



SARDAR PATEL UNIVERSITY, BALAGHAT

School of Computer Application

Syllabus under NEP

Course: Bachelor of Computer Applications (BCA)

Semester: VI

Branch: Computer Science and Application

w.e.f. Academic Session: 2025-26

Subject: Mobile Application Development (BCAMA601T)

UNIT - I: Introduction to Mobile Application Development

Overview of mobile computing and mobile platforms (Android, iOS, cross-platform). Characteristics of mobile applications. Mobile app architecture and lifecycle. Development tools and IDEs (Android Studio, Xcode, Visual Studio). Setting up the environment and creating a simple mobile app.

UNIT - II: User Interface Design

UI components: TextView, EditText, Button, ImageView, RecyclerView, etc. **Layouts:** LinearLayout, RelativeLayout, ConstraintLayout, FrameLayout. Event handling and listeners. Designing responsive and adaptive UIs for different screen sizes. Material design principles and guidelines.

UNIT - III: Data Management in Mobile Apps

Shared Preferences and internal storage. SQLite database integration. Content providers and data sharing between apps. Working with files and external storage. Introduction to Room Database (modern Android persistence library).

UNIT - IV: Connectivity and Advanced Features

Networking in mobile apps: HTTP, REST APIs, JSON, XML Consuming web services in mobile applications. **Background tasks:** AsyncTask, Services, WorkManager. Notifications and alerts. Location-based services and Google Maps integration. Sensors and multimedia handling (camera, audio, video).

UNIT - V: Mobile App Deployment and Emerging Trends

Testing and debugging mobile applications. Performance optimization and security considerations. Publishing apps on Google Play Store and Apple App Store. Cross-platform development frameworks (Flutter, React Native). **Emerging trends:** AI in mobile apps, AR/VR, IoT integration. Case studies of successful mobile applications.

Reference Books

1. **Professional Android** – Reto Meier & Ian Lake
2. **Android Programming: The Big Nerd Ranch Guide** – Bill Phillips, Chris Stewart, Kristin Marsicano
3. **Beginning Android Programming with Android Studio** – Jerome DiMarzio
4. **Mobile Application Development** – Jeff McWherter & Scott Gowell
5. **Learning React Native** – Bonnie Eisenman
6. **Flutter for Beginners** – Alessandro Biessek



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Mobile Application Development Practical Problem List (BCAMA601P)

Basics of Mobile App Development

1. Create a simple "Hello World" Android application.
2. Develop an app that takes user input (name) and displays a greeting message.
3. Build a calculator app with basic arithmetic operations.
4. Create an app that demonstrates the activity lifecycle (onCreate, onStart, onResume, etc.).

User Interface Design

5. Design a login form using TextView, EditText, and Button controls.
6. Create a registration form with multiple input fields and validation.
7. Develop an app using different layouts (LinearLayout, RelativeLayout, ConstraintLayout).
8. Build a list-based app using RecyclerView to display student names.

Data Management

9. Create an app that stores and retrieves user preferences using SharedPreferences.
10. Develop an app that stores student records in SQLite database and displays them in a ListView.
11. Implement CRUD operations (Insert, Update, Delete, Select) using SQLite.
12. Build an app that reads and writes data to a file in internal storage.

Connectivity and Advanced Features

13. Create an app that fetches JSON data from a REST API and displays it.
14. Develop a weather app using an online API.
15. Build an app that sends and receives SMS messages.
16. Create a location-based app that shows the user's current location using Google Maps.
17. Develop an app that captures an image using the device camera and displays it.
18. Build a music player app that plays audio files from local storage.

Deployment and Emerging Trends

19. Create an app that sends push notifications.
20. Develop a cross-platform app using Flutter or React Native (simple to-do list app).



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Subject: Full Stack Development (BCAMA602T)

UNIT - I: Introduction to Full Stack Development

Overview of full stack development. Client-side vs. server-side programming. **Web architecture:** front-end, back-end, and database layers. Tools and technologies for full stack development. Setting up development environment (VS Code, Node.js, Git).

UNIT - II: Front-End Development

HTML5: structure, forms, multimedia tags. **CSS3:** styling, responsive design, Flexbox, Grid. **JavaScript basics:** DOM manipulation, events, ES6 features. Introduction to front-end frameworks (React/Angular/Vue). Building interactive user interfaces.

UNIT - III: Back-End Development

Introduction to server-side programming. **Node.js basics:** modules, npm, event-driven architecture. **Express.js framework:** routing, middleware, REST APIs. Handling HTTP requests and responses. Authentication and session management.

UNIT - IV: Database Management

Introduction to databases: SQL vs. NoSQL. **Relational databases (MySQL/PostgreSQL):** schema design, queries. **NoSQL databases (MongoDB):** collections, documents, CRUD operations. Connecting databases with Node.js/Express. ORM tools (Sequelize, Mongoose).

UNIT - V: Deployment and Advanced Topics

Testing and debugging full stack applications. Version control with Git and GitHub. Deployment on cloud platforms (Heroku, AWS, Netlify). **Security practices:** input validation, encryption, secure authentication. **Emerging trends:** microservices, serverless architecture, DevOps basics. Case studies of full stack applications.

Reference Books

1. **Full Stack Development: With React and Node.js** – Shama Hoque
2. **Learning Web Development with React and Bootstrap** – Harmeet Singh, Mehul Bhatt
3. **Node.js, MongoDB, and Angular Web Development** – Brad Dayley, Brendan Dayley, Caleb Dayley
4. **Web Development with MongoDB and Node.js** – Ethan Brown
5. **Learning PHP, MySQL & JavaScript** – Robin Nixon (for foundational concepts)
6. **Pro MERN Stack: Full Stack Web App Development with Mongo, Express, React, and Node** – Vasan Subramanian



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Full Stack Development Practical Problem List (BCAMA602P)

Basics & Environment Setup

1. Install Node.js, Git, and VS Code; create a simple "Hello World" web app.
2. Build a static webpage using HTML and CSS.
3. Create a responsive webpage using Flexbox and Grid layout.
4. Develop a simple JavaScript program to validate a form (e.g., email, password).

Front-End Development

5. Create a dynamic webpage using DOM manipulation (e.g., to-do list).
6. Build a single-page application (SPA) using React with multiple components.
7. Implement routing in React (React Router) for navigation between pages.
8. Create a simple front-end project that consumes a public API (e.g., weather API).

Back-End Development

9. Set up a Node.js server using Express.js.
10. Create RESTful APIs for CRUD operations (students or products database).
11. Implement middleware in Express.js for logging and error handling.
12. Build a user authentication system with sessions or JWT (JSON Web Tokens).

Database Integration

13. Connect a Node.js application to a MySQL database and perform CRUD operations.
14. Create a MongoDB database and perform CRUD operations using Mongoose.
15. Design a schema for a blog application (users, posts, comments).
16. Implement search functionality in a database-driven app.

Deployment & Advanced Features

17. Use Git and GitHub for version control (commit, push, pull requests).
18. Deploy a full stack application on Heroku or Netlify.
19. Implement input validation and security measures (e.g., password hashing).
20. Build a mini full stack project (e.g., task manager, e-commerce cart, or student portal).



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Subject: System Analysis and Design (BCAMI603T)

UNIT - I: Introduction to System Analysis and Design

Definition, scope, and importance of SAD. **Types of systems:** open, closed, deterministic, probabilistic. **System development life cycle (SDLC) models:** Waterfall, Spiral, Agile. **Role of system analyst:** skills, responsibilities, and challenges. Case studies of real-world systems.

UNIT - II: System Planning and Feasibility

Preliminary investigation and problem identification. **Feasibility study:** technical, economic, operational, legal, and schedule feasibility. Cost-benefit analysis. **Tools for system planning:** Gantt charts, PERT charts. Documentation and reporting.

UNIT - III: System Requirements and Analysis

Requirement gathering techniques: interviews, questionnaires, observation, document analysis. Functional and non-functional requirements. Data flow diagrams (DFD) and process modeling. Entity-Relationship (ER) diagrams and data modeling. Decision tables and decision trees. Structured analysis techniques.

UNIT - IV: System Design

Logical vs. physical design. Input and output design principles. User interface design and usability considerations. File and database design. System security and control measures. Design documentation.

UNIT - V: System Implementation and Maintenance

System implementation strategies: direct, parallel, phased, pilot. **Testing methods:** unit testing, integration testing, system testing, and acceptance testing. Training and user support. **System maintenance:** corrective, adaptive, perfective, preventive. Evaluation of system performance. Emerging trends in system development (cloud-based systems, AI-driven design, DevOps).

Reference Books

1. **Systems Analysis and Design** – Elias M. Awad
2. **Systems Analysis and Design** – Kenneth E. Kendall & Julie E. Kendall
3. **Modern Systems Analysis and Design** – Jeffrey A. Hoffer, Joey F. George, Joseph S. Valacich
4. **Systems Analysis and Design Methods** – Whitten, Bentley, Dittman
5. **Analysis and Design of Information Systems** – James A. Senn
6. **Systems Analysis and Design** – Alan Dennis, Barbara Haley Wixom, Roberta M. Roth



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Subject: Communication Skill (BCAAEC604T)

UNIT - I: Fundamentals of Communication

Definition, process, and importance of communication. **Types of communication:** verbal, non-verbal, written, visual. Barriers to effective communication and overcoming them. Principles of effective communication. Role of communication in professional and academic settings.

UNIT - II: Oral Communication

Public speaking basics: voice modulation, clarity, confidence. **Group discussions:** techniques, participation, evaluation. **Presentation skills:** planning, structuring, and delivering presentations. **Interview skills:** preparation, common questions, body language. **Listening skills:** active listening, empathetic listening, note-taking.

UNIT - III: Written Communication

Basics of professional writing: clarity, conciseness, correctness. **Business correspondence:** letters, memos, notices, circulars. **Report writing:** structure, style, and presentation. Email etiquette and drafting effective emails. Resume and cover letter writing.

UNIT - IV: Non-Verbal and Interpersonal Communication

Importance of non-verbal communication: gestures, facial expressions, posture. Body language in professional settings. **Interpersonal communication:** building rapport, teamwork, conflict resolution. Cross-cultural communication and sensitivity. Role of emotional intelligence in communication.

UNIT - V: Communication in Professional Context

Communication in organizations: formal and informal channels. **Meetings:** agenda preparation, minutes writing, participation skills. Negotiation and persuasion techniques. Communication for leadership and management. **Use of technology in communication:** video conferencing, social media, digital tools.

Reference Books

1. **Business Communication** – Meenakshi Raman & Prakash Singh
2. **Effective Business Communication** – Herta A. Murphy, Herbert W. Hildebrandt, Jane P. Thomas
3. **Communication Skills** – Sanjay Kumar & Pushp Lata
4. **Developing Communication Skills** – Krishna Mohan & Meera Banerji
5. **Business Communication: Process and Product** – Mary Ellen Guffey & Dana Loewy
6. **Essentials of Business Communication** – Rajendra Pal & J.S. Korlahalli



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Subject: Cyber Security Awareness & Practices (BCAVEC605T)

UNIT - I: Introduction to Cyber Security

Definition, scope, and importance of cyber security. **Types of cyber threats:** malware, phishing, ransomware, social engineering. **Cyber security principles:** confidentiality, integrity, availability (CIA triad). Cyber security policies and standards (ISO, NIST). Role of individuals and organizations in cyber safety.

UNIT - II: Network and System Security

Basics of computer networks and protocols. Firewalls, intrusion detection/prevention systems (IDS/IPS). Secure configuration of operating systems. **Encryption basics:** symmetric and asymmetric cryptography. Virtual Private Networks (VPNs) and secure communication.

UNIT - III: Cyber Attacks and Defense Mechanisms

Common attack types: denial of service (DoS), SQL injection, cross-site scripting (XSS), man-in-the-middle. **Malware types:** viruses, worms, trojans, spyware, adware. **Defense mechanisms:** antivirus, patch management, secure coding practices. Incident response and recovery planning. Case studies of major cyber attacks.

UNIT - IV: Cyber Security Practices for Individuals and Organizations

Password management and multi-factor authentication. Safe browsing practices and email security. Social media safety and digital footprint management. Security in mobile devices and applications. **Organizational practices:** access control, role-based security, data backup policies.

UNIT - V: Legal, Ethical, and Emerging Trends

Cyber laws in India (IT Act 2000, amendments). Intellectual property rights and digital privacy issues. Ethical hacking and penetration testing basics. **Emerging trends:** cloud security, IoT security, AI in cyber defense. Careers in cyber security and certifications (CEH, CISSP, CompTIA Security+).

Reference Books

1. **Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives** – Nina Godbole & Sunit Belapure
2. **Cybersecurity and Cyberwar: What Everyone Needs to Know** – P.W. Singer & Allan Friedman
3. **Computer Security: Principles and Practice** – William Stallings & Lawrie Brown
4. **Information Security: Principles and Practice** – Mark Stamp
5. **Cybersecurity Essentials** – Charles J. Brooks, Christopher Grow, Philip Craig, Donald Short
6. **Network Security Essentials: Applications and Standards** – William Stallings