SHIVAJI UNIVERSITY, KOLHAPUR - 416004,
MAHARASHTRA
PHONE:EPABX-2609000, www.unishivaji.ac.in, bos@unishivaji.ac.in
शिवाजी विद्यापीठ, कोल्हापूर -४१६००४,महाराष्ट्र
दूरध्वनी-ईपीएबीएक्स -२६०९०००, अभ्यासमंडळे विभाग दुरध्वनी ०२३१—२६०९०९४

Estd. 1962
"A++" Accredited by
NAAC (2021)
With CGPA 3.52

Ref./SU/BOS/Com & Mgt./ 157 **Date : 25/05/2026**

The Principal
All Concerned Affiliated Colleges/ Institutions,
Shivaji University, Kolhapur

Subject : Regarding syllabi of B. Com. Part-III Information Technology (IT) (Sem. V & VI) degree programme under the Faculty of Commerce & Management as per National Education Policy, 2020

Sir/Madam,

With reference to the subject mentioned above, I am directed to inform you that the University authorities have accepted and granted approval to the revised syllabi of **B. Com. Part-III Information Technology (IT) (Sem. V & VI)** under the Faculty of Commerce & Management as per National Education Policy, 2020

This syllabi shall be implemented from the academic **year 2026-2027** onwards. A soft copy containing the syllabus is attached herewith and it is also available on university website www.unishivaji.ac.in (Online Syllabus).

The question paper on the pre-revised syllabi of above mentioned programme will be set for the examinations to be held in October/November 2026 & March/April, 2027. These chances are available for repeater students, if any.

You are therefore, requested to bring this to the notice of all students and teachers concerned.

Thanking you,

Yours faithfully,

Dy. Registrar

Encl: As above

for Information and necessary action

Copy to:

1	The I/c Dean, Faculty of Commerce & Management	6	Appointment Section A & B
2	The Director, Board of Examinations and Evaluation	7	I.T.Cell /Computer Centre
3	The Chairman, Respective Board of Studies	8	Eligibility Section
4	B. Com. Section	9	Affiliation Section (T.1) (T.2)
5	Internal Quality Assurance Cell (IQAC Cell)	10	P.G. Seminar Section

SHIVAJI UNIVERSITY, KOLHAPUR

Estd. 1962,
NAAC "A++" Grade

Faculty of Commerce and Management

Syllabus for
Bachelor of Commerce (IT) (B. Com IT)
Part III (SEM-V & VI)

CBCS Course Structure to be implemented from Academic Year 2026-27
(Under NEP 2.0)

(Subject to the modifications that will be made from time to time)

SEMESTER V

S. No.	Course Code	Course Title	L	P	Credit	Theory			Practical	
						Int	Uni	Total	Int	Uni
1	DSC13	RDBMS	4		4	20	80	100		
2	DSC14	System Analysis and Design	4		4	20	80	100		
3	DSM4	Cooperative Development	4		4	20	80	100		
4	DSM5	Income tax	2		2	10	40	50		
5	VSC4	Web Technology-III	2		2	10	40	50		
6	DSE1.1	Block Chain Technology	4		4	20	80	100		
	DSE1.2	Web Application Security								
	DSE1.3	Network Security								
7	DSC15	Lab on VSC4		2						50
8	DSC16	Lab on DSC13		2						50
9	FP2	Field Project		2	2					50
TOTAL					22	100	400	500		150

SEMESTER VI

S. No.	Course Code	Course Title	L	P	Credit	Theory			Practical	
						Int	Uni	Total	Int	Uni
1	DSC17	Java Programming	4		4	20	80	100		
2	DSC18:	Foundations of Linux	4		4	20	80	100		
3	DSM6:	Business Law	4		4	20	80	100		
5	DSE2:1	Data Centre Management	4		4	20	80	100		
	DSE2: 2	Data Warehousing								
	DSE2: 3	Design Thinking and Innovation								
6	DSC19	Lab on DSC17			2					50
7	OJT1	On Job Training		4	4				20	80
TOTAL					22					

SEMESTER-V

Course Code	Cours Title	L	T	P	Credit	Theory			Practical	
DSC13	RDBMS	4			4	**Int**	**Uni**	**Total**	**Int**	**Uni**
						20	80	100		
Course Outcomes (COs):	CO1: To understand core concepts of RDBMS CO2: To identify programing features of RDBMS CO3: To analyze the role of data manipulation commands in RDBMS CO4: To identify the programing features of RDBMS through PL/SQL									
Prerequisite										Hrs.
UNIT I	**Introduction to DBMS & RDBMS:** File systems vs. Database systems. Data abstraction, data independence, and architecture. Key terminology: Tables (Relations), Rows (Tuples), Columns (Attributes). Entity-Relationship (ER) Model. Mapping ER Diagrams to Relational Tables. Keys: Primary, Foreign, Candidate, Super, Unique keys. Database Constraints: NOT NULL, CHECK, Referential Integrity.									15
UNIT II	**Relational Database Design (Normalization):** Functional Dependencies. Normalization Forms: 1NF, 2NF, 3NF, BCNF. Lossless and Dependency Preserving Decomposition.									15
UNIT III	**Structured Query Language (SQL):** **DDL (Data Definition Language):** Create, Alter, Drop, Truncate. **DML (Data Manipulation Language):** Insert, Update, Delete, Select with WHERE, ORDER BY, GROUP BY, HAVING. **Joins:** Inner, Left, Right, Full. **Built-in Functions:** Numeric, Character, Date, Aggregate Functions (SUM, AVG, COUNT, MAX, MIN).									15
UNIT IV	**PL/SQL Basics:** Introduction to PL/SQL architecture, Variables, constants, and data types (scalar, composite, %TYPE, %ROWTYPE attributes), Control structures: Conditional statements (IF-THEN-ELSE, CASE) and loops (LOOP, WHILE, FOR, cursor FOR loops), **Cursors:** Understanding and managing explicit cursors, their attributes, and parameterized cursors, **Triggers:** Creating DML, DDL, and database event triggers									15
Text Books/ Reference Books	1. Database Systems Using Oracle – Second edition – Nilesh Shah – PHI 2007 2. Database system concepts –Henry F.Korth. 3. Oracle 9i Complete reference – Loney Koch – Tata Mc Graw Hill 2005									

Course Code	Cours Title	L	T	P	Credit	Theory			Practical	
DSC14	System Analysis and Design	4			4	Int	Uni	Total	Int	Uni
						20	80	100		
Course Outcomes (COs):	1. Understand life cycle models, requirement elicitation techniques, understand the concept of analysis and design of software. 2. Develop SRS document. 3. Use of analysis and design tools for system development. 4. Apply software engineering concepts in software development to develop quality software.									
Prerequisite										Hrs.
UNIT I	**Basic Concepts of System** Definition and Concepts; Elements of a System: Input, Output Processor, Control, Feedback, Environment, Boundaries and Interface; Characteristics of a System; Types of systems -Physical and Abstract System, Open and Closed Systems, Man-made Systems; Information and its categories									15
UNIT II	**System Development Life Cycle** Introduction to SDLC, Various phases: study, analysis, design, development, testing, implementation, maintenance; System documentation: Types of documentation and their importance. System Development Models: Waterfall Model, Incremental and Iterative, Agile Methodology, Spiral Model, Prototyping Model									15
UNIT III	**System Analysis and Design** Data Flow Diagram (DFD), Developing DFD; System Design Module specifications, Module Coupling and cohesion, Input and Output Input design: Input data, Input media and devices; Output design; Form Design: Classification of forms, Requirements of Form design.									15
UNIT IV	**System Implementation and Maintenance** Need of System Testing, Types of System Testing, Quality Assurance; System Conversion, Conversion methods, procedures and controls, System evaluation and performance, Maintenance activities and issues. System Security Threats, Control measures, System Audit, Disaster Recovery Planning									15
Text Books/ Reference Books	1. Software Engineering a Practitioners Approach by S. Pressman & Roger, Seventh Edition, McGraw Hill International Edition. 2. Software Engineering by Sommerville, , 7th edition, Pearson Publication 3. Software Engineering by K.K. Aggarwal & Yogesh Singh, New Age International Publishers. 4. Software Engineering: Concepts and Practices by Suman edition-02 Cengage Publication 5. Web sites of NPTEL / Swayam 6. www. edx.com									

Course Code	Cours Title	L	T	P	Credit	Theory			Practical	
DSM4	Cooperative Development	4			4	**Int**	**Uni**	**Total**	**Int**	**Uni**
						20	80	100		
Course Outcomes (COs):	1. Study the meaning and principles of Co-operation. 2. Study the agricultural and Non-agricultural Credit Co-operative institutions. 3. Study the Co-operative credit system 4. Study the important cooperative organizations									
Prerequisite										Hrs.
UNIT I	Introduction to Co-operative movement in India 1.1 Meaning ,definition and features of Co-operation. 1.2 Principles of Co-operation-ICA and Manchester Principles 1.3 Role of Co-operation in economic development. 1.4 Review of Committees on Cooperative Development since 1991 (Vaidhyanathan Committee, Shivajirao Patil Committee)									15
UNIT II	Agricultural Co-operatives in India 2.1 Co-operative Marketing-Types, functions, problems and remedies 2.2 NAFED-Objectives, Management, Functions and Progress 2.3 Co-operative Farming -Types, problems and remedies 2.4 Role of Dairy Cooperatives –problems and remedies									15
UNIT III	Co-operative Banking & Credit Societies in India 3.1 Review of Co-operative credit movement –Three Tier and Two Tier Structure 3.2 PrimaryAgriculturalCooperativeSocieties-Functions,ProblemsandRemedies 3.3 DCC Banks-Administrative Structure, Progress, Problems and Remedies 3.4 State Cooperative Banks-Administrative Structure ,Progress, Problem sand Remedies									15
UNIT IV	Important Cooperative Organizations in India 4.1 Urban Cooperative Banks-Types, Management, Progress and Problems 4.2 Non-Agriculture Credit Cooperatives-Functions and Problems 4.3 Consumer Cooperatives-Types, Role and Problems 4.4 Sugar Co-operatives -Role, Progress, problems and remedies									15
Text Books/ Reference Books	Dwivedi Ramesh Chandra, (2005), „Hundred Years of Cooperative Movement in India"-Centre for Promotion of Cooperatiism • Garg M. C. And Joshi N. N., (2009), „Cooperative Credit And Banking –Strategies For Development", Deep And Deep Publication, New Dehli-110027 • Hajela T.N., (1994)Cooperation: Principles, Problems and Practice, Konark Publishers, N.Delhi. • Krishna swamy O.R. and Kulandhiswamy V.(2000) Cooperation: Concept and Theory, Arudra Academy, • Kulkarni P.R.(2007) Laws of Co-operative Banking, Macmillan Publisher India Ltd.pp.24-25 (2007) • MaharashtraRajyaSahakariDudhMahasanghMaryadithttp://www.mahanand.in/ • NAFEDhttp://www.nafed-india.com • NakkiranS (2006) Cooperative Management :Principles and Techniques, Deep and Deep, New Delhi, 2006 • National Dairy Development Board-https://www.nddb.coop/ • Review of Co-operativeMovementinIndia"sAgriculturalCreditDepartment,RBI.pp.59-60. • Strickland C.F., (2010) „An Introduction To Cooperation In India" Humphery Milford Oxford University Press. • The Maharashtra Co-operative Quarterly, The Maharashtra Rajya Shahakar Sanghah									

Course Code	Cours Title	L	T	P	Credit	Theory			Practical	
DSM5	Income Tax	2			2	**Int**	**Uni**	**Total**	**Int**	**Uni**
						10	40	50		
Course Outcomes (COs):	CO1: To understand the basic concepts of income tax and basis of charge CO2: To identify the residential status and its implication on tax liability									
Prerequisite										Hrs.
Unit- I	**Basic Concepts:** A) Meaning of Income Tax, Basis of Charge, Concepts of Previous Year, Assessment Year, Person, Income, Assessee. B) Residential Status and Taxability- Meaning of Residential Status, Provisions for determination of Residential status and tax liability in respect of individual and HUF, Determination of Residential Status of Firms and Companies									15
Unit II	Exemptions, Deductions and Rates of Tax Exemptions under section 10 and Deductions under Chapter VI A, Tax Rates for current Assessment Year for Individual Assessees Computation of Taxable Income and Tax Liability of Individual Assessee.									15
Text Books/ Reference Books	1. Prasad Bhagwati –Income Tax Law & Practice, New Delhi : Wishwa Prakashan , 1996 2. Dinkar Pagare –Income Tax Law and Practice, S. Chand, New Delhi 3. Manoharan, T.N. - Direct Taxes : Snow White Publications, New Delhi 16 4. S.S. Gupta - How to need your obligation-April 2017 5. Dr. V.K. Singhania and Dr. Monica Singhania - Students‟ Guide to Income Tax and GST, Taxmann, New Delhi									

Course Code	Cours Title	L	T	P	Credit	Theory			Practical	
VSC4	Web Technology- III	2			2	**Int**	**Uni**	**Total**	**Int**	**Uni**
						10	40	50		
Course Outcomes (COs):	CO1: To understand server-side logic and web application development through PHP CO2.To integrates the File handling and database skills to store and retrieve data through PHP.									
Prerequisite										Hrs.
Unit I	**Core PHP Programming** **Introduction to PHP:** Syntax, variables, data types, operators, and language constructs. **Control Structures:** Conditional statements (if-else , switch) and loops (for , while , foreach). **Functions:** Creating and using user-defined functions, passing arguments, variable scope, and using built-in functions. **Arrays & Strings:** Working with enumerated, associative, and multi-dimensional arrays, and using string manipulation functions and regular expressions. **Form Handling:** Processing form data using GET and POST methods, and implementing form validation.									15
Unit: II.	**File and Database Management (MySQL)** **File Handling:** Reading from and writing to files, handling file uploads, and managing directories. **PHP & MySQL Integration:** Connecting PHP to a MySQL database, executing queries, and performing CRUD (Create, Read, Update, Delete) operations **Session & Cookie Management:** Managing user sessions and storing data using cookies for state management.									15
Text Books/ Reference Books	1. Steven Holzner, "PHP: The Complete Reference Paperback", McGraw Hill Education (India), 2007. 2. Timothy Boronczyk, Martin E. Psinas, "PHP and MYSQL (Create-Modify-Reuse)", Wiley India Private Limited, 2008. 3. Robin Nixon, "Learning PHP, MySQL, JavaScript, CSS & HTML5", 3rd Edition Paperback, O'reilly, 2014. 4. Luke Welling, Laura Thompson, PHP and MySQL Web Development", 4th Edition, Addition Paperback, Addison-Wesley Professsional,2008. 5. David Sklar, Adam Trachtenberg, "PHP Cookbook: Solutions & Examples for PHP Programmers", 2014.									

Course Code	Cours Title	L	T	P	Credit	Theory			Practical	
DSE1.1	Block Chain Technology	4			4	**Int**	**Uni**	**Total**	**Int**	**Uni**
						20	80	100		
Course Outcomes (COs):	1. Understand the structure of Blockchain 2. Identify basics of cryptocurrency. 3. Analyze different Blockchain Vulnerabilities. 4. Determine various applications of Blockchain.									
Prerequisite										Hrs.
UNIT I	**Introduction to Blockchain Technology:** Why blockchain matters more than you think, What is Blockchain?,How does a Blockchain work, The origins of blockchain, Blockchain Applications. Basic Cryptography: Blockchain came from Bitcoin, Why is Blockchain a Distributed, P2P Network?, Blockchain Vs Cryptocurrency, Types of Blockchain.									15
UNIT II	**Overview of Blockchain.** Basics of Blockchain: Blockchain Technology, The Evolution of Blockchain Technology, Blockchain Technology – Basics, Introduction to the Decentralized Web Introduction to Distributed Ledgers, Merkle Tree and Hashing, Blocks, Wallets, and Addresses, Public and Private Key. Consensus Algorithms: Cryptography and Cryptographic Algorithms, Transaction Execution and Distribution, Components of Blockchain Ecosystem, Blockchain Architecture. Cryptocurrency and Bitcoin, Benefits of using Blockchain Technology, The Origin of BlockchainCompleted, Blockchain came from Bitcoin. Basic Understanding of Blockchain: Why blockchain matters more than you think What is Blockchain and what is it going to change The Origin of Blockchain, A deeper dive into understanding Blockchain									15
UNIT III	**Smart Contracts**: Introduction to smart contracts, Introduction to smart contracts platforms, Smart contract structure, Development, Deployment & Testing of smart contracts, Use cases & case studies. Solidity Programming Language: Basics of solidity, Variables & Data types, Control structures, Functions & modifiers, Events & logging, Storage & memory management, Error handling. Developing Smart Contracts: Setting up Developing Environment, Creating first smart contract, Solidity fundamentals, Smart contract interactions.									15
UNIT IV	**Decentralized Applications (DApps):** Introduction to Decentralized Applications(DApps), Blockchain platforms for DApp development, Development Environment set up, Front End development for DApps, Structure of DApp, DApp development.									15

	Use Cases of Smart Contracts and DApps: Use cases of Smart Contracts & DApps. Legal Considerations: Security Challenges & Measures, Smart contract platforms, Smart Contract Implementation Ricardian Contracts & Smart Contracts Practice.	
Text Books/ Reference Books	The Basics of Bitcoins and Blockchains by Anthony Lewis, Two Rivers Distribution Blockchain Explained: A Pragmatic Approach by Srihari Kapu, Blockchain Technology by Chandramouli Subramanian , University Press India Andreas M. Antonopoulos and Gavin Wood, "Mastering Ethereum: Building Smart Contracts and DApps", O"Reilly Melanie Swan, "Blockchain: Blueprint for a New Economy", O"Reilly Hands-On Smart Contract Development with Solidity and Ethereum: From Fundamentals to Deployment Paperback – 6 December 2019 by David Hoover, O" Really 3. Smart Contracts and Comparative Law: A Western Perspective by Andrea Stazi, Springer Publications	

Course Code	Cours Title	L	T	P	Credit	Theory			Practical	
DSE1.2	Web Application Security	4			4	**Int**	**Uni**	**Total**	**Int**	**Uni**
						20	80	100		
Course Outcomes (COs):	CO1. Analyze recent web application attacks, understanding the methodologies used and the impact of such attacks. CO2.Develop skills in incident response and handling, learning to effectively manage and mitigate security breaches. CO3. Stay updated on emerging trends and technologies in web application security, preparing them for future challenges. CO4. Gain practical experience through hands-on labs and exercises, applying their knowledge to real-world scenarios and reinforcing their skills in web application security.									
Prerequisite										Hrs.
UNIT I	Web Application Security Fundamentals**:** Introduction to CIA, Authentication, Authorization and basic terminologies related to W.A.S. Overview of Web Application Security (Introduction, Web Functionality and security aspect) and Importance of Web Application Security in Modern Computing, Common Vulnerabilities and Exposures (CVEs) in Web Applications, Understanding the Threat Landscape, OWASP top 10 introduction, Important protocols for W.A.S. : HTTP, HTTPS, FTP, SMTP, DNS, SSH (Secure Shell), ICMP, TLS/SSL, Kerberos, OAuth, IPsec, API analysis and Third-party dependencies									15
UNIT II	Web Application Penetration Testing (WAPT) Overview of VAPT & WAPT, Cyber Kill chain, Information Gathering, Active & Passive Reconnaissance, Advanced Reconnaissance Techniques using OSINT, Client-Side Testing: XSS and its types, Cross-Origin Resource Sharing (CORS), ServerSide Testing: SQL injection and its types, Server-Side Request Forgery (SSRF), XML External Entity (XXE) Injection, Advanced Exploitation Techniques: Remote File Inclusion (RFI), Server-Side Template Injection (SSTI), User Attacks: Inducing User Actions, Capturing Cross-Domain Data, Client-Side Injection Attacks, Local Privacy Attacks, ActiveX Control attacks, Browser Attacks									15
UNIT III	Advance Defensive Strategies Advanced Input Validation Techniques, Securing Authentication and Authorization Mechanisms, API security and Secure configuration of cloud resources, Secure Session Management(IAM), File Security Principles, Web Application Firewalls (WAF) and Intrusion Detection Systems (IDS) Secure Coding Practices and Development Guidelines(Approaches to Code Review, Signatures of Common Vulnerabilities)									15

UNIT IV	Incident Management in Web Application Security Incident response lifecycle and IR plan, Incident Response and Handling in Web Application Security, Legal and Ethical, Implications of Web Application Security Testing, Emerging Trends and Technologies in Web Application Security , Real-world Applications and Case Studies Case Studies of Recent Web Application Attacks, Understanding Real world red teaming Web Application attacks,	15
Text Books/ Reference Books	1. Windows Server 2019 Cookbook: Over 100 recipes to effectively configure networks, manage security, and administer workloads, 2nd Edition Paperback – Import, 22 July 2020 by Mark Henderson (Author), Jordan Krause (Author) 2. Hacking Exposed Web Applications, 3rd edition, JOEL SCAMBRAY, VINCENT LIU, CALEB SIMA 3. The Web Application Hacker's Handbook Discovering and Exploiting Security Flaws By DafyddStuttard, Marcus Pinto 4. Rich Bowen, Ken Coar, “Apache Cookbook”, O‟Reilly 5. Web Application Security, A Beginner's Guide, Bryan Sullivan, Vincent Liu, 2011,	

<table>
<tr><th>Course Code</th><th>Cours Title</th><th>L</th><th>T</th><th>P</th><th>Credit</th><th colspan="3">Theory</th><th colspan="2">Practical</th></tr>
<tr><td rowspan="2">DSE1.3</td><td rowspan="2">Network Security</td><td rowspan="2">4</td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2">4</td><td>Int</td><td>Uni</td><td>Total</td><td>Int</td><td>Uni</td></tr>
<tr><td>20</td><td>80</td><td>100</td><td></td><td></td></tr>
<tr><td>Course Outcomes (COs):</td><td colspan="10">CO1: Analyze recent web application attacks, understanding the methodologies used and the impact of such attacks.
CO2: Develop skills in incident response and handling, learning to effectively manage and mitigate security breaches.
CO3: Stay updated on emerging trends and technologies in web application security, preparing them for future challenges.
CO4: Gain practical experience through hands-on labs and exercises, applying their knowledge to real-world scenarios and reinforcing their skills in web application security.</td></tr>
<tr><td>Prerequisite</td><td colspan="9"></td><td>Hrs.</td></tr>
<tr><td>UNIT I</td><td colspan="9">Introduction to Network security, Model for Network security, Model for Network access security, Real-time Communication Security: Introduction to TCP/IP protocol stack, Implementation layers for security protocols and implications, IPsec: AH and ESP, IPsec: IKE.</td><td>15</td></tr>
<tr><td>UNIT II</td><td colspan="9">Media- Based-Vulnerabilities, Network Device Vulnerabilities, Back Doors, Denial of Service (DoS), Spoofing, Man-in-the-Middle, and replay, Protocol -Based Attacks, DNS Attack, DNS Spoofing, DNS Poisoning, ARP Poisoning, TCP/IP Hijacking, Virtual LAN (VLAN), Demilitarization Zone (DMZ) , Network Access Control (NAC), Proxy Server , Honey Pot , Network Intrusion Detection Systems (NIDS) and Host Network Intrusion Prevention Systems Protocol Analyzers, Internet Content Filters, Integrated Network Security Hardware</td><td>15</td></tr>
<tr><td>UNIT III</td><td colspan="9">Authentication: Kerberos, X.509 Authentication Service, Scanning: Port Scanning, Port Knocking- Advantages, Disadvantages. Peer to Peer security. Electronic Mail Security: Distribution lists, Establishing keys, Privacy, source authentication, message integrity, non-repudiation, proof of submission, proof of delivery, message flow confidentiality, anonymity, Pretty Good Privacy (PGP)</td><td>15</td></tr>
<tr><td>UNIT IV</td><td colspan="9">Firewalls and Web Security: Packet filters, Application level gateways, Encrypted tunnels, Cookies. Assignments on latest network security techniques, Security applications in
wireless sensor network and wireless Communication networks</td><td>15</td></tr>
<tr><td>Text Books/ Reference Books</td><td colspan="10">William Stallings, “Cryptography and Network Security – Principles and Practices”, Prentice Hall of India, Third Edition, 2003.
Cisco: Fundamentals of Network Security Companion Guide (Cisco Networking Academy Program).
Saadat Malik, Saadat Malik. “Network Security Principles and Practices (CCIE Professional</td></tr>
</table>

	Development)". Pearson E ducation. 2002. (ISBN: 1587050250) . Mark Ciampa "Security + Guide to Network Security Fundamentals/Edition 3" Cengage Learning publisher, ISBN-10: 1428340661, ISBN-13: 978-1428340664

Course Code	Cours Title	L	T	P	Credit	Theory			Practical	
DSC15	Lab on VSC4	2			2	**Int**	**Uni**	**Total**	**Int**	**Uni**
						10	40	50		
Course Outcomes (COs):	After completion of this course students will be able to – CO1: Apply fundamental concepts of PHP through programs CO2. Implement Database connectivity through MySQLfor manipulating data.									
Prerequisite										Hrs.
Programs	i) Arithmetic Operations on 2 numbers(real) ii) Percentage of Student in 5 Subjects iii) Convert Degree Celsius To Degree Fahrenheit iv) Calculate Simple Interest. v) Display type of given value.(gettype()) Decision Making - I: i) Check Integer is even or odd ii) Maximum Between 3 numbers iii) Leap Year or Not iv) Grade of a student from Percentage Decision Making - II: Check whether given variable stores an integer, float, Boolean, null, array, string, resource. Iterative - I: i) Factorial of natural number ii) Number of digits, sum of digits, reverse number and palindrome or not iii) Prime number (using break) iv) Permutation of 1,2,3(using continue) v) Patterns: Triangles, Pyramids Array - I: Create an array and display array and Smallest, Largest, Sum, Average of integer numeric array Array – II: i) Create two arrays and merge them. ii) Create array and reverse it. iii) Create associative array and fetch value array and key array from it. MySQL – I Initial: Connect to mysql database, create own database, choose database, create a table using PHP MySQL – II Manipulation: To manipulate data in a table using PHP i) insert record in a table ii) update record in a table iii) delete record from a table MySQL – III Selection: To display contents of table using PHP i) All records ii) First 10 records iii) Using criteria iv) Using order by particular column									

<table>
<tr><th>Course Code</th><th>Cours Title</th><th>L</th><th>T</th><th>P</th><th>Credit</th><th colspan="3">Theory</th><th colspan="2">Practical</th></tr>
<tr><td rowspan="2">DSC16</td><td rowspan="2">Lab on DSC13</td><td rowspan="2">2</td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2">2</td><td>Int</td><td>Uni</td><td>Total</td><td>Int</td><td>Uni</td></tr>
<tr><td>10</td><td>40</td><td>50</td><td></td><td></td></tr>
<tr><td>Course Outcomes (COs):</td><td colspan="10">After completion of this course students will be able to –
1. To develop basic applications using PHP technology
2. To develop applications in PHP using MySQL..</td></tr>
<tr><td>Prerequisite</td><td colspan="9"></td><td>Hrs.</td></tr>
<tr><td>Programs</td><td colspan="9">Create the following relations-
Customer, Account, Loan,Branch , Depositor , Borrower, Supplier.
Perform following DDL operations on the relations
• Alter :Add-add columnsAdd-constraints
• Modify-modify the data type and size
• Drop-delete column
Perform following DML operations
• Insertion of records
• Arithmetic, Logical, Comparison operations
• String Operations
• Aggregate functions
• Aggregate functions with group by and having clause
• Nested sub-queries
• Update records
PL/SQL programs
Reverse the String
• Factorial of given number
• Pay Roll preparation and updation using cursor and trigger
• Student Mark Sheet Preparation and updation using cursor and trigger</td><td>15</td></tr>
</table>

Course Code	Cours Title	L	T	P	Credit	Theory			Practical	
FP2 CEP2	Field Project			2	2	**Int**	**Uni**	**Total**	**Int**	**Uni**
							50	50		
Course Outcomes (COs):	CO1: Understand domain knowledge of Relational Database Management System CO2. Identify the implementation of Relational Database Management System									

Guidelinesfor Project

1. A group of maximum two to four students prepare a Field project under the guidance of internal teacher.
2. Students should adopt Field Visit approach
3. Students should visit any organization and collect the information about RDBMS used by the organization
4. Number of Copies: The student should submit one Spiral copy of the Field Project Report to College /University & also prepare one individually spiral copy. 5

. The Field project report is duly signed by Principal or Head of Department, Project Guide and Student.

Guidelines for submission of the Project Report.

a. Paper: The Report shall be typed on white paper, A4 size, for the final submission. The report to be submitted must be original and subsequent copies may be photocopied on any paper.

b. Typing: The typing shall be of standard letter size, 1.5 spaced and on both side of the paper. (Normal text should have Times New Roman, Font size 12. Headings can have bigger size)

c. Margins: The typing must be done in the following margins: Left 1.5 inch, Right ----- 1-inch Top------ 1 inch, Bottom 1 inch

d. Front Cover: The front cover should contain the following details:

TOP: The title in block capitals of 6mm to 15mm letters.

CENTRE: Full name in block capitals of 6mm to 10mm letters.

BOTTOM: Name of the University, Course, Year of submission -all in block capitals of 6mm to 10mm letters on separate lines with proper spacing with center alignment.

Documentation Format

a) Cover Page
b) Institute/College Recommendation
c) Guide Certificate
d) Declaration
e) Acknowledgement
f) Index
g) Chapter Scheme
1) Organization Profile
2) Objectives of Tally
3) Scope of tally
4) Features of Tally
5) Advantages and Disadvantages of Tally
6) Reports (with valid data minimum 4 reports)
7) Conclusion

SEMESTER-VI

Course Code	Cours Title	L	T	P	Credit	Theory			Practical	
DSC17	Java Programming	4			4	**Int**	**Uni**	**Total**	**Int**	**Uni**
						20	80	100		
Course Outcomes (COs):	CO1: Understand the basics of Java Programing. CO2: Identify the Object Oriented Structure of Java Programing. CO3: Analyze the error handling and multithreading mechanism of Java programing CO4: Identify the GUI programing features of Java programing									
Prerequisite	Knowledge of Problem Solving Techniques using C, C++ programming language									Hrs.
UNIT I	**Introduction:** JDK, JRE, JVM architecture, setting up the environment, and first program. Data types, variables, type casting, operators (arithmetic, logical), and control statements (if-else, switch, loops).									15
UNIT II	**Object-Oriented Programming (OOP)** Classes, objects, constructors, method overloading, inheritance, method overriding, this and super keywords, encapsulation, and abstraction (interfaces/ abstract classes).									15
UNIT III	**Advance Features:** Exception handling (try-catch-finally, throw), String handling (String, StringBuilder), and wrapper classes. Multithreading (Thread class, Runnable, synchronization), File I/O (InputStream, OutputStream, File handling).									15
UNIT IV	**GUI Programing** Differences between command-line applications and GUI applications, Overview of Java AWT framework, AWT Components: Frame, Panel, Basic Controls: Button, Label, TextField, TextArea, Checkbox, Choice, List, Layout Management: FlowLayout, BorderLayout, GridLayout, CardLayout, Event Handling: Event-driven programming concepts, Event classes and listener interfaces.									15
Text Books/ Reference Books	1. Programming with JAVA, A Primer by E Balagurusamy 2. Herbert Schildt, Java 2: The Complete Reference, Tata McGraw-Hill 3. The Java Tutorials: http://docs.oracle.com/javase/tutorial/) 4. The Java Tutorials of Sun Microsystems Inc 5. Java Complete Reference by Patric Norton 6. Core Java Vol. I (Addison- Wesley) Sun Press ISBN – 981-405-861-0 2. Core Java Vol. II (Addison- Wesley) Sun Press ISBN – 981-4058-50-5 7. Thinking in Java, Bruce Eckel,, Addison – Wesley, ISBN: 9814035750 8. Java 2 Programming Black Book by Steven Holzner, Dream Tech Publication									

Course Code	Cours Title	L	T	P	Credit	Theory			Practical	
DSC18	Foundations of Linux	4			4	**Int**	**Uni**	**Total**	**Int**	**Uni**
						20	80	100		
Course Outcomes (COs):	CO1: To understand fundamental concepts of Linux. CO2: To identify the techniques of Linux System administration. CO3: To implement basic commands in Linux CO4: To devlop shell scripts for commands and systems calls in Linux									
Prerequisite										Hrs.
UNIT I	**Introduction to the Linux** Environment History and evolution of the Linux operating systems, Comparison between free and proprietary software, Pros and cons of using Linux, Popular Linux distributions An overview of the Linux environment, Linux Architecture, Introduction to the Bourne Shell (bash) The vim editor									15
UNIT II	**Linux System Administration** Devices and file system management, User management, managing basic file system permissions Configuring the system - display, network, desktop, etc. System configuration files, System start-up and shutdown, Backup and system recovery Tools, An introduction to common applications and file formats on Linux, An introduction to tools for Linux development									15
UNIT III	**Introduction to the CLI** Shell environment, commands, syntax, options, getting help Basic commands and utilities File system navigation and manipulation Process Management Command line processing I/O redirection and filters									15
UNIT IV	**Basic Shell Scripting** The built-in constructs of the shell, Basics of filters and regular expressions, Common Linux Commands using shell scripts, Programming using system calls under Linux, utility programs, Examples									15
Text Books/ Reference Books	1. LINUX with Operating System Concepts by Richard Fox, CRC Press 2. Linux Commands- Instant Reference by Bryan PF affenberge 3. The Design of the Unix Operating System- Bach Page | 9 4. Unix Shell Programming- Yashwant Kanetkar 5. Unix Concepts and Application – Sumitabhadas 6. Linux : The Complete Reference- Richard Peterson									

Course Code	Cours Title	L	T	P	Credit	Theory			Practical	
DSM6	Business Law	4			4	**Int**	**Uni**	**Total**	**Int**	**Uni**
						20	80	100		
Course Outcomes (COs):										
Prerequisite										Hrs.
UNIT I	Indian Contract Act 1872 & Sale of Goods Act 1930 A) Indian Contract Act Meaning of Business Law, sources of Business Law, Agreements, Contract- kinds of contracts: Valid, Void, Voidable, Contingent and Quasi Contract and E-contract, distinguish between Agreement and Contract. Offer or Proposal- definition, Essentials of Valid proposal or offer, counter offer, Standing or open offer, distinguish between offer and invitation to offer. Acceptance-definition, Essentials of a valid acceptance, Promise. Communication of Offer and acceptance and Revocation. Capacity to contract, Free Consent ,Consideration Discharge of Contract and Remedies for breach of contract B) Sale of Goods Act 1930 Introduction, Definition, Essentialities of the contract of sale, Duties of Seller & Buyer, Distinction between „sale" and „agreement of sell, Distinction between „sale and hire-purchase agreement" Conditions and Warranties, Distinguish between condition and warranties, Transfer of property as between the seller and the buyer, Rights of an unpaid seller									15
UNIT II	Indian Companies Act, 2013: A) Procedure of Incorporation of Company, Definition and Nature of Company Promoters and preliminary contract Types of Companies: Chartered Companies Statutory Companies, Registered companies under the Act. OPC, Companies limited by shares, Companies Limited by guarantee, Private Company, Public Company, Producer Companies Formation of Companies with charitable objects, Holding Company and Subsidiary company, Small Company, Dormant Company. Procedure for Incorporation of Company, Effect of Incorporation. Membership of a company, Rights and Liabilities of Members Documents: Memorandum of Association and Articles of Association: Meaning: Concept, Clauses. Prospectus. Meaning, When to be issued, When not required, Various kinds of prospectus, Contents of Prospectus, Private Placements. B) Meetings and Winding up of company Meetings: Purpose, types of meeting, concepts of quorum-proxy, resolution, types of resolution Winding Up of Company: Meaning, various modes of winding up of company.									15
UNIT III	Negotiable instruments Act 1881: A) Meaning and Characteristics of Negotiable Instrument, Negotiation and Endorsement, Kinds of Endorsement, Holder and Holder in Due Course B) Classification of Negotiable Instruments. Promissory Notes and Bills of Exchange, Essential elements of Promissory Note and Bill of Exchange, distinguish between Promissory note and Bill of Exchange, Cheque: Meaning, Types of Cheque, crossing the cheque, Types of Crossing,									15

	dishonor of cheque and Penalties in case of dishonor of certain cheques, distinguish between cheque and Bill of exchange.	
UNIT IV	Intellectual Property Rights : A) Copyrights, Trade Marks and patents : Copy Right Act 1957: Meaning and definition of IPR, Silent features of IPR Acts Meaning of copyright, what works are protected under copyright, rights of copyright owner, Importance of copyright act, Term & duration, Procedure for registration of copy right, Rights of owner for Infringement of copyright Trade Mark and Merchandise Act 1999: Meaning, functions of Trade mark, Types of Trade Marks, rights of Trade mark owner, Importance of Trade mark Act, Term & duration, Procedure for registration of Trademark, Rights of owner for Infringement of Trademark rights, introduction to patents and industrial design	15
Text Books/ Reference Books	1. Elements of Mercantile Law: By N.D. Kapoor – Sulchand & Sons 2. Indian Contract Act: By Avtar Signh – Eastarn Book Company 3. Business Law: By M.C. Kuchal- Vikas Publication 4. Business Law By Pillai, R.S.N. and Bhagavathi- -S. Chand 5. Business Law By Sheth, Yejpal- -Pearson Publication 6. The Companies Act 2013, Bare Act, Paperback, Professional Book publisher. 7. Companies Act, 2013 (Hardbound Pkt. edn.) (English, Hardcover, Bharat) 8. Law Relating to Intellectual Property Rights -M K Bhandari- Central Law Publications 9. https://www.icsi.edu/media/webmodules/publications	

Course Code	Cours Title	L	T	P	Credit	Theory			Practical	
DSE2.1	Data Centre Management	4			4	**Int**	**Uni**	**Total**	**Int**	**Uni**
						20	80	100		
Course Outcomes (COs):	1. Understand core concepts of data centre and its functionality. 2. Illustrate architecture and key elements incorporated in data centre. 3. Analyze Risk management process of a data centre environment. 4. Evaluate requirements and recommendations for security of data centre.									
Prerequisite										Hrs.
UNIT I	Concepts: Definition, types (Enterprise, Colocation, Hyperscale), and business demands. Site Selection: Location criteria, risk assessment, connectivity, and, power/water access. Infrastructure Design: Architectural layout, white space planning, and space management. Standards: Uptime Institute Tiers I-IV (redundancy), TIA-942 (telecommunications), and ISO 27001.									15
UNIT II	**Physical Infrastructure & Facilities Management** **Power Systems:** Generators, UPS (Uninterruptible Power Supply), static/automatic transfer switches, and power distribution. **Cooling Systems:** Airflow management, hot/cold aisle containment, and HVAC systems. **Fire & Safety:** Suppression systems and environmental monitoring. **Cable Management:** Structured cabling, fiber, and copper standards.									15
UNIT III	**IT Infrastructure and Operations** **Hardware:** Servers, storage area networks (SAN), and networking equipment. **DCIM Tools:** Using Data Center Infrastructure Management (DCIM) for monitoring and capacity planning. **Operations & Maintenance:** Preventive maintenance, incident management, and vendor management. **Security:** Physical security, access control, and CCTV.									15
UNIT IV	**Advanced Data Center Topics** **Cloud & Virtualization:** Software-Defined Networking (SDN), Virtual Machines (VMs), and OpenStack. **Sustainability:** Power Usage Effectiveness (PUE) metrics, green energy initiatives, and energy efficiency. **Disaster Recovery:** Business continuity planning and backup site selection.									15
Text Books/ Reference Books	1. Data Center Management: Your guide to efficient Data Center operation, Dr. Mohammad Nawaz, July 31, 2019 2. Data Center Handbook 1st Edition, HwaiyuGeng, Wiley 3. Data Center for Beginners: A beginner's guide towards understanding Data Center Design (Data Center Design Guide), B.A. Ayomaya, Mar 31, 2020 4. Cloud Native Data Center Networking: Architecture, Protocols, and Tools, Dinesh G. Dutt , o‟Reilly 5. Data Center Networks: Topologies, Architectures and Fault-Tolerance Characteristics 2013th Edition, Yang Liu, Jogesh K. Muppala, Springer 6. Enterprise Data Center Design and Methodology 1st Edition, Rob Snevely, Sun									

Course Code	Cours Title	L	T	P	Credit	Theory			Practical	
DSE2.2	Data Warehousing	4			4	**Int**	**Uni**	**Total**	**Int**	**Uni**
						20	80	100		
Course Outcomes (COs):	CO 1. To understand the principles of Data warehouse and Data Mining. CO 2. To understand the Architecture of a Data Mining sy stem. CO 3. To perform classification, association, and prediction of data. CO 4. To apply data mining techniques for mining the web content.									
Prerequisite										Hrs.
UNIT I	**Data Warehousing – Introduction and Design:** Overview and Concepts: Data Warehousing Components, Building a Data Warehouse, Data Warehouse Architecture, Infrastructure and Metadata. Data Design and Data Representation: Principles of Dimensional Modeling, Data Extraction, Transformation and Loading, Data Quality, Online Analytical Processing (OLAP)–OLAP and Multidimensional Data Analysis.									15
UNIT II	**Data Mining –** Pre-processing: Steps in Data mining process, Data Mining Functionalities, Architecture of a Typical Data Mining Systems, Classification of Data Mining Systems, Knowledge Discovery in Databases (KDD), KDD Process, Data Preprocessing, Data Cleaning, Data Transformation, Data Compression and Dimension Reduction, Principal Component Analysis, Binning Methods.									15
UNIT III	**Data Mining Techniques** Association Rule Mining, Classification and Prediction : Efficient and Scalable Frequent Itemset Mining Methods, Mining, Various Kinds of Association Rules, Association Rules, Market Basket Analysis, Apriori Algorithm, Tree Based Algorithms. Classification by Decision Tree Introduction, Bayesian Classification, Rule Based Classification, Classification by Back propagation, Support Vector Machines, Lazy Learners, Prediction Techniques, Regression Models.									15
UNIT IV	**Clustering & Introduction to Web Mining Data Mining Algorithms:** Clustering. Partitioned Algorithms, Hierarchical Algorithms, Density Based, Algorithms, Grid Based Algorithms, Web Content Mining, Web Structure Mining, Web Usage Mining, Spatial Mining, Multimedia Data Mining, Text Mining.									15
Text Books/ Reference Books	1. J. Han and M. Kamber, " Data Mining Tools and Technique s", Morgan Kaufmann Publishers. 2. M.H. Dunham, " Data Mining Introductory and Adv anced Topics", Pear son Education. 3. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, " Introduction to Data Mining", Pearson Education.									

Course Code	Cours Title	L	T	P	Credit	Theory			Practical	
DSE2.3	**Design Thinking and Innovation**	0	0	2	1	**Int**	**Uni**	**Total**	**Int**	**Uni**
						30	20	50	--	--
Course Outcomes (COs):	CO1: Understand design-based thinking approach to solve problems CO2: Propose real-time innovative product designs and Choose appropriate frameworks, strategies, techniques during prototype development. CO3: Understand the importance of prototyping and design prototype for solving problem CO4: Analyze emotional experience and Inspect emotional expressions to better understand users while designing innovative products									
Prerequisite										Hrs
UNIT I	**Basics of Design Thinking** 1. Understand the concept of innovation and its significance in business 2. Understanding creative thinking process and problem solving approaches 3. Know Design Thinking approach and its objective 4. Design Thinking and customer centricity – real world examples of customer challenges, use of Design Thinking to Enhance Customer Experience, Parameters of Product experience, Alignment of Customer Expectations with Product. 5. Discussion of a few global success stories like AirBnB, Apple, IDEO, Netflix etc. 6. Explain the four stages of Design Thinking Process – Empathize, Define, Ideate, Prototype, Implement									
UNIT II	**Learning to Empathize and Define the Problem** 1. Know the importance of empathy in innovation process – how can students develop empathy using design tools 2. Observing and assimilating information 3. Individual differences & Uniqueness Group Discussion and Activities to encourage the understanding, acceptance and appreciation of individual differences. 4. What are wicked problems 5. Identifying wicked problems around us and the potential impact of their solutions									
UNIT III	**Ideate, Prototype and Implement** 1. Know the various templates of ideation like brainstorming, systems thinking 2. Concept of brainstorming – how to reach consensus on wicked problems 3. Mapping customer experience for ideation 4. Know the methods of prototyping, purpose of rapid prototyping. 5. Implementation									
UNIT IV	**Feedback, Re-Design & Re-Create** 1. Feedback loop, focus on User Experience, address ergonomic challenges, user focused design 2. Final concept testing, 3. Final Presentation – Solving Problems through innovative design concepts & creative solution									
Text Books/ Reference Books	1. E Balaguruswamy (2023), Developing Thinking Skills (The way to Success), Khanna Book 2. Tim Brown, (2008), "Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation", Harvard Business Review 3. 8 steps to Innovation by R T Krishnan & V Dabholkar, Collins Publishing 4. Design Thinking and Innovation 5. Design Thinking by Nigel Cross, Bloomsbury									

<table>
<tr><th>Course Code</th><th>Cours Title</th><th>L</th><th>T</th><th>P</th><th>Credit</th><th colspan="3">Theory</th><th colspan="2">Practical</th></tr>
<tr><td rowspan="2">DSC19</td><td rowspan="2">Lab on DSC17</td><td rowspan="2">2</td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2">2</td><td>Int</td><td>Uni</td><td>Total</td><td>Int</td><td>Uni</td></tr>
<tr><td>10</td><td>40</td><td>50</td><td></td><td></td></tr>
<tr><td>Course Outcomes (COs):</td><td colspan="10">After completion of this course students will be able to –
CO1: Apply object oriented concepts through java
CO2. Implement GUI concepts for preparing interactive java applications.</td></tr>
<tr><td>Prerequisite</td><td colspan="9"></td><td>Hrs.</td></tr>
<tr><td>Programs</td><td colspan="9">1. Java programs based on branching and looping statements.
2 Java programs based Type Casting
3 Java programs based on command line arguments
4 Java programs based on constructors
5 Java programs based on inheritance
6 Java programs based on method overloading
7 Java programs based on method overriding
8 Java programs based on interfaces
9 Java programs based on packages
10 Java programs based on multithreading
11 Java programs based on exception handling
12 Java programs based on AWT</td><td>60</td></tr>
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