

Veer Narmad South Gujarat University, Surat

Program Structure: First Year M.Sc (C.A.)

(SEM – I and SEM – II)

(w.e.f. Academic Year June, 2023)

Program outcome	<p>PO1: To possess advanced knowledge of computer application and knowledge of define problem domain. It also makes students capable of using core concept in the conceptualization of domain specific application development.</p> <p>PO2: The program develops the skills of critical thinking problem solving, evaluative learning of various techniques and understand the essence of problems.</p> <p>PO3: The program trains the students to use latest technology to design software as per the needs which is used in industry. So, outgoing students are ready to face the challenging demands of the industry.</p> <p>PO4: The program teaches students to use advance tools to solve Real world problems.</p> <p>PO5: The program train the students to possess the skill and acumen for developing research oriented approach.</p> <p>PO6: Industry based projects will provide the student exposure to work in the challenging and demanding environment of the industry. Project development training makes students to find out right opportunity for entrepreneurship for betterment of individual and Society at large.</p> <p>PO7: To train students to work in team and also train student to acquire leadership quality during the project development.</p>
Program Specification Output	<p>PSO1: Develop and strengthen the fundamental core concept that are required to solve Complex problems.</p> <p>PSO2: To develop students to be more curious towards learning new and emerging Technologies that adapt quickly to the changes. Also, improving student's understanding related to technical problems and enhancing their capabilities to address the problems to turn into solutions through various possible ways by enhancing critical thinking ability.</p> <p>PSO3: To develop the professional and Entrepreneurship skills that needs Independence logical and analytical thinking towards teamwork and leadership.</p> <p>PSO4: To develop the student to design, execute and evaluate Computer projects in industry using appropriate Technology.</p> <p>PSO5: To train students to inculcate the passion of continuous learning and doing research.</p> <p>PSO6: Enhance the passion among the students for updating knowledge, innovative ideas, up skilling and implementing the knowledge in applied areas and research areas by understanding the real world problems, addressing the real world problems and their possible solutions that lead to build a successful professional career.</p>

Program Structure		Semester-wise break up for the courses is given below:							
SEMESTER – 1									
Course Code	Title	Teaching		Total Hours of Teaching Desirable (Including tutorials)	Course Credits	University Examination		Internal Marks	Total Marks
		Theory	Practical			Duration	Marks		
FND- 101	Version Control and Database Management	2	0	30	2	3 Hrs	70	30	100
102-01 OR 102-02	Web Development and Design OR Fundamentals of Mobile Application Development	3	0	45	3	3 Hrs	70	30	100
103-01 OR 103-02	Web Development Frameworks OR Event and media handling	4	0	60	4	3 Hrs	70	30	100
104-01 OR 104-02	Web Development Operations OR Animation, Device and Components handling	4	0	60	4	3 Hrs	70	30	100
105-01 OR 105-02	Automated Testing Framework OR Android API and Framework	4	0	60	4	3 Hrs	70	30	100
106	Practical	-	12	120	8	5 Hrs	140	60	100
107	Project	-	6	60	4	5 Hrs	70	30	200
FND-01	Foundation Elective (Mandatory to obtain 2 credits by selecting any one University approved 2 credit certificate course and produce the evidence.)	0	-	-	2	-	-	-	-
Total			18		31		560	240	800

For Practical and Minor Project:

(1) Batch Size – 30 (desirable) (Maximum: 40 students) (2) The journal should be certified by the concerned faculty and by the Head of the Department, failing which the student should not be allowed to appear for External Practical Examination. (3) Student will submit softcopy of Project duly certified by the internal guide.

SEMESTER – 2

Course Code	Title	Teaching per week		Course Credits	University Examination		Internal Marks	Total Marks
		Theory	Project		Duration	Marks		
FND-02	Foundation Elective (Mandatory to obtain 2 credits by selecting any one University approved 2 credit certificate course) and produce the evidence.	-	-	2	-	-	-	-
201	Project	-	12	12	3 Hrs	280	120	400
202	Core Elective (Mandatory to obtain 3 credits by selecting any one 3 credits certificate course approved and offered by V.N.S.G.U./affiliated colleges or any other UGC recognized University.) and produce the evidence.	-	-	3	-	-	-	-
Total		-	12	17		280	120	400

For Project: Students will individually develop a full scale project and submit progress report to their concerned internal guides every week. One hour load will be considered per every four students/week for Project work.

Course: FND- 101: Version Control and Database Management

Course Code	FND- 101						
Course Title	Version Control and Database Management						
Credit	2						
Minimum hours per Semester	24 hrs. (Including class work, examination, preparation etc.)						
Review / Revision	June 2023						
Pre-requisite	Knowledge of RDBMS, Python, statistical methods.						
Course outcome	<p>CO1: To build a strong conceptual understanding of the version control technology, understand necessary functionalities</p> <p>CO2: To learn the concept of Git and its installation and concepts of GitHub. To learn to modify and redistribute the database and keep track of changes using open-source version control systems like Git.</p> <p>CO3: To understand the concept of Docker and will learn to package applications in containers, allowing them to be portable to any system using a Docker container software development platform.</p> <p>CO4: To evaluate business needs, design a data warehouse, and integrate and visualize data using dashboards and visual analytics</p> <p>CO5: To learn about Data warehouse process flows and architecture..</p>						
Mapping between Cos with PSOs		PS01	PS02	PS03	PS04	PS05	PS06
	CO1						
	CO2						
	CO3						
	CO4						
	CO5						
Course Content	<p>Unit-1:</p> <p>1.1 Concepts of Version Control</p> <p>1.1.1 Purpose of Version Control System (VCS)</p> <p>1.1.2 Types of VCS</p> <p>1.1.3 Advantages and concepts</p> <p>1.2 Concepts of Gits and installation process</p> <p>1.2.1 Configuration of Gits</p> <p>1.2.2 Create and Initialize project in Git</p> <p>Unit-2:</p> <p>2.1 Concepts of GitHub</p> <p>2.1.1 Create GitHub</p> <p>2.1.2 Create, Add and Commit repository</p> <p>2.1.3 File states: Committed, Modified, Staged</p> <p>2.1.4 Add and Commit files in Git</p> <p>2.1.5 Pushing and Pulling repository to GitHub</p> <p>2.1.6 Using branches in Git</p>						

Unit-3:**3.1 Concepts of Docker:**

3.1.1 Purpose and significance of Docker

3.1.2 Installing and Setting the Docker

3.1.3 Docker Terminologies:

3.1.3.1 Images, Containers, Docker Daemon, Client, Hub

3.1.3.2 Docker Run, pull, ps

3.2 Webapps with Docker

3.2.1 Static sites and Docker Images (Base, Child, Official, User)

3.2.2 Dockerfile

Unit-4:

4.1 Concepts of Data Warehouse

4.1.1 Features and Types of Data Warehouse

4.1.2 Difference among OLAP and OLTP

4.2 Integrating heterogeneous Database

4.2.1 Advantages and Dis-advantages of Query-driven and Update-driven Approach.

4.2.2 Concepts of Data Warehouse Tools:

4.2.2.1 Extraction, Data Cleaning, Data Transformation

4.2.2.2 Data Loading

4.2.3 Important terminologies of Data Warehouse:

4.2.3.1 MetaData, Metadata Repository

4.2.3.2 Data Cube, Data Mart

Unit-5:

5.1 Data Warehouse Process Flow:

5.1.1 Extract and load the data, Cleaning and transforming the data.

5.1.2 Backup and archive the data, Query management and directing to data sources.

5.2 Data Warehouse Architecture and Models:

5.2.1 Business Analysis Framework

5.2.2 3-tier Architecture, Virtual Warehouse, Data Mart

5.2.3 Enterprise Warehouse

Load Manager, Warehouse Manager and Query Manager

[All Units carry Equal Weightage]

Reference Books	<ol style="list-style-type: none"> 1. The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling, 3rd Edition, Ralph Kimball, Margy Ross , ISBN-13: 978-1118530201, Wiley Inc. 2. Database Systems: Introduction to Databases and Data Warehouses 1st Edition, Nenad Jukic, Susan Vrbsky, Svetlozar Nestorov, ISBN-13: 978-1943153190, Prospect Press 3. Building a Scalable Data Warehouse with Data Vault 2.0 - 1st Edition, Daniel Linstedt, Michael Olschimke, ISBN-13: 978-0122025109 4. Data Warehousing Fundamentals for IT Professionals 2nd Edition, Paulraj Ponniah, ISBN-13: 978-0410462072, Wiley Inc. 5. The Kimball Wiley Inc.Group Reader: Relentlessly Practical Tools for Data Warehousing and Business Intelligence Remastered Collection 2nd Edition, ISBN-13: 978-1119216315, Wiley Inc. 6. The Pragmatic Programmer: From Journeyman to Master 1st Edition, Andrew Hunt, David Thomas, ISBN-13: 978-0201616224 7. Code Complete 2e (Developer Best Practices), Steve McConnell, ISBN- 13: 978-0735619678, Microsoft Press US 8. The Docker Book, James Turnbull , Publisher: James Turnbull; 1809 2nd edition 9. Docker in Action, 2nd Edition, Jeff Nickoloff, Stephen Kuenzli, ISBN-13: 978-1617294761 10. Learning Docker - Second Edition: Build, ship, and scale faster, Jeeva S. Chelladurai, Vinod Singh, Pethuru Raj, ISBN-13: 978-1786462923 11. Docker: Up & Running, Karl Matthias, Sean P. Kane, ISBN-13: 978-1491917572
Teaching Methodology	Class Work, Discussion, Self-Study, Seminars and/or Assignments
Evaluation Method	<p>30% Internal assessment.</p> <p>70% External assessment.</p>

Course: 102-01: Web Development and Design

Course Code	102-01						
Course Title	Web Development and Design						
Credit	3						
Minimum hours per Semester	36 hrs. (Including class work, examination, preparation etc.)						
Review / Revision	June 2023						
Course outcome	<p>CO1 : Able to learn the Concept of JavaScript, React Js and advance modules of RectJs</p> <p>CO2: To gain conceptual clarity on React WebApp building process, from pc to the server</p> <p>CO3: To learn the working with NOSQL database.</p> <p>CO4: To understand the whole process of building App using React.js and will able to develop modern, complex, responsive and scalable websites.</p> <p>CO5: To learn Redux Middleware and How its use as Middleware with React JS. They will understand necessary functionalities and elements of client and server-side development of website. At the end of the course, they will develop modern, complex, responsive and scalable web applications with React JS and Redux.</p>						
Mapping between Cos with PSOs		PS01	PS02	PS03	PS04	PSO5	PS06
	CO1						
	CO2						
	CO3						
	CO4						
	CO5						
Course Content	<p>Unit-1 : Java Script concepts:</p> <p>1.1 Introduction to Java Script</p> <p>1.2 JS syntax:</p> <p style="padding-left: 20px;">1.2.1 Document and Window object</p> <p style="padding-left: 20px;">1.2.2 Variables and operator</p> <p style="padding-left: 20px;">1.2.3 Math and String manipulations</p> <p>1.3 Objects and Arrays</p> <p style="padding-left: 20px;">1.3.1 Date and Time</p> <p>1.4 Conditions and Iterations:</p> <p style="padding-left: 20px;">1.4.1 Conditional statements</p> <p style="padding-left: 20px;">1.4.2 Switch Case</p> <p style="padding-left: 20px;">1.4.3 Loops in JS</p> <p>1.5 Functions</p>						

<p>Course Content</p>	<p>Unit-2: React JS :</p> <ul style="list-style-type: none"> 2.1 Templating using JSX: Expressions, functions, attributes 2.2 Components (Properties, Events, State), Props <ul style="list-style-type: none"> 2.2.1 Event Management 2.2.2 State Management 2.3 Life cycle of components 2.4 HTTP programming (Client Side) <ul style="list-style-type: none"> 2.4.1 Expense Rest Api Serve 2.4.2 fetch() API 2.5 Rendering List and Portals <p>Unit-3: Advanced Features of React JS:</p> <ul style="list-style-type: none"> 3.1 Error Handling 3.2 Routers <ul style="list-style-type: none"> 3.2.1 Index Router 3.2.2 Nested Routing 3.2.3 Creating Navigation 3.3 concepts of Redux <ul style="list-style-type: none"> 3.3.1 Redux data flow 3.3.2 Redux State and Actions 3.3.3 Redux reducer <p>Unit-4: Redux:</p> <ul style="list-style-type: none"> 4.1 Redux Store <ul style="list-style-type: none"> 4.1.1 Creating and configuring Store 4.1.2 Loading Initial State 4.2 Integrating Redux with UI <ul style="list-style-type: none"> 4.2.1 Basics of Redux with UI 4.2.2 Using Redux with React 4.2.3 React-Redux patterns <p>Unit-5: Redux Middleware and React JS</p> <ul style="list-style-type: none"> 5.1 Redux Middleware concepts <ul style="list-style-type: none"> 5.1.1 Middleware and Side Effects 5.2 Creating Middleware in React 5.3 Types of Middleware: <ul style="list-style-type: none"> 5.3.1 logging, crash reporting, routing 5.3.2 handling asynchronous requests 5.4 Redux App structure 5.5 Difference between React, React JS and React Native <ul style="list-style-type: none"> 5.5.1 Application areas of React, React JS and React Native <p>[All Units carry Equal Weightage]</p>
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Reference Books	<ol style="list-style-type: none"> 1. Web Development with Node and Express, Ethan Brown, O'Reilly Media, Inc., ISBN: 978-1-491-94930-6 2. Node.js, MongoDB, React, React Native Full-Stack Fundamentals and Beyond, Eric Bush, Blue Sky Productions Inc., ISBN: 978-0-9971966-8-9 3. Fullstack React: The Complete Guide to ReactJS and Friends, Anthony Accomazzo, Lean Publishing, Ari Learner, Clay Allsopp, David Guttman, Tyler McGinnis, Nate Murray, 4. The Road to React: Your journey to master React.js in JavaScript, by Robin Wieruch 5. Beginning React Native with Hooks, Greg Lim 6. Full-Stack React Projects: Learn MERN stack development by building modern web apps using MongoDB, Express, React, and Node.js, 2nd Edition 7. Angular From Theory To Practice, Asim Hussain, Version 1.2.0, 2017-11-24 8. Angular: Up and Running: Learning Angular, Step by Step, Shyam Seshadri, O'Reilly Media, Inc. 9. Mastering Web Application Development with AngularJS, Pawel Kozlowski Peter and Bacon Darwin, Packt Publishing 10. The Complete Redux Book, Ilya Gelman and Boris Dinkevich, Lean Publishing 11. Redux in Action, Marc Garreau and Will Faurot, ISBN 9781617294976
Teaching Methodology	Class Work, Discussion, Self-Study, Seminars and/or Assignments
Evaluation Method	<p>30% Internal assessment.</p> <p>70% External assessment.</p>

Course: 103-01: Web Development Frameworks

Course Code	103-01						
Course Title	Web Development Frameworks						
Credit	4						
Minimum hours per Semester	48 hrs. (Including class work, examination, preparation etc.)						
Review / Revision	June 2023						
Pre-requisite	Concepts of Web Development and Design						
Course outcome	CO1: To understand the concept of Angular JS, Form Validation in Angular JS and Developing the application in Angular JS CO2: To Learn the React WebApp Building process from PC to Server CO3: To understand the concepts of JavaScript UI libraries like React CO4: To solve complex applications using Redux.						
Mapping between Cos with PSOs		PS01	PS02	PS03	PS04	PSO5	PS06
	CO1						
	CO2						
	CO3						
	CO4						
Course Content	<p>Unit-1:</p> <p>1.1 Concepts of AngularJS</p> <p>1.1.1 Advantages and limitations of Angular JS</p> <p>1.1.2 Features of AngularJS</p> <p>1.1.3 Architecture of AngularJS</p> <p>1.1.4 Difference among Angular and AngularJS</p> <p>1.2 AngularJS Expressions, Databinding, Directives</p> <p>Unit-2:</p> <p>2.1 AngularJS Controllers, Modules and Scope</p> <p>2.2 AngularJS Dependency, filters and Tables</p> <p>2.2.1 Creating Select box/Drop Down List</p> <p>2.2.2 Using ng-options and ng-repeat</p> <p>2.2.3 Using Data source as an object</p> <p>2.3 Binding Application data to HTML DOM elements</p> <p>2.3.1 Directives: ng-disabled, ng-show, ng-click, ng-hide</p> <p>2.4 AngularJS forms:</p> <p>2.4.1 Input controls:</p> <p>2.4.1.1 input elements, select elements</p> <p>2.4.1.2 button elements, textarea elements</p> <p>2.4.2 Events (ng-click, dbl-click, mousedown, mouseup, mouseleave, mouseenter, mouseover, keydown, keyup, keypress, change)</p> <p>2.4.3 Data binding using ng-model directive</p> <p>2.4.4 Checkbox, Radiobutton and Selectbox</p>						

	<p>Unit-3:</p> <p>3.1 Form Validation:</p> <p>3.1.1 Directives: \$invalid, \$error, \$dirty</p> <p>3.2 AJAX call to retrieve data in JSON format.</p> <p>3.2.1 \$http directive service</p> <p>3.2.2 HTTP service methods:</p> <p>3.2.2.1 .delete(), .get(), .head(), .jsonp(), .patch(), .post(), .put()</p> <p>Unit-4:</p> <p>4.1 Angular JS applications:</p> <p>4.1.1 Datepicker directive, Displaying Data from JSON file</p> <p>4.1.2 Pagination using dirPagination directive</p> <p>4.1.3 Screen width and height</p> <p>4.1.4 Add and remove form fields dynamically</p> <p>4.2 Image Upload</p> <p>4.3 Validations :</p> <p>4.3.1 Mobile number</p> <p>4.3.2 No whitespace exists</p> <p>Unit-5:</p> <p>5.1 Introduction to Express.js</p> <p>5.1.1 Installation and Objectives of Express.js</p> <p>5.2 Express Router, Dynamic and static route., multiple router</p> <p>5.3 Express.js (Response, Request, Post, Get)</p> <p>5.3.1 File upload, Cookies, Middleware</p> <p>5.3.2 Scaffolding, Template</p> <p>[All Units carry Equal Weightage]</p>
Reference Books	<ol style="list-style-type: none"> 1. Web Development with Node and Express, Ethan Brown, O'Reilly Media, Inc., ISBN: 978-1-491-94930-6 2. Node.js, MongoDB, React, React Native Full-Stack Fundamentals and Beyond, Eric Bush, Blue Sky Productions Inc., ISBN: 978-0-9971966-8-9 3. Fullstack React: The Complete Guide to ReactJS and Friends, Anthony Accomazzo, Lean Publishing, Ari Learner, Clay Allsopp, David Guttman, Tyler McGinnis, Nate Murray, 4. The Road to React: Your journey to master React.js in JavaScript, by Robin Wieruch 5. Beginning React Native with Hooks, Greg Lim 6. Full-Stack React Projects: Learn MERN stack development by building modern web apps using MongoDB, Express, React, and Node.js, 2nd Edition 7. Angular from Theory to Practice, Asim Hussain, Version 1.2.0, 2017-11-24 8. Angular: Up and Running: Learning Angular, Step by Step, Shyam Seshadri, O'Reilly Media, Inc. 9. Mastering Web Application Development with AngularJS, Pawel Kozlowski Peter and Bacon Darwin, Packt Publishing 10. The Complete Redux Book, Ilya Gelman and Boris Dinkevich, Lean Publishing 11. Redux in Action, Marc Garreau and Will Faurot, ISBN 9781617294976
Teaching Methodology	Class Work, Discussion, Self-Study, Seminars and/or Assignments
Evaluation Method	30% Internal assessment. 70% External assessment.

Course: 104-01: Web Development Operations

Course Code	104-01						
Course Title	Web Development Operations						
Credit	4						
Minimum hours per Semester	48 hrs. (Including class work, examination, preparation etc.)						
Review / Revision	June 2023						
Pre-requisite	Understanding about basics of Web Development Framework.						
Course outcome	<p>CO1: To understand the benefits of DevOps over other software development processes</p> <p>CO2: To learn and Gain insights into the DevOps environment and Get an overview of different DevOps Tools, To understand the concepts of the working of DevOps Delivery Pipeline.</p> <p>CO3: To understand the ability to solve the problems of Operation team generated from the changes done by Developers by using tools like Ansible and Jenkins</p> <p>CO4: To collaborate between Development and Operations Team to deploy code to production environment faster in a repeatable and automated way</p>						
Mapping between Cos with PSOs		PS01	PS02	PS03	PS04	PSO5	PS06
	CO1						
	CO2						
	CO3						
	CO4						
Course Content	<p>Unit-1:</p> <p>1.1 Concepts of Developers and Operations</p> <p>1.2 Integration of Developers and Operations</p> <p>1.3 Purpose of DevOps:</p> <p style="padding-left: 20px;">1.3.1 DevOps Architecture</p> <p style="padding-left: 20px;">1.3.1 workflow of the waterfall method</p> <p style="padding-left: 20px;">1.3.2 Agile software development</p> <p>1.4 Difference between Agile and DevOps</p> <p>Unit-2:</p> <p>2.1 DevOps life cycle and workflow</p> <p>2.2 DevOps Automation tools and their purpose:</p> <p style="padding-left: 20px;">2.2.1 Various tools and their purpose:</p> <p style="padding-left: 20px;">2.2.2 Maven, Jira, Splunk, Ansible</p> <p style="padding-left: 20px;">2.3.1 Purpose and Introduction of Maven</p> <p style="padding-left: 20px;">2.3.2 Purpose and introduction of Ansible</p>						

	<p>Unit-3.</p> <p>3.1 Ansible: Introduction and working</p> <p>3.2 Installation process</p> <p>3.3 YAML:</p> <p>3.3.1 Key, value</p> <p>3.3.2 List, List inside Dictionaries, List of Dictionaries</p> <p>3.3.2 Quick commands: File Transfer, transferring file to servers</p> <p>3.3.3 managing package</p> <p>3.4 Ansible Playbook:</p> <p>3.4.1 Concepts of Playbook</p> <p>3.4.2 Create Playbook</p> <p>3.4.3 different tags of YAML (name, hosts, vars, tasks)</p> <p>Unit-4:</p> <p>4.1 Ansible: Creating role</p> <p>4.1.1 creating Role Directory</p> <p>4.1.2 Utilizing Roles in Playbook</p> <p>4.1.3 Breaking Playbook role</p> <p>4.2 Ansible Variables</p> <p>4.3 Exception handling in Playbooks</p> <p>4.4 Control Structures:</p> <p>4.4.1 Blocks</p> <p>4.4.2 Loops</p> <p>4.4.3 Conditionals</p> <p>Unit-5:</p> <p>5.1 Jenkins:</p> <p>5.1.1 Concepts and Architecture of Jenkins</p> <p>5.1.2 Applications of Jenkins</p> <p>5.1.3 Features of Jenkins</p> <p>5.1.4 Advantages of Jenkins</p> <p>5.1.5 Installation of Jenkins</p> <p>5.2 CI/CD(Continuous Integration/Continuous Delivery)</p> <p>5.2.1 CI/CD Pipeline</p> <p>5.2.2 Concepts of CI</p> <p>5.2.3 Concepts of CD</p> <p>5.3 Concepts of Pipeline Security</p> <p>Building CI/CD Pipeline with Jenkins</p> <p>[All Units carry Equal Weightage]</p>
<p>Reference Books</p>	<ol style="list-style-type: none"> 1. DevOps For Beginners, Joseph Joyner , Publisher: Mihails Konoplovs 2. Practical Devops, Second Edition, Joakim Verona, Publisher: Ingram short title, ISBN-13: 978-1788392570 3. DevOps For Beginners , Berg Craig, ISBN: 9798653362941 4. The DevOps Handbook, Second Edition, Gene Kim, Jez Humble, Patrick Debois, John Willis, Nicole Forsgren 5. Ansible: From Beginner to Pro 1st ed. Edition, Michael Heap , Apress Publications, ISBN-13: 978-1484216606 6. Learning Ansible 2 - Second Edition, Fabio Alessandro Locati, Packt Publishing, ISBN-13: 978-1786464231 7. Ansible Automation Platform, PETER SMITH, ISBN-13 979-8742550914 8.Jenkins 2: Up and Running, Brent Laster , ISBN-13: 978-1491979594 9. Continuous Delivery with Docker and Jenkins, 2nd Edition, Rafal Leszko, ISBN-13: 978-1838552183 10. CI/CD Pipeline Using Jenkins Unleashed, Pranoday Dingare, ISBN-

	13: 978-1484275078
Teaching Methodology	Class Work, Discussion, Self-Study, Seminars and/or Assignments
Evaluation Method	30% Internal assessment. 70% External assessment.

Course: 105-01: Automated Testing Framework

Course Code	105-01						
Course Title	Automated Testing Framework						
Credit	4						
Minimum hours per Semester	48 hrs. (Including class work, examination, preparation etc.)						
Review / Revision	June 2023						
Pre-requisite	Concepts of Web Development and Operations						
Course outcome	<p>CO1: To understand and implement software testing in manual and automated mode using popular open source automated testing IDE.</p> <p>CO2: Understanding the learning various aspects of testing.</p> <p>CO3: Able to gain proficiency in area of software/project testing at different levels.</p>						
Mapping between Cos with PSOs		PS01	PS02	PS03	PS04	PSO5	PS06
	CO1						
	CO2						
	CO3						
Course Content	<p>Unit-1:</p> <p>1.1 Concepts of software testing</p> <p> 1.1.1 Manual and Automation testing and their Pros and Cons</p> <p> 1.1.2 Tests that can be performed using Automated testing</p> <p>1.2 Introduction to Selenium:</p> <p> 1.2.1 Selenium IDE, RC(remote control), web-driver and Grid</p> <p> 1.2.2 Install Selenium IDE, Fire Bug, Fire Path</p> <p> 1.2.3 Selenium architecture and installation</p> <p> 1.2.4 Selenium Client Library, JSON Wire Protocol over HTTP</p> <p> 1.2.5 Concepts of Browser Drivers</p> <p>Unit-2:</p> <p>2.1 Selenium Python:</p> <p> 2.1.1 Introduction and advantages</p> <p> 2.1.2 navigating links using get() method.</p> <p> 2.1.3 Interacting with webpage.</p> <p>2.2 Locating single and multi elements:</p> <p> 2.2.1 find_element_by_id, find_element_by_name, find_element_by_xpath</p> <p> 2.2.2 find_element_by_tag_name</p> <p>2.3 Create an Action Chain Object and using it.</p> <p> 2.3.1 Action chain methods: (click, click and hold, double click, drag and drop, Key down, key up, perform, pause, release)</p>						

Course Content	<p>Unit-3:</p> <p>3.1 Import selenium webdriver packages:</p> <p>3.2.1 webdriver.support.ui package, using with chrome, edge, ie, firefox.</p> <p>3.2.2 initialize Browser, Navigate to any website.</p> <p>3.2.3 Get login page of the website, fetch user_id, password</p> <p>3.2.4 webdriver methods: maximize_window(), get(), find_element_by_name(), send_keys(), find_element_by_name(), close()</p> <p>3.2.5 Import Keys class from Selenium.webdriver.common.keys</p> <p>3.2 Usecase: facebook login , gmail login using any browser using selenium webdriver.</p> <p>Unit-4:</p> <p>4.1 Difference between FindElement and FindElements</p> <p>4.1.1 Locators in Selenium</p> <p>4.1.2 Dynamic Xpath</p> <p>4.1.3 Dynamic CSS</p> <p>4.2 Handling drop-downs</p> <p>4.3 Handling file uploads</p> <p>4.4 Handling Alerts, Popups and Multi-windows</p> <p>4.5 Handling Mouse events:</p> <p>4.5.1 Mouse Hover event</p> <p>4.5.2 Right, double click, drag and drop</p> <p>4.6 Screenshot handling:</p> <p>4.6.1 Capture screenshots in selenium</p> <p>4.6.2 Capture Full Page screenshot</p> <p>Unit-5:</p> <p>5.1 Implicit, Explicit and Fluent Wait</p> <p>5.2 Apache POI</p> <p>5.2.1 Read and Write Data from Excel File</p> <p>5.3 Database Testing:</p> <p>5.3.1 Database Testing using MySQL</p> <p>5.3.2 Database Testing Using DB2</p> <p>5.4 Ajax Call handling</p> <p>5.5 Listeners in Selenium</p> <p>JavaScript handling in Selenium [All Units carry Equal Weightage]</p>
Reference Books	<ol style="list-style-type: none"> 1. The Art of Software Testing, 3rd Edition, Glenford J. Myers, Corey Sandler, Tom Badgett, 2. Software Testing, 2nd Edition, 2005, Ron Patton, Sams Publishing, ISBN-13: 978-0672327988, 3. Selenium with Python, Pallavi R Sharma, BPB Publication, ISBN-13: 978-9389328813 4. Python Testing with Selenium, Sujay Raghavendra, ISBN-13: 978-1484262481 5. Selenium WebDriver, Rajeev Gupta, ISBN-13: 978-9332526297 6. Guide To Test Automation Using Selenium, Garg and Aditya, McGraw Hill, ISBN: 9781259005930 7. Fundamentals Of Database Systems, Ramez Elmasri, ISBN:9788131716250
Teaching Methodology	Class Work, Discussion, Self-Study, Seminars and/or Assignments
Evaluation Method	30% Internal assessment. 70% External assessment.

Course : T1-106 : Practical

Course Code	T1-106
Course Title	Practical
Credit	12
Practical / Week	12 hours (Out of which 6 hours in supervised mode and 6 hours in un-supervised mode).
Minimum weeks per Semester	15 Weeks (Including Lab work, examination, preparation etc.)
Review / Revision	June – 2023
Purpose of Course	Hands on practice is essential for all application-oriented subjects. The courses relevant to web-design and development or mobile app developments can be learnt appropriately if the knowledge is applied in terms of applications. Various applications include portions relevant to web development from scratch till the testing and deployment and android based application developments and deployment. Practical is based on Course102-01 to 105-01 in case the student has opted web development electives. In option to this, the students who selected elective as android based course, the practical will be based on 102-02 to 105-02.
Course Content:	Students will perform practical based on any one of the following groups: Group-1:102-01, 103-01, 104-01 and 105-01 Courses. Group-2:102-02, 103-02, 104-02 and 105-02 Courses.
Teaching Methodology	Lab. Work, hands-on-experience, webinar, seminar, demonstrations, expert lectures.
Evaluation Method	30% Internal assessment. 70% External assessment.

Course : 107: Project

Course Code	107
Course Title	Project
Credit	6
Lab / Week	6 hours (Out of which 3 hours in supervised mode and 3 hours in un-supervised mode).
Minimum weeks per Semester	15 Weeks (Including Lab work, examination, preparation etc.)
Review / Revision	June – 2023
Purpose of course	<ul style="list-style-type: none">• During the semester, students will undergo the applied technology related to web design and development interactive app development or Mobile technology based application development and deployment. The syllabus covers various innovative technologies. To apply these technologies and enhance their acquired skills during semester; students will work on an in-house project.• Students are expected to develop an interactive and dynamic web application or android based mobile application covering all technical skills learnt during the semester.• Any open source database can be used for the purpose of project development. The project work will be in-house and continuous process since the commencement of the semester.• At end of the semester, students will submit the project and project report.• The internal and external evaluation will be based on developed app through viva-voce and presentation of the developed app.• Students are expected to develop project individually.
Pre-requisite	Practical knowledge based on courses : 102, 103, 104 and 105 Courses.
Course outcome	CO1: Students will be able to understand the concepts of styles and theme CO2: Students will have Knowledge of testing Apps and publishing Apps CO3: Students will have knowledge about cross platform application development CO4: Students will have knowledge of various technologies covered during the semester

Course: FND-01

Course Code	FND-01
Course Title	Foundation Elective
Credit	2
Duration	24 to 30 hours course. Students are required to submit the certificate and validate it through the Department head / In-charge Department Head before the internal Project viva.
Review / Revision	June – 2023
Purpose of Course	Students are required to select any one from the following during the semester. (i) NSS/ NCC participation at University/State/national level and produce the relevant certificate. (ii) Representation at University/State/National level for any sports/cultural event (Under Saptdhara) and produce the certificate. (iii) Choose any 2 –credit university recognized certificate course on any inter-disciplinary or subject related course and produce the certificate of completion.
Course Objective	1) To enhance the skill apart from the regular curriculum. 2) To acquire additional knowledge and enhance their skill.
Pre-requisite	-
Course outcome	CO1: Obtain an additional knowledge and upgrade. CO2: Enhance multi-disciplinary knowledge in different area apart from their core subjects. CO3: Multi-dimensional growth in different fields.