



Re-Accredited 'B++' 2.86 CGPA by NAAC

VEER NARMAD SOUTH GUJARAT UNIVERSITY

University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.

વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી

યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.

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-: પરિપત્ર :-

કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખા હેઠળની તમામ એમ.એસસી. (કોમ્પ્યુટર સાયન્સ) ચલાવતી સંલગ્ન કોલેજોના આચાર્યશ્રીઓ તથા ડિપાર્ટમેન્ટનાં વડાશ્રીને જણાવવાનું કે, શૈક્ષણિક વર્ષ ૨૦૨૩-૨૪ થી અમલમાં આવનાર M.Sc. (CA) (Two Year) Program ના Sem.1 & 2 નો અભ્યાસ સમિતિ દ્વારા નિયુક્ત પેટા સમિતિ દ્વારા તૈયાર કરેલ સ્ટ્રક્ચર અને અભ્યાસક્રમ કોમ્પ્યુટર સાયન્સ વિષયની અભ્યાસ સમિતિના ચેરમેનશ્રીએ અભ્યાસ સમિતિ વતી અને કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખાની મંજૂરીની અપેક્ષાએ કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખા વતી કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખાનાં અધ્યક્ષશ્રીએ મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ એકેડેમિક કાઉન્સિલની તા.૦૭/૦૭/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંક: ૧૩ થી સ્વીકારી મંજૂર કરેલ છે. જેની આથી જાણ કરવામાં આવે છે.

એકેડેમિક કાઉન્સિલની તા.૦૭/૦૭/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંક: ૧૩

:: આથી ઠરાવવામાં આવે છે કે, શૈક્ષણિક વર્ષ ૨૦૨૩-૨૪ થી અમલમાં આવનાર M.Sc.(CA) (Two Year) Program ના Sem.1 & 2 નો અભ્યાસ સમિતિ દ્વારા નિયુક્ત પેટા સમિતિ દ્વારા તૈયાર કરેલ સ્ટ્રક્ચર અને અભ્યાસક્રમ કોમ્પ્યુટર સાયન્સ વિષયની અભ્યાસ સમિતિના ચેરમેનશ્રીએ અભ્યાસ સમિતિ વતી અને કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખાની મંજૂરીની અપેક્ષાએ કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખા વતી કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખાનાં અધ્યક્ષશ્રીએ મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ સ્વીકારી M.Sc.(CA) (Two Year) Program ના Sem.1 & 2 નું સ્ટ્રક્ચર અને અભ્યાસક્રમ સુધારા-વધારા સાથે મંજૂર કરવામાં આવે છે.

(બિડાણ: ઉપર મુજબ)

ક્રમાંક : એસ./સિલેબસ/પરિપત્ર/૧૭૬૫૦/૨૦૨૩
તા.૧૨/૦૭/૨૦૨૨

W. P. S.
કુલસચિવ

પ્રતિ,

- ૧) યુનિવર્સિટી સંલગ્ન તમામ એમ.એસસી. (કોમ્પ્યુટર સાયન્સ) કોલેજોના આચાર્યશ્રીઓ.
.....આપશ્રીની કોલેજ/વિભાગના સંબંધિત શિક્ષકોને જાણ કરી અમલ કરવા સારું.
- ૨) ડીનશ્રી, કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખા.
- ૩) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.

.....તરફ જાણ સારું.

M.Sc. (Computer Application)(Two year Program)

Sem-I and II Structure & Syllabus:

(1st year Course structure, Admission process and Framework)

Aim: To impart application oriented knowledge after completing three years traditional graduation degree course in the field of computers.

Objective: On completion of 3 years of traditional graduation program, the student can avail specialization in the applied fields of computer science and application. The objective of the two years of master's program is to provide additional two years to enhance technically by imparting technology by means of application-oriented study. The important aspects of the program are : (i) Advance knowledge and skills, Specialization in the fields of latest and future technologies and computer applications in the fields of web development, mobile applications, artificial intelligence, data science, cybersecurity etc. (ii) To aligning the program with industry requirements and trends, ensuring that graduates are equipped with the necessary knowledge and skills to meet the demands of the rapidly evolving technology industry. (iii) To develop students ability to undertake independent research projects in computer applications. This includes promoting innovation, critical thinking, problem-solving skills, and the ability to apply theoretical concepts to practical scenarios. (iv) To align the program with industry requirements and trends, ensuring that graduates are equipped with the necessary knowledge and skills to meet the demands of the rapidly evolving technology industry. (v) To enhance students' professional skills, including communication, teamwork, project management, and leadership abilities. This enables them to effectively collaborate with colleagues, manage complex projects, and assume leadership roles in their careers. (vi) To emphasize the importance of ethical behavior and legal compliance in the field of computer applications. This includes raising awareness about privacy, security, intellectual property, and professional codes of conduct. (vii) To encourage entrepreneurial thinking among students and provide them with the necessary skills and knowledge to start their own ventures in the field of computer applications. This includes fostering creativity, business acumen, and an understanding of market dynamics. (viii) To instill a passion for continuous learning and self-improvement in students. The program aims to develop their ability to adapt to emerging technologies and industry trends throughout their professional lives. (ix) To provide students with a global perspective on computer applications, including exposure to international best practices, cultural diversity, and global industry standards. (x). To maintain high academic standards and promote excellence in teaching, research, and student performance. The program aims to produce graduates who are well-rounded, knowledgeable, and capable of making significant contributions to the field of computer applications.

Eligibility Criteria:

Criteria to avail admission in First year of M.Sc (CA)(Two year) degree Program:

The applicant must fulfil any one of the following criteria:

- (i) B.C.A. degree from any UGC recognized University
- (ii) B.Sc.(Computer Science) / B.Sc.(I.T.) /B.Sc.(Data science and Analytics)/ Any U.G.C./AICTE recognized under graduate program with minimum 60 credits acquired from computer courses.
- (iii) B.C.A.(Honours) or any four year U.G.C./AICTE recognized under graduate program with minimum 80 credits acquired from computer courses will be admitted to the second year of the M.Sc.(Computer Application) program based on the credit transfer.

In-take capacity: 75 per Division.

Nos. of Divisions allowed per College/Institute: Maximum One

Admission Criteria:

Admission will be carried out at Institute/College level. The institute/college need to invite an application for the vacant seats after following the step-1 and step-2 as shown below. The merit must be prepared and should be submitted to the university. However, the admission must be carried out at local institute level.

- **Step-1:** Admission in First Year (Sem-I) for any academic year; Preference for admission will be given to the students of same college/institute based on candidate' Third year merit score of T.Y.B.C.A. The candidate must be from immediate previous academic year batch of B.C.A. program; who pursued the B.C.A. from the same institute/college. In event of any backlog, the final year score will be considered excluding the subject in which the student is having backlog for the purpose of merit.
- **Step-2:** Following Step-1, the remaining vacant seats will be filled by passed out students from immediate previous academic year batch of B.Sc. (Computer Science) / B.Sc.(I.T.) / any bachelor's degree holder with 60 credits achieved from computer courses at graduate level approved by AICTE/UGC from the same college/institute on the basis of candidate' merit score of Third year considering them at par.
- **Step-3:** Following step-2, the remaining seats will be filled by any passed out students of previous batches (Prior to immediate previous academic year) from B.C.A. (three years course)/B.Sc. (computer Science)/B.Sc.(IT)/ any bachelor's degree holder with 60 credits achieved from computer courses at graduate level degree holders of the same institute based on their merit of B.C.A. (three year course)/B.Sc.(Computer)/B.Sc.(I.T.)/ any bachelor's degree holder with 60 credits achieved from computer courses at graduate level approved by AICTE/UGC will be considered for admission in order; considering their final year score for the purpose of merit.
- **Step-4:** Following step-3, applicants from B.C.A. (three years course)/B.Sc. (computer Science)/B.Sc.(IT)/ any bachelor's degree holder with 60 credits achieved from computer courses at graduate level degree holders from any other institutes of VNSGU will be considered for vacant seats in order; considering their final year score for the purpose of merit.
- **Step-5:** Following step-4, the remaining seats can be filled by B.C.A./B.Sc.(IT)/B.Sc. (Computer Science)/B.Sc.(Statistics)/B.Sc.(Math)/B.Sc.(Physics)/Any bachelor's degree holder with 60 credits achieved from computer courses at graduate level approved by AICTE/UGC students from VNSGU and other universities based on their merits considering them at par and considering their final semester mark-sheet for the purpose of merit.

Course Frame-work:

First year of M.Sc. (CA) :

		<u>Total Credits to Earn</u>	<u>Total Marks</u>
Sem-I	:	(2+2+3+12+8+4) = 31 Credits	800 Marks
Sem-II	:	(2+3+12) = 17 Credits	400 Marks
Total	:	48 Credits	1200 Marks

M.Sc. (C.A.) Sem-I Structure:

Students can select any given Elective course offered by the institution.

- Students will undergo minimum one certificate course recognized by V.N.S.G. University as Foundation Elective (2 credits) during the semester, One Foundation course (Part of syllabus, 2-credits), One core elective (3 credit) and Three core compulsory subjects (4 credits each) hereafter called as modules. The student will study the Certificate course under Foundation Elective.
- Every core Elective and core Compulsory subject will be associated with a Practical Paper (2 credits per module).
- Project (4 credits) relevant to the selected course (Core and Elective) during semester-I.

Marks Distribution:

For Paper-101 to 105 :	External : 70 Marks and Internal: 30 Marks
For 106- Practical :	External: 140 Marks and Internal: 60 Marks
For 107-Project :	External : 70 Marks and Internal: 30 Marks

Exam Pattern and Schedule:

- **Internal assessment:** Continuous assessment process (Assignment, Attendance, Class Test, Viva)
- **External Assessment:** At end of every module (course), University exams of 70 Marks (3 Hours duration) will be conducted. At end of semester-I, Practical exam carrying 8 Credit (2 credit each for core Elective and Core Compulsory subjects) and 140 marks will be conducted. Duration of Practical Exams: 5 hours. Project viva of 4 credits and 70 marks will be conducted separately.
- Students are required to acquire additional 2 credits for semester-I and semester-II by enrolling for the certificate course recognized by the University. This will be an additional mandatory certificate course apart from the regular curriculum offered for the programme. Students are required to register separately for their choice of course by registering at own and submit the certificate on successful completion of the University recognized certificate course (Minimum 2 credit course) to their respective H.O.D./in- charge H.O.D.

M.Sc. (C.A.) Sem-II Structure:

Students will undergo a full time project during this semester. Students will implement applied knowledge acquired for the subject in terms of developing a major project:

- It is mandatory for the students to undergo any technical subject relevant to one 2-credit (Foundation Elective) and one 3-credit certificate (Core Elective) course approved and offered by V.N.S.G.U./affiliated colleges or any other UGC recognized University.; The tuition fees does not include the fees for 2- credit(Foundation Elective) and 3-credit(Core Elective) certificate courses. It is mandatory for Students but they can opt their choice out of available valid courses.

Course Fees: As per the norms of the University.

Laboratory Utilization Fees: Rs.1000/- per semester.

[Foundation paper (2-credit certification in semester 1 and 2) and Core elective (3-credit certification in semester-2) are mandatory and their fees will be paid by the students separately as per the norms of certificate course structure of the University.]

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>

Course: FND- 101: Version Control and Database Management

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	CO1: To build a strong conceptual understanding of the version control technology, understand necessary functionalities 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. 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. CO4: To evaluate business needs, design a data warehouse, and integrate and visualize data using dashboards and visual analytics CO5: To learn about Data warehouse process flows and architecture..						
Mapping between Cos with PSOs		PS01	PS02	PS03	PS04	PSO5	PS06
	CO1						
	CO2						
	CO3						
	CO4						
	CO5						
Course Content	Unit-1: 1.1 Concepts of Version Control 1.1.1 Purpose of Version Control System (VCS) 1.1.2 Types of VCS 1.1.3 Advantages and concepts 1.2 Concepts of Gits and installation process 1.2.1 Configuration of Gits 1.2.2 Create and Initialize project in Git Unit-2: 2.1 Concepts of GitHub 2.1.1 Create GitHub 2.1.2 Create, Add and Commit repository 2.1.3 File states: Committed, Modified, Staged 2.1.4 Add and Commit files in Git 2.1.5 Pushing and Pulling repository to GitHub 2.1.6 Using branches in Git						

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. Chelladhurai, 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> 1.2.1 Document and Window object</p> <p> 1.2.2 Variables and operator</p> <p> 1.2.3 Math and String manipulations</p> <p>1.3 Objects and Arrays</p> <p> 1.3.1 Date and Time</p> <p>1.4 Conditions and Iterations:</p> <p> 1.4.1 Conditional statements</p> <p> 1.4.2 Switch Case</p> <p> 1.4.3 Loops in JS</p> <p>1.5 Functions</p>						

Course Content	<p>Unit-2: React JS :</p> <p>2.1 Templating using JSX: Expressions, functions, attributes</p> <p>2.2 Components (Properties, Events, State), Props</p> <p> 2.2.1 Event Management</p> <p> 2.2.2 State Management</p> <p>2.3 Life cycle of components</p> <p>2.4 HTTP programming (Client Side)</p> <p> 2.4.1 Expense Rest Api Serve</p> <p> 2.4.2 fetch() API</p> <p>2.5 Rendering List and Portals</p> <p>Unit-3: Advanced Features of React JS:</p> <p>3.1 Error Handling</p> <p>3.2 Routers</p> <p> 3.2.1 Index Router</p> <p> 3.2.2 Nested Routing</p> <p> 3.2.3 Creating Navigation</p> <p>3.3 concepts of Redux</p> <p> 3.3.1 Redux data flow</p> <p> 3.3.2 Redux State and Actions</p> <p> 3.3.3 Redux reducer</p> <p>Unit-4: Redux:</p> <p>4.1 Redux Store</p> <p> 4.1.1 Creating and configuring Store</p> <p> 4.1.2 Loading Initial State</p> <p>4.2 Integrating Redux with UI</p> <p> 4.2.1 Basics of Redux with UI</p> <p> 4.2.2 Using Redux with React</p> <p> 4.2.3 React-Redux patterns</p> <p>Unit-5: Redux Middleware and React JS</p> <p>5.1 Redux Middleware concepts</p> <p> 5.1.1 Middleware and Side Effects</p> <p>5.2 Creating Middleware in React</p> <p>5.3 Types of Middleware:</p> <p> 5.3.1 logging, crash reporting, routing</p> <p> 5.3.2 handling asynchronous requests</p> <p>5.4 Redux App structure</p> <p>5.5 Difference between React, React JS and React Native</p> <p> 5.5.1 Application areas of React, React JS and React Native</p> <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	Unit-1: 1.1 Concepts of AngularJS 1.1.1 Advantages and limitations of Angular JS 1.1.2 Features of AngularJS 1.1.3 Architecture of AngularJS 1.1.4 Difference among Angular and AngularJS 1.2 AngularJS Expressions, Databinding, Directives Unit-2: 2.1 AngularJS Controllers, Modules and Scope 2.2 AngularJS Dependency, filters and Tables 2.2.1 Creating Select box/Drop Down List 2.2.2 Using ng-options and ng-repeat 2.2.3 Using Data source as an object 2.3 Binding Application data to HTML DOM elements 2.3.1 Directives: ng-disabled, ng-show, ng-click, ng-hide 2.4 AngularJS forms: 2.4.1 Input controls: 2.4.1.1 input elements, select elements 2.4.1.2 button elements, textarea elements 2.4.2 Events (ng-click, dbl-click, mousedown, mouseup, mouseleave, mouseenter, mouseover, keydown, keyup, keypress, change) 2.4.3 Data binding using ng-model directive 2.4.4 Checkbox, Radiobutton and Selectbox						

	<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	<p>30% Internal assessment.</p> <p>70% External assessment.</p>

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> 1.3.1 DevOps Architecture</p> <p> 1.3.1 workflow of the waterfall method</p> <p> 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> 2.2.1 Various tools and their purpose:</p> <p> 2.2.2 Maven, Jira, Splunk, Ansible</p> <p> 2.3.1 Purpose and Introduction of Maven</p> <p> 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>
Reference Books	<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	CO1: To understand and implement software testing in manual and automated mode using popular open source automated testing IDE. CO2: Understanding the learning various aspects of testing. CO3: Able to gain proficiency in area of software/project testing at different levels.						
Mapping between Cos with PSOs		PS01	PS02	PS03	PS04	PSO5	PS06
	CO1						
	CO2						
	CO3						
Course Content	Unit-1: 1.1 Concepts of software testing 1.1.1 Manual and Automation testing and their Pros and Cons 1.1.2 Tests that can be performed using Automated testing 1.2 Introduction to Selenium: 1.2.1 Selenium IDE, RC(remote control), web-driver and Grid 1.2.2 Install Selenium IDE, Fire Bug, Fire Path 1.2.3 Selenium architecture and installation 1.2.4 Selenium Client Library, JSON Wire Protocol over HTTP 1.2.5 Concepts of Browser Drivers Unit-2: 2.1 Selenium Python: 2.1.1 Introduction and advantages 2.1.2 navigating links using get() method. 2.1.3 Interacting with webpage. 2.2 Locating single and multi elements: 2.2.1 find_element_by_id, find_element_by_name, find_element_by_xpath 2.2.2 find_element_by_tag_name 2.3 Create an Action Chain Object and using it. 2.3.1 Action chain methods: (click, click and hold, double click, drag and drop, Key down, key up, perform, pause, release)						

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	<p>30% Internal assessment.</p> <p>70% External assessment.</p>

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. 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.

Course: 102-02: Fundamentals of Mobile Application Development

Course Code	102-02						
Course Title	Fundamentals of Mobile Application Development						
Credit	3						
Minimum hours per Semester	36 hours						
Review / Revision	June – 2023						
Pre-requisite	Concepts of Mobile technology, Android studio, database and object oriented concepts are desirable.						
Course outcome	<p>CO1: Students will be able to understand the concepts of Android</p> <p>CO2: Students will be get knowledge of layout designing using different widgets and its installation.</p> <p>CO3: Students will have knowledge of activity and intent method to handle database.</p> <p>CO4: Students will be able to learn how to Implement mobile application with backend technology.</p>						
Mapping between Cos with PSOs		PS01	PS02	PS03	PS04	PS05	PS06
	CO1						
	CO2						
	CO3						
	CO4						
Course Content	<p>Unit-1:</p> <p>1.1 Introduction of Android</p> <p>1.1.1 Architecture of Android</p> <p>1.1.2 Installation of Android and Android Emulator</p> <p>1.1.3 Dalvik VM</p> <p>1.2 Android Widgets:</p> <p>1.2.1 Button, Toast, Custom Toast</p> <p>1.2.2 CheckBox, RadioButton, AlertDialog</p> <p>1.2.3 Spinner, ListView, TextView</p> <p>Unit-2:</p> <p>2.1 Advance Widgets:</p> <p>2.1.1 WebView, RatingBar, TimePicker, DatePicker</p> <p>2.1.2 ProgressBar, Vertical and Horizontal ScrollView</p> <p>2.1.3 SeekBar, ImageSwitcher, ImageSlider</p> <p>2.2 Table and Search:</p> <p>2.2.1 TabLayout, FrameLayout</p> <p>2.2.2 SearchView, SearchView on Toolbar</p> <p>2.2.3 Text Exditing with TextWatcher</p> <p>Unit-3:</p> <p>3.1 Activity and Intents:</p> <p>3.1.1 LifeCycle, Implicit Intent, Explicit Intent</p> <p>3.1.2 StartActivityForResult</p> <p>3.1.3 Share App Data</p>						

	<p>3.2 Android Fragments</p> <p>3.3 Android Menu</p> <p>3.3.1 Option Menu</p> <p>3.3.2 Context Menu</p> <p>3.3.3 Popup Menu</p> <p>Unit-4:</p> <p>4.1 Database Handling:</p> <p>4.1.1 Android AlarmManager</p> <p>4.2 Read Data from Device Storage:</p> <p>4.2.1 From Internal memory and External memory</p> <p>4.2.1.1 FileInputStream, FileOutputStream</p> <p>4.2.1 Preferences</p> <p>Unit-5:</p> <p>5.1 Database handling: SQLite</p> <p>5.2 Database methods:</p> <p>5.2.1 SQLiteOpenHelper class (onCreate(), onUpgrade(), close() methods)</p> <p>5.2.1.1 Handling database (create, open, drop, close)</p> <p>5.2.2 SQLiteDatabase class to handle SQL query: execSQL(), insert(), update(), query()</p> <p>5.2.2.1 Performing CRUD</p> <p>5.2.3 getWritableDatabase() method</p> <p>5.3 Handling Cursor</p> <p>5.3.1 fetching data in list view</p>
Reference Books	<p>1) Android Application Development (With Kitkat Support), Author: Pradeep Kothari, Publisher: DreamTech Press., ISBN: 978-9351194095</p> <p>2) Android Studio 3.0 Development Essentials: Android 8 Edition Author – Neil Smyth, Publisher: Payload Media, ISBN – 13: 978 – 1977540096</p> <p>3) Android Programming for Beginners - Second Edition, Author: John Horton, Publisher: Image Short ISBN: 978-1789538502</p> <p>4) Android 9 Development Cookbook, Author: Rick Boyer, Publisher: Packet Publishing, ISBN: 978-1788991216</p> <p>5) Professional Android – fourth Edition, Author: Reto Meier, Ian Lake, Publisher: Wrox, ISBN – 13: 978-1118949528</p> <p>6) Android Programming: Pushing the Limits 1st Edition, Author: Erik Hellman, Publisher: Wiley, ISBN – 13: 978-1118717370</p> <p>7) Fundamentals of Android App Development : Android Development for Beginners to Learn Android Technology, SQLite, Firebase and Unity, Author: Sujit Kumar Mishra, Publisher: BPB Publication, ISBN: 978-93-89845-204</p> <p>8) Starting with Android: Android application development guide 1st Edition, Author: Dr. M. M. Sharma, Publisher :BPB Publication, ISBN: 978-9386551955</p> <p>9) Introducing SQLite for Mobile Developers 1st Edition, Author: Jesse Feiler, Publisher: Apress, ISBN : 978-1484217658</p> <p>10) Android Programming Unleashed, Author: B. M. Harwani, Publisher: Pearson Education India, ISBN-13: 978-0-672-33628-7</p>
Teaching Methodology	Class Work, Discussion, Self-Study, Seminars and/or Assignments
Evaluation Method	30% Internal assessment, 70% External assessment.

Course: 103-02: Event and Media handling

Course Code	103-02						
Course Title	Event and Media handling						
Credit	4						
Minimum hours per Semester	48 hrs. (Including class work, examination, preparation etc.)						
Review / Revision	June – 2023						
Pre-requisite	Knowledge of Fundamentals of Mobile Application Development						
Course outcome	<p>CO1: Students will be able to understand the concepts of event handling in Android</p> <p>CO2: Students will be get knowledge of XML and JSON and will learn method to implement the concept of XML and JSON in android application.</p> <p>CO3: Students will learn concept of Media handling.</p> <p>CO4: Students will learn and implement concept of Media Recording and text to speech conversion in andorid.</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 Event Handling:</p> <p> 1.1.1 Input Events capturing</p> <p> 1.1.2 View Class and Event Listeners</p> <p>1.2 Callback methods of Event Listener interface:</p> <p> 1.2.1 onClick(), OnKey(), onTouch()</p> <p> 1.2.2 OnLongClick(), onFocusChange(), onCreateContextMenu()</p> <p>1.3 Event Listeners Registration</p> <p>1.4 Event Handlers:</p> <p> 1.4.1 onKeyDown(), onKeyUp(), onTrackballEvent()</p> <p> 1.4.2 onTouchEvent(), onFocusChanged()</p>						

Unit-2:**2.1 XML parsers:**

- 2.1.1 Purpose of parsers
- 2.1.2 SAX (Simple API for XML) parser
- 2.1.3 Android DOM (Document object Model) parser
- 2.1.4 comparison among SAX and DOM

2.2 Structure of XML File**2.3 Parsing the XML file using SAX parser****2.4 Parsing the XML file using DOM parser****2.5 XMLPullParser and its methods to parse XML file****Unit-3:****3.1 JSON (Javascript Object Notation)**

- 3.1.1 Comparing JSON with XML
- 3.1.2 Structure of JSON
- 3.1.3 JSON object, array

3.2 JSON parsing

- 3.2.1 JSONArray class

Unit-4:**4.1 Handling Audio Files:****4.1.1 MediaPlayer class**

- 4.1.1.1 Methods to handle Audio files: (start(),stop(),pause(), prepare(), setDataSource(), prepare(), isPlaying())

4.2 Handling Video files:**4.2.1 MediaController and VideoView class**

- 4.2.1.1 Methods to handle video files: (start(), pause(),suspend(), resume(), seekTo(), setMediaController(), setVideoURI())

Unit-5:**5.1 Media Recording****5.1.1 Sound and videoRecording:**

- 5.1.1.1 recording sound and video
- 5.1.1.2 Storing in external folder
- 5.1.1.2 Use of MediaRecorder class

5.2 Audio Manager class:

- 5.2.1 Controlling volume and ringer
- 5.2.2 setRingerMode() method
- 5.2.3 Ringer Modes (Normal,Silent,Vibrate)

5.3 Convert Text to Speech:**5.3.1 TextToSpeech class**

- 5.3.1.1 Important Methods: speak(), setSpeechRate(),
- 5.3.1.2 setPitch(), setLanguage(), shutdown(), stop()

5.3.2 OnInitListener Interface:

- 5.3.2.1 onInit() method

5.3.3 Controlling the speech methods:

- 5.3.3.1 setSpeechRate(), setPitch()

Reference Books	<p>1) Android Application Development (With Kitkat Support), Author: Pradeep Kothari, Publisher: DreamTech Press., ISBN: 978-9351194095</p> <p>2) Android Studio 3.0 Development Essentials: Android 8 Edition Author – Neil Smyth, Publisher: Payload Media, ISBN – 13: 978 – 1977540096</p> <p>3) Android Programming for Beginners - Second Edition, Author: John Horton, Publisher: Image Short ISBN: 978-1789538502</p> <p>4) Android Studio new Media Fundamentals: Content Production of Digital Audio/Video, Illustration and 3D Animation, Author: Wallace Jackson, Publisher: Apress, ISBN – 13: 978-1484216408</p> <p>5) Android Programming: Pushing the Limits 1st Edition, Author: Erik Hellman, Publisher: Wiley, ISBN – 13: 978-1118717370</p> <p>6) Android 9 Development Cookbook, Author: Rick Boyer, Publisher: Packet Publishing, ISBN: 978-1788991216</p> <p>7) JSON Quick Syntax Reference, Author: Wallace Jackson, Publisher: Apress, ISBN: 9781484218631</p> <p>8) Beginning Json, Author: Ben Smith, Publisher: Apress, ISBN: 9781484240427</p> <p>9) Java XML and JSON 1st ed. Edition. Author : Jeff Friesen, Publisher: Apress, ISBN – 13: 978-1484219157</p> <p>10) Android Programming Unleashed, Author: B. M. Harwani, Publisher: Pearson Education India, ISBN-13: 978-0-672-33628-7</p> <p>11) Android Wireless Application Development: Advanced Topics (Developer's Library) 3rd Edition, Author: Shane Conder, Publisher: Addison Wesley, ISBN-13: 978-0321813848</p>
Teaching Methodology	Class Work, Discussion, Self-Study, Seminars and/or Assignments
Evaluation Method	30% Internal assessment. 70% External assessment.

Course: 104-02: Animation, Device and Components handling

Course Code	104-02							
Course Title	Animation, Device and Components handling Using Android							
Credit	4							
Minimum hours per Semester	48 hrs. (Including class work, examination, preparation etc.)							
Review / Revision	June – 2023							
Pre-requisite	Concepts of Event and Media handling using android.							
Course outcome	CO1: Students will be able to understand the concepts of animation and effects CO2: Students will have knowledge of Device and component handling CO3: Students will have knowledge of using Google MAP in android application CO4: Students will have knowledge of Android Telephony and Different sensors							
Mapping between Cos with PSOs		PS01	PS02	PS03	PS04	PSO5	PS06	
	CO1							
	CO2							
	CO3							
	CO4							
Course Content	Unit-1: 1.1 Animations and Effects: 1.1.1 Load and Start animation 1.1.2 Applying different animations: 1.1.2.1 Zoom in-out, Fade in-out 1.1.2.2 Slide up-down, Rotate in-Out 1.1.2.3 Clockwise - Anti-Clockwise 1.2 Intents: 1.2.1 Concepts of Intents 1.2.2 Starting Activity and Service, Delivering broadcast 1.2.3 types of Intents: Implicit and Explicit 1.3 Handling Device Camera: 1.3.1 android.hardware.camera2 API 1.3.2 camera intent Unit-2: 2.1 Purpose of Bluetooth 2.1.1 Bluetooth API 2.1.2 Checking Internet connection 2.2 Functionalities using Bluetooth API 2.2.1 Scan for the available Bluetooth devices within the range 2.2.2 Use local Bluetooth adapter for paired Bluetooth devices 2.2.3 Connect to other.devices through service discovery 2.2.4 Transfer data to and from other devices using bluetooth 2.2.5 Manage multiple connections 2.3 Wi-Fi connectivity: 2.3.1 Scan for the available Wi-Fi networks within the range 2.3.2 Allow devices to connect to the internet 2.3.3 Connect to other devices through service discovery 2.3.4 Manage list of configured networks.							

	<p>2.3.5 Manage multiple connections</p> <p>Unit-3:</p> <p>3.1 Drag and Drop Framework:</p> <p>3.1.1 Drag Event class</p> <p>3.1.2 Drag Listeners</p> <p>3.1.3 Helper methods and Class</p> <p>3.2 Drag and Drop Process: (Start, continuing, Dropped, Ended)</p> <p>3.3 Google Map android API:</p> <p>3.3.1 Installing and Using Google Map API in android device</p> <p>3.4 Sending Email through Android App</p> <p>3.5 Sending sms using SMSManager API</p> <p>3.6 SMS using Intent</p> <p>Unit-4:</p> <p>4.1 Android telephony:</p> <p>4.1.1 android.telephony.TelephonyManager class for telephony service</p> <p>4.1.2 Determining call state</p> <p>4.1.3 Phone call by invoking default phone calls app using an Intent object</p> <p>4.2 Sensors : Motion Sensors, Environmental Sensors, Position sensors</p> <p>4.2.1 Sensor framework, framework classes and interfaces</p> <p>4.2.2 SensorManager, Sensor, SensorEvent, SensorEventListener</p> <p>Unit-5:</p> <p>5.1 Types of maps</p> <p>5.2 Google Map API and its methods</p> <p>5.2.1 addCircle(), addPolygon, addTileOverlay()</p> <p>5.2.2 clear(), getLocation(), snapshot()</p> <p>5.3 Displaying Current location</p> <p>5.3.1 Callback methods</p> <p>5.4 Searching location on Google Map</p> <p>5.4.1 Using Geocoder class and its methods</p>
Reference Books	<ol style="list-style-type: none"> 1) Advanced Android™ Application Development, Fourth Edition, Author: Joseph Annizzi Jr., Lauren Darcey, Shane Conder, Publisher: Addison Wesley Professional, ISBN : 9720133892420 2) Android 3.0 Animations : Beginner's Guide, Author: Alex Shaw, Publisher: PACKT Publishing, ISBN: 978-1-84951-528-3 3) Learning Android Google Map, Author: Raj Amal W., Publisher: Packt Publishing, ISBN: 9781849698863 4) Android Sensor Programming By Example, Author: Varun Nagpal, Publisher: Packt Publication, ISBN-13: 978- 1785285509 5) Android Wireless Application Development: Advanced Topics (Developer's Library) 3rd Edition, Author: Shane Conder, Publisher: Addison Wesley, ISBN-13: 978-0321813848 6) Professional Android 4th Edition, Author: Reto Meier, Publication: Wrox, ISBN – 13: 978-1118949528 7) Android 9 Development Cookbook, Author: Rick Boyer, Publisher: Packet Publishing, ISBN:978-1788991216

	<p>8) Android Application Development (With Kitkat Support), Author: Pradeep Kothari, Publisher: DreamTech Press., ISBN: 978-9351194095</p> <p>9) Android Studio 3.0 Development Essentials: Android 8 Edition Author – Neil Smyth, Publisher: Payload Media, ISBN – 13: 978 – 1977540096</p>
Teaching Methodology	Class Work, Discussion, Self-Study, Seminars and/or Assignments
Evaluation Method	30% Internal assessment. 70% External assessment.

Course: 105-02: Android API and Framework

Course Code	105-02						
Course Title	Android API and Framework						
Credit	4						
Minimum hours per Semester	48 hrs. (Including class work, examination, preparation etc.)						
Review / Revision	June – 2023						
Pre-requisite	Concepts of Animation, Device and Components handling						
Course outcome	CO1: Students will be able to understand the concepts of styles and theme, API and Framework. CO2: Students will have knowledge of testing Apps and publishing Apps CO3: Students will have knowledge of Flutter for cross platform application development CO4: Students will have knowledge of React Native						
Mapping between Cos with PSOs		PS01	PS02	PS03	PS04	PSO5	PS06
	CO1						
	CO2						
	CO3						
	CO4						
Course Content	<p>Unit-1:</p> <p>1.1 Android styles and theme: 1.1.1 Defining and using Style 1.1.2 Style Inheritance</p> <p>1.2 Applying colors to Theme attributes 1.2.1 Nine-Patch Buttons 1.2.2 Applying Theme</p> <p>1.3 Testing the App 1.3.1 Enable USB Debugging on Device 1.3.2 Build APK and Install on Device</p> <p>1.4 Publishing App on Google Store: 1.4.1 Generate signed APK version of App 1.4.2 Registering Google Play store 1.4.3 Uploading signed APK</p> <p>Unit-2:</p> <p>2.1 Flutter Introduction: 2.1.1 Introduction, features , Advantages and Dis-Advnatages 2.1.2 Creating Flutter application in Android Studio 2.1.3 Architecture of Flutter Framework(Widgets,Gestures,States, Layers)</p> <p>2.2 Categories of Widgets: 2.2.1 Platform specific widgets 2.2.2 Layout widgets 2.2.3 State maintenance widgets 2.2.4 Platform independent, basic widgets</p> <p>2.3 Widget Layouts: 2.3.1 Single child widget 2.3.2 Multiple child widget</p> <p>2.4 Gestures and their events: 2.4.1 Gestures and their events: Tap, Double Tap, Drag, Pinch, Spread/Zoom, Panning</p>						

	<p>2.4.2 Widgets for specific advacned Gestures: Dismissible, Draggable, LonPressDraggable, DragTarget, IgnorePointer, AbsorbPointer, Scrollable</p> <p>2.5 Navigation and Routing</p> <p>2.5.1 State categories: Ephermal , App State</p> <p>2.5.2 Routing concepts and its relavant class and methods</p> <p>2.5.2.1 MaterialPageRoute class</p> <p>2.5.2.2 Navigator.push, Navigator.pop methods</p> <p>Unit-3:</p> <p>3.1 Flutter Animation system:</p> <p>3.1.1 Animation Class : Animation<double>, Animation<Color>, Animation<Size>, AnimationController</p> <p>3.1.2 Non-linear Animation (CurvedAnimation)</p> <p>3.2 Flutter framework Package</p> <p>3.2.1 Categories : Dart Package, Flutter Package</p> <p>3.2.2 Flutter Plugin Package</p> <p>3.3 REST based Application:</p> <p>3.3.1 http class functionality</p> <p>3.3.1.1 methods: read, get, post, put, head, delete</p> <p>3.3.1.2 Data access from Web server and display using ListView</p> <p>Unit-4:</p> <p>4.1 Working with Database:</p> <p>4.1.1 use of sqlite package</p> <p>4.1.2 Functionality of SQLite package: create and open SQLite database</p> <p>4.1.2 Execute SQL statements (CRUD operation)</p> <p>4.1.3 Filter queries (IN, Between, LIKE, NOT LIKE)</p> <p>4.1.4 Internationalization</p> <p>4.2 Testing and Deployment:</p> <p>4.2.1 Automated testing of application</p> <p>4.2.2 Types of Testing(Unit test, Widget Test, Integration test)</p> <p>4.2.3 Deploying Flutter application in Android (Create Apk file)</p> <p>4.2.4 Deploying Flutter application in iOS (Create apk file)</p> <p>Unit-5:</p> <p>5.1 Fundamentals of React Native:</p> <p>5.1.1 Features, Advantages, Limitations</p> <p>5.1.2 Installing and configuration</p> <p>5.1.3 Creating basic app "hello world" using React Native</p> <p>5.1.4 State, Props and Container Component</p> <p>5.1.5 Container and Presentation Component</p> <p>5.2 Layouts and componénts:</p> <p>5.2.1 flexbox and properties</p> <p>5.2.2 ListView, Text Input, ScrollView</p> <p>5.2.3 Placing images, Buttons</p> <p>5.3 React Native HTTP:</p> <p>5.3.1 Handling network request using fetch</p> <p>5.4 React Native Router:</p> <p>5.4.1 Install router</p> <p>5.4.2 Add Router</p> <p>5.4.3 Create components</p>
Reference Books	<p>1) Android Application Development (With Kitkat Support), Author: Pradeep Kothari, Publisher:DreamTech Press.,ISBN:978-9351194095</p> <p>2) Advanced Android™ Application Development, Fourth Edition, Author: Joseph Annizzi Jr., Lauren Darcey, Shane Conder,</p>

	<p>Publisher: Addison Wesley Professional, ISBN : 9720133892420</p> <p>3) Flutter for Beginners: An introductory guide to building cross-platform mobile applications with Flutter and Dart 2, Author: Alessandro Biessek, Packt Publishing House, ISBN: 978-1788996082</p> <p>4) Beginning Flutter: A Hands On Guide to App Development, Author: Marco L. Napoli, Publisher: Wrox, ISBN: 978-1119550822</p> <p>5) Practical Flutter: Improve your Mobile Development with Google's Latest Open-Source SDK , Author: Frank Zammetti. Publisher: Apress, ISBN-13: 978-1484249710</p> <p>6) Flutter Complete Reference: create beautiful, fast and native apps for any device, Author: Alberto Miola, Kindle Edition</p> <p>7) React Native for Mobile Development: Harness the Power of React Native to Create Stunning iOS and Android Applications 2nd ed. Edition, Author: Akshat Paul, Publisher: Apress, ISBN – 13: 978-1484244531</p> <p>8) React Native By Example: Native mobile development with React. Author: Richard Kho, Publisher: Packt Publication, ISBN – 13: 978-1786464750</p> <p>9) React Native Cookbook: Recipes for solving common React Native development problems, 2nd Edition, Author: Dan Ward. Publisher: Packt Publication, ISBN – 13: 978-1788991926</p> <p>10) React and React Native: A complete hands-on guide to modern web and mobile development with React.js, 3rd Edition, Author: Adam Boduch, Publisher: Packt Publication, ISBN – 13: 978-1839211140</p>
Teaching Methodology	Class Work, Discussion, Self-Study, Seminars and/or Assignments
Evaluation Method	30% Internal assessment. 70% External assessment.

First Year M.Sc. (CA)

Semester – II

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	-	-	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-02

Course Code	FND-02
Course Title	Foundation Elective
Credit	2
Duration	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. 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: Obtain additional 2 credits from university. CO3: Enhance multi-disciplinary knowledge in different area apart from their core subjects. CO4: Multi-dimensional growth in different fields.

Course: 201: Project

Course Code	201
Course Title	Project
Credit	12
Duration	Minimum 15 Weeks
Duration	Full time project
Review / Revision	June – 2023
Purpose of Course	It is desirable that students join an organization (through Industry / Software firms / Any other relevant organization / internship with any software development organization) in process to apply their acquired knowledge related to their selected Track. Students will develop and deploy a reasonable size of project applying all relevant skills and understand the project development phases.
Pre-requisite	Prior knowledge of Courses 102 to 105.
Course outcome	- Gain full time project development experience. It will enhance their skill, compatibility and real time experience. The exposure to develop a project will give them confidence and understand the need of an hour. It will help them to start their professional career in the field of computer and I.T.
Project Evaluation:	30% Internal : Based on presentation of the project and viva-voce. 70% External: Based on project presentation and viva-voce. The evaluation of the external assessment will be carried out by panel of three examiners: (i) One examiner from the same institute (ii) One examiner from software industry/corporate (iii) One examiner from other institute affiliated to the university having minimum 11 years of teaching experience at graduation level in computer faculty.

Course: 202

Course Code	202
Course Title	Core Elective
Credit	3
Duration	Minimum 36 hours course. Students are required to submit the certificate of completion and validate it through the Department head / In-charge Department Head before the internal Project viva.
Review / Revision	June -- 2023
Purpose of Course	<p>Apart from the regular curriculum offered to the students, they are expected to get exposure from other relevant and upcoming technologies. Students will pursue any 3 credit course as per the modality suggested as follows.</p> <p>Modality of Enrollment for the course:</p> <p>Students are required to select and enroll core subject related 3-credit technical course recognized by Veer Narmad South Gujarat University or offered by any other UGC recognized University or IIT or IIM or NIT or ISRO or Any prominent University among top Hundred universities in world or offered by SWAYAM or offered by Department of ET&ICT.</p> <p>Students need to complete this course successfully and submit completion certificate for verification to their HOD/In-charge HOD.</p> <p>Students are required to take approval of their concerned faculty member and Department Head before pursuing the course.</p>
Course Objective	<ol style="list-style-type: none"> 1) To enhance the skill apart from the regular curriculum. 2) To acquire additional knowledge and enhance their technical knowhow.
Pre-requisite	Basic technical Knowledge about selected certificate course.
Course outcome	<p>CO1: Obtain an additional knowledge and upgrade.</p> <p>CO2: Obtain additional 3 credits from university.</p> <p>CO3: Enhance technical skill and knowledge in relevant areas apart from their core subjects.</p> <p>CO4: Multi-dimensional growth in different fields.</p>