॥ सा विद्या या विमुक्तये ॥

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

'ज्ञानतीर्थ', विष्णुपुरी, नांदेड – ४३१ ६०६ (महाराष्ट्र राज्य) भारत

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

'Dnyanteerth', Vishnupuri, Nanded - 431 606 (Maharashtra State) INDIA

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

Established on 17th September, 1994, Recognized By the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'B++' grade

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विज्ञान व तंत्रज्ञान विद्याशाखे अंतर्गत राष्ट्रीय शैक्षणिक धोरण २०२० नुसार पदव्युत्तर स्तरावरील अभ्यासक्रम (Syllabus) शैक्षणिक वर्ष २०२४–२५ पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, या विद्यापीठा अंतर्गत येणा–या सर्व संलग्नित महाविद्यालये, विद्यापीठ संचलित महाविद्यालय, विद्यापीठ परिसर संकुले व उपपरिसर संकुलामध्ये शैक्षणिक वर्ष २०२३–२४ पासून पदव्यूत्तर स्तरावर राष्ट्रीय शैक्षणिक धोरण –२०२० लागू करण्यात आले आहे. त्यानुसार विज्ञान व तंत्रज्ञान विद्याशाखेतील खालील अभ्यासक्रम लागू करण्याच्या दृष्टीने मा. कुलगुरू महोदयांनी मा. विद्यापरिषदेच्या मान्यतेच्या अधीन राहून मान्यता प्रदान केली आहे. त्यानुसार खालील अभ्यासक्रम शैक्षणिक वर्ष २०२४–२५ पासून लागू करण्यात येत आहे.

1. M. Sc. I year Computer Application (Affiliated college)
2. M. Sc. I year Data Science (Affiliated college)

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या **www.srtmun.ac.in** या संकेतस्थळावर उपलब्ध आहेत. तरी सदरील बाब ही सर्व संबंधितांच्या निदर्शनास आणून द्यावी, ही विनंती.

'ज्ञानतीर्थ' परिसर,
विष्णुपुरी, नांदेड – ४३१ ६०६.
जा.क्र.:शै–१/एनइपी/युजीअभ्यासक्रम/२०२४–२५/२०६
दिनांक ०८.०८.२०२४

डॉ. सरिता लोसरवार
सहा.कुलसचिव
शैक्षणिक (१–अभ्यासमंडळ) विभाग

प्रत : १) मा. आधिष्ठाता, विज्ञान व तंत्रज्ञान विद्याशाखा, प्रस्तुत विद्यापीठ.
२) मा. संचालक, परीक्षा व मुंल्यमापन मंडळ, प्रस्तुत विद्यापीठ.
३) मा. प्राचार्य, सर्व संबधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
४) मा. संचालक, सर्व संकुले परिसर व उपपरिसर, प्रस्तुत विद्यापीठ
५) मा. प्राचार्य, न्यू मॉडल डिग्री कॉलेज हिंगोली.
६) सिस्टीम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ. याना देवून कळविण्यात येते की, सदर परिपत्रक संकेतस्थळावर प्रसिध्द करण्यात यावे.

SWAMI RAMANAND TEERTH
MARATHWADA UNIVERSITY, NANDED - 431 606

(**Structure and Syllabus of Two Years PG Degree Program with Multiple Entry and Exit Option**)

TWO YEAR MASTERS PROGRAMME IN SCIENCE

Subject M. Sc. Computer Application

Eligibility: Any Graduate

Under the Faculty of
Science and Technology

Effective from Academic year 2024 – 2025

(As per NEP-2020)

Swami Ramanand Teerth Marathwada University

Nanded

Affiliated Colleges

Faculty of Science and Technology

NEP-2020 Oriented Structure of Post Graduate Programs

(as per Govt of Maharashtra GR dated 16-05-2023)

M. Sc. Computer Application (affiliated colleges) (2 years' full time PG Programs)

Introduced from Academic Year 2024-2025

Eligibility: Any Graduate

Swami Ramanand Teerth Marathwada University, Nanded

Faculty of Science and Technology

NEP-2020 oriented Structure of Two Years Post Graduate Program

Subject: M.Sc. Computer Application (affiliated colleges)

Eligibility: Any Graduate

(2 years' full time PG Programs in Affiliated Colleges)

Introduced from Academic Year 2024-2025 **(as per Govt. of Maha GR dated 16-05-2023)**

Program Year and Sem	**Level**	**Semester**		**Faculty**			**Other courses**				
			Major / Mandatory /		**Electives/**		**RM**	**OJT/FP/**	**RP**	**Total Sem. credits**	**Cumu. Credits**
			Theory	**Practical**	**Theory**	**Practical**					
			(04 credits)	**(01credits)**	**(04 credits) (03+01)**		**(03credits)**	**(03 Credits)**	**(04 Credits)**		
			SCMP		**SCMP**						
M.Sc. CA	6.0	First Semester	SCMPAC-401 SCMPAC-402 SCMPAC-403	SCMPACP-401 SCMPACP-402 SCMPACP-403	SCMPAE-401	---------	SVECR-401 Research Methodology Compulsory	---------	---------	**22**	**22**
M.Sc. CA		Second Semester	SCMPAC-451 SCMPAC-452 SCMPAC-453	SCMPACP-451 SCMPACP-452 SCMPACP-453	SCMPAE - 451	-------	---------	SCMPAOJ-451	----------	**22**	**44**
PG Diploma			24credits + 06 Credits		06 credits +02 Credits		03credits	03credits	----------	**44 credits**	

Exit Option: After completion of First year as above with 44 credits, student will be awarded PG Diploma in Computer Science and Applications**

****(for students who have done 03 years UG program)**

****(available from AY 2024-2025)**

1. Abbreviations: **S- Science, CMPA- COMPUTER APLLICATION,** Discipline **S**pecific **C**ore course (C- Core Course)
2. Abbreviations: **SCMPAE- D**iscipline Supportive **E**lective **C**ourse (E- Elective Course)
3. Abbreviations: SVECR: Research Methodology course
4. Abbreviations: SCMPAOJ: On Job Training, Internship/ Apprenticeship or Field Project
5. Abbreviations: SCMPAR: Research Project

Syllabus First Semester

Core Courses Code	Title	Remarks Credits
SCMPAC-401	Java Programming	3
SCMPAC-402	Content Management System with WordPress and Joomla	3
SCMPAC-403	RDBMS and NoSQL with MongoDB	3
SCMPACP-401	Lab 1: Java Programming	2
SCMPACP-402	Lab 2 :CMS	2
SCMPACP-403	Lab 3: RDBMS and NoSQL	2
SCMPAE-401	**Chose any one** A. Data Analysis using Power BI B. Block Chain Technology C. Advanced Web Technology	03 Theory and 01 Lab
SVECR-401	Research Methodology	03

Syllabus Second Semester

Core Courses Code	Title	Remarks Credits
SCMPAC-451	Mobile Application Development with Kotlin	04
SCMPAC-452	React JS	04
SCMPAC-453	Advanced Python Programming	04
SCMPACP-451	Lab 4: Kotlin Lab	01
SCMPACP-452	Lab 5: React JS	01
SCMPACP-453	Lab 6: Advanced Python	01
SCMPAE-451	Chose any one A. Cloud Computing B. Software Testing C. ASP.NET MVC Core	03 Theory and 01 Lab
SCMPAOJ-451	On Job Training , Internship/ Apprenticeship or Field Project	03

Note $$: Contents of the common courses in campus and affiliated colleges shall be different

M. Sc. CA First Year, Semester I and II (*Level 6.0*): *Teaching Scheme*

	Course Code	Course Name	Credits Assigned per course			Teaching Scheme (Hrs./ week) per course	
			Theory	Practical	Total	Theory	Practical
Major	SCMPAC-401 to SCMPAC-403 and SCMPAC-451 to SCMPAC-453	All Core Course	04	--	**04**	**04**	--
Elective	SCMPAE-401and SCMPAE-451	All Elective Courses	03	--	**03**	**03**	--
Special Courses	SVECR-401 and SCMPAOJ-451	Research Methodology and On Job Training	03	--	**03**	**03**	
Major Practical	SCMPACP-401 to SCMPACP-403 and SCMPACP-451 to SCMPACP-453	All Core labs	--	01	**01**	--	**02**
Elective Practical	SCMPAEP-401 and SCMPAEP-451	Elective lab	--	01	**01**	--	**02**
Total Credits per semester			**18**	**04**	**22**	**18**	**04**
Total credits per year			**36**	**08**	**44**	**36**	**08**

M. Sc. CA First Year, Semester I and II (Level 6.0): Examination Scheme

Course Code (2)	**Course Name (3)**	**Theory**				**Practical**		**Total Col (6+7) / Col (8+9) (10)**
		Continuous Assessment (CA)			**ESA**			
		Test I (4)	**Test II (5)**	**Avg of (T1+T2)/2 (6)**	**Total (7)**	**CA (8)**	**ESA (9)**	
SCMPAC401 to SCMPAC-403 and SCMPAC-451 to SCMPAC-453	All core courses	20	20	`20	80	--	--	100
SCMPAE-401 and SCMPAE-451	All elective courses	15	15	15	60	--	--	75
SVECR-401 and SCMPAOJ-451	Research Methodology	15	15	15	60	--	--	75
SCMPACP-401 to SCMPACP-403 and SCMPACP-451 to SCMPACP-451	All Core Labs	--	--	--	--	05	20	25
SCMPAEP-401 and SCMPAEP-451	All Elective labs	--	--	--	--	05	20	25

Note: Teaching scheme and Examination scheme for Second year will be elaborated later, along with detailed syllabus of Second Year

Guidelines for Course Assessment:

A. Continuous Assessment (CA) (20% of the Maximum Marks): This will form 20% of the Maximum Marks and will be carried out throughout the semester. It may be done by conducting **Two Tests** (Test I on 40% curriculum) and **Test II** (remaining 40% syllabus). Average of the marks scored by a student in these two tests of the theory paper will make his **CA** score (col. 6).

B. End Semester Assessment (80% of the Maximum Marks): ***(For illustration we have considered a paper of 04 credits, 100 marks and need to be modified depending upon credits of an individual paper)***

1. **ESA Question paper will consists of 6 questions, each of 20 marks.**
2. **Students are required to solve a total of 4 Questions.**
3. **Question No.1 will be compulsory and shall be based on entire syllabus.**
4. Students need to solve **ANY THREE** of the remaining Five Questions (Q.2 to Q.6) and shall be based on entire syllabus.

C. Question paper for campus PG and PG in affiliated colleges will be different

Note: Number of lectures required to cover syllabus of a course depends on the number of credits assigned to a particular course. One credit of theory corresponds to 15 Hours lecturing and for practical course one credit corresponds to 30 Hours. For example, for a course of two credits 30 lectures of one hour duration are assigned, while that for a three credit course 45 lectures.

%%%%%

M.Sc. Computer Application

M.Sc.(CA) F. Y. (Semester I)

SCMPAC-401 Java Programming

Learning Objectives:

i To Design and build robust Java Application

ii To Design and build robust and maintainable web applications.

iii To create dynamic HTML content with Servlets and Java Server Pages, using the JSP Standard Tag Library (JSTL).

iv To Make Servlets and JSP work together cleanly.

Course Outcomes:

After successful completion of this course, students should be able to:

i. Create Java Applications

ii. Create dynamic and interactive web sites and interaction with client and server.

iii. Do server side programming with java Servlets and JSP.

iv. Implement different data structure using collection framework.

Unit I: Java Fundamental

Java History and Java Architecture
Java Program Structure
Command Line Arguments
Data Types and Variables
Flow Control Statements
Arrays

UNIT II: Object Oriented Concepts

Classes and Objects
Static members
Constructors
Encapsulation
Inheritance
this and super keyword
Polymorphism
Abstract class and Abstract Methods
Interfaces
Final Keyword
System Packages and User defined Packages

UNIT III: Exception Handling, Strings and Collections

Try, catch block and finally clause
User defined exceptions
String and StringBuffer class
ArrayList

Generics and Iterator
TreeSet and HashSet
HashMap

Unit IV Java Database Connectivity 8 Hrs.

JDBC Introduction, JDBC Architecture, JDBC Drivers, Establishing Connection, Executing Query and Processing Results, Metadata, Prepared Statement, Callable Statement

Unit V Introduction to Servlets and JSP 8 Hrs.

Introduction to Servlets, Deploying Simple Servlet, Servlet Life Cycle, Get and Post Requests, Request Object

UNIT VI Introduction to JSP

Introduction to JSP, Scripting Elements- Expressions, Scriptlets, Declarations, Directives, Sessions in JSP, Using JDBC in JSP, JavaBeans in JSP

References:

1. Java The Complete Reference 9th Edition, Herbert Schildt, McGraw Hill Education (India) Private Limited, New Delhi.
2. Java Servlet & JSP Cookbook, Bruce W. Perry, O'Reilly Publication.
3. Core Servlets and JavaServer Pages, Marty Hall, Prentice Hall Professional, 2004

M.Sc. Computer Application

M.Sc.(CA) F. Y. (Semester I)

SCMPAC-402-Content Management System with WordPress and Joomla

Learning Objectives:

1. To Design and build web applications with WordPress and Joomla.
2. To create dynamic HTML content with WordPress and Joomla
3. To move woo commerce site from Local Server to Live Server

Course Outcomes:

After successful completion of this course, students should be able to:

1. Create dynamic and interactive web sites with WordPress and Joomla.
2. Do web hosting on LAN.
3. Plan website by choosing colour schemes, fonts, layouts, and more.
4. Select, install, and activate a theme in word press.
5. Design e-commerce site using woo commerce plugin.

Unit I: Introduction to Content Management System **12 Hrs**

Web Content Development and Management
Content Types and Formats
Norms and Guidelines of Content Development
Dynamic vs Static websites
Popular open source CMS
Web Hosting and Managing Multimedia Content
Creating and Maintaining a Wiki Site
XAMP and MAMP servers
Installing a CMS

Unit II: Website Development using WordPress **10 Hrs**

Installing WordPress, Installing Themes, creating a Child Theme, Modifying a Theme, Setting Up a WordPress Site, Starting the MRP Theme, The WordPress Loop, Continuing with the Loop, Splitting the Page into Templates, Creating a Page for Single Posts,

UNIT III: WordPress Pages, Menus and forms **8 Hrs**

Creating Pages, Customizing the Navigation Menu, Customizing the Sidebar, Creating a Custom Page Template, adding a Contact Form, Uploading a WordPress Site

Unit III: Advanced WordPress Concepts **10 Hrs**

What are plugins? Finding plugins, installing plugins, Activating and deactivating plugins,

Editing plugin settings, deleting plugins, Adding, editing, and deleting users,
User roles and permissions, Importing content from another site,
Exporting your WordPress data, WordPress General settings,
Changing the site title and tagline, Changing your URL,
Using a different homepage, Updating the admin email address,
Changing time zones Date/Time formats

Unit IV: Woo Commerce Plugin **10 Hrs**

Introduction to Woo Commerce, Woo Commerce installation,
Convert HTML to Woo commerce using [short-code], Recent Products,
Featured Products, Variable Products, Woo commerce Settings,
Payment Gateway Integration, moving woo commerce site from Local Server to Live Server

UNIT V Introduction to Joomla **10 Hrs**

Installing Joomla on Web Server
Joomla Admin -Joomla global configuration -Article manager–Archive
Manager-FrontPage manager -Section manager - Category manager- Media.
Manager-Menu manager -Component manager -Content Manager-Extensions,
Manager-Module Manager-Plugin Manager-Template Manager-How to install a new module-
How to install a new Template-How to install a new plugin-?
How to install a new Component-Understanding the concept of Joomla positions?

M.Sc. Computer Application

M.Sc.(CA) F. Y. (Semester I)

SCMPAC-403 RDBMS and NoSQL with MongoDB

Objectives:

1. To understand the features of Relational database.
2. To describe data models and schemas in DBMS.
3. To use SQL- the standard language of relational databases for database operations.
4. To understand the functional dependencies and design of the databases.

Outcomes:

1. To study the basic concepts of relational databases
2. Learn and practice data modeling using the entity-relationship and developing Database designs
3. Understand the use of Structured Query Language (SQL) and learn SQL syntax for Writing queries.

Unit I Introduction and Basic Concepts **8 Lectures**

Structure of DBMS
Advantages and Disadvantages of DBMS
Users of DBMS
Disadvantages of RDBMS,
Relational Database: Entities, Attributes and Domains
Tuples, Relations and their schemes

Unit – II SQL Statements & Working with Tables **8Lectures**

What is SQL?
Types of SQL Commands (DDL, DML, DQL, DCL, TCL)
Data types in SQL
Creating and Selecting Tables
Manipulation and Altering Table data
WHERE Clause and DISTINCT Clause
Data Constraints

Unit III Operators, SQL Functions and Views **8 Lectures**

What are Operators and types of Operators
Single Row Functions

Multiple Row Functions
What is View?
Working with Views

Unit IV Sorting, Grouping Data in SQL and Joining Tables, Subqueries 8 Lectures

Order by Clause
Group by Clause
Having Clause
What is join? Join Styles: Theta, ANSI , Using
Types of Joins: Equi Joins, Non Equi Join, Outer Join: Left, Right, Full, Self-Join Cross Join
SQL Subqueries

Unit V: Introduction to NoSQL Databases

Introduction to NoSQL and its NoSQL features,
Different types of NoSQL Data base
Introduction to MongoDB
MongoDB architecture
Data modelling in MongoDB
Advantages of MongoDB over RDBMS
Mongo Shell
Configuration file in MongoDB

UNIT VI: Models of NoSQL 8 Hrs.

Aggregate Data Models; Aggregates, Example of Relations and Aggregates,
Key-Value and Document Data Models, Column-Family Stores,
Summarizing Aggregate-Oriented Databases. Distribution Models; Single Server, Shading,
Master-Slave Replication, Peer-to-Peer Replication, Update Consistency, Read Consistency,
Relaxing Consistency, The CAP Theorem,

References:

1. “Oracle Database 10g PL/SQL Programming” by Scott Urman , Ron Hardman, MichaleMc Laughlin, Oracle Press, TMH, ISBN-0-07-059779-0.

2. “Oracle Database 10g The Complete Reference” By Kevin Loney, Bob Bryla Oracle Press (TATA McGraw Hill Edition) ISBN-13:978-0-07-059425-8, ISBN-10: 0-07-059425-2

3. SQL, PL/SQL the programming language of ORACLE 4th Edition by Ivan Bayross ISBN81-7656964-

M.Sc. Computer Application

M.Sc.(CA) F. Y. (Semester I)

SCMPACP-401 Lab 1: Java Programming

Conduct 15 Practical's on the given syllabus

M.Sc. Computer Application

M.Sc.(CA) F. Y. (Semester I)

SCMPACP-402 Lab 2: CMS

Conduct 15 Practical's on the given syllabus

M.Sc. Computer Application

M.Sc.(CA) F. Y. (Semester I)

SCMPACP-403 Lab 3: RDBMS and NoSQL

Conduct 15 Practical's on the given syllabus

M.Sc. Computer Application

M.Sc.(CA) F. Y. (Semester I)

SCMPAE-401 A. Data Analysis using Power BI

Learning Objectives:

i. Data Analysis with Microsoft Power BI course would enable the students in understanding Basics of Data Analysis and design & write the simple Dashboard for an organization
ii. Learn how to design graphs tables and dashboard
iii. Learn fundamental concepts of Data Analysis and Data Visualization such as. Generating Different graphs, Tables, Dashboard etc.

Course Outcomes:

After successful completion of this course, students should be able to:

i. To design graph and charts for visualizing data.
ii. To design the dashboard to solve the problems related to decision making
iii. To publish the report on cloud for effective use
iv. To design the power BI Applications
v. To work on live operational data and to visualize the data for decision making

Unit I: Introduction to Power BI 10 Hrs

Introduction to Data Visualization and Reporting
Business Intelligence (BI)
Power BI Products Download and Install, Power BI Desktop (Power Query, Power Pivot, Power View, Power BI Report Server, Power BI Mobile)
Flow of Work in Power BI, Power BI Architecture,
A Brief History of Power BI,
Power BI Job Roles,
Types of Reports in Real-World,
Data Sources Types in Power BI

Unit II: Getting and Transforming Data with Power BI Desktop **10** Hrs

Getting Data: Excel vs. Power BI Desktop & Service,
Direct Query vs Import Data,
Data Transformation, Benefits of Data Transformation,
Shape or Transform Data using Power Query,
Overview of Power Query / Query Editor, Query Editor User Interface,
Data Sources
SQL Views
M Queries

Query Folding
MQuery Examples

Unit III: Creating and Formatting Power BI Reports 10 Hrs

Power BI Report Architecture
Live Connection to Power BI Datasets
Visualizing best practices
Choosing the Visual
Slicers
Report Filter Scopes
Visualizing Formatting
Map Visuals
Bar and Column Charts,
Clustered Bar and Column Chart
Stacked Bar Chart,
Stacked Column Chart
Pie and Donut Charts
Scatter Charts
Table Visual,
Matrix Visualization
Line and Area Charts
Line Chart,
Area Chart, Stacked Area Chart
Line and Stacked Column Chart, Line and Clustered Column Chart, Ribbon Chart, Waterfall Chart, Funnel Chart

Unit IV Applying Custom Visual, Animation, and Analytics **10**Hrs

Drill through Reports
Bookmarks
ARcGIS Map Visual for Power BI
Water fall chart Breakdown
Analytics Pane
Custom Visuals
Animation and Data Storytelling
Date and Time Functions
Text Functions
Logical Functions
Math & Statistical Functions

Unit V: Designing Power BI dashboard and Architecture **10**Hrs

Dashboard vs Reports
Dashboard design
Multi Dashboard Architecture

Dashboard titles
Live Report Pages
Mobile Optimized dashboards

Unit VI: Deploying the Power BI Report Server and Power BI App **10**Hrs

Planning for the Power Bi Report Server
Installation- Hardware and software Requirements
Configuration
Service Account
Remote report server database
Office online server for Excel Workbooks
Upgrade Cycles
Report Server Desktop Application
Report Server Web Portal
Power BI Mobile Application
Introduction to Power BI App. 10Hrs

References:

1. Mastering Microsoft Power BI Expert Techniques for Effective Data Analytics and Business Intelligence, By Brett Powell, 2018
2. Introducing Microsoft Power BI by Alberto Ferrari and Marco Russo, Microsoft Press 2016
3. Applied Microsoft Power Bi: Bring Your Data to Life! by Teo Lachev & Edward Price & Jen Underwood

M.Sc. Computer Application

M.Sc.(CA) F. Y. (Semester I)

SCMPAE-401 Lab A. Data Analysis using Power BI

Conduct 15 Practical's on the given syllabus

M.Sc. Computer Application

M.Sc.(CA) F. Y. (Semester I)

SCMPAE-401 B. Block Chain Technology

Learning Objectives:

i. This course is intended to study the basics of Blockchain technology.

ii. During this course student will explore various aspects of Blockchain technology like application in various domains.

iii. Students will able to understands BitCoin, Ethereum, Hyperledger, Solidity Programming

iv. By implementing learner will have idea about private and public Blockchain, and smart contract.

Course Outcomes:

After the completion of this course, student will be able to

i. Understand and explore the working of Blockchain technology (Understanding)

ii. Analyze the working of Smart Contracts (Analyze)

iii. Understand and analyze the working of Hyperledger (Analyze).

iv. Apply the learning of solidity and de-centralized apps on Ethereum (Apply).

Unit I: Introduction of Cryptography and Blockchain: 12Hrs

Model of decentralization, What is Blockchain, Blockchain Technology Mechanisms & Networks, Blockchain Origins, Objective of Blockchain, Blockchain Challenges, Transactions And Blocks, P2P Systems, Basics of Cryptography, Keys As Identity, Digital Signatures, Hashing, and public key cryptosystems, private vs. public Blockchain.

Unit II: BitCoin and Cryptocurrency: **12**Hrs

What is Bitcoin, The Bitcoin Network, The Bitcoin Mining Process, Mining Developments, Bitcoin Wallets, Decentralization and Hard Forks, Ethereum Virtual Machine (EVM), Merkle Tree, Double-Spend Problem, Blockchain And Digital Currency, Transactional Blocks, Impact Of Blockchain Technology On Cryptocurrency

Unit III: Introduction to Ethereum: 08Hrs

What is Ethereum, Introduction to Ethereum, Consensus Mechanisms, How Smart Contracts Work, Metamask Setup, Ethereum Accounts, Receiving Ether's What's a Transaction?, Smart Contracts.

Unit IV Introduction to Hyperledger: **12Hrs**

Permission less model and Open Consensus, Proof or Work(PoW) and its Limitation, Beyond PoW, Introduction to Hyperledger: What is Hyperledger? Distributed Ledger Technology & its Challenges, Hyperledger & Distributed Ledger Technology, Hyperledger Fabric, Hyperledger Composer, Enterprise Block-Chain

Unit V: Solidity Programming: **08**Hrs

Solidity - Language of Smart Contracts, Installing Solidity & Ethereum Wallet, Basics of Solidity, Layout of a Solidity Source File & Structure of Smart Contracts, General Value Types (Int, Real, String, Bytes, Arrays, Mapping, Enum, address)

Unit VI: Blockchain Security and Applications: **08**Hrs

Hyper ledger Aries, Blockchain Security,

Internet of Things, Medical Record Management System, Domain Name Service and Future of Blockchain, Alt Coins

References:

1. Mastering Blockchain: A deep dive into distributed ledgers, consensus protocols, smart contracts, DApps, cryptocurrencies, Ethereum, and more, 3rd Edition, Imran Bashir, Packt Publishing, 2020, ISBN: 9781839213199, book website: https://www.packtpub.com/product/mastering-blockchain-third-edition/9781839213199
2. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, Princeton University Press (July 19, 2016).
3. Antonopoulos, Mastering Bitcoin.
4. Antonopoulos and G. Wood, Mastering Ethereum.
5. D. Drescher, Blockchain Basics. Apress, 2017.
6. Hyperledger Tutorials - https://www.hyperledger.org/use/tutorials
7. Ethereum Development Resources - https://ethereum.org/en/developers
8. Online materials and case studies

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SCMPAE-401 Lab B. Block Chain Technology

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SCMPAE-401 C. Advanced Web Technology

Course Objectives

To aware the Students with advanced web technology

To develop a skill to write applications using PHP and Java Script

Course Outcome

Students will be able to develop a dynamic webpage by the use of PHP and java script. On completion of this course, a student will be able to develop a web application using PHP and java script.

Unit-I: Introduction **10**

Web Technology & XML Internet – current state, hardware and software requirement, ISP, an internet account, web home page, URL, browser, security on web, searching tools, search engines, FTP, Gopher, Telnet, emails, TFTP Web browser architecture, web page and multimedia, static dynamic and active web page, simple mail transfer protocol, simple network management protocol, hypertext transfer protocol

Unit-II: Basics of PHP **6**

Introduction to PHP, what does PHP do?, History of PHP, language basics, datatypes, variables, expressions and operators, flow control statements, including code, embedding PHP in web pages.

Unit-III: Functions & Strings **6**

Calling a function, defining a function, variable scope, function parameters, return values, variable functions, and anonymous functions. Strings: Accessing individual characters, cleaning strings, encoding and escaping, comparing strings, manipulating and searching strings, regular expressions.

Unit-IV: Arrays & Objects: **10**

Indexed vs. associative arrays, identifying elements of an array, storing data in arrays, multidimensional arrays, extracting multiple values, converting between arrays and variables, traversing arrays, sorting. Objects: Creating an object, accessing properties and methods, declaring a class, introspection.

Unit-V: Database Structure **10**

Overview Introduction, connecting to and disconnecting from the server, Entering queries , Creating and using a database , Creating and selecting a database , creating a table , loading data into a table , Retrieving information from a table, selecting all data, selecting particular rows, selecting particular columns , sorting rows, date calculations, working with NULL values , pattern matching , counting rows , using more than one tables.

Unit-VI: MySQL Database **8**

MySQL databases in PHP: Introduction, connecting to a MySQL database, querying the database, Retrieving and displaying the results, modifying data, deleting data.

References:

1. Reference Books:

2. HTML The complete Reference (2nd Edition Thomas A Powel Tata McGraw Hill publication) The complete Reference (HTML & XHTML)- 5th Edition Thomas A Powel Tata McGraw Hill publication
3. PHP &MySQL for Dynamic Web Sites- Fourth Edition By Larry ULLman BoS in Comp.Sci. affiliated colleges PG 2023 Page 35
4. Learning PHP, MySQL and JavaScript By Robin Nixon -O‟REILLY Publications
5. Programming PHP By Rasmus Lerdorf, Kevin Tatroe, Peter MacIntyre 4. SAMS Teach yourself PHP in 24 hours, Author: Matt Zandstra, Sams Publishing.

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SVECR-401 Research Methodology

Common Syllabus for all PG Courses is given on University Website

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SCMPAC-451 Mobile Application Development with Kotlin

Learning Objective:

Android Application Development course is designed to quickly get you up to speed with writing apps for Android devices. The student will learn the basics of Android platform and get to understand the application lifecycle

Course Outcomes:

By the end of the course, student will be able to write simple GUI applications, use built-in widgets and components, work with the database to store data locally, and much more.

UNIT I Introduction to Kotlin and Its Features: 8 Hrs.

Introduction to Kotlin and Its Features,Program Structure,Variables, Data Types, Type Conversion, Operators, Input /Output, Control Statements, When Expression, Looping Statements, Break, Continue and Return Enum, Nullable Non Nullable Types, Smart cast, Unsafe and Safe Cast, Elvis Operator.

UNIT II Functions, Array, String and Object Oriented Programming

Functions, Recursion, Default and Named Arguments, Arrays, String, Object Oriented Concepts Classes and Objects, Constructor, Visibility Modifiers, Inheritance, Abstract Class, Interface, Data Classes, Basic Lambdas, Inline Functions.

UNIT III Exception Handling and Collections Framework 8 Hrs.

Exception Handling. ,Try Catch, Multiple Try BlockFinally, BlockKotlin ,Throw Keyword Collections,List -> ArrayList, Vector, LinkedList,Set -> HashSet, Map -> HashMap.

UNIT IV. Introduction to Android Programming 8 Hrs.

Android Its Features, API Levels and Versions, Android Architecture ,JVM, DVM, ART, DEX,Creating First Android Application,Android Project Structure,AndroidManifest.XM,Activity and Activity Life Cycle.

UNIT V. User Interface Design 8 Hrs.

LinearLayout, RelativeLayout, ContraintLayout, TextView, EditText, Button, Switch, RadioButton, and RadioGroup Views, Progress Bar View, CheckBox, ImageView, Spinner and Adapter, TimePicker View, DatePicker View, WebView, Toast, ScollView, CardView, List View Custom List View and RecyclerView.

UNIT VI. Intents, Fragments, Dialog, Menus, and Storage Media 8 Hrs.

Implicit Intent, Explicit Intents, Fragments (Navigation Drawer),Alert Dialog, Custom Dialog, Menus, Shared Preferences, Internal Storage, SQLite Database, Notifications, Publishing to the Android Market.

References:

1. Kotlin in Action Paperback – 19 February 2017 by Dmitry Jemerov (Author), Svetlana Isakova (Author)
2. Kotlin Programming Paperback – 6 September 2018 by Josh Skeen (Author), David Greenhalgh (Author)
3. Head First Kotlin: A Brain-Friendly Guide 1st Edition, Kindle Edition by Dawn Griffiths (Author), David Griffiths (Author)

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SCMPAC-452 React JS

Learning Objectives:

i. React JS course would enable the students in understanding Basics of front end design & write the simple web development using React JS programming.
ii. Learn how to design forms, web applications.
iii. Learn fundamental concepts of React JS such as. State, Props, Operators, conditional and looping statements, Arrays, Arrow functions etc.

Course Outcomes:
After successful completion of this course, students should be able to:

i. To design front end applications.
ii. To write web application to solve the given problem
iii. To use GraphQL, Webpack, and server-side rendering
iv. To design program using java script.

Unit I: Introduction to JavaScript **10Hrs**

Variables, Arrow functions, Rest and spread, Object and array destructuring, Template,literals,Classes,Callbacks,Promises,Async/Await,ES Module

Unit II: Basics of React Concepts **10Hrs**

what is react?, benefits of using react, first react code, creating component classes, working with properties, what is JSX, benefits, understanding JSX, React and JSX gotchas, React component states, working with states, states and properties, stateless components, Hooks

Unit III: Styling and Hooks **10Hrs**

CSS in React, Inline Styling, SAAS, What is HOOK? useState, useEffect, useContext, useRef, useReducer, useCallback, useMemo, Custom Hooks

Unit IV: working with forms and Menus **10 Hrs**

Defining a form and its events, form elements, form validations, Bulding menu with JSX, Bulding menu without JSX.

Unit V: React Architecture **10Hrs**

Adding webpack to project, React router, router features, React Memo

Unit V: Redux **10Hrs**

flux data architecture, redux data library, GraphQL

References:

1. React Quickly- AZAT MARDAN, ISBN 9781617293344, ©2017 by Manning Publications, Edition First.
2. Learning React-
Functional Web Development with React and Redux, Alex Banks and Eve Porcello, isbn=9781491954553 f, First Edition, O'Reilly.

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SCMPAC-453 Advanced Python Programming

Course Objectives:

1. To understand why Python is a useful scripting language for developers.
2. To define the structure and components of a Python program.
3. To understand programming constructs in Python.
4. To acquire Object Oriented Skills in Python
5. To develop the ability to write database applications in Python

Course Outcomes:

After successful completion of this course, learner will be able to

1. Write programs using Python programming constructs.
2. Design and Develop applications using Python programming.
3. Design object oriented programs with Python classes.
4. Use exception handling in Python applications for error handling.
5. Design and Develop applications connecting with database.

UNIT I: Introduction and basic control structure of Python **10** Hrs

Introduction and Features of Python, Data Types, Variables, Operators, Control Structures: Loops and Decision.

UNIT II: Data Types and Classes **10** Hrs

Data Types: Numerical, String, Set, Dictionary, List, Tuple, Classes and Objects, Functions and Arguments, Inheritance, Polymorphism.

UNIT III: Classes **10** Hrs

Classes and Objects, Functions and Arguments, Inheritance, Polymorphism.

UNIT IV: Modularization and Exceptions **10** Hrs

Standard Modules, Packages, Exception raising, Exception Handling, Error Processing.

UNIT V: Database Connectivity with MySQL, GUI Programming and Database Connectivity Using Python **10** Hrs

Getting MySQL for Python, connecting with database, Passing Query to MySQL. GUI using Tkinter Module, Creating Label, Text, Button, Info Dialog Boxes, Radio button, Check button, Importing MySQL for Python, connecting with database, Passing a query to MySQL.

UNIT VI: Web Development using Python **10** Hrs

Django Installation, Creating Project, Creating Application, Templates and Models, Data Manipulation, Django Admin, Django Syntax- variables, tags, if-else, loops, Database Connection with MySQL.

Reference Books: -

1. Learning Python-Mark Lutz-O‟Reilly 5th edition
2. MySQL for Python-Albert Lukaszcwskc-Packet publication 1st edition

3. Django 2 by Example (Build powerful and reliable Python web applications from scratch)-Antonio Mele

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SCMPACP-451 Lab 4: Kotlin Lab

Conduct 15 Practical's on the given syllabus

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SCMPACP-452 Lab 5: React JS

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SCMPACP-453 Lab 6: Advanced Python

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SCMPAE-451 A. Cloud Computing

Learning Objectives:

i. To provide students with the fundamentals and essentials of Cloud Computing.
ii. To provide students a sound foundation of the Cloud Computing so that they are able to start using and adopting Cloud Computing services and tools in their real life scenarios.
iii. To enable students exploring some important cloud computing driven commercial systems and applications.
iv. To expose the students to frontier areas of Cloud Computing and information systems, while providing sufficient foundations to enable further study and research.

Course Outcomes:

After successful completion of this course, students should be able to:

i. Explain the core concepts of the cloud computing paradigm: how and why this paradigm shift came, the characteristics, advantages and challenges brought about by the various models and services in cloud computing.
ii. Apply the fundamental concepts in datacenters.
iii. Identify resource management fundamentals and outline their role in managing infrastructure in cloud computing.
iv. Analyze various cloud programming models and apply them to solve problems on the cloud.

Unit I: Introduction to Cloud Computing 06Hrs

Cloud Computing – Overview, cloud computing architecture, Cloud Computing: Architecture – Deployment Models, Cloud Computing: Virtualization,

Unit II Service and Data Management in Cloud Computing 06 Hrs.

Service Level Agreement, Cloud Economics, Managing Data, Introduction to Map Reduce, Open Stack

Unit III: Resource Management and Cloud Security 10 Hrs

Resources in Cloud Computing, Resource management in Cloud, Resource Management for IaaS, Resource Management – Objectives, Challenges, Cloud Computing: Security, Security Issues In Collaborative SaaS Cloud, Broker for Cloud Marketplace

Unit IV Open Source and Commercial Clouds 10 Hrs

Mobile Cloud Computing – Introduction, Need of Mobile Cloud Computing, Key-features of Mobile Cloud Computing, Typical MCC Workflow, Mobile Cloud Computing –Typical Architecture

Unit V: Research trend in Cloud Computing **10 Hrs**

Docker, Docker features, Docker components and architecture, Green cloud, Cloud computing advantages and challenges, Data center (DC) architectures, Sensor Networks and its challenges, Sensor Cloud Computing, Sensor cloud framework, Basic IoT architecture, IoT cloud, Cloud components for IoT

Unit VI: Cloud–Fog Computing **10 Hrs**

Cloud-Fog Paradigm – Overview, Cloud-Fog-Edge/IoT,, Cloud-Fog Paradigm – Resource Management Issues, VM Migration – Basics, Migration strategies, Dew Computing, Serverless Computing, Sustainable Computing

References:

1. Enterprise Cloud Computing: Technology, Architecture, Application, Gautam Shroff, Cambridge University Press
2. Cloud Security, Ronald L. Krutz and Russell Dean Vines, Wiley Publishing, Inc.
3. Beginning Serverless Computing, Maddie Stigler, APress Publication
4. Zen of Cloud, Haishi Bai, CRC Press

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SCMPAE-451 A. Cloud Computing

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SCMPAE-451 B. Software Testing

Learning Objectives:

i. The student should be made to expose the criteria for test cases.
ii. Learn the design of test cases and be familiar with test management and test automation techniques.

Course Outcomes:

i. At the end of the course the students will be able to Design test cases suitable for a software development for different domains.
ii. Identify suitable tests to be carried out and prepare test planning based on the document.
iii. Document test plans and test cases designed and Use of automatic testing tools.

Unit-I Test Automation and STLC **12 Hrs**

What is Automation testing
Software test automation
Advantages of Automation testing
skill needed for automation
scope of automation
design and architecture for automation
requirements for a test tool
challenges in automation
STLC Phases
Types of Testing
Methods of Testing
Static and Dynamic Testing

Unit-II Test Management **10Hrs**

Test Plan Template
Usecase Testing
Scenario Testing
Testcases & Test Data
Testcases Template
Test Design Technique

Unit-III Defect Management **08 Hrs**

What is Defect/Bug?
Reason for Defects in Software

Defect Tracking System
Defect Life Cycle
Attributes of Defect

Unit-IV Introduction to Selenium **10 Hrs**

History of Selenium
Why Selenium tool
Differences between Selenium and other Tools
Different components in Selenium
Installation and Introduction to IDE
Creating first script

Unit-V Selenium WebDriver **08 Hrs**

Web Elements/HTML Elements
Inspecting Web Elements (Using a Browser)
Element Locators – To locate/recognize/identify elements in web pages (Using HTML Locators)
Performing actions on elements (Using WebDriver Commands/Methods)
Page Object Model (Creating Object Repositories)
Waits
Writing Test Cases

Unit-VI TestNG Framework for Selenium **6 Hrs**

Create Test batches
Prioritize Test cases
Execute Test Batches
Inserting Verification Points & Generate test Reports

References:

1. Software Testing Concepts and Tools, Nageswara Rao Dreamtech Publication ISBN 8177227122, 9788177227123
2. Software Testing by Ron Patton, Second Edition, BPB Publication, ISBN-9780672327988
3. Selenium WebDriver Recipes in Java by Zhimin Zhan.

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SCMPAE-451 B. Software Testing

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SCMPAE-451 C. ASP.NET MVC Core

Learning Objectives:

i. Microsoft .NET Core and ASP.NET MVC 6 course would enable the students in understanding Basics of .NET Core and Designing Web Application with ASP.NET MVC 6
ii. Learn how to design Dynamic Web Application
iii. Learn fundamental concepts of Model View and Controller, Creating Controller, Creating and generating Different Views.
iv. Creating and Using Razor View and Partial View.
v. Learn how Create Database Application with Entity Framework
vi. Learn the use of Scaffolding.
vii. Learn HTML Helper and Validations

Course Outcomes:

After successful completion of this course, students should be able to:

i. Learn how to build a simple MVC application using .NET 6
ii. Learn to build Database web applications using Entity Framework.
iii. Configure database connectivity for Entity Framework
iv. Understand and use Validations
v. Learn how to Design the Single Page Web Application

Unit I: Introduction to .NET Core and MVC 6 **10Hrs**

Introduction to .NET Core 6.0
Introduction to MVC 6
NET Web Forms (vs) ASP.NET MVC
Advantages and disadvantages of each
List of Versions of ASP.NET MVC
Differences between versions of ASP.NET MVC
MVC Architecture
Controller and action method, View, and Model
Request Flow in ASP.NET MVC
Overview of Folders and files of MVC project

Unit II: Controllers **10 Hrs**

Introduction to Controllers
Creating Controllers and Actions
Calling action methods thru the browser
Returning from action methods
Parameters in Action methods

ActionLink
URL Routing
The need of URL Routing
Parameters in URL
Default Parameter Values
Parameters with Constraints
Literals in URL

Unit III: Views, and Model **10Hrs**

Introduction to Views (Razor)
ActionResult and ViewResult, Returning a view
Creating a Simple Razor View
Intermingling Code and Markup in Razor Views
View Bag / View Data / Temp Data
Shared Views, ASPX View Engine (vs) Razor
Introduction to LayoutViews
The need of layout views, cshtml
Creating custom layout views
Layout Views with Sections
Partial Views
RenderPartial()
Introduction to Models
Need of models
Creating models using 'CodeFirst approach'

UNIT IV Entity Framework in MVC and Scaffold Templates in MVC 10Hrs

Introduction to Entity Framework
Need of Entity Framework
Creating DbContext and DbSet
Configuring connection string
Introduction to scaffold Templates in MVC
Need of Scaffolding
Creating controllers and views using scaffold
Strongly typed views
Understanding Index, Details, Create, Edit, Delete action methods and views

Unit V: HTML Helpers, Action Filters, and Validations **10Hrs**

Introduction to HTML helpers
DisplayNameFor( ), DisplayFor( )
BeginForm( ), LabelFor()
EditorFor( ), ValidationMessageFor( )
RadioButtonFor( ), DropDownListFor( )
ListBoxFor( ), CheckBoxFor( )
AntiForgeryToken()
Introduction to action filters
Introduction to Validations

Model level validations (vs) View level validations
Importing jQuery Validation Plug in
[Required], [RegularExpression]. [Range]
[StringLength], [Compare], [Remote], IsValid

Unit VI: Advanced Programming, Security and Deployment 10 Hrs

ASP.NET Core Pipeline
ASP.NET Core Filters
Creating Custom Filters
Dependency Injection (DI)
Implementing DI in ASP.NET Core
Built-In Container Service
ASP.NET Core Environments
Exceptions Handling and Logging
Authentication and Authorization
Deploying Web Application
Deployment (docker, azure, aws)
Running in Production Build Web Application

References:

1. Pro ASP.NET Core 6: Develop Cloud-Ready Web Applications Using MVC, Blazor, and Razor Pages 9th ed. Edition -Adam Freeman
2. High Performance Enterprise Apps using C# 10 and .NET 6 Ockert J. du Preez
3. Programming ASP.NET Core Paperback – 1 January 2019 by Dino Esposito (Author)

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SCMPAE-451 C ASP.NET MVC Core

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SCMPAOJ-451 On Job Training, Internship/ Apprenticeship or Field Project

Student should complete On Job Training / Internship/ Apprenticeship or Field Project

Report of one the above should be submitted