Govt. Digvijay Autonomous PG College Rajnandgaon(CG)

SCHEME OF EXAMINATION
&
SYLLABUS

FOR

THE FOUR-YEAR UNDER GRADUATE PROGRAMME

(FYUGP)

BACHELOR OF COMPUTER APPLICATION
(BCA- 5TH&6TH) 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	

Program Objective (PO)

Po1- The Program objective of this course make students familiar with the use of .Net Framework and concept of .NET and enable communication and data transfer between devices without the need for physical, wired connections.

Po2- Software engineering that prepares agility in solving software and system challenges with a comprehensive set of skills appropriate to the needs of the dynamic global computing-based society.

Po3- The necessary mathematical techniques to prove more advanced attributes of these models.

Po4– Python programming is intended for software engineers, system analysts, program managers and user support personnel who wish to learn the Python programming language.

Po5- The Internet of Things (IoT) is aimed at enabling the interconnection and integration of the physical world and the cyber space.

Program Specific Outcome (PSO)

PSO1- Implement Basic language and their advanced features like event handling, exception handling.

PSO2- Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

PSO3- Through mobile communication and wireless network analyze various routing algorithms used in mobile/wireless networks.

PSO4- Compare and evaluate different computer graphics techniques based on performance, aesthetic and implementation difficulty.

PSO5- Define the Structure and Components of a Python Program

Syllabus and Marking Scheme
Session – 2025-26
BCA- V Semester

S. No	Course Type	Course-code	Subject	Periods L	T	P	Credit	Theory Marks	Internal Marks	Total Marks Max	Min
1	DSC-XIII	UBCCT501	Dot net technology	3	0	0	3	80	20	100	40
		UBCCL501	Lab Dot net technology	0	0	1	1	40	10	50	17
2	DSC-XIV	UBCCT502	Software Engineering	3	1	0	4	80	20	100	40
3	DSC-XV	UBCCT503	Statistical Analysis	3	1	0	4	80	20	100	40
4	DSE-III	UBCGT504	Mobile & wireless communication	3	1	0	4	80	20	100	40
5	DSE- IV	UBCGT505	IOT(internet of things)	3	1	0	4	80	20	100	40
6	SEC-V	UBSEC512	Choose one from pool of SEC	2	0	0	2	40	10	50	17
TOTAL				18	2	2	22	-	-	600	-

BCA- VI Semester

S. No	Course Type	Course-code	Subject	Periods L	T	P	Credit	Theory Marks	Internal Marks	Total Marks Max	Min
1	DSC-XVI	UBCCT601	Basic of Computer Graphics	3	1	0	4	80	20	100	40
2	DSC-XVII	UBCCT602	Programming in python	3	0	0	3	80	20	100	40
		UBCCL602	Lab python	0	0	1	1	40	10	50	17
3	DSC-XVIII	UBCCT603	TOC	3	1	0	4	80	20	100	40
4	DSE-V	UBCGT604	Machine learning	3	1	0	4	80	20	100	40
5	DSE- VI	UBCGT605	Major Project – 01	1	3	0	4	80	20	100	40
6	SEC-VI	UBSEC612	Choose one from pool of SEC(Project/Internship)	2	0	0	2	40	10	50	17
Total				17	4	1	22	-		600	

DSC- Discipline Specific Course,
DSE- Discipline Specific Elective
AEC-Ability Enhancement Core Course,
SEC- Skill Enhancement Course,
GE- Generic Elective,
VAC- Value Added course

Department of Computer Application
BCA- VI Semester
DSC –XVIII TOC

Session 2025-26	Programme- UG
Semester –VI	Subject- TOC
Course Type –DSC	Course Code- UBCCT603
Credit – 3+1=4	Lecture -60
MM – 100	Min Marks-40

Course Title	TOC
Course Objective	It introduces basic computation models, their properties and the necessary mathematical techniques to prove more advanced attributes of these models.
Course Learning Outcome	After completion of course the students will able to:- • Distinguish different computing languages and classify their respective types • Recognise and comprehend formal reasoning about languages • Show a competent understanding of the basic concepts of complexity theory

Unit	Lecture	Contents/Topic	Credits
I	15	**UNIT I AUTOMATA FUNDAMENTALS** Introduction to formal proof — Additional forms of Proof — Inductive Proofs –Finite Automata — Deterministic Finite Automata — Non-deterministic Finite Automata — Finite Automata with Epsilon Transitions	
II	15	**UNIT II REGULAR EXPRESSIONS AND LANGUAGES** Regular Expressions — FA and Regular Expressions — Proving Languages not to be regular — Closure Properties of Regular Languages — Equivalence and Minimization of Automata	04
III	15	**UNIT III CONTEXT FREE GRAMMAR AND LANGUAGES** CFG — Parse Trees — Ambiguity in Grammars and Languages — Definition of the Pushdown Automata — Languages of a Pushdown Automata — Equivalence of Pushdown Automata and CFG, Deterministic Pushdown Automata.	
IV	15	**UNIT IV PROPERTIES OF CONTEXT FREE LANGUAGES** Normal Forms for CFG — Pumping Lemma for CFL — Closure Properties of CFL — Turing Machines — Programming Techniques for TM, UNDECIDABILITY :- Non Recursive Enumerable (RE) Language — Undecidable Problem with RE — Undecidable Problems about TM	
Total	60	04 Unit	

Department of Computer Application
BCA- VI Semester
DSC – XVI Basic's Computer Graphics

Session 2025-26	Programme- UG
Semester –VI	Subject- Basic of Computer Graphics
Course Type – DSC	Course Code- UBCCT601
Credit – 3+1=4	Lecture -60
MM – 100	Min Marks-40

Course Title	Computer Graphics
Course Objective	It's used in digital photography, film and television, video games, and on electronic devices and is responsible for displaying images effectively to users. Think of computer graphics as the intersection of design and computer science, with the purpose of delighting and engaging audiences.
Course Learning Outcome	After completion of course the students will able to:- • To implement various algorithms to scan, convert the basic geometrical primitives, transformations and clipping. • construct and manipulate complex models, geometries and scene graphs in both 2D and 3D • implement computer graphics algorithms in a shader language • compare and evaluate different computer graphics techniques based on performance, aesthetic and implementation difficulty

Unit	Lecture	Contents/Topic	Credits
I	15	Introduction, What is computer Graphics?, Area of Computer Graphics, Design and Drawing, Animation Multimedia applications, Simulation, How are pictures actually stored and displayed, Difficulties for displaying pictures.Cathode Ray Tube, Quality of Phosphors, CRTs for Color Display, Beam Penetration CRT, The Shadow - Mask CRT, Direct View Storage Tube, Tablets, The light Pen, Three Dimensional Devices.	04
II	15	Point Plotting Techniques, Qualities of good line drawing algorithms, The Digital Differential Analyzer (DDA), Bresenham's Algorithm, Generation of Circles. What is transformation?, Matrix representation of points.	
III	15	Basic transformation, Need for Clipping and Windowing, Line Clipping Algorithms, The midpoint subdivision Method, Other Clipping Methods, Sutherland - Hodgeman Algorithm, Viewing Transformations.	
IV	15	THREE DIMENSIONAL GRAPHICS Need for 3-Dimensional Imaging, Techniques for 3-Dimesional displaying, Parallel Projections, Perspective projection, Intensity cues, Stereoscope effect, Kinetic depth effect, Shading. Solid Area Scan Conversion, Scan Conversion of Polygons, Algorithm Singularity.	
Total	60	04 Unit	

Department of Computer Application
BCA- VI Semester
DSC – XVII Python programming

Session 2025-26	Programme- UG
Semester – VI	Subject- Python programming
Course Type - DSC	Course Code- UBCCT602
Credit – 3+1=4	Lecture -60
MM – 100	Min Marks-40

Course Title	Python programming
Course Objective	Python programming is intended for software engineers, system analysts, program managers and user support personnel who wish to learn the Python programming language.
Course Learning Outcome	After completion of course the students will able to:- · Define the Structure and Components of a Python Program. · Demonstrate proficiency in handling of loops and creation of functions. Identify the methods to create and manipulate lists, tuples and dictionaries. · Discover the commonly used operations involving regular expressions and file systems.

Unit	Lecture	Contents/Topic	Credits
I	15	Introduction to Python :-Installing Python, basic syntax, interactive shell, editing saving and running a script; The concept of data types, variables, assignments; immutable variables; numerical types, operators(Arithmetic Operator, Relational Operator, Logical or Boolean Operator, Assignment Operator, Ternary Operator, Bitwise Operator, Increment or Decrement Operator) and expressions; comments in the program, understanding error messages.	04
II	15	Creating Python Programs: - Input and Output Statements, Control Statements (Branching, Looping, Conditional Statement, Exit function, Difference between break, continue and pass).Function : Defining a function, calling a function, types of function, Function Arguments, Anonymous Functions, global and local variables, Recursion	
III	15	Strings and Text Files: - Manipulating files and directories, os and sys modules, text files: reading/writing text and numbers from/to a file, creating and deleting a formatted file, String Manipulations: subscript operator, indexing, slicing a string; strings and number system: converting string to numbers and vice-versa, Binary, octal and hexadecimal numbers.	
IV	15	Lists, Tuples and Dictionaries :Basic list operators, replacing, inserting and removing an element, searching and sorting lists, Accessing tuples, Working Functions and Methods, dictionary literals, Adding and Removing keys, accessing and replacing values, traversing dictionaries.Data Structures using Lists: Elementary Data Representation- Linear List Array, Stacks, Queues, Linked Lists, and Trees. Modules: - Importing module, Math module, packages, Composition,Exception Handling: Exception, Exception Handling, except clause, try, finally clause, User-Defined Exceptions.	
Total	60	04 Unit	

Python Programming Lab
1.Scheme of Examination:-

Practical examination will be of 3 hours duration. The distribution of practical marks will be as follows

Program 1	-5
Program 2	-5
Program 3	-5
Viva	-10
(Practical Copy+	-15
Practical Sessional)	
Total	-40

2. In every program there should be comment for each coded line or block of code.
3. Practical files should contain printed program with name of author. date.path of program. unit no and printed output.
4. All the following programs or a similar type of programs should be prepared.

List of Pratical

1. Write a program that reads an integer value and prints —leap year or —not a leap year.
2. Write a program that takes a positive integer a and then produces n lines of output shown as follows.
3. Write a program to create the following Pattern For example enter a size: 5   -

   *

   **

   **
4. ****
5. *****
6. Write a function that takes an integer n as input and calculates the value of $1 + 1/1! + 1/2! + 1/n!$
7. Write a function that takes an integer input and calculates the factorial of that number,
8. Write a function that takes a string input and checks if it is a palindrome or not.
9. Write a list function to convert a string into a list, as in list (-abc) gives [a, b, c].
10. Write a program to generate Fibonacci series.
11. Write a program to check whether the input number is even or odd.
12. Write a program to compare three numbers and print the largest one.
13. Write a program to print factors of a given number.
14. Write a method to calculate GCD of two numbers.
15. Write a program to create Stack Class and implement all its methods, (Use Lists).
16. Write a program to create Queue Class and implement all its methods, (Use Lists)
17. Write a program to implement linear and binary search on lists,
18. Write a program to sort a list using insertion sort and bubble sort and selection sort.

Note: List of experiments may be changed by the concerned teacher.

Department of Computer Application
BCA- VI Semester
DSE –V "Machine Learning"

Session 2025-26	Programme- UG
Semester –VI	Subject- Machine Learning
Course Type –DSE	Course Code-
Credit – 3+1=4	Lecture -60
MM – 100	Min Marks-40

Course Title	Machine Learning
Course Objective	Gain a deep understanding of advanced AI and machine learning principles.
Course Learning Outcome	After completion of course the students will able to:- • Acquire skills for conducting a through literature review and formulating research problems. • Learn to design and implement advanced AI and machine learning algorithms. • Can understand and design generative AI techniques. • Can apply AI and machine learning techniques to solve real world problems.

Unit	Lecture	Contents/Topic	Credits
I	15	**Introduction:** Concept of Machine Learning, Applications of Machine Learning, elements of Machine Learning, Traditional Supervised VS. Unsupervised Learning, programming Vs. Machine learning Statistical Learning: Bayesian Method, The Naïve Bayes Classifier.	
II	15	**Linear Regression:** Prediction using Linear Regression, Gradient Descent Linear Regression with one variable, Linear Regression with multiple variables, Polynomial Regression, Feature Selection and Feature Extraction. Logistic Regression: Classification using Logistic Regression, Logistic Regression vs. Linear Regression, Logistic Regression with one variable and with multiple variables.	04
III	15	**Regularization:** Regularization and its utility: The problem of Over fitting, Application of Regularization in Linear and Logistic Regression, Regularization and Bias/Variance. Neural Networks: Introduction, Model Representation, Gradient Descentvs. Perceptron Training, Stochastic Gradient Descent, Multilayer Perceptrons, Multiclass Representation, Back propagation Algorithms.	
IV	15	**Deep Learning:** Introduction basics, various architectures of Deep learning: CNN, LSTM, Generative AI. Machine learning tools: Introduction of MATLAB, WEKA as machine learning tools, Using GUI of MATLAB and WEKA to develop Machine learning based models. Write programs to Implement machine learning models.	
Total	60	**04 Unit**	

Text/Reference book :

1. Machine Learning Anuradha Srinivasaraghavan, vincy Joseph, Wiley publication India 2019 edition.
2. Machine Learning, Tom M. Mitchell, McGraw hill, Indian Edition

Session 2025-26	Programme- UG
Semester -VI	Subject- Major project 01
Course Type -DSE	Course Code-
Credit – 1+3=4	Lecture -15
MM – 100	Min Marks-40

Course Title	Major Project 01
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 chapter(s):

    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.**

Session 2025-26	Programme- UG
Semester - VI	Subject- Project or Internship
Course Type - SEC	Course Code-
Credit – 2	Lecture -30
MM - 50	Min Marks-17

GUIDELINES FOR PREPARING THE PROJECT REPORT FOR U.G. STUDENTS

1. ARRANGEMENT OF CONTENTS
The sequence in which the project report material should be arranged as follows:

1. **Cover Page**
2. **Certificate of Guide and HOD**
3. **Acknowledgement**
4. **Declaration by Student**
5. **Table of Contents**
6. **Abstract**
7. **Keywords**
8. **Chapters**
9. **References**

2. PREPARATION FORMAT
2.1 Cover Page– A specimen copy of the Cover page ofthe project report isgiven in **AnnexureA.**

2.2 Certificate of Project Guide and HOD - Annexure B.

2.3 Acknowledgement- This should not exceed one page. **Annexure C**

2.4 Declaration- This should not exceed one page.**Annexure D**

2.5 Table of contents- see **Annexure E**

2.6 Abstract – Abstract should be one page synopsis of the project work (about 300 words with key words). Font Style Times NewRoman and Font Size 12. Use unicode/krutidev010 for Hindi with font size 14.**Annexure F**

2.7 Minimum fifteen keywords related to project report and subject.

2.8 Chapters – The chapters may be broadly divided into 3 or 4 parts, (i)Introductory chapter, (ii) Literature Review (if any) (iii) Theoretical analysis,(iv)ExperimentalInvestigations/Data Analysis (v)Experimental results, (vi) Discussion of results, (vii)Summary, Conclusions and Recommendations, (viii) References.

2.9 Bibliography/References –The listing of references should be in alphabetical order. The reference material should be listed in the alphabetical order of the surnameof the first author. The name of the author/authors should be immediately followed bythe year and other details. **See Annexure G.**

Note- The general text shall be typed in the Font style `Times New Roman` and Font size 12 for English. Use unicode/krutidev010 for Hindi with font size 14.

PROJECT TITLE

A Project report (SEC Course) submitted to

GOVT. DIGVIJAY AUTONOMOUS P.G. COLLEGE, RAJNANDGAON

for

BACHELOR OF ARTS/SCIENCE/COMMERCE

in

NAME OF DEPARTMENT

by

NAME AND ROLL NO. OF THE STUDENT

Under the esteemed Guidance of

NAME OF PROJECT GUIDE

(Designation)

NAME OF THE DEPARTMENT
GOVT. DIGVIJAY AUTONOMOUS P.G. COLLEGE, RAJNANDGAON
AFFILIATED TO HEMCHAND YADAV VISHWAVIDYALAYA, DURG,
CHHATTISGARH
May2026

CERTIFICATE

This is to certify that the project report entitled "TITLE OF PROJECT WORK" submitted by "NAME OF STUDENT/COURSE/ROLL NO." is a bonafide work carried out under my guidance and supervision. The results presented in this project report have not been submitted to any other university or Institute for the award of any degree.

SIGNATURE OF THE GUIDE   HEAD OF THE
DEPARTMENT
  NAME-   NAME-
  Date -   Date-

ACKNOWLEDGEMENT

It gives me great pleasure to thank …………………………… (Name and Designation of the guide), Department of …………………………… for the constant support and guidance given to usthroughout the course of this project. He/she has been a constant source ofinspiration for me.

We also take the opportunity to acknowledge the contribution of Professorand Head, Department of …………………………for his support and assistance duringthe development of the project.

We also take this the opportunity to acknowledge the contribution of allfaculty members of the department for their assistance and cooperation during thedevelopment of our project.

Name of the student

DECLARATION

I hereby declare that the project titled "PROJECT TITLE" is a bonafide work duly completed by me. It does not contain any part of the projector thesis submitted by any other candidate to this or any other institute or university.

All such materials that have been obtained from other sources havebeen duly acknowledged.

(Signature)

Student's Name -……………………………………

Class   -……………………………………

Roll No.   - ……………………………………

CONTENTS

ABSTRACT

Write your abstract here. Writeyour abstract here. Write your abstract here.

Key Words: Write minimum fifteen (15) keywords Related to project report and subject.

REFERENCES

1. Stewart, James. *Calculus: Early Transcendentals*. 8th ed., Cengage Learning, 2015.

2. Rudin, Walter. *Principles of Mathematical Analysis*. 3rd ed., McGraw-Hill, 1976.

Learning Resources
BCA-6TH SEMESTER

Course	Book/Reference Recommended
BASICS OF COMPUTER GRAPHICS	• Computer Graphics by M. Pauline Baker, Donald Hearn PHI. • Computer Graphics By A.P. Godse, TPPublication. • Computer Graphics By V.K. Pachghare, Laxmi Publication • Principles of Interactive Computer Graphics By. William. M. Newmann.
PROGRAMMING IN PYTHON	• T. Budd, Exploring Python, TMH, 1st Ed. 2011 • Allen Downey, Jeffrey Elkner, Chris Meyers, How to think like a computer scientist: Learning with Python, Freely available online, 2012 • Luca Massaron John Paul Mueller, Python for Data science For Dummies, Wiley,2ed.2019 • Introduction to computation and programming using python: with application to understanding data, John V. Guttag
LAB PYTHON	• Problem Solving using Python - E. Balagurusamy, Mc Graw Hill Education Ltd., 2017 • Practical Programming An Introduction to Computer Science Using Python - Jennifer Campbell
TOC	• Introduction to Automata Theory, Languages, and Computation by John E. Hopcroft, Rajeev Motwani, and Jeffrey D. Ullman • Introduction to the Theory of Computation by Michael Sipser
MACHINE LEARNING	• Machine Learning for Algorithmic Trading: Predictive models to extract signals from market and alternative data for systematic trading strategies with Python, 2nd Edition 2nd Edition by Stefan Jansen (Author) • Machine Learning for Absolute Beginners by Oliver Theobald • Machine Learning for Hackers by Drew Conway and John Myles White