# Govt. Digvijay Autonomous PG College Rajnandgaon(CG)

## SCHEME OF EXAMINATION & SYLLABUS

**FOR**

**THE FOUR-YEAR UNDERGRADUATE PROGRAMME**

**(FYUGP)**

As per provision of NEP-2020 to be implemented from Academic Year 2022 onwards

**BACHELOR OF COMPUTER APPLICATION**
**(BCA- 7TH &8TH) SEMESTER EXAM**

**UNDER**

**DEPARTMENT OF COMPUTER APPLICATION**

**SESSION – 2025-26**

**(APPROVED BY BOARD OF STUDIES)**

# Govt. Digvijay Autonomous PG College , Rajnandgaon(CG)

## Department of Computer Application

Session – 2025 -26

***List of Members of Board of Studies (BOS)***

| S.No | Name of Member | Nominee Type | Signature |
|---|---|---|---|
| 1 | Mrs. Hempushpa | Chairman | |
| 2 | Dr. Durga Prasad Rao | VC Nominee | |
| 3 | Prof. Gulame Mustafa Ansari | Principal Nominee | |
| 4 | Prof. Shailendra Arya | Principal Nominee | |
| 5 | Mr. Anshu Ramteke | Adviser Member | |
| 6 | Ms. Nadini sahu | Ex-Student | |

# Syllabus and Marking scheme

## Session – 2025-26

## BCA- VII Semester

| S. No | Course Type | Course-code | Subject | Periods | | | Credit | Theory Marks | Internal Marks | Total Marks | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | | | Max | Min |
| 1 | DSC | UBCCT701 | Mobile Application Development | 3 | 0 | 0 | 3 | 80 | 20 | 100 | 40 |
| | | UBCCL701 | Lab:Mobile Application Development | 0 | 0 | 1 | 1 | 40 | 10 | 50 | 17 |
| 2 | DSE | UBCGT702 | Cloud Computing | 3 | 0 | 0 | 3 | 80 | 20 | 100 | 40 |
| | | UBCGL702 | Lab:Cloud Computing | 0 | 0 | 1 | 1 | 40 | 10 | 50 | 17 |
| 3 | DSE | UBCGT703 | Cryptography & Network Security | 3 | 1 | 0 | 4 | 80 | 20 | 100 | 40 |
| 4 | DSE | UBCGT704 | Advance Operating System | 3 | 1 | 0 | 4 | 80 | 20 | 100 | 40 |
| 5 | GE | UBCGE704 | RDBMS | 3 | 0 | 0 | 3 | 80 | 20 | 100 | 40 |
| | | | Lab: RDBMS | 0 | 0 | 1 | 1 | 40 | 10 | 50 | 17 |
| TOTAL | | | | 15 | 2 | 3 | 20 | - | - | 600 | - |

# GOVT. DIGVIJAY AUTONOMOUS PG COLLEGE, RAJNANDGAON

**AS PER NEP 2020 (SEMESTER-VII AND VIII)**

## Program Objective (PO)

Po1- Design mobile applications with more than one user interface and more than one system component.

Po2- To provide students a sound foundation of the Cloud Computing so that they are able to start using and adopting Cloud Computing services and tools in their real life scenarios

Po3- To make the student learn different encryption techniques along with hash functions, MAC, digital signatures and their use in various protocols for network security and system security.

Po4– The course objective of Advanced Operating Systems is to provide an in-Depth understanding of the design, implementation, and evaluation of modern operating systems with a focus on complex and distributed environments.

Po5- Understand the concepts, characteristics and benefits of cloud computing.

## Program Specific Outcome (PSO)

PSO1- Understand the concepts, characteristics and benefits of cloud computing.

PSO2- Summarize the intrusion detection and its solutions to overcome the attacks. Basic concepts of system level security.

PSO3- Understand the architecture and functioning of mobile operating system. Ability to develop modules for mobile devices.

PSO4- Students will learn to collect data from various sources (web, social media, databases, etc.), understand different data types (structured, semi-structured, unstructured), and analyze existing datasets.

PSO5- This course objective is to obtain skill and knowledge in any programming language as well as database language.

# Department of Computer Application
## BCA- VII Semester
### DSC – Mobile Application Development

| | |
|---|---|
| **Session 2025-26** | **Programme- UG** |
| **Semester – VII** | **Subject- Mobile Application Development** |
| **Course Type - DSC** | **Course Code-** |
| **Credit – 3+1=4** | **Lecture -60** |
| **MM – 100** | **Min Marks-40** |

| | |
|---|---|
| **Course Title** | **Mobile Application Development** |
| **Course Objective** | • Recognize the capabilities and limitations of mobile devices<br>• Design mobile applications with more than one user interface and more than one system component. |

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|---|---|
| **Course Learning Outcome** | After Completing this course, students will be able to:<br>• Apply general programming knowledge in the field of developing mobile applications.<br>• Develop and deploy mobile applications into different hosting services.<br>• Interact between user interface and underlying application.<br>• Understand the full life cycle development of mobile apps.<br>• Plan and carry out design work including developing a prototype that can be evaluated with a specified user group. |

| Unit | Lecture | Contents/Topic | Credit |
|---|---|---|---|
| **I** | **14** | **Introduction to Mobile Application**: History of Android, Android Features, Android Versions, Fundamentals: Basic Building blocks, Activities, Receivers, Intent Filters and Activity Stack.<br>**Android Development:** Development IDE: Android studio, Eclipse, Android Virtualization, Framework, Creating Android Virtual, Device(AVD), System Images in AVD, creating a hardware Profile in AVD, Creating an Emulator Skin, Creating and Running a Simple Hello World Program | **04** |
| **II** | **15** | **Basic UI Design:** Style & Themes, Form widgets, Text Fields, Layouts: Relative Layout, Table Layout, Frame Layout, Linear Layout, Nested layouts(dip, dp, sip, sp versus px)Styles. xml, Drawable Resources for Shapes, gradients(selections),Style attribute in the Layout file, Alert Dialogs & Toast, Time and Date, Images and media, | |
| **III** | **15** | **Android Interface:** View and Notifications: creation and display, Menu:options menu, Context menu, Pop-up Menu, Input Controls: Buttons, Text Fields, Checkboxes, Alert Dialogs, Spinners, Rating bar,Progress bar, Android Threads and Thread Handlers, Content Providers, Android File System ,Database(SQLite, firebase) | |
| **IV** | **16** | **Messaging and Location-Based Services:** Sending SMS Messages Programmatically, Getting Feedback After Sending the Message, Receiving and sending Email, Introduction to Location-based service, Configuring an Android Emulator for Location-Based Services, Geocoding and Map-Based Activities, Different Types of Permission in Android, Android Connectivity, Different types of Sensors, Android App Testing, Android App Development. | |
| **Total** | **60** | | |

# Lab: Mobile Application Development

| Total No. of learning –Training/performance | Periods: 30 Peroids(30 Hours) | |
|---|---|---|
| **Module** | **Topics(Course contents)** | **No. Of Period** |
| **Lab/Field Training/Experiment Contents of Course** | 1. Create "Hello World" application that will display "Hello World" in the middle of the screen in the red color with white background.<br>2. Create custom Toast & Dialog Box.<br>3. Design an application that contains phone contacts in vertical linear manner. Selected contact appears at the top of the list with a large italicized font and a blue background.<br>4. Create an application that uses Layout Mangers and Events Listeners.<br>5. Develop a standard calculator application to perform basic calculations like addition,substraction,multiplication and division.<br>6. Design an application to draws basic graphical primitives(rectangle.circle) on the screen.<br>7. Design an android application using Radio buttons.<br>8. Create a user registration application that stores the user details in a database table.<br>9. Build a mobile application that create,save,update and delete data in database.<br>10. Create an application that takes the name from a text box and shows hello message along with the name entered in text box,when the user clicks the ok button.<br>11. Devise an application that implements Multithreading.<br>12. Develop a mobile application that uses GPS location information.<br>13. Create an application that writes data to the SD card.<br>14. Implement an application that creates an alert upon receiving message.<br>15. Design a mobile application that creates alarm clock.<br>16. Create a screen that has input boxes for User Name,Password,Address,Gender(radio buttons for male and female),age(numeric) and a Submit button. On clicking the submit button,print all the data below the submit button(use any layout)<br>17. Design an androif application to create page using Intent and one button and pass the values from one activity to second activity.<br>18. Design an android application send SMS using Intent.<br>19. Create an android application using Fragments.<br>20. Design an android application for menu.<br>Note : This is a temtative list;the teacher concern can add more program as per requirement. | **30** |

# Department of Computer Application

## BCA- VII Semester

### DSE – Cloud Computing

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|---|---|
| **Session 2025-26** | **Programme- UG** |
| **Semester – VII** | **Subject- Cloud computing** |
| **Course Type - DSE** | **Course Code-** |
| **Credit – 3+1=4** | **Lecture -60** |
| **MM – 100** | **Min Marks-40** |

| | |
|---|---|
| **Course Title** | **Cloud Computing** |
| **Course Objective** | To provide students a sound foundation of the Cloud Computing so that they are able to start using and adopting Cloud Computing services and tools in their real life scenarios |

| | |
|---|---|
| **Course Learning Outcome** | After Completing this course, students will be able to:<br>• Understand the concepts,characteristics and benefits of cloud computing.<br>• Understand the key security and compliance challenges of cloud computing.<br>• Understand the concept of cloud security and governance.<br>• Learn the concept of cloud Infrasturcture model.<br>Understand the cloud storage,cloud Virtualizatin and Micro services. |

| Unit | Lecture | Contents/Topic | Credit |
|---|---|---|---|
| I | 14 | **Fundamental Cloud Compuing** : Concepts, Terminology, Technologies, Benefits, Challenges, SLAs and business cost metrics associated with cloud computing, SaaS, IaaS, PaaS delivery models, Common cloud deployment models and cloud characteristics, Various of cloud computing.<br>**Cloud Architecture**: The technology architecture of cloud platforms and cloud-based solutions and services and their utilization via a set of cloud computing design patterns, Hybrid cloud deployment models, compound design patterns and solutions architectures that span cloud and on-premise environments. | 04 |
| II | 15 | **Cloud Security & Governance:** The cloud security mechanisms, cloud security architecture, A set of security design patterns, The definition of cloud governance precepts,Roles,Practices and processes, Common governance challenges and pitfalls specific to cloud computing. | |
| III | 15 | **Cloud Storage:** The cloud storage devices, Structures and technologies, cloud storage mechanisms, Persistent storage,Redudants storage, Cloud-attached storage, Cloud-remote storage, cloud storage gateways, cloud storage brokers, Direct attached storage(DAS),Network Attached Storage(NAS),Storage area Network(SAN), Various cloud storage-related design patterns. | |
| IV | 16 | **Cloud Virtualization & Microservices**: Core topic areas pertaining to the fundamental Virtualization mechanisms and types used within contemporary cloud computing platforms are explored along with various key performance indicators and related metrics, Microservices of Cloud Computing | |
| **Total** | **60** | | |

## Lab: Cloud Computing

| Module | Topics(Course Content) | No. of Periods |
|---|---|---|
| List of Practical Experiment | Note: This is tentative list.the teachers concern can add more experiments as per requirement.<br>1. Use gcc to complie c-programs.split the programs to different modules and create an application using make command.<br>2. Use version control systems command to clone,commit,push,fetch,pull,checkout,reset and delete repositories.<br>3. Install vitualbox/VMware Workstation with different flavours of linus or windows OS on top of window 7 or 8.<br>4. Install a C compiler in the virtual machine created using virtual box and execute Simple Programs.<br>5. Install Google App Engine.Create hello world app and other simple web applications using python/java.<br>6. Use GAE launcher to launch the web applications.<br>7. Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in Cloudsim.<br>8. Find a procedure to transfer the files from one virtual machine to another virtual machine.<br>9. Find a procedure to launch virtual machine using trystack(Online Openstack Demo Version)<br>10. Install hadoop single node cluster and run simple applications like word count. | 30 |

## Department of Computer Application

## BCA- VII Semester

### DSE – Cryptography and Network security

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|---|---|
| **Session 2025-26** | **Programme- UG** |
| **Semester - VII** | **Subject- Cryptography and Network security** |
| **Course Type - DSE** | **Course Code-** |
| **Credit – 3+1=4** | **Lecture -60** |
| **MM - 100** | **Min Marks-40** |

| | |
|---|---|
| **Course Title** | **Cryptography and Network security** |
| **Course Objective** | To make the student learn different encryption techniques along with hash functions, MAC, digital signatures and their use in various protocols for network security and system security. |

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|---|---|
| **Course Learning Outcome** | After Completing this course, students will be able to:<br>• Classify the symmetric encryption techniques.<br>• Illustrate various Public key cryptographic techniques.<br>• Evaluate the authentication and hast algorithms.<br>• Summarize the intrusion detection and its solutions to overcome the attacks. Basic concepts of system level security.. |

| Unit | Lecture | Contents/Topic | Credit |
|---|---|---|---|
| I | 14 | **Classical Encryption Techniques:** Basics of computer network/IP model, Foundations of Cryptography and security trends, Secret key vs public key cryptography, Symmetric cipher model, substitution techniques, Transportation techniques, Mathematical tools for cryptography:Modeular arithmetic, Euclidean algorithm, finite fields, polynomial arithmetic.<br>**Symmetric cipher:** Symmetric cipher model, Traditional block cipher: Stream and block cipher, Feistel cipher network structure, Design Principles of Block Ciphers, Data Encryption Standard (DES), Strength of DES Triple DES, Block cipher design principal, Block cipher operation, Advance encryption Standard (AES), Evaluation criteria of AES,AES transformation function, key distribution. | 04 |
| II | 15 | **Public Key cryptography and Hash Function:** Principles of public key cryptosystem, requirement, RSA algorithm. Hash function, Key management: Diffie-Helman Key exchange, Man in the middle attack, elliptic curve arithmetic, elliptic curve cryptography, Application of cryptographic hash function, Hash and Message authentication Code (MAC), Hash and MAC algorithms, MAC based on hash function, Digital signature and Authentication protocol. Key management and distribution: Distribution of symmetric key and public key, Public key Infrastructure (PKI). | |
| III | 15 | **IP and Web security protocols:** User authentication: principle, Remote user authentication using symmetric and asymmetric encryption, Kerberos, E-mail security: Pretty Good Privacy (PGP), S/MIME, IP security: IPsec, transport layer Security: Secure Socket layer (SSL), Secure Electronic Transaction (SET). | |
| IV | 16 | **Network Security and Management:** Principles of cryptography, Authentication, integrity, key distribution and certification, Access control and Firewalls, attacks and counter measures, security in many layers. Infrastructure for network management, The internet standard management framework, SMI, MIB, SNMP, Security and administration. Symmetric Cipher, Hash, Message Authentication Code (MAC), Public key, Private key, Secure Socket Layer (SSL), Secure Electronic Transaction (SET). | |
| **Total** | **60** | | |

# Department of Computer Application

## BCA- VII Semester

### DSE – Advance Operating System

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|---|---|
| **Session 2025-26** | **Programme- UG** |
| **Semester – VII** | **Subject- Advance Operating System** |
| **Course Type – DSE** | **Course Code-** |
| **Credit – 3+1=4** | **Lecture -60** |
| **MM – 100** | **Min Marks-40** |

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|---|---|
| **Course Title** | **Advance Operating System** |
| **Course Objective** | The course objective of Advanced Operating Systems is to provide an in-depth understanding of the design, implementation, and evaluation of modern operating systems with a focus on complex and distributed environments. |

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|---|---|
| **Course Learning Outcome** | After Completing this course, students will be able to:<br>• Knowledge about advanced concepts in OS.<br>• Ability to develop OS for distributed systems.<br>• Understand process synchronisation and concurrency control.<br>• Understand the architecture and functioning of mobile operating system. Ability to develop modules for mobile devices. |

| Unit | Lecture | Contents/Topic | Credit |
|---|---|---|---|
| I | 14 | **Multiprocessor Operating Systems:** System Architectures, Structures of OS, OS design issues, Process synchronization, Process Scheduling and Allocation, memory management. | 04 |
| II | 15 | **Distributed Operating Systems:** System Architectures, Design issues, Communication models, clock synchronization, mutual exclusion, election algorithms, Distributed Deadlock detection, Distributed scheduling, Distributed shared memory, Distributed File system, Multimedia file systems, File placement, Caching. | |
| III | 15 | **Database operating systems:** Requirements of Database OS, Transaction process model, Synchronization primitives, Concurrency control algorithms. | |
| IV | 16 | **Mobile Operating Systems:** ARM and Intel architectures, Power Management, Mobile OS Architectures, Underlying OS, Kernel structure and native level programming, Runtime issues, Approaches to power management. | |
| **Total** | **60** | | |

## Department of Computer Application

## GE – III RDBMS

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|---|---|
| **Session 2025-26** | **Programme- UG** |
| **Semester - VII** | **Subject- RDBMS** |
| **Course Type - GE** | **Course Code- UBCGE704** |
| **Credit – 3+1=4** | **Lecture -60** |
| **MM - 100** | **Min Marks-40** |

| **Course Title** | **RDBMS** |
|---|---|
| **Course Objective** | • These objectives ensure that students not only understand the theoretical aspects of RDBMS but also gain practical skills in designing, implementing, and managing relational databases. |
| **Course Learning Outcome** | At the end of these Course the student will be able:<br>• To learn about the database concept, Architecture, various users data model and data management<br>• Familiar with RDBMS software like Oracle and my SQL.create various table and database<br>• Explore various SQL commands.<br>• Create database on the basis of E-R diagram for minor and major projects. |

| Unit | Lecture | Contents/Topic | Credits |
|---|---|---|---|
| I | 15 | **Overview of database management:** Introduction, Data processing versus Data management, Data model, Network model, Relational model, Hierarchical model, Instance and Schema, View of database system, File oriented approach versus Database oriented approach, Data independence , DBMS architecture, Database administration, Database languages: DDL, DML,DCL, TCL, Different kinds of DBMS users, Introduction to data dictionary. | 04 |
| II | 15 | **Database design and ER model:** Introduction, Entity: Strong and Weak entities, Relationship, Cardinality, Attributes, Concept of keys: Super key, candidate key, primary key, alternate key, foreign key, ER diagram, Constraints in database, Codd's Rules, Extended ER feature: Generalization, Specialization and Aggregation, Participation, Converting ER Model into relational Schema. | |
| III | 15 | **Relational database design and operation:** Introduction, dependencies: functional dependencies, multivalued dependencies, join dependencies, Anomalies, Decomposition, Normalization : normal form: 1 NF, 2 NF, 3NF, BCNF, 4 NF, 5 NF Denormalization, relational algebra, Select operation, Project operation, Union operation, Cartesian Product operation, Intersection operation, Join operation, Difference types of join( Inner join, Outer join, self join ) | |
| IV | 15 | **Transaction:** Introduction, Desirable properties of transaction (ACID), Concurrence, control technique, Serializablity. | |
| **Total** | **60** | **04 Unit** | |

**Lab :- Relational Database Management System(RDBMS)**

| Lab | Practical List |
|---|---|
| | 1. Design an employee table in Oracle/SQL Server having eid(primary key) ename, edesignation,edoj,edob, eaddress, salary, econtact as field and answer the following question:<br>a. Insert five records in above created file.<br>b. Display all five records.<br>c. Delete the fourth record.<br>d. Update the third record of the field ename as 'Hari'.<br>e. Add one new field in the table.<br><br>2. Design a Salary table Oracle/SQL server with one primary key and foreign key (employee table) having following fields : Month, working days, deptid, gross, incentive, deduction and net salary<br>a. Insert five records in above created file.<br>b. Display all five records.<br>c. Use foreign key relations and display records.<br>d. Update the second record of the field deptid as 'Sales'.<br>e. Add one new field in the table.<br><br>3. Create a new User in Oracle/SQL Server.<br>4. Create a view in Oracle/SQL Server.<br>5. Create a new table in Oracle/SQL Server and practice for join operation.<br>6. Create a new User in Oracle/SQL Server and practice for the commit and rollback command.<br>7. Create a new database in Oracle/SQL Server having atleast 05 tables for the Hotel Management System.<br>8. Create a new database in Oracle/SQL Server having atleast 04 tables for the Covid Vaccination Management System.<br>9. Create a new database in Oracle/SQL Server having atleast 05 tables for the Liberary Management System.<br>10. Create a new table in Oracle/SQL Server and practice for Group by and Order by clause.<br>11. Create a new table in Oracle/SQL Server and practice for max(), min(), avg() and count() functions.<br>12. Create a new table in Oracle/SQL Server and practice for lower(), substr(), trim() and upper() functions.<br>13. Create a new table in Oracle/SQL Server and practice for unique and check constraints.<br>14. Create a new table in Oracle/SQL Server and practice for any two date formats.<br>15. Create a new table in Oracle/SQL Server and practice using clause.<br>16. Create a new table in Oracle/SQL Server and practice for having clauses with sub queries. |

| Lab | Practical List |
|---|---|
| | 17. Create a new table in Oracle/SQL Server and practice for aliases in any table.<br>18. Create a new table in Oracle/SQL Server and practice for inner and outer join.<br>19. Create a new table in Oracle/SQL Server and practice for Drop command.<br>20. Write a PL/SQL program for addition of two numbers.<br>21. Write a PL/SQL program to find the factorial value of any entered number.<br>22. Write a PL/SQL program for swapping of Two numbers.<br>23. Write a PL/SQL program to print the first ten Natural Numbers.<br>24. Write a PL/SQL program to generate even series upto five digita starting from 2 and sum all the terms.<br>25. Write a PL/SQL program to practice for implicit and explicit cursors.<br><br>Note:- Concerned teacher can add additional experiments as per requirement.<br><br>**Learning resources :-**<br>**Text Books, Reference Books and Others**<br>• **Database system concept, H.Korth and A. Silberschatz, TMH Publications.**<br>• **Database Management System, Alexics & Mathews, Vikash publication.**<br>• **Database Management system, C.J.Date, narosha Publication**<br>• **Database management System by James Matin.**<br>• **Principles of database System by Ullman.**<br>• **Program Design, Pete-Juliff, PHI publication** |

**Learning Resources**
**BCA-7TH SEMESTER**

| Course | Book/Reference Recommended |
|---|---|
| **MOBILE APPLICATION DEVELOPMENT** | • Android Programming with Kotlin for Beginners by John Horton<br>• Android Programming: The Big Nerd Ranch Guide |
| **LAB MOBILE APPLICATION DEVELOPMENT** | • Android Programming: Pushing the Limits<br>• Head-First Kotlin: A Brain-Friendly Guide |
| **CLOUD COMPUTING** | • Architecting the Cloud: Design Decisions for Cloud Computing Service Models (SaaS, PaaS, and IaaS) : Michael J. Kavis (Author)<br>• Cloud Computing: Methodology, Systems, and Applications : Lizhe Wang (Editor), Rajiv Ranjan (Editor), Jinjun Chen (Editor), Boualem Benatallah (Editor |
| **CRYPTOGRAPHY & NETWORK SECURITY** | • Introduction to Cryptography" by Johannes A Buchmann<br>• Public-Key Cryptography: Theory and Practice" by A Das and C E Veni Madhavan<br>• Cryptography and Network Security : Principles and Practice" by William Stallings<br>• Recent Advances in RSA Cryptography (Advances in Information Security)" by Stefan Katzenbeisser |
| **ADVANCE OPERATING SYSTEM** | • Principles of Operating System- Peterson.<br>• Operating System - - Mandinick & Donovan. |
| **RDBMS** | • Databasesystemconcept: H. Korth and A. Silberschatz, TMH<br>• Data Base ManagementSystem : IvanBayross<br>• Data BaseManagementSystem : JamesMatin<br>• DatabaseManagementSystem : Leon & Leon, VikasPublication |
| **LAB RDBMS** | • An Introduction todatabasesystems : Bipin Desai, GalgotiaPublication.<br>• DatabaseManagementSystem: A. K. Majumdar &P.Bhattacharya,TMH |