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)

<u>Department of Computer Application</u>

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

BCA- VIII Semester (With Honours Course)

S. No	Course Type	Course-code	Subject	Periods			Credit	Theory Marks	Internal Marks	Total Marks	
				L	T	P				Max	Min
1	DSC	UBCCT801	Big Data Analytics	3	1	0	4	80	20	100	40
2	DSE	UBCGT802	Soft Computing	3	1	0	4	80	20	100	40
3	DSE	UBCGL803	Digital Image Processing	3	1	0	4	80	20	100	40
4	DSE	UBCGT804	Data Mining and Data Warehousing	3	1	0	4	80	20	100	40
5	DSE	UBCGT805	Major Project - 02	0	0	4	4	80	20	100	40
	TOTAL			12	3	5	20	-	-	600	-

Department of Computer Application
BCA- VIII Semester
DSC – Big Data Analytics

Session 2025-26	Programme- UG
Semester - VIII	Subject- Big Data Analytics
Course Type - DSC	Course Code-
Credit – 3+1=4	Lecture -60
MM - 100	Min Marks-40

Course Title	Big Data Analytics
Course Objective	• Students will learn to present data findings effectively using charts, graphs, and other visualization tools. • 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.

Course Learning Outcome	After Completing this course, students will be able to: • Understand the concepts, characteristics and benefits of cloud computing. • Understand the key security and challenges of cloud computing • Understand the concept of Cloud Security and governance. • Learn the Concept of Cloud Infrastructure Model. • Understand the cloud storage, Cloud Virtualization & Micro services

Unit	Lecture	Contents/Topic	Credit
I	14	**Understanding Big Data:** Datasets, Data Analysis, Data Analytics-Descriptive Analysis, Diagnostics Analytics, Predictive Analytics, Perceptive Analytics, Big Data Characteristics – volume, velocity, variety, veracity, value, Different Types of Data – Structured Data, Unstructured Data, Semi – Structured Data.	04
II	15	**Introduction Hadoop:** Big Data – Apache Hadoop& Hadoop Eco System – Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce – Data Serialization.	
III	15	**Hadoop Architecture:** Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands, Anatomy of File Write and Read, NameNode, Secondary NameNode, and DataNode, Haddop MapReduce paradigm, Map and Reduce tasks.	
IV	16	**Theory and Methods for Big Data Analytics:** Regression Modeling, Multivariate Analysis, Baysian Modeling, Interfacee and Baysian Networks, Support Vector and Kernel Methods, Analysis of Time Series: Linear System Analysis, Nonlinear Dynamics, Rule Induction, Decision Tree.	
Total	60		

Department of Computer Application
BCA- VIII Semester
DSE – Soft Computing

Session 2025-26	Programme- UG
Semester - VIII	Subject- Soft Computing
Course Type - DSE	Course Code- UBCGL 802
Credit – 3+1=4	Lecture -60
MM - 100	Min Marks-40

Course Title	Soft Computing
Course Objective	At the end of the course , the student will be able to: • Ability to appreciate the importance of optimizations and its use in computer engineering fields and other domains. • To introduce the ideas of fuzzy sets, fuzzy logic and use of heuristics based on human experience.

Course Learning Outcome	At the end of the course , the student will be able to: • Analyze and appreciate the applications which can use fuzzy logic. • Understand the difference between learning and programming and explore practical applications of Neural networks (NN). • Students would understand the efficiency of a hybrid system and how neural network and fuzzy logic can be hybridized to from a Neuro - fuzzy networks and its various applications.

Unit	Lecture	Contents/Topic	Credit
I	16	**Introduction:** Soft computing, different tools of soft computing: Fuzzy logic, Artificial, Neural Network, Genetic Algorithm), Area of Application. **Fuzzy Logic:** Introduction to classical set and fuzzy sets, Membership Function. Properties and operations of classical set and Fuzzy set, a-cuts, Properties of a-cuts, Linguistic Variables, Membership function, Classical Relation and Fuzzy Relation and its properties and operations, Defuzzification and its methods, Fuzzy rule base.	04
II	16	**Artificial Neural Network (ANN):** Big Data – Architecture, Introduction, Evolution of Neural Network, Biological Neural Network Vs ANN, Basic Model of ANN, Different types of ANN, Single Layer Perceptron, Solving XOR Problem, Activation Function, Linear Satiability, Supervised and unsupervised learning, perceptron learning, delta learning, feed-Forward and Feedback Network, Error Back Propagation Network(EBPN), Associative memories and its types, Hopefield Network, Kohenenself – organizing Map.	
III	16	**Genetic Algorithm:** What is Optimization?, Introduction, Application GA Operators: selection crossover and mutation, different techniques of selection, crossover and mutation, different types of chromosomes, Application of GA.	
IV	12	**Hybrid Soft Computing:** Design of Neuro – Fuzzy model like ANFIS, Neuro -Genetic Fuzzy-Genetic model.	
Total	60		

Department of Computer Application
BCA- VIII Semester
DSE – Digital Image Processing

Session 2025-26	Programme- UG
Semester - VIII	Subject- Digital Image Processing
Course Type - DSE	Course Code- UBCGL 803
Credit – 3+1=4	Lecture -60
MM - 100	Min Marks-40

Course Title	**Digital Image Processing**
Course Objective	• The objective of this course is to provide students with a comprehensive understanding of the fundamental concepts, techniques, and applications of digital image processing.

Course Learning Outcome	At the end of this course, the students will be able to: • Learn and understand the digital image processing. • Learn and understand various image transform used in digital image processing. • Learn and understand various image enhancement technique used in digital image processing. • Learn and understand various image restoration technique and methods used in digital image processing.

Unit	Lecture	Contents/Topic	Credit
I	15	Introduction to digital image processing, Elements of Digital Image Processing system, Visual perception and properties of human eye, Image representation, A simple image model, Some basic relationship between pixels, Image geometry.	04
II	15	Introduction to Fourier Transform, DFT & FFT, Properties of 2D Fourier Transform, Separable Image Transforms –Walsh, Hadamard Transform, Discrete Cosine Transform, Haar Transform	
III	15	Image Enhancement - Histogram Modeling, Equalization and modification, Image smoothing, Image sharpening, Spatial Filtering, Homomorphic filtering for image enhancement, Model of Image Degradation/Restoration process, Inverse filtering, Least Mean Square (Wiener) filtering, Constrained least mean square restoration, Singular value decomposition, Recursive filtering.	
IV	15	Image compression models, Lossless compression: Variable length coding, LZW coding, Lossy Compression: Transform coding, Wavelet coding, Image Segmentation: Detection of discontinuities, Edge linking and boundary detection, Thresholding-Region oriented segmentation and Texture.	
Total	**60**		

Department of Computer Application
BCA- VIII Semester
DSE – Data Mining and Data Warehousing

Session 2025-26	Programme- UG
Semester - VIII	Subject- Data Mining and Data Warehousing
Course Type - DSE	Course Code- UBCGL 804
Credit – 3+1=4	Lecture -60
MM - 100	Min Marks-40

Course Title	Data Mining and Data Warehousing
Course Objective	• The objective of this course is to provide students with a strong foundation in the principles and practices of data warehousing and data mining, enabling them to analyze large volumes of data effectively.

Course Learning Outcome	At the end of this course, the students will be able to:
	• Store voluminous data for online processing.
	• Preprocess the data for mining applications.
	• Apply the association rules for mining the data.
	• Design and deploy appropriate classification technique.
	• Evaluate various mining techniques on complex data objects.

Unit	Lecture	Contents/Topic	Credit
I	15	**Introduction :** What is Data Mining? Why it is important, Mining on what kind of data, Data mining functionalities, steps of Data mining, knowledge discovery, **Data Warehouse**: Meaning, definition, OLTP vs OLAP, Data Warehouse Architecture, Three tier architecture, data cube and OLAP technology.	04
II	15	**Association rule :** Basic concept, Frequent item set mining : Apriori algorithm etc., mining various kind of association rule: mining multilevel association rules, mining multidimensional association rule.	
III	15	**Classification and Prediction :** What is classification and prediction, Decision tree algorithms: CART, ID3, C4.5,CHAID, Bayesian classification, Rule based classification, Classification by backpropagation, Support vector machine, Association classification and other classification methods. Prediction using Regression and Neural network methods. Accuracy measures, Ensemble methods.	
IV	15	**Cluster Analysis :** What is cluster analysis, Partiotiong method, Hierarchical methods, Experiments with python data mining tools for model development, data preprocessing , feature selection for Financial Data , Health care data etc.	
Total	60		

Department of Computer Application
BCA- VIII Semester
DSE – "Major project - 02"

Session 2025-26	Programme- UG
Semester –VIII	Subject- Major project 02
Course Type –DSE	Course Code-
Credit – 12	Lecture -
MM – 100	Min Marks-

Course Title	Major Project 02
Course Objective	This course objective is to obtain skill and knowledge in any programming language as well as database language.
Course Learning Outcome	After completion of course the students will able to:- • Enhance knowledge on latest techniques. • Make ready for IT industry. • Upgrade skill set as per IT industry. • Handle real word applications.

Unit	Contents/Topic	Lecture

	Important Guidelines for Project
	
	 A project report has to be submitted as per the rules described below: Number of Copies:
	 1. The student should submit One hard bound copy of the Project Report with one CD/DVD.
	 2. No of students: Every student has to submit separate project.
	 3. Acceptance / Rejection of Project Report: The student must submit a project report to the Head of Department/Project Guide for approval. The Head of Department/Project Guide holds the right to accept the project or suggest modifications for resubmission.
	 4. Format of the Project Report :The student must adhere strictly to the following format for the submission of the Project Report
	
	    I. Paper: The report shall be typed on white paper, A4 size or continuous computer stationary bond, for the final submission. The report to be submitted to the University must be original and subsequent copies may be photocopied on any paper.
	    II. Typing: The typing shall be of standard letter size, double-spaced and on one side of the paper only, using black ribbons and black carbons.
	    III. Margins: The typing must be done in the following margins
	
	      Left ----------- Top ----35mm,
	      Right--------- 20mm Bottom-----20mm
	
	    IV. Binding: The Report shall be Rexene bound in black. Plastic, spiral bound Project Reports not be accepted.
	    V. Front Cover: The front cover should contain the following details:
	
	      TOP: The title in block capitals of 6mm to 15mm letters.
	      CENTER: Full name in block capitals of 6mm to 10mm letters.
	      BOTTOM: Name of the University, year of submission- all in
	         block capitals of 6mm to 10mm letters on separate
	         lines with proper spacing and centring.
	
	    VI. Blank Sheets: At the beginning and end of the report, two white black bound papers should be provided, one for the purpose of binding and other to be left blank.
	 5. Abstract: Every report should have an abstract following the Institute's Certificate. The abstract shall guide the reader by highlighting the important material contained in the individual chapters, section, subsection etc.
	 6. Certificates etc: The report should contain the following
	    I. Institute Certificate: Successful completion of project by competent authority.
	    II. Acknowledgment	

III. List of Figures
IV. Tables
V. Nomenclature and Abbreviations
7. Contents of the Project Report: The project report must contain following in form of chapter, however student may include any other relevant chapters)

I. Introduction to the project: This chapter shall highlight the purpose of project work, it will also define the chapters to be followed in the Project Report

II. Scope of work: Brief scope of the project work done

III. Existing System and Need for proposed System: If there is some system already in use, then give brief detail of it in order to help to understand the enhancements carried out by the student in the existing system

IV. Operating Environment: Hardware and Software required and used

V. Proposed System: Which may contain following:
   a. Objectives to be fulfilled: clearly define the objective(s) of the system
   b. User Requirements: State the requirements of the use in unambiguous manner.
   c. Requirements Determination Techniques and Systems Analysis Methods Employed: Use the formal methods to describe the requirements of the use like Fact Finding Methods, Decision Analysis, and Data Flow Analysis etc.
   d. Prototyping: If the prototypes has been developed prior to the detailed design, then give details of the prototype.
   e. System Feature: Which includes as follows: Module specifications
      - D.F.D. and ER
      - System flow charts
      - Data Dictionary
      - Structure charts
      - Database /File layouts
      - Design of Input Design of Output screens and reports
      - User Interfaces
      - Design of Control Procedures
      -

8. Testing procedures and Implementation phase
9. Problems encountered, Drawbacks and Limitations
10. Proposed Enhancements/ Future enhancement
11. Conclusions
12. Bibliography
13. Annexure

Assessment and Evaluation :-

Maximum marks -100
Internal – 20 (PPT , Documentation and synopsis report)
Semester Exam – 80 (Project file-25, Presentation-40 , Viva-15)

Text Books, Reference Books and Others

- **Database system concept, H. Korth and A. Silberschatz, TMH Publications.**
- **The Complete Reference, Kevin Loney, Oracle Press.**
- **SQL, PL/SQL the Programming Language of Oracle, Ivan Bayross, PustakKosh Publication. Microsoft SQL Server Management and Administration, Ross, STM Publications.**
- **James Rumbaugh, Ivar Jacobson, The unified modelling language user guide Grady Booch, Pearson Education.**

Learning Resources
BCA-8TH SEMESTER(WITH HONOURS COURSE)

Course	Book/Reference Recommended
BIG DATA ANALYTICS	• BIG DATA ANALYTICS: KULKARNI, PARAG.JOSHI, SARANG.BROWN, META S. • Big Data Analytics: Dr. Sudeep Tanwar. Sushil Kumar Singh, Dr. Sudhanshu Tyagi
SOFT COMPUTING	• SOFT COMPUTING :FUNDAMENTALS AND APPLICATIONS" by Pratihar D K • Fuzzy Information and Engineering 2010: Vol 1 (Advances in Intelligent and Soft Computing)" by Bing-Yuan Cao and Guojun Wang
DIGITAL IMAGE PROCESSING	• Fundamentals of Digital Image Processing - A. K. Jain, Prentice Hall • Digital Image Processing - Rafael C. Gonzalez, Richard E. Woods
DATA MINING AND DATA WAREHOUSING	• Data mining:concepts and techniques- jiawei han and micheline kamber. • Data mining concepts- h. Marget