

SARVAJANIK UNIVERSITY												
SARVAJANIK COLLEGE OF COMMERCE AND COMPUTER APPLICATIONS												
BACHELOR OF COMPUTER APPLICATION (BCA)												
TEACHING & EXAMINATION SCHEME FOR BCA PROGRAMME AY:2025-26(BATCH:2025)												
Sem	Course Code	Course Title	Group	Teaching Scheme				Examination Scheme				
				Contact Hours			Credit	Theory		Practical		Total
				Theory	Practical	Total		CCE	SEE	CCE	SEE	
5	BSCA21501	Fundamentals of Relational and NoSQL Database - Theory	Major	3	0	3	3	40	35	0	0	75
	BSCA21502	Information Security	Major	4	0	4	4	50	50	0	0	100
	BSCA21503	Advance Java - Theory	Major	3	0	3	3	40	35	0	0	75
	BSCA22501	Operating System	Minor	4	0	4	4	50	50	0	0	100
	BSCA22502	E-commerce	Minor	4	0	4	4	50	50	0	0	100
	BSCA25501	System Analysis Design	SEC	0	4	4	2	0	0	25	25	50
	BSCA29501	Fundamentals of Relational and NoSQL Database - Practical	Practical	0	2	2	1	0	0	10	15	25
	BSCA29502	Advance Java - Practical	Practical	0	2	2	1	0	0	10	15	25
					Total	26	22					550
Sem	Course Code	Course Title	Group	Teaching Scheme				Examination Scheme				
				Contact Hours			Credit	Theory		Practical		Total
				Theory	Practical	Total		CCE	SEE	CCE	SEE	
6	BSCA21601	Cyber Security	Major	4	0	4	4	50	50	0	0	100
	BSCA21602	Cloud Computing	Major	4	0	4	4	50	50	0	0	100
	BSCA21603	Mobile Application Development - Theory	Major	3	0	3	3	40	35	0	0	75
	BSCA22601	Internet of Things	Minor	4	0	4	4	50	50	0	0	100
	BSCA27601	Internship	Internship	0	8	8	4	0	0	50	50	100
	BSCA24601	Business Communication Skill-5	AEC	2	0	2	2	25	25	0	0	50
	BSCA29601	Mobile Application Development - Practical	Practical	0	2	2	1	0	0	10	15	25
					Total	27	22					550

SARVAJANIK UNIVERSITY						
Sarvajanik College of Commerce & Computer Applications						
Faculty	Computer Application			Programme	BCA	
Year	3			Version	2.0	
Semester	6			Effective From	June 2025	
Course Code	BSCA21601	Course Name		Cyber Security		
Teaching Scheme				Examination Scheme		
Credits	Lecture	Practical	Total	CCE	SEE	Total
4	4	0	4	50	50	100
Course Outcome: The course aims to equip students with expertise in vulnerability scanning, network defense tools, web application security, cybercrime investigation, ethical hacking, penetration testing, and firewall concepts to effectively mitigate cyber threats and secure networks.						
Course Learning Outcomes: Upon completing the Cloud Computing course, students will be able to understand concepts of network security, vulnerability scanning, web application security, cybercrime investigation, ethical hacking, penetration testing, and firewall management to effectively secure cloud-based infrastructures.						
Units	Content					Weight/ Teaching Hours
1	Introduction to Cyber Security - Meaning and importance of cyber security in today’s digital world - Goals of security: Confidentiality, Integrity, Availability (CIA Triad) - Types of cyber-attacks: Malware, Phishing, Ransomware, DoS/DDoS - Cyber security challenges in organizations and personal use					08
2	Systems Vulnerability Scanning: - Overview of vulnerability scanning, - Open Port / Service Identification, - Banner / Version Check, Traffic Probe, - Vulnerability Probe, Vulnerability Examples, - OpenVAS, Metasploit. - Networks Vulnerability Scanning - Netcat, Socat, - understanding Port and Services tools - Datapipe, Fpipe, WinRelay					06
3	Web Application Tools Scanning for web vulnerabilities tools: - Nikto, W3af, HTTP utilities - Curl, OpenSSL and Stunnel, - Application Inspection tools – Zed Attack Proxy, Sqlmap. - DVWA, Webgoat, - Password Cracking and Brute-Force Tools – John the Ripper, L0htcrack, Pwdump, - HTC-Hydra					08

4	Introduction to Cyber Crime and law: - Cyber Crimes, Types of Cybercrime, Hacking, Attack vectors, Cyberspace and Criminal Behavior, - Clarification of Terms, - Traditional Problems Associated with Computer Crime, - Introduction to Incident Response, Digital Forensics, Computer Language	06
5	Introduction to Cyber Crime Investigation - Password Cracking, - Keyloggers and Spyware, Virus and Worms, - Trojan and backdoors, Steganography, - DOS and DDOS attack, Buffer Overflow, - Attack on wireless Networks	06
6	Ethical Hacking, penetration Testing - Ethical Hacker, Roles and Responsibilities, - Benefit of Ethical Hacking, Skills require to become Ethical hacker, - Penetration testing concepts, Phases of Ethical hacking, - Areas of penetration testing, SQL Injection, - Concepts of SQL Injection, - Types of SQL Injection, - Case study of SQL Injection.	08
7	Cyber Laws and Ethics - Introduction to IT Act 2000 (India) - Cybercrimes under IT Act - Intellectual Property Rights in cyber space - Ethical Hacking vs. Unethical Hacking - Privacy concerns and data protection laws	06
8	Cyber Safety and Best Practices - Safe use of email and social media - Identifying and avoiding phishing scams - Safe use of mobile devices - Backup and disaster recovery - Security updates and antivirus importance	06

Suggested Reference Books:

1. Frontiers of Electronic Commerce, Ravi Kalakota and Andrew Whinston, Addison Wesley
2. Electronic Commerce: A Managerial Perspective, Efraim turban, Jae Lee, David King, H. Michel Chung, Addison Wesley

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Faculty	Computer Application			Programme	BCA	
Year	3			Version	2.0	
Semester	6			Effective From	June 2025	
Course Code	BSCA21603	Course Name		Mobile Application Development - Theory		
Teaching Scheme				Examination Scheme		
Credits	Lecture	Practical	Total	CCE	SEE	Total
3	3	0	3	40	35	75
Course Objective This Course will enable students to create mobile applications across the mobile operating systems - Android and iOS. Students understand how to implement OOPS concept to create efficient and Implementable applications.						
Course Learning Outcomes At the end of this course, students will be able to: 1. describe Flutter architecture, widgets and their life cycle. 2. practice the designing a well interface using Widgets and Components. 3. perform CRUD Operations Using Local Database and Rest API's. 4. use navigation between different pages and refresh screens with data.						
Units	Content					Weight/ Teaching Hours
1	- Introduction to Flutter and Dart - Overview of mobile app development - Why Flutter? (Advantages over native & other frameworks) - Flutter architecture and components - Installation and setup of Flutter SDK & Android Studio/VS Code - Basics of Dart programming language (Variables, Data Types, Operators, Functions) - Writing your first Flutter app ("Hello World")					08
2	Flutter Widgets and UI Design - Understanding widgets (Stateless vs Stateful) - Commonly used widgets: Text, Image, Container, Row, Column, ListView, Stack - Layouts and alignment in Flutter - Styling widgets (Colors, Fonts, Padding, Margin) - Using Material Design & Cupertino widgets - Hands-on: Creating a simple profile page UI					10
3	Navigation and State Management - Routes and Navigation (push, pop) - Passing data between screens - State management basics (setState, Provider, Riverpod – introduction) - Handling user input (TextField, Forms) - Hands-on: Multi-screen app (e.g., Login → Home Page)					10

4	Working with Data and APIs - Local data storage (Shared Preferences, SQLite basics) - Fetching data from REST APIs (http package) - JSON parsing in Flutter - Displaying dynamic data using ListView.builder - Hands-on: Weather App using API data	08
5	Device Features and Firebase Integration - Accessing device features: Camera, Gallery, Location - Introduction to Firebase - Firebase Authentication (Email/Password login) - Firebase Cloud Firestore (storing and retrieving data) - Hands-on: Simple chat or to-do list app using Firebase	08
6	Deployment and Project Development - App testing and debugging in Flutter - Building APK and running on physical device - Publishing apps to Google Play Store (overview) Final Project Guidelines: - Students create their own functional mobile app using Flutter - Example Projects: Expense Tracker, Quiz App, E-commerce Product Catalog, Notes App	10

Suggested Reference Books:

1. Beginning App Development with Flutter (TextBook) By Rap Payne | Apress | 1st
2. Beginning Flutter: A Hands On Guide to App Development By Marco L. Napoli | Wrox | 1st
3. Pragmatic Flutter (TextBook) By Priyanka Tyagi | CRC Press | 1st
4. Flutter Apprentice By Moore K.
5. Flutter Complete Reference By Alberto Miola

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Faculty	Computer Application			Programme	BCA	
Year	3			Version	2.0	
Semester	6			Effective From	June 2025	
Course Code	BSCA21602	Course Name		Cloud Computing		
Teaching Scheme				Examination Scheme		
Credits	Lecture	Practical	Total	CCE	SEE	Total
4	4	0	4	50	50	100
Course Objective This subject aims to provide a comprehensive understanding of basic concepts of cloud computing, cloud computing models and platforms, Virtualization Techniques, Risk involved in cloud computing, privacy issues.						
Course Learning Outcomes Upon completing the Cloud Computing course, students will be able to Understand concepts of Cloud Computing, cloud architecture and deployment models, cloud service providers, virtualization techniques and Service & privacy issues in cloud computing.						
Units	Content					Weight/ Teaching Hours
1	Introduction to Cloud Computing - Cloud Computing - Definition of cloud computing - Central Ideas Behind Cloud Computing - Characteristics of Cloud Computing - Challenges of Cloud Computing - Novel Applications of cloud computing - Security risk of cloud computing - Advantages and Disadvantages of Cloud Computing					08
2	Virtualization Techniques - Introduction of Virtualization - Working of Virtualization - Types of Virtualization(Desktop virtualization, Network Virtualization, Storage Virtualization, Data virtualization, Hardware Virtualization, Software Virtualization) - Advantages and Disadvantage of Virtualization - Characteristic and Applications of Virtualization - Hypervisors (Type 1 Hypervisor, Type 2 Hypervisor)					10
3	Cloud Computing Architecture & Deployment Model - Introduction to cloud computing architecture & deployment model - Components of cloud computing architecture (Client Infrastructure, Cloud access device, Application, Services, Runtime cloud, storage, Infrastructure Security) - Types of cloud deployment models (public cloud, private cloud, hybrid cloud, community cloud, multi cloud) - Key drivers to adopting the cloud - The impact of cloud computing on users - A comparative analysis of cloud deployment models					10

4	Cloud Service Model & service providers - Introduction to cloud service model (SaaS, PaaS, IaaS) - Advantages and Disadvantages of SaaS, PaaS, IaaS - Difference between SaaS, PaaS, IaaS - Service providers (Amazon web service, Microsoft Azure, Google cloud platform, IBM cloud service, VMware cloud, Oracle cloud, Red hat)	06
5	Cloud Security and Privacy issues - Infrastructure security - Network-level security - Application-level security - Host level security - Data Security and Storage - Privacy issues - Data Life cycle	08
6	Security in Cloud Computing - Common security risks in cloud - Identity and Access Management (IAM) - Data encryption in cloud - Security best practices for cloud users - Compliance standards (ISO 27001, GDPR)	06
7	Emerging Trends in Cloud Computing - Serverless Computing - Edge Computing - Multi-Cloud Strategy - AI and Machine Learning in Cloud - Cloud in IoT applications	05
8	Future of Cloud and Career Opportunities - The future of cloud technology - Cloud automation and DevOps - Cloud-based gaming and streaming - Careers in cloud computing - Skills needed for cloud professionals	06

Suggested Reference Books:

- 1 Cloud Computing Fundamentals, Industry Approach and Trends: Rishabh Sharma 2015 2nd Edition
- 2 Cloud Computing For Dummies, Judith Hurwitz, Robin Bloor, Marcia Kaufman, Fern Halper, 2010, 1st Edition
- 3 Cloud Computing: Principles and Paradigms, Rajkumar Buyya, James Broberg, Andrzej Goscinski 2013, 1st Edition

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Faculty	Computer Application			Program	BCA	
Year	3			Version	2.0	
Semester	6			Effective From	June 2025	
Course Code	BSCA29601	Course Name		Mobile Application Development - Practical		
Teaching Scheme				Examination Scheme		
Credits	Lecture	Practical	Total	CCE	SEE	Total
1	0	2	2	10	15	25
Sr. No.	Practical Exercises/Experiments					Approx. Hrs. Required
1	Install Flutter SDK, configure Android Studio/VS Code, and run a sample Flutter app on an emulator or physical device.					04
2	Create a simple "Hello World" Flutter app using Dart language.					02
3	Write a Flutter app to display personal details (name, course, college) using basic Text widgets.					02
4	Design a profile card UI using Container, Row, Column, Image, and Text widgets.					02
5	Create a simple calculator UI layout using buttons and text fields (without functionality).					02
6	Build a student list page using ListView and ListTile widgets.					02
7	Create a multi-screen navigation example (e.g., Home Screen → About Screen → Contact Screen).					02
8	Make a login form with username and password input fields, validate input, and navigate to the home page.					04
9	Store and retrieve simple key-value pairs (e.g., username) using Shared Preferences.					04
10	Fetch and display JSON data from a public API (e.g., list of posts or users) using the http package.					02
11	Create an app that takes a photo using the device camera and displays it.					02
12	Connect a Flutter app with Firebase Authentication for Email/Password login.					02
13	Build a To-Do List app using Firebase Cloud Firestore for storing and retrieving tasks.					04
14	Build and generate an APK for your app and install it on a mobile device.					04

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Faculty	Computer Application			Programme	BCA	
Year	3			Version	2.0	
Semester	6			Effective From	June 2025	
Course Code	BSCA27601	Course Name		Internship		
Teaching Scheme				Examination Scheme		
Credits	Lecture	Practical	Total	CCE	SEE	Total
4	-	8	8	50	50	100
Course Objective 1) To provide students with practical exposure to industry standards and practices. 2) To foster the application of academic knowledge in real-life work scenarios. 3) To enhance students' interpersonal, communication, and problem-solving skills. 4) To help students identify their strengths and areas of interest in professional domains. 5) To inculcate a sense of responsibility, discipline, and work ethics.						
Course Learning Outcomes 1) CO1 (Apply): Apply programming, development, or analytical skills gained in the classroom to solve real-world computing problems during the internship. 2) CO2 (Analyze): Analyze the architecture, workflow, and practices of the host organization to understand the integration of computer systems in business or technical environments. 3) CO3 (Evaluate): Evaluate project requirements, software tools, and technologies used during the internship to recommend improvements or alternative approaches. 4) CO4 (Create): Create a structured technical report and project documentation summarizing the tasks, challenges, and outcomes of the internship. 5) CO5 (Present): Present the project findings and experience effectively using professional communication and presentation skills tailored to the IT/software industry.						
Units	Content					
1	INTERNSHIP REPORT TEMPLATE (to be submitted after internship completion) Front Page Title: Internship Report Student Name: Roll Number: Program and Semester: College Name and Department: Name of Organization/Company: Internship Duration (From – To): Internship Guide Name (Industry and Faculty): Submission Date: ➤ Acknowledgment A short paragraph acknowledging the guidance and support of the organization and faculty mentor. ➤ Certificate Internship Completion Certificate (copy from organization) ➤ Declaration Declaration by the student that the report is original and submitted for					

	academic purposes. ➤ Internship Details Name and Address of Organization Nature of Business/Services Department/Team worked in Name and Designation of Industry Supervisor ➤ Objectives of Internship What you aimed to learn and accomplish. ➤ Description of Work Done Overview of the tasks and responsibilities handled Description of technologies/tools used Screenshots, flowcharts, or diagrams (if applicable) ➤ Learning Outcomes Skills developed, software or tools learned, industry exposure gained. ➤ Challenges and Solutions Mention any problems faced and how you solved them. ➤ Weekly Summary Brief of what was done in each week (can be derived from the logbook). ➤ Conclusion Summary of overall experience, learning, and impact on career development. ➤ References Any websites, books, or resources referred to during the internship.	
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Faculty	Computer Application			Program	BCA	
Year	3			Version	2.0	
Semester	6			Effective From	June 2025	
Course Code	BSCA22601	Course Name		Internet of Things - Theory		
Teaching Scheme				Examination Scheme		
Credits	Lecture	Practical	Total	CCE	SEE	Total
4	4	0	4	50	50	100
Course Objective This course is an introduction for students to IoT. The course also gives students an idea about various components of IoT and explains the working of them. The course also explains the role of embedded systems in IoT ecosystem						
Course Learning Outcomes Course Out come After having completed the course the student will gain: 1. Understanding about the architectural detail of IoT 2. Exposure to working with Arduino & Raspbery pi 3. Knowledge about domain specific applications of IoT						
Units	Content					Weight/ Teaching Hours
1	Introduction to IoT - Definition and Concept of IoT - Evolution and History of IoT - Importance and Scope of IoT - Applications in Various Domains(Healthcare, Agriculture, Smart Cities, etc.) - Challenges in IoT					06
2	IoT Architecture - Basic Architecture of IoT System - Components of IoT: Sensors, Actuators, Gateways, Cloud - Layered Architecture (Perception, Network, Middleware, Application) - Characteristics of IoT Devices and Systems					05
3	IoT Communication Models and APIs - Communication Models: Device-to-Device, Device-to-Gateway, Device-to-Cloud - IoT Communication APIs - Data Flow and Messaging in IoT Systems - Role of REST and MQTT in IoT					06
4	IoT Networking and Communication Protocols - Overview of Communication Technologies (Wi-Fi, Bluetooth, ZigBee, NFC, RFID, LoRa) - IoT Protocol Stack - Application Layer Protocols: MQTT, CoAP, HTTP - Transport Layer: TCP, UDP - Network Layer: IPv4, IPv6, 6LoWPAN - Data Link and Physical Layer Considerations					08

5	IoT Device Management and Security - Device Configuration and Management - IoT Security Challenges - Security Threats: Attacks, Privacy Concerns - Security Mechanisms: Authentication, Encryption, Secure Communication - Case Studies on IoT Security Breaches	06
6	Cloud and Edge Computing in IoT - Role of Cloud Computing in IoT - IoT and Big Data Analytics - Introduction to Edge and Fog Computing - Differences between Cloud, Edge, and Fog - Real-time Processing and Decision-Making	06
7	IoT Applications and Case Studies - Smart Homes - Smart Healthcare - Smart Transportation - Smart Farming - Industrial IoT (IIoT) - Real-time Use Cases and Project Examples (Non-practical, theoretical insights)	07
8	Future Trends and Challenges in IoT - Emerging Trends: AI & ML in IoT, 5G, Blockchain in IoT - Sustainable IoT (Green IoT) - Legal, Ethical, and Social Issues - Scalability and Interoperability Issues - Future Scope and Career Opportunities in IoT	08

Suggested Reference Books:

- IoT & Applications I.A. Dhotre Technical Publication
- Designing the Internet of Things Adrian McEwen and CassimallyWiley
- The Internet of Things Connection objects to web Edited byHakimaChauchi Wiley
- Introduction to Embedded System -By Shibu KV, McGrawHill
- Getting Started with Internet of Things –By Cuno Pfister, O’Reilly
- Learning Internet of Things-By Peter Waher , Packt Publication
- Internet of Things : A Hands on Approach – By Arshdip BahgaandVijay Madiseti
- "The Internet of Things: Enabling Technologies, Platforms, andUse

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Faculty	Computer Application			Program	BCA	
Year	3			Version	2.0	
Semester	5			Effective From	June 2025	
Course Code	BSCA21503	Course Name		Advance Java – Theory		
Teaching Scheme				Examination Scheme		
Credits	Lecture	Practical	Total	CCE	SEE	Total
3	3	0	3	40	35	75
Course Objective This subject aims to impart advanced knowledge and skills in Java programming, encompassing concepts such as multithreading, Servlets, JSP, and Applets						
Course Learning Outcomes Upon completing the Advanced Java course, students will master advanced programming concepts and technologies such as multithreading, Java EE, JSP, Servlets, and Applets, enabling them to develop robust, scalable Java applications.						
Units	Content					Weight/ Teaching Hours
1	AWT, Events, File Handling - AWT Components (Containers, Buttons, Label, TextField, TextArea, Panel, Scrollbar, Checkbox) - Event Handling in Java - Event Listners - File Handling in java - file handling with CRUD					6
2	Java Applet - local and remote applets, - difference between applet and application - applet life cycle - developing executable applet code - adding applet to HTML file - running the applet, passing parameter to applet - various methods and component classes to develop basic applet					8
3	Threads - Threads: What are threads? - Threads vs. Process - Ways of creating a thread - Thread class - Life cycle of Thread - Multithreading and Synchronization: How to create multiple threads - Synchronization between threads using synchronized methods & blocks - Deadlock					8
4	JDBC - JDBC Architecture - Types of JDBC Drivers - Introduction to major JDBC Classes and Interface					6

	- Statement Interface, PreparedStatement, CallableStatement - Exploring ResultSet Operation - Creating simple JDBC Application,	
5	JSP - Introduction to JSP - JSP vs Servlet - JSP Life Cycle - JSP Architecture - JSP scripting tags - JSP Directive Elements - JSP action Tags	6
6	Servlet - Introduction to Servlets - Servlet Architecture - Life Cycle of Servlet - ServletConfig and ServletContext - RequestDispatcher and sendRedirect - Sessions and session tracking techniques - CRUD in Servlet	10

Suggested Reference Books:

Sr. No.	Title of book /article	Author(s)	Year of publication	Publication Edition
1	JAVA: The Complete Reference	Herbert Schildt	2019	11 th Edition
2	Core Servlets and Java Server Pages - Volume 1	Marty Hall, Larry Brown	2004	2nd Edition
3	HeadFirst Servlets and JSP	Kathy Sierra	2008	2nd Edition

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Sarvajanik College of Commerce & Computer Applications						
Faculty	Computer Application		Program		BCA	
Year	3		Version		2.0	
Semester	5		Effective From		June 2025	
Course Code	BSCA29502	Course Name		Advance Java – Practical		
Teaching Scheme				Examination Scheme		
Credits	Lecture	Practical	Total	CCE	SEE	Total
1	0	1	1	10	15	25
Sr. No.	Practical Exercises/Experiments					Approx. Hrs. Required
1	Write a applet program to print a String.					2
2	Write a program to implement simple applet that set Fore ground , Back ground color draw a rectangle , fill a rectangle and display it.					2
3	Write a applet program to create simple GUI consist of Button , Radio button , Text field , Check box and Lable.					2
4	Develop an applet that draw a circle. The Dimension of the applet should be 500 x 300 pixels. The circle should be centered in the applet and have a radius of 100 pixels. Display your name centered in a circle(using drawOval() method).					2
5	Draw ten Black circles in a vertical column in the center of the applet.					2
6	Develop a program that has only one button in the frame, clicking on the button cycles through the colors : Red - Green - Blue and so on. One color changes per click. (use getBackGround() method to get the current color).					2
7	Develop a program that contains three check boxes and 30 x 30 pixel canvas. The three checkboxes should be labeled “Red”, “Green”, “Blue”. The selection of the check boxes determines the color of the canvas. For example, if the user selects both “Red” and “Blue”, the canvas should be purple.					2
8	Develop a simple servlet program which maintains a counter for the number of times it has been accessed since its loading, initialize the counter using deployment descriptor.					4
9	Create a web form which processes servlet and demonstrates use of cookies and sessions.					4
10	Develop a simple JSP program for user registration and then control will be transfer it into second page.					2
11	Develop a simple JSP program for user login form with static and dynamic database					2
12	Develop a JSP program to display the grade of a student by accepting the marks of five subjects.					2

Suggested Reference Books:

Sr. No.	Title of book /article	Author(s)	Year of publication	Publication Edition
1	JAVA: The Complete Reference	Herbert Schildt	2019	11 th Edition
2	Core Servlets and Java Server Pages - Volume 1	Marty Hall, Larry Brown	2004	2nd Edition
3	HeadFirst Servlets and JSP	Kathy Sierra	2008	2nd Edition

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Faculty	Computer Application			Program	BCA	
Year	3			Version	2.0	
Semester	5			Effective From	June 2025	
Course Code	BSCA22502	Course Name		E-commerce		
Teaching Scheme				Examination Scheme		
Credits	Lecture	Practical	Total	CCE	SEE	Total
4	4	0	4	50	50	100
Course Objective: This course aims to provide a comprehensive understanding of the technological aspects, frameworks, and security considerations of e-commerce, while also addressing consumer-oriented strategies, business-to-business transactions, and ethical implications,						
Course Learning Outcomes: Upon completion of this course, students will gain expertise in e-commerce technologies, consumer-oriented strategies, business-to-business transactions, security protocols, and ethical considerations, enabling them to excel in the dynamic landscape of electronic commerce.						
Units	Content					Weight/ Teaching Hours
1	E-commerce and its Technological Aspects - Overview of developments in Information Technology and Defining E-Commerce: The scope of E commerce, Electronic Market, Electronic Data Interchange, - Internet Commerce, Benefits and limitations of E-Commerce, - Produce a generic framework for E-Commerce, - Architectural framework of Electronic Commerce, - Web based E Commerce Architecture.					8
2	Consumer Oriented E Commerce E-Retailing: - Traditional retailing and e retailing, Benefits of e retailing, Key success factors, Models of e retailing, Features of e retailing. - E services: Categories of e-services, Web-enabled services, matchmaking services, - Information-selling on the web, e entertainment, - Auctions and other specialized services. - Business to Business Electronic Commerce					8
3	Electronic Data Interchange: - Benefits of EDI, EDI technology, - EDI standards, EDI communications, - EDI Implementation, EDI Agreements, - EDI Security. Electronic Payment Systems, - Need of Electronic Payment System: - Study and examine the use of Electronic Payment system and the protocols used					10

4	Security in E Commerce: - Introduction to E-Commerce Security - Threats in Computer Systems: Virus, - Security Technologies and Mechanisms - Legal, Ethical, and Privacy Issues in E-Commerce Security	6
5	Issues in E Commerce - Understanding Ethical, Social and Political issues in E-Commerce: A model for Organizing the issues, Basic Ethical Concepts, - Analyzing Ethical Dilemmas, - Candidate Ethical principles Privacy and Information Rights: - Information collected at E-Commerce Websites, - The Concept of Privacy.	8
6	E-Payment System - Main Concerns in Internet Banking - Digital Payment Requirements - Digital Token-based e-payment Systems - Cheque Payment Systems on the Internet - Risk in E-Payment Systems	6
7	E-Commerce Case Study - Various brands case study with key features: - E-Commerce platform strategies - Strength and weaknesses for various platforms - CRM in E-Commerce site - Key resources and activities	5
8	E-Security and Online threats - Security on the Web - E-business Risk Management Issues - Legal and Ethical Issues : Cyber talking - Application Fraud, Internet Gambling, Threats to Children	6

Suggested Reference Books:

- E-commerce 2018: Business, Technology, Society" by Kenneth C. Laudon and Carol Guercio
- E-commerce Essentials" by Kenneth C. Laudon, Carol Guercio Traver, and Bryan O'Keeffe
- E-Commerce: Concepts, Models, Strategies – C.S.V. Murthy
- E-Commerce: Strategy, Technologies and Applications – David Whiteley
- Electronic Commerce: A Managerial Perspective – Efraim Turban, David King, Jae K. Lee

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Sarvajanik College of Commerce & Computer Applications						
Faculty	Computer Application			Program	BCA	
Year	3			Version	1.0	
Semester	5			Effective From	June 2025	
Course Code	BSCA21501	Course Name		Fundamentals of Relational and NoSQL Database – Theory		
Teaching Scheme				Examination Scheme		
Credits	Lecture	Practical	Total	CCE	SEE	Total
3	3	0	3	40	35	75
Course Objective To provide Fundamental knowledge of the detailed architecture, define objects, load data, query data and performance tune NoSQL databases.						
Course Learning Outcomes 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						
Units	Content					Weight/ Teaching Hours
1	Unit 1: Database Basics - Type of Database Systems - Relational Database Design - E-commerce Application - Early Database Management Systems - Flat File Data Management Systems - Organization of Flat File Data Management Systems - Hierarchical Data Model Systems					06
2	Unit 2: Variety of NoSQL Databases - Data Management with Distributed Databases - Store Data Persistently, Maintain Data Consistency, Ensure Data Availability - Balancing Response Times, Consistency, and Durability Consistency, Availability, and Partitioning: The CAP Theorem - ACID and BASE - ACID: Atomicity, Consistency, Isolation, and Durability - BASE: Basically Available, Soft State, Eventually Consistent					08
3	Unit 3: Types of NoSQL Databases - Key-Value Pair Database - Document Database - Column Family Databases - Graph Databases - Time-series Database					06

4	Unit 4: MongoDB - The Document Data Model - Documents and Collections - Mongo Shell	04
5	Unit 5: MongoDB Databases - Working Database – create, drop - Working with collections – create, drop - Working with Document – Adding batch of document, find document, modify document, find selected fields, removing document - Indexing - Writing to Shards - MongoDB as a File System	08
6	Unit 6: Cassandra - The Column-Family Data Model - Databases and Tables - Columns, Types, and Keys - Cassandra’s Architecture - Cypher Query Language (CQL)	07

Suggested Reference Books:

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

SARVAJANIK UNIVERSITY						
Sarvajanik College of Commerce & Computer Applications						
Faculty	Computer Application			Program	BCA	
Year	3			Version	2.0	
Semester	5			Effective From	June 2025	
Course Code	BSCA29501	Course Name		Fundamentals of Relational and NoSQL Database – Practical		
Teaching Scheme				Examination Scheme		
Credits	Lecture	Practical	Total	CCE	SEE	Total
1	0	1	1	10	15	25
Sr. No.	Practical Exercises/Experiments					Approx. Hrs. Required
1	Create a database called “StudentDB” in mongodb. Create a Collection named “students”. Create a Collection named “faculties”.					2
2	Insert a single document into both collections name “students” and “faculties”. Insert multiple documents(At least 4) into both collections name “students” and “faculties”.					2
3	Display all available databases. Display all documents in a collection “students”. Display only name and course field in “students” collection. Display only name and department field in “faculties” collection.					2
4	Find Students whose age is greater than 20. Find students whose age is greater than 20 and score is less than 80. Find all students who live in “surat” or “vadodara”. Find all students whose course is BCA in the “students” collection.					2
5	Find all faculties aged 35 or older who live in Surat, from “faculties” collection. Sort the results of the previous query by age, in ascending order. Find faculties whose salary is greater than or equal to 30000 and less than 250000. Sort the results of the previous query by salary, in descending order.					2
6	Find top five faculties with highest salary. Find faculties whose name starts with “S”. Find faculties who are not from “Delhi”					2
7	Update a single document into “students” collection (ex:- age:25). Update all students enrolled in the “BSC” course by setting their batch 2025					2
8	Delete only one student named “Bob” from the“ students” collection. Delete all documents from the “students” collection where the course is “BA”.					4
9	Count the total students in the “students” collection who live in “surat”. Count the total faculties in the “faculties” collection whose department is BCA.					4

10	Create a database named “collegeDB”. Create a collection named “course”. Drop a collection “course”. Drop database “collegeDB”.	2
11	Create an index on the course field into “students” collection. View all Indexes of a collection “students”. Count the number of students enrolled in each distinct course.	2
12	Create an index on the Department field into “faculties” collection. Count the number of faculties of each distinct department.	2

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Sarvajanik College of Commerce & Computer Applications						
Faculty	Computer Application			Program	BCA	
Year	3			Version	2.0	
Semester	5			Effective From	June 2025	
Course Code	BSCA21502	Course Name		Information Security		
Teaching Scheme				Examination Scheme		
Credits	Lecture	Practical	Total	CCE	SEE	Total
4	4	0	4	50	50	100
Course Objective The objective of Information Security is to upgrade fundamentals of security over network. This course covers basic cryptography concepts, techniques and encryption algorithms. After going through this course student will be able to configure security policy in OS						
Course Learning Outcomes The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning out comes in cognitive, psychomotor and affective domain to demonstrate following course outcomes. - Describe importance of Security in Communication. - Explain basic concept of Encryption Algorithm. - Elaborate Firewall Techniques. - Explain latest trends in OS Security Assessment Tools. - Install various firewalls for information security. - Apply/Use anti malware and Cleanup Tools for betterment of information security. - Apply/Use antivirus effectively for the security of OS.						
Units	Content					Weight/ Teaching Hours
1	Introduction of Information Security - Need of Information Security - Security Trends - What is Information Security - Overview of Information Security - Security Services - Security Mechanism - Security Attacks - The OSI Security Architecture - A Model for Network Security					08
2	Security Techniques - Symmetric Cipher Model - Cryptography ,Cryptanalysis Substitution Techniques • Caesar Cipher • Monoalphabetic Cipher • Polyalphabetic Cipher					12

	• Playfair Cipher • Hill Cipher - Problems with Symmetric Cipher Algorithms - Diffie-Hellman Key exchange algorithm - Transposition Techniques - Steganography	
3	Symmetric Encryption Algorithm - Block Cipher Principal - The Data Encryption Standard - Feistel Structure - First Round of DES - Strength of DES • Double DES • Man in the Middle Attack - Block Cipher Modes of Operation • Electronic Code Book • Cipher Block Chaining Mode • Cipher Feedback Mode • Output Feedback Mode • Counter Mode	10
4	Asymmetric Key Encryption - Limitations of Symmetric Key Encryption - Asymmetric Key Encryption • Maintaining Confidentiality • Maintaining Authentication • Managing confidentiality and authentication together	06
5	System Security - Intrusion - Classification of Intruders - Intrusion Detection techniques. • Statistical anomaly detection • Rule based detection. - Password Management - Password selection strategies. - Malicious software : Virus and Related Threats, Virus Countermeasures - Need of firewall. - Firewall characteristics. - Types of Firewall • Packet filtering firewall. • Application proxy firewall. • Circuit level proxy firewall.	10
6	Network Security Fundamentals	06

	- Need for network security - Firewalls and intrusion detection/prevention systems - Virtual Private Networks (VPN) - Secure protocols: HTTPS, SSH - Wireless security basics (WEP, WPA, WPA2)	
7	Information Security Policies & Laws - Importance of security policies in organizations - Examples of security policies (acceptable use policy, password policy) - Overview of IT Act 2000 (India) and cyber laws - Data protection and privacy basics	05
8	Incident Management & Future Trends - Steps in incident response (detection, containment, recovery, lessons learned) - Backup and disaster recovery planning - Current trends: cloud security, IoT security, AI in security - Career opportunities in information security	04

Suggested Reference Books:

- Cryptography and Network Security, William Stallings, Pearson
- Cryptography and Network Security Forouzon Mc Graw Hill
- Network Security Essentials. William Stallings Pearson
- Network Security: Private Communication in a Public World Charlie Kaufman Prentice Hall
- Cryptography Theory and Practice Douglas R. Stinson

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Sarvajanik College of Commerce & Computer Applications						
Faculty	Computer Application			Program	BCA	
Year	3			Version	1.0	
Semester	5			Effective From	June 2025	
Course Code	BSCA22501	Course Name		Operating System		
Teaching Scheme				Examination Scheme		
Credits	Lecture	Practical	Total	CCE	SEE	Total
4	4	0	4	50	50	100
Course Objective This course enables students to understand the importance of an Operating system, its functionalities to manage resources of computers and Peripherals, program development, and its execution. The student will acquire knowledge of Process Management, Memory Management, File Management, and I/O Management						
Course Learning Outcomes At the end of this course, students will be able to: 1. discuss the basics of Operating System fundamentals 2. implement the CPU scheduling algorithms for Process management. 3. describe inter-process Communication problems and deadlock. 4. use memory management strategies and allocation techniques. 5. practice le management and IO management methods.						
Units	Content					Weight/ Teaching Hours
1	Introduction of Operating System - Operating Systems - Definitions, - Functions of OS, Features of OS, - Types of operating system - Multiprogramming, Batch, Time Sharing, - Single user Multiuser, - components, - Operating system Services, - System Calls, programs, System structure.					08
2	Process Management - Process Overview, - Process States, - Process State Transitions, - Process Control Block, - Context Switching, Threads Concept, - Types of threads, - Basic concepts of CPU Scheduling, - Types of Schedulers, Scheduling Criteria, - Scheduling Algorithms: Preemptive and non-preemptive, - FCFS, SJF, SRTN, RR, and Priority.					10
3	Interprocess Communication & Deadlock - Interprocess Communication, - Race Condition, - Critical Section,					

	- Mutual Exclusion, Disabling Interrupts, Shared Lock Variable, - Strict Alternation, TSL (Test and Set Lock) Instruction. Deadlock: - Deadlock Definition, - Deadlock characteristics, Deadlock detection and recovery, - Deadlock avoidance, Deadlock prevention.	08
4	Memory Management - Memory Management: Concept, - Basic memory management techniques, - Logical and Physical address, - Swapping, - Memory Allocation Strategies (First Fit, Best Fit, and Worst Fit), - Paging, Concept of a Page Fault, - Page Replacement Algorithms: FIFO, LRU, OPT, - The concept of virtual memory.	10
5	I/O and File Management I/O Management: I/O Devices: - dedicated device, - Virtual device and shared device, - I/O buffering, - Disk Scheduling (FCFS, SSTF, SCAN, C-SCAN, LOOK, and C-LOOK). File Management: - File concept, File types, File Attributes, File operation, - Directory structure, - File access methods: Sequential access, Direct access and Indexed Access.	09
6	Security & Protection: - Security Environment, - Design Principles Of Security, - User Authentication, - Protection Mechanism : - Protection Domain, Access Control List	07
7	Unix/Linux Operating System: - Development Of Unix/Linux, - Role & Function Of Kernel, - System Calls, - Elementary Linux command & Shell Programming, - Directory Structure, - System Administration - Case study: Linux, Windows Operating System	07
8	Virtualization Concepts: - Virtual machines; - supporting multiple operating systems simultaneously on a single hardware platform; - running one operating system on top of another. - True or pure virtualization.	04

Suggested Reference Books:

1. Modern Operating Systems by Andrew S. Tanenbaum
2. Operating Systems: Internals & Design Principles by William Stallings
3. Operating System Concepts by Peter B. Galvin, Greg Gagne, Abraham Silberschatz
4. Unix Concepts And Application by Sumitabha Das

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Sarvajanic College of Commerce & Computer Applications						
Faculty	Computer Application			Programme	BCA	
Year	3			Version	2.0	
Semester	5			Effective From	June 2025	
Course Code	BSCA25501	Course Name		System Analysis and Design		
Teaching Scheme				Examination Scheme		
Credits	Lecture	Practical	Total	CCE	SEE	Total
2	-	4	4	25	25	50
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.						
Course Learning Outcomes - 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.						
Units	Content					
1	Project Introduction & Planning - Identifying and selecting project topic - Problem statement and scope definition - Preparing project proposal					06
2	System Analysis & Requirements - Gathering requirements (interviews, questionnaires, observation) - Functional and non-functional requirements - System analysis tools: Data Flow Diagrams (DFD), Use Case Diagrams - Requirements specification document (SRS) preparation					06
3	System Design - Designing input, output, and database structure - ER diagrams and schema design - User interface (UI) design principles					04
4	Implementation & Coding Standards - Choosing programming language and platform					08

	- Coding standards and best practices	
5	Project Documentation (As per standard academic format) - Title Page - Certificate - Acknowledgement - Abstract - Table of Contents - Introduction of Project - Problem Statement - Objectives and Scope - Literature Review / Existing System - Proposed System - System Analysis (DFD, Use Case, ER diagrams) - System Design (screens, database, architecture) - Implementation Details - Testing and Results - Conclusion and Future Scope - References	10
6	Project Presentation & Viva - Preparing project presentation (PPT) - Demonstrating the working project - Handling viva questions on design, coding, and implementation - Time management and presentation skills	06