SARDAR PATEL UNIVERSITY, BALAGHAT

School of Computer Application

Syllabus under NEP

Course: Bachelor of Computer Applications (BCA) **Semester: VIII**

Branch: Computer Science and Application **w.e.f. Academic Session: 2025-26**

Subject: Advance Database Systems using PostgreSQL (BCADSE801AT)

UNIT - I: Introduction to Advanced Database Concepts

Review of DBMS basics and relational model. **Evolution of database systems:** hierarchical, network, relational, object-relational. **Advanced data models:** distributed, parallel, and cloud databases. **PostgreSQL overview:** history, features, and architecture. Client-server model and PostgreSQL ecosystem (pgAdmin, psql).

UNIT - II: PostgreSQL Fundamentals

Installation and configuration of PostgreSQL on Windows/Linux. Database creation, schema design, and role management. **PostgreSQL data types:** numeric, character, date/time, Boolean, arrays. **Constraints:** primary key, foreign key, unique, check, not null. Indexes and sequences for auto-increment. **Basic SQL operations:** CREATE, INSERT, UPDATE, DELETE, SELECT.

UNIT - III: Advanced SQL in PostgreSQL

Complex queries: joins (inner, outer, self), subqueries. **Views:** creation, update, and security implications. Stored procedures and user-defined functions (PL/pgSQL basics). Triggers and rules for automation. Window functions (RANK, ROW_NUMBER, LEAD/LAG). Common Table Expressions (CTEs) and recursive queries.

UNIT - IV: Performance and Optimization

Query execution plan and EXPLAIN/ANALYZE usage. **Indexing strategies:** B-Tree, Hash, GIN, GiST, **and BRIN. Transactions:** ACID properties, isolation levels, savepoints. **Concurrency control:** locks, deadlocks, MVCC (Multi-Version Concurrency Control). Backup and restore (pg_dump, pg_restore). **Replication basics:** streaming replication, logical replication.

UNIT - V: Advanced Features and Applications

PostgreSQL support for JSON, JSONB, and XML. Full-text search capabilities. Handling large objects (LOBs) and arrays. Security: roles, privileges, SSL connections, row-level security. Extensions in PostgreSQL (PostGIS, pgRouting, etc.). Case studies: building a student management system, e-commerce database, or library system. Emerging trends: PostgreSQL in cloud platforms (AWS RDS, Azure Database for PostgreSQL).

Reference Books

1. **PostgreSQL: Up and Runnin** – Regina Obe & Leo Hsu
2. **Beginning Databases with PostgreSQL** – Richard Stones & Neil Matthew
3. **Database System Concepts** – Abraham Silberschatz, Henry F. Korth, S. Sudarshan
4. **Mastering PostgreSQL in Application Development** – Dimitri Fontaine

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Course: Bachelor of Computer Applications (BCA) **Semester: VIII**

Branch: Computer Science and Application **w.e.f. Academic Session: 2025-26**

Subject: E-Commerce and E-Governance (BCADSE801BT)

UNIT- I: Introduction to E-Commerce

Meaning, scope, and types of e-commerce (B2B, B2C, C2C, C2B). E-commerce business models and revenue models. **Infrastructure for e-commerce:** internet, intranet, extranet. Advantages and limitations of e-commerce. Case studies of successful e-commerce platforms.

UNIT - II: E-Commerce Technologies

Electronic payment systems: credit cards, debit cards, digital wallets, UPI. Online banking and mobile commerce. **Security issues in e-commerce:** encryption, digital signatures, SSL, firewalls. E-commerce software and platforms (Magento, Shopify, WooCommerce basics). Supply chain management and e-commerce integration.

UNIT - III: E-Governance Fundamentals

Definition, scope, and importance of e-governance. **Models of e-governance:** G2C, G2B, G2G, G2E. **E-governance infrastructure in India:** National e-Governance Plan (NeGP). Digital India initiative and its components. Benefits and challenges of e-governance.

UNIT - IV: E-Governance Applications

Online services: e-taxation, e-health, e-education, e-voting. E-governance in rural development and agriculture. **Case studies:** Aadhaar, UMANG app, DigiLocker, BHIM app. Role of ICT in governance and transparency. Cyber laws and IT Act in India.

UNIT - V: Emerging Trends and Future Directions

Cloud computing and e-commerce/e-governance. Artificial Intelligence and Big Data in e-commerce personalization. Blockchain in e-payments and governance. Smart cities and IoT applications in governance. Ethical and social issues in e-commerce and e-governance.

Reference Books

1. **E-Commerce: Concepts and Technologies** – P.T. Joseph
2. **E-Commerce: Strategy, Technologies and Applications** – David Whiteley
3. **E-Governance in India: Initiatives and Challenges** – Pankaj Sharma
4. **Electronic Commerce** – Gary Schneider

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Course: Bachelor of Computer Applications (BCA) **Semester: VIII**

Branch: Computer Science and Application **w.e.f. Academic Session: 2025-26**

Subject: Digital Entrepreneurship & Innovation (BCADSE802T)

UNIT - I: Fundamentals of Digital Entrepreneurship

Concept, scope, and evolution of entrepreneurship in the digital age. Characteristics, mindset, and skills of successful digital entrepreneurs. Traditional vs. digital business models. Role of ICT, mobile apps, and digital platforms in entrepreneurship. **Entrepreneurial ecosystem:** incubators, accelerators, startup hubs. Case studies of Indian and global digital startups (Flipkart, Ola, Amazon, Nykaa).

UNIT - II: Digital Business Models and Strategies

Types of digital business models: platform-based, subscription, freemium, marketplace, gig economy. Revenue generation strategies in digital businesses. Customer-centric strategies and digital value creation. **Digital marketing:** SEO, SEM, social media, influencer marketing, content marketing, email marketing. E-commerce integration with entrepreneurship. Case studies of digital business strategies (Netflix, Swiggy, Zomato, BYJU'S).

UNIT - III: Innovation and Emerging Technologies

Concept and importance of innovation in entrepreneurship. **Types of innovation:** product, process, organizational, disruptive, and business model innovation. **Emerging technologies:** Artificial Intelligence, IoT, Blockchain, Cloud Computing, AR/VR, Metaverse. Role of data analytics, big data, and machine learning in innovation. Case studies of innovative companies (Paytm, Tesla, Google, Apple). Government initiatives supporting innovation (Startup India, Digital India, Atal Innovation Mission).

UNIT - IV: Building and Managing Digital Startups

Idea generation, validation, and prototyping. Business plan development for digital ventures. **Funding sources:** venture capital, angel investors, crowdfunding, incubators, and government schemes. Legal and ethical issues in digital entrepreneurship (IPR, cyber laws, data privacy, compliance). Risk management, scalability, and sustainability strategies. Entrepreneurial leadership, team building, and organizational culture in startups. Case studies of Indian unicorns (OYO, Razorpay, Zerodha).

UNIT - V: Future Trends in Digital Entrepreneurship

Digital transformation and its impact on businesses. Smart cities, e-governance, and opportunities for entrepreneurs. Sustainability and green entrepreneurship in digital space. Globalization and cross-border digital businesses. **Future skills for digital entrepreneurs:** adaptability, creativity, digital literacy, design thinking. Role of innovation in social entrepreneurship and inclusive growth. Case studies of future-oriented ventures (SpaceX, BYJU'S, EdTech startups, fintech innovations).

Reference Books

1. **Digital Entrepreneurship** – M. Khajeheian & W. M. Friedrichsen
2. **Entrepreneurship Development** – S.S. Khanka
3. **Innovation and Entrepreneurship** – Peter F. Drucker
4. **Digital Business and E-Commerce Management** – Dave Chaffey