing : Principles, Techniques and Tools", Tata McGraw-Hill Education Pvt. Ltd., 2011.

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Master of Science (Information Technology)
M.Sc. (Information Technology) Semester-III

Course Code	PS03EINT57	Title of the Course	Web Application Frameworks
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	1. To learn client-side Web application framework. 2. To understand MVVM architecture and MVC architecture. 3. To learn basics of CodeIgniter and its features.

Course Content		
Unit	Description	Weightage* (%)
1.	**Client-side Web Application Framework - I** – Introduction to Angular framework – Setting up Project, project organization and management – Directives, Expressions, Controllers, Filters – Templates	25%
2.	**Client-side Web Application Framework - II** – MVVM Architecture – Data binding – Dependency injection – Routing – Modules, Forms, Includes, Views – Angular Applications	25%
3.	**CodeIgniter Framework-I** – Introduction to MVC – Introduction to CodeIgniter, Features and Objectives – Applications Flowcharts – Models, Views and Controller – Overview of Libraries – Helpers	25%
4.	**CodeIgniter Framework-II** – Database Handling – URL Routing – Error Handling – Form validation – Session management – Active record	25%

Teaching-Learning Methodology	Blended learning approach incorporating traditional classroom teaching and online /ICT-based teaching practices.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Develop applications using different Web application frameworks.

Suggested References:	
Sr. No.	References
1.	Brad Green and Syham Seshadri, "AngularJS", O'Reilly.
2.	Beginning AngularJS - Andrew Grant,Apress.
3.	CodeIgniter for Rapid PHP Application Development - David Upton, packtpub.
4.	Thomas Myer: Professional CodeIgniter – Wrox Publication.
5.	Internet reference for the relevant topics.

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SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar, Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.25)
Syllabus with effect from the Academic Year 2022-2023

PROGRAMME STRUCTURE
Master of Science (Information Technology)
Semester-IV

Programme Outcome (PO) - For Master of Science (Information Technology) Programme Sem. IV	Master of Science program provides extended theoretical and practical knowledge of different science subjects. Master of Science programme at Sardar Patel University is designed keeping the overall back ground preparation in mind for the student to either seek a job or to become an entrepreneur. The students, after completion of Bachelor of Science can select the master's programme in the subject they have had at the final year or in a related discipline (depending upon eligibility criteria prescribed by university). **Programme outcomes: At the end of the program, the students will be able to** 1. Have a deep understanding of both the theoretical and practical concepts in the respective subject. 2. Understand laboratory processes and use scientific equipments and work independently. 3. Develop research temperament as a consequence of their theory and practical learning. 4. Communicate scientific information in oral and written form. 5. Understand the issues related to nature and environmental contexts and think rationally for sustainable development. 6. The students are able to handle unexpected situations by critically analyzing the problem.
Programme Specific Outcome (PSO) - For Master of Science (Information Technology) Sem. IV	The objective of the M.Sc. (IT) programme is to prepare post-graduates for software industry, corporate sector, government organizations and academics by providing skill-based education in the core and emerging areas of Information Technology. The programme emphasizes on giving the students a sound background in theoretical and skill-oriented courses relevant to the latest trends in software development.

To Pass	(i) At least 40% Marks in the University Examination in each paper and (ii) At least 40% Marks in the total of Internal and the University Examination in each paper.

Course Type	Course Code	Name Of Course	Theory/ Practical	Credit	Exam Duration in hrs	Component of Marks		
						Internal Total	External Total	Total
Core Course	**PS04CINT51**	Project Work	=	25	=	==	600	600

Master of Computer Applications (MCA)

PROGRAMME OBJECTIVE:

The objective of the MCA programme is to prepare post-graduates for software industry, corporate sector, government organizations and academics by providing skill-based education in the core and emerging areas of computer applications. The programme emphasizes on giving the students a sound background in theoretical and skill-oriented courses relevant to the latest trends in software development.

M.Sc. (Information Technology) Semester-IV

Course Code	PS04CINT51	Title of the Course	Project Work
Total Credits of the Course	25	Hours per Week	48

Course Objectives:	1. To enable students to develop solution for real-life problems. 2. To enable students to gain IT industry exposure for software development.

Course Content	
Description	Weightage* (%)
Training on Software Development.	100%

Teaching-Learning Methodology	Project-based learning approach in which students acquire skills on design, development, analysis, critical thinking, decision making, evaluation and testing of software systems.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	University Examination	100%

Course Outcomes: Having completed this course, the learner will be able to	
1.	develop solution for real-life problems.

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