

CURRICULUM FOR

“BACHELOR OF SCIENCE (HONS.)”

B.Sc. (Hons.)
Information
Technology
SEM - 5

w.e.f. Academic Year 2025-26

॥ तमसो मा ज्योतिर्गमय ॥

VISION

To provide equal opportunities for value based global education for creating an Enlightened Society

MISSION

To establish and facilitate educational institutions in the region for providing affordable value based global education to all who aspire to study and to create opportunities to educators, social workers and philanthropists to serve society



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creating an enlightened society...

UNIVERSITY OFFICE

Dr. R. K. Desai Marg, Athwalines,
Surat-395001, Gujarat, India.

Website: www.sarvajanikuniversity.ac.in

Email: admin@sarvajanikuniversity.ac.in

Email: info@sarvajanikuniversity.ac.in

Mo.: +919979102021 / +9197129 30321

Contact No .+912612660266



Constituent Institute:

**Shree Ramkrishna Institute of
Computer Education and Applied
Sciences (SRKI)**

SARVAJANIK UNIVERSITY
FACULTY OF SCIENCE



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Faculty of Science
B. Sc. (Honors)
Information Technology
SEM - 5

DETAILED CURRICULUM
(W.E.F. 2025-26)



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MAJOR SUBJECTS

SEM 5

DETAILED CURRICULUM

(W.E.F. 2025-26)

Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Science		Program	B.Sc. Information Technology		
Year	2025		Version	1.0		
Semester	V		Effective From	June, 2025		
Course Code	BSCS31518	Course Name	Advanced Database Technologies			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous Assessments (CCE)	Semester end examinations (SEE)	Total
3	3	-	-	40	35	75

Purpose of Course	The purpose of course is to make students use the four types of NoSQL Databases (Document-oriented, Key/Value Pairs, Column-oriented and Graph).
Course Objective	To provide Fundamental knowledge of the detailed architecture, define objects, load data, query data and performance tune NoSQL databases.
Pr-requisite	Basic understanding of Database Concepts.
Course Out come	After completing this course, a learner will be able to identify what type of NoSQL database to implement based on business requirements, can able to apply NoSQL data modeling from application specific queries
Course Content	Unit 1: Database Basics [6 Hrs] 1.1 Type of Database Systems 1.1.1 Relational Database Design 1.1.2 E-commerce Application 1.1.3 Early Database Management Systems 1.1.4 Flat File Data Management Systems 1.1.5 Organization of Flat File Data Management Systems 1.1.6 Hierarchical Data Model Systems

Unit 2: Variety of NoSQL Databases**[6 Hrs]**

- 2.1 Data Management with Distributed Databases
- 2.2 Store Data Persistently, Maintain Data Consistency, Ensure Data Availability
- 2.3 Balancing Response Times, Consistency, and Durability
Consistency, Availability, and Partitioning: The CAP Theorem
- 2.4 ACID and BASE
 - 2.4.1 ACID: Atomicity, Consistency, Isolation, and Durability
 - 2.4.2 BASE: Basically Available, Soft State, Eventually Consistent

Unit 3: Types of NoSQL Databases**[8 Hrs]**

- 3.1 Key-Value Pair Database
- 3.2 Document Database
- 3.3 Column Family Databases
- 3.4 Graph Databases
- 3.5 Time-series Database
- 3.6 In-Memory Database

Unit 4: MongoDB Database**[12 Hrs]**

- 4.1 The Document Data Model
- 4.2 Documents and Collections, Mongo Shell
- 4.3 Working Database – create, drop
- 4.4 Working with collections – create, drop
- 4.5 Working with Document – Adding batch of document, find document, modify document, find selected fields, removing document
- 4.6 Indexing, Writing to Shards
- 4.7 MongoDB as a File System

Unit 5: Neo4j - Graph Database**[6 Hrs]**

- 5.1 The Graph Databases – navigational db, relational db, NoSQL db
- 5.2 Neo4j building blocks, Key value stores
- 5.3 Cypher Query Language – Nodes, relationships

	Unit 6: Firebase [6 Hrs] 6.1 Introduction to Firebase 6.2 Working with real-time data 6.3 Firebase Environment setup
Reference Book	1. Designing Data-Intensive Applications By Martin Kleppmann-O'Reilly 2. NoSQL for Mere Mortals® By Dan Sullivan-O'Reilly 3. Pro MongoDB™ Development By Deepak Vohra 4. MongoDB in Action By Kyle Banker 5. Cassandra: The Definitive Guide By Eben Hewitt 6. Nosql Web Development With Apache Cassandra by Deepak Vohra 7. Learning Neo4j By Rik Van Bruggen

Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Science		Program	B.Sc. Information Technology		
Year	2025		Version	1.0		
Semester	V		Effective From	June, 2025		
Course Code	BSCS31521	Course Name	Advanced Database Technologies			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous Assessments (CCE)	Semester end examinations (SEE)	Total
1	–	-	1	15	10	25

Purpose of Course	The purpose of the course is to make students capable of implementing concepts, methods, tools and techniques studied in courses of semester 5.
Course Objective	The objective of these course is to enable students to learn practical implementation of Advanced Database Technologies
Pre-requisite	As per theory papers of Major - Advanced Database Technologies
Course Out come	After completion of this course, the student will be capable of performing practical application of subject - Advanced Database Technologies
Course Content	The students will be required to carry out practical on Advanced Database Technologies using the methods and tools discussed A Journal must be prepared for the practical work done.
Practical	List of practicals will be prepared at the beginning of each semester
Reference Books	As per paper Major - Advanced Database Technologies

Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Science		Program	B.Sc. (Information Technology)		
Year	3		Version	1.0		
Semester	5		Effective From	June, 2025		
Course Code	BSCS31516	Course Name	Major: Fundamentals of Cloud Computing and Internet of Things			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous Assessments (CA)	Term end examinations (TEE)	Total
3	3	0	0	40	35	75

Purpose of Course	- The course gives students an idea about Cloud Computing Fundamentals And Cloud Based Systems - The purpose of this course is to impart knowledge on Internet of Things(IoT), which relates to the study of sensors, actuators, and controllers, among other Things, IoT applications
Course Objective	- To provide comprehensive knowledge of cloud computing and aspects related to it - The purpose of this course is to impart knowledge on Internet of Things(IoT), which relates to the study of sensors, actuators, and controllers, among other Things, IoT applications
Pr-requisite	Basic understanding of operating system,computer network and Internet, Basic programming knowledge
Course Out come	- After completion of this course, the student will gain comprehensive knowledge of Cloud based systems and aspects related to it - Understanding about the architectural detail of IoT - Knowledge about domain specific applications of IoT - Exposure to working with Arduino
Course Content	Unit 1 : Introduction to Cloud Computing (6 Hours)

	1.1 Basics of Cloud Computing: Definition, Features, and Benefits 1.2 Evolution of Cloud Computing and Comparison with Traditional Computing 1.3 Advantages and Challenges of Cloud Computing 1.4 Cloud Service Models: IaaS, PaaS, SaaS 1.5 Cloud Service Providers- AWS, Azure, Google Cloud Unit 2 : Cloud Deployment Models and Virtualization (6 Hours) 2.1 Cloud Deployment Models: Public, Private, Hybrid, Community 2.2 Virtualization in Cloud Computing: Concept, Types, and Benefits 2.3 Role of Hypervisors in Cloud Computing 2.4 Virtual Machines (VMs) vs. Containers Unit-3 : Cloud Security, Compliance and Future Trends (7 Hours) 3.1 Security Risks in Cloud Computing: Data Breaches, Account Hijacking 3.2 Cloud Security Measures: Encryption, Access Control, Firewalls 3.3 Service Level Agreement 3.4 Cloud in Business and Enterprise Applications 3.5 Role of Cloud computing in IoT 3.6 Big Data and AI in Cloud Computing 3.7 Serverless Computing and Edge Computing 3.8 Future Trends: Quantum Computing, Cloud Automation Unit-4 : Introduction to Internet of Things (IoT) (6 Hours) 4.1 Definition and Characteristics of IoT 4.2 Components of IoT: Devices, Gateways, Cloud, and Applications 4.3 IoT Architecture and Communication Models 4.4 Benefits and Challenges of IoT
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	Unit-5 : IoT Applications and Security (6 Hours) 5.1 IoT in Smart Homes, Smart Cities, Healthcare, Agriculture, Manufacturing, Energy and Grid. 5.2 IoT Data Management and Analytics 5.3 Security Challenges in IoT: Threats, Privacy, and Mitigation Techniques 5.4 Ethical Considerations in IoT Unit-6 : Building Applications Using Arduino (7 Hours) 6.1 Introduction to Arduino 6.2 Flavors of Arduino 6.3 Architecture of Arduino board 6.4 Arduino Toolchain 6.5 Installing Arduino Desktop IDE 6.6 Installing Board drivers, configuring board type, uploading the Program
Practical	List of practical will be prepared at the beginning of each semester
Reference Books	1. Cloud Computing: Principles and Paradigms - R. Buyya et al - Wiley 2010 2. Cloud Computing : Principles Systems and Application - LGillametal- Springer 2010 3. Cloud Computing Bible - Sosinsky - Wiley - India, 2011 4. Cloud Computing Second Edition Dr. Kumar Saurabh - Wiley-India, 2012 5. Cloud Computing - Insight into New Era Infrastructure - Dr Kumar Saurabh - Wiley India 2012 6. IoT & Applications I.A. Dhotre Technical Publication 7. Designing the Internet of Things Adrian McEwen and Cassimally Wiley 8. The Internet of Things Connection objects to web Edited by Hakima Chauchi Wiley

	9. Introduction to Embedded System -By Shibu KV, McGrawHill 10. Getting Started with Internet of Things –By Cuno Pfister, O'Reilly
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Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Science		Program	B.Sc. (Information Technology)		
Year	3		Version	1.0		
Semester	5		Effective From	June, 2025		
Course Code	BSCS31519	Course Name	Major: Fundamentals of Cloud Computing and Internet of Things			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous Assessments (CA)	Term end examinations (TEE)	Total
1	0	0	2	10	15	25

Purpose of Course	The purpose of this course is to impart practical knowledge on Internet of Things(IoT), which relates to the study of sensors, actuators, and controllers, among other Things, IoT applications
Course Objective	The purpose of this course is to impart knowledge on Internet of Things(IoT), which relates to the study of sensors, actuators, and controllers, among other Things, IoT applications
Pr-requisite	Basic understanding of operating system,computer network and Internet, Basic programming knowledge
Course Out come	- Understanding about the architectural detail of IoT - Knowledge about domain specific applications of IoT - Exposure to working with Arduino
Course Content	The students will be required to carry out practical on IoT using the methods and tools discussed in their theory. A Journal must be prepared for the practical work done.
Practical	List of practical will be prepared at the beginning of each semester

Reference Books	As per paper Major - Fundamentals of Cloud Computing and Internet of Things
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Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Science		Program	B.Sc. (Information Technology)		
Year	3		Version	1.0		
Semester	5		Effective From	June, 2025		
Course Code	BSCS31517	Course Name	Major: Web Application Development-III(TH)			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous Assessments (CA)	Term end examinations (TEE)	Total
3	3	0	0	40	35	75

Purpose of Course	The purpose of this course is to equip students with the knowledge of React.js fundamentals, including components, state management, routing, Redux, and Hooks, to build dynamic web applications.
Course Objective	The course aims to help students understand React.js concepts, implement state management, work with routing, and utilize Hooks for efficient application development.
Pr-requisite	Basic knowledge of JavaScript, HTML, and CSS.
Course Out come	After completing this course, a learner will be able to develop interactive React applications using Redux, Hooks, and effective state management techniques.
Course Content	Unit 1: Introduction to React (6 Hours) 1.1 Basic concept of React

	1.2 Difference between AngularJS and ReactJS 1.3 React features Unit 2: React Basics (6 Hours) 2.1 ECMA Script 2.2 React with JSX 2.2.1 React elements as JSX 2.3 Basic React Components 2.3.1 Stateless functional component 2.3.2 Stateful component 2.3.3 Higher order component 2.3.4 Nesting component 2.4 State and props in React Unit 3: React Forms (7 Hours) 3.1 React Form 3.2 Forms in React (Controlled vs. Uncontrolled Components) 3.3 Different form elements 3.4 Manage Control and Actions with Forms Unit 4: React Routing (6 Hours) 4.1 Life cycle of ReactJS 4.1.1 Mounting
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	4.1.2 Updating 4.1.3 Unmounting 4.2 React Routing 4.2.1 Router properties 4.2.2 Nesting Router 4.3 React Router (React-Router-DOM) 4.4 Navigation between pages (Link, NavLink) 4.5 Dynamic Routing with Forms Unit 5: Introduction to Redux (6 Hours) 5.1 Introduction to Redux 5.2 Redux building parts – State, Actions, Reducers 5.3 Concept of the store, Action creators, middleware Unit 6: React – Redux and Hooks (7 Hours) 6.1 Explicitly passing the store 6.2 Presentational Vs container component 6.3 The React Redux provider 6.4 React Redux Connect 6.5 Introduction to Hooks 6.6 Cypher Query Language – Nodes, relationships
Practical	List of practical will be prepared at the beginning of each semester
Reference Books	1. Pro React 16 by Adam Freeman

	2. Learning React: Learning React: Functional Web Development with React and Redux , O'Reilly 3. Learning React: Modern Patterns for Developing React Apps, O'Reilly 4. Fullstack React: The complete guide to ReactJS and Friends 5. Learning React by Kirupa Chinnathambi 6. Pro MERN Stack by Vasani Subramanian
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Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Science		Program	B.Sc. (Information Technology)		
Year	3		Version	1.0		
Semester	5		Effective From	June, 2025		
Course Code	BSCS31520	Course Name	Major: Web Application Development-III(PR)			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous Assessments (CA)	Term end examinations (TEE)	Total
1	0	0	2	10	15	25

Purpose of Course	The purpose of this course is to equip students with the knowledge of React.js fundamentals, including components, state management, routing, Redux, and Hooks, to build dynamic web applications.
Course Objective	The course aims to help students understand React.js concepts, implement state management, work with routing, and utilize Hooks for efficient application development.
Pr-requisite	Basic knowledge of JavaScript, HTML, and CSS.
Course Out come	After completing this course, a learner will be able to develop interactive React applications using Redux, Hooks, and effective state management techniques.
Course Content	The students will be required to carry out practical on ReactJs using forms,routing, and rendering discussed in their theory.

	A Journal must be prepared for the practical work done.
Practical	List of practical will be prepared at the beginning of each semester
Reference Books	As per paper Major - Web Development - III



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MINOR SUBJECTS

SEM 5

DETAILED CURRICULUM

(W.E.F. 2025-26)

ARTIFICIAL INTELLIGENCE-I

Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Science		Program	B.Sc. Information Technology		
Year	2025		Version	1.0		
Semester	V		Effective From	April, 2025		
Course Code	BSCS32505	Course Name	Artificial Intelligence -I			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous Assessments (CCE)	Semester end examinations (SEE)	Total
4	4	-	-	40	35	75

Purpose of Course	The purpose of the course is to establish foundations of concepts, approaches, methods and techniques artificial intelligence
Course Objective	This subject aims to create a solid foundation in the principles and techniques of Artificial Intelligence, enabling them to understand, analyze, and apply AI concepts to solve problems and develop intelligent systems.
Pr-requisite	Basic concepts of Data Structure and Algorithms
Course Outcome	After completion of this course, the student will be able to understand and solve real world AI problems, application areas and state of the art AI concepts which are being used in practical implementation.
Course Content	Unit 1 Introduction to AI [6 hrs] 1.1 Types of Intelligence, Human Vs. Machine Intelligence, 1.2 Composition of intelligence - Reasoning, Learning, Problem Solving, Perception, Linguistic Intelligence 1.3 AI Agents & Environments -Human agent, robotic agent and software agent, ideal rational agent, structure of intelligent agents 1.4 Types of Agents Unit 2 : Problem Solving By Search [7 hrs] 2.1 Problem Formulation and State Space Representation 2.2 8-Puzzle, 8-Queens, missionaries and cannibals problem, Robot Navigation Problem, Water Jug Problem 2.2 Search techniques for Solution Search 2.2.1. Uninformed search strategies - BFS, DFS 2.2.2 Informed search strategies

	Unit 3 : Planning [4 hrs] 3.1 Planning Problem - Air cargo Transport, spare tire problem, the blocks world 3.2 Planning with state space search, Goal stack planning, Plan Space Planning Unit 4 : Knowledge Representation [5 hrs] 4.1 Knowledge-Based agents, systems & Machine Intelligence 4.2 Overview of Logical and Procedural Representation Schemes 4.3 Structured Representation Schemes - Semantic Network, Description Logic, Ontology, Conceptual Graphs 4.4 First Order Predicate Logic and Rule Based Systems Unit 5 : Real Life Application Areas of AI [6 hrs] 5.1 Expert Systems - Characteristics, Importance, Applications, Examples, Rule based system architecture 5.2 Robotics-Sensors and Effectors, Applications, Robotic Perception, Movement Planning 5.3 Natural Language Processing 5.4 Generative AI and Language Modelling Unit 6 : Introduction to LLM [7 hrs] 6.1 Language Modelling 6.2 Large Language Models 6.3 Applications of LLMs 6.4 Types of LLMs Unit 7 : Prompt Engineering [7 hrs] 7.1 What is Prompt 7.2 Prompt Designing 7.3 Task Formulation using Prompts 7.4 Prompt Patterns 7.5 Prompt Tuning Techniques Unit 8 : Introduction to Langchain [7 hrs] 8.1 Langchain Framework 8.2 Langchain Use cases 8.3 Langchain Tools
Text and Reference Literature	1. A First Course in Artificial Intelligence by Deepak Khemani, McGrawHill, ISBN :978-1-25-902998-1 2. Introduction to Artificial Intelligence and Expert System by Dan W. Patterson, PHI, ISBN : 978-93-325-5194-7 3. Artificial Intelligence –A Modern Approach (2nd Edition 2004) by Stuart J. Russell and Peter Norvig, Pearson Education, ISBN: 978-81-775-8367-0 4. Introduction to Artificial Intelligence by Rajendra Akerkar, PHI, ISBN : 978-81-203-2864-8 5. Artificial Intelligence -Structures and Strategies for Complex Problem Solving (4th Edition 2004) by George F. Luger, Pearson Education 6. Foundation of Artificial Intelligence and Expert Systems by V.S. Janakiraman, K. Sarukesi, P. Gopalakrishnan, Mc Millan

Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Science		Program		B.Sc. Information Technology	
Year	2025		Version		1.0	
Semester	V		Effective From		July, 2025	
Course Code	BSCS32506	Course Name		Information Security and Cyber Security I		
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial(T)	Practical (P)	Continuous Assessments (CCE)	Semester end examinations (SEE)	Total
4	4	-	-	50	50	100

Purpose of the Course	The purpose of the course is to make students capable of concepts to protect valuable information and systems from unwanted access and attacks.
Course Objectives	This subject aims to cover various privacy techniques on digital assets, ensuring data availability and mitigating risk. Learning cryptosystems and ways to move towards Cybersecurity culture to Global security.
Pre requisite	Basic concepts of computer systems and networks
Course out come	After completion of this course, the student will able to understand the importance of data protection and take career paths towards cybersecurity
Course content	1. Introduction to Information Security [6 Hours] 1.1. Computer security, Information security, Threats, Attacks, Malicious Logic, Need of information security. 1.2. Principles of CIA concepts: Policies , procedure, guidelines and standards from security perspective. 1.3. Administrative measure and technical measure to enforce CIA (goals/foundation of IS) 1.4. Security risk at common ports and services, Risk at esource sharing, User account configuration in operating systems. 2. Cryptography [6 Hours] 2.1. Evolution and history of Cryptography 2.2. Cryptanalysis and cryptosystems 2.3. Monoalphabetic and polyalphabetic ciphers 2.4. Applications of cryptography 2.5. Benefits and limitation of cryptography 2.6. Future of cryptography (Quantum, Blockchain, Post-Quantum) 2.7. Types of cryptography 2.8. Challenges in cryptography.

Course content	3. Symmetric Key Cryptography (Stream and block) [9 Hours]
	3.1. Stream based Cryptography - Traditional/Classic/Substitution Ciphers (Caesar cipher, Vigenere cipher, Substitution cipher, Monoalphabetic and polyalphabetic cipher, Transposition cipher, Playfair cipher, ZEBRA technique, Railfence cipher, hill cipher) 3.2. Block cipher - BLOWFISH 3.3. Data Encryption Standard - DES and Tripple DES 3.4. Advance Encryption Standard – AES 3.5. Contemporary symmetric cipher
	4. Asymmetric Key Cryptography [9 Hours]
	4.1. Rivest-Shamir-Adelman – RSA 4.2. Diffie-Hellman key exchange 4.3. Digital signature standard – DSS and digital certificate 4.4. Elliptic curve digital signature algorithm – ECDSA 4.5. Elliptic curve cryptography – ECC 4.6. Kerckhoff's principle for cryptosystem 4.7. Secure socket layer - SSL 4.8. Hash algorithm – MD5, SHA1
	5. Introduction to cyber crime and cyber offences [9 Hours]
	5.1. Introduction to cybercrime, types and category of cyber crime 5.2. Techniques of Cyber Crimes 5.3. E-Mail spoofing, Spamming, Cyberdefamation, Salami attack, Data diddling, Hacking, Online fraud, Software Piracy, computer Sabotage, Email bombing, Computer network Intrusions, Password sniffing, Credit card frauds 5.4. How criminal plans attacks 5.5. Reconnaissance attack, Active attack, Passive attack, Scanning and scrutinizing of information, gaining and maintaining system access 5.6. Cyberstalking:- Types of cyberstalking, cases of cyberstalking, how stalking works 5.7. Botnets and Honeypot
	6. Cyber Crime: Mobile and Wireless Devices [9 Hours]
	6.1. Proliferation of mobile and wireless devices in diverse environment 6.2. Types and techniques of debit and credit card frauds 6.3. Security challenges and system settings for mobile devices 6.4. Authentication services security for mobile devices 6.5. LDAP Security of hand-held mobile devices, RAS security for mobile devices, Media player control security and DRM, Network API security for mobile computing applications 6.6. Attacks on mobile phones 6.6.1. Phishing, Vishing, Smishing 6.6.2. Types of Bluetooth vulnerabilities - Hacking bluetooth 6.6.3. Unconventional Storage Device threat through stolen devices 6.6.4. Protecting data on lost device 6.6.5. Organizational Measures for handling Mobile devices 6.7. Computer languages in cyber security.
	7. CyberSecurity Frameworks [6 Hours]

	7.1. Framework needs, objectives, components 7.2. NIST Network safety system (CSF) 7.3. NIST Risk management framework (RMF) 7.4. Government hazards and approval (FedRAMP) 7.5. SANS Basic security controls 7.6. Benefits and limitations of cyber security frameworks. 8. Cyberspace [6 Hours] 8.1. Need and importance of cyberspace 8.2. Inherent characteristics of cyberspace 8.3. Forms of cyberspace regulations 8.4. Cyberspace regulatory 8.5. Industry best practices
Practical	Web Link for Practical application: ● Crypto Hashes and Collisions Practical Cryptography for Developers ● Programming Languages for Cryptography Cryptography Guide ● Nmap: the Network Mapper - Free Security Scanner ● How Does Trend Micro Smart Protection Server Work?
Reference Books	1. Computer security: Art and Science, Matt Bishop, Addison –Wesley 2. Introduction to computer security, Matt Bishop, Addison –Wesley 3. Information security – William stalling 4. Information security, Dhien patel, PHI 5. Cryptography and network security, Fourth edition, William stalling 6. Cyber security understanding cyber crimes computer forensics and legal perspectives by Nina Godbole , Sunit belapur by Wiley India Publications. 7. Internet forensic using digital evidences to solve computer crime by Robert Jones O'Reilly. 8. Windows forensic - The field guide for conducting corporate computer investigations by Chad Steel Wiley India publications. 9. Digital evidence and computer crime 3rd Edition by Eoghan Casey Academic Press 10. Cyber crimes and fraud management by Petrick kishore, macmillan Education 11. E-Material: Cyber Security

SARVAJANIK UNIVERSITY
FACULTY OF COMPUTER SCIENCE AND APPLICATIONS
B.Sc. (Honours) (Computer Science) / (Information Technology)
B.Sc. (Honours with Research) (Computer Science) / (Information Technology)
Sem-V



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SKILL ENHANCEMENT COURSE

(SEC) SUBJECT

SEM 5

DETAILED CURRICULUM

(W.E.F. 2026-27)

SARVAJANIK UNIVERSITY
FACULTY OF COMPUTER SCIENCE AND APPLICATIONS
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B.Sc. (Honours with Research) (Computer Science) / (Information Technology)
Sem-V

Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Computer Science and Applications		Program	B.Sc. (Computer Science) / B.Sc. (Information Technology)		
Year	3		Version	1.0		
Semester	5		Effective From	June, 2026		
Course Code	BSCS35509	Course Name	Software Development Lab			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous Assessments (CA)	Term end examinations (TEE)	Total
2	0	0	4	25	25	50

Purpose of Course	The purpose of the course is to make students capable of implementing concepts, methods, tools and techniques studied in practical courses and activities of Software Development
Course Objective	● Introduce the fundamental concepts and principles of system analysis and design in the context of software development. ● Enable students to identify, analyze, and document system requirements effectively. ● Develop the ability to design logical and physical models of systems using appropriate tools and techniques. ● Familiarize students with different system development life cycle (SDLC) models and their applications. ● Equip students with skills to prepare professional system documentation and communicate technical designs clearly.
Pr-requisite	Knowledge of latest technologies, tools and software engineering
Course Out come	● Understand the role of system analysis and design in software project development. ● Apply requirement gathering and analysis techniques to define system specifications. ● Use diagrammatic tools such as DFDs, ER diagrams, and UML diagrams to represent system requirements and designs. ● Evaluate different SDLC models and select appropriate methods for a given project. ● Design logical and physical system models for real-life business applications. ● Prepare clear and well-structured system documentation. Demonstrate teamwork and communication skills in presenting system analysis and design work.

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Sem-V

Course Content	Practical 1: Problem Statement and Process Model Selection (1 lab sessions) Aim: To analyze a real-world problem statement and select a suitable software development life cycle (SDLC) model with proper justification. Description: - Define a software requirement problem(e.g., Online Library Management System, Hospital Management, or ATM System). - Document the scope, operational constraints, and objectives. Choose appropriate SDLC models like Waterfall, Incremental, RAD, Prototype , Agile, or Spiral and justify why a specific model fits the chosen problem.
	Practical 2: Software Requirement Specification (SRS) (2 lab sessions) Aim: To prepare a complete SRS document for the chosen software problem. Description: Prepare various analysis models like Data Flow Diagrams, ER Diagrams, Use Case Diagrams, Class Diagrams etc. using appropriate software tools.
	Practical 3: Data Design and Interface Design (2 lab sessions) Aim: To design data and Human Computer Interface appropriate to problems and requirements. Description: - Design Database tables, relationships, constraints, keys etc. Using appropriate software tools. - Design Input Screens, Output Screens, Dashboards etc using appropriate Software Tools.
	Practical 4: Designing Interaction and Behavioral Models (2 lab sessions) Aim: To design various models indicating system component interactions and behaviour appropriate for the problem and requirements. Description: Design Sequence Diagram, Activity Diagram, StateChart Diagram, Deployment Diagrams, System Flowchart etc. using appropriate Software Tools.
	Practical 5 : Software Coding of core functionalities (5-6 lab sessions) Aim: Development of Core functionalities/Admin Modules of the required software appropriate for the problem and requirements. Description: - Write code to develop Core functionalities/Admin Modules of the required software appropriate for the problem and requirements using appropriate software development platforms, programming &/or scripting language etc. - Perform Unit Testing of the developed Core functionalities/Admin Modules.

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B.Sc. (Honours with Research) (Computer Science) / (Information Technology)
Sem-V

	Practical 6 : Software Coding of core functionalities (10-12 lab sessions) Aim: Development of transnational functionalities/ User modules of the required software appropriate for the problem and requirements. Description: ● Write code to develop transnational functionalities/ User modules of the required software appropriate for the problem and requirements using appropriate software development platforms, programming &/or scripting language etc. ● Perform Unit Testing of the developed transnational functionalities/ User modules.
	Practical 7 : Software Integration and Integration Testing (02- 03 lab sessions) Aim: To integrate already developed Core functionalities/Admin Modules and transnational functionalities/ User modules and perform integration testing. Description: ● Software Menu development, Dashboard development, functionality linking etc. ● Perform Integration Testing of the developed Core functionalities/Admin Modules and transnational functionalities/ User modules
	Practical 8 : Packaging, Deployment and system level testing (02-03 lab sessions) Aim: To create various software packages as per the problem and the requirements, deployment/hosting/upload of the developed software/ webapp /mobile app and test the deployment. Description: ● To create various software packages as per the problem and the requirements, ● To deploy/host/upload of the developed software/ webapp /mobile app ● Perform System level testings like security testing, load testing, stress testing, usability testing etc.
Teaching Methodology	Individual/Pair/Group Labwork,
Work Submission	Journal/Report/Document
Evaluation Scheme	50% CCE + 50% SEE
CCE Evaluation method	Evaluation of Labwork Performance and Journal/ Report/ Document submission
SEE Evaluation method	Evaluation based on Software Demonstration and Viva-voice