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	

GOVT. DIGVIJAY AUTONOMOUS PG COLLEGE, RAJNANDGAON,

AS PER NEP2020 (SEMESTER-V & VI)

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			Credit	Theory Marks	Internal Marks	Total Marks	
				L	T	P				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			Credit	Theory Marks	Internal Marks	Total Marks	
				L	T	P				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- V Semester

DSC – XIII Dot Net Technology

Session 2025-26 **Semester – V**	**Programme- UG** **Subject- Dot Net technology**
Course Type – DSC **Credit – 3+1=4**	**Course Code- UBC CT501** **Lecture -60**
MM – 100	**Min Marks-40**

Course Title	**Dot Net technology**
Course Objective	The primary objective of this course is to provide concepts of .NET framework and different concepts of vb.net, C# programming language and make students familiar with their uses and applications..

Course Learning Outcome	After completion of course the students will able to:- • To implement basic language • To create classes and objects and to implement different object oriented features • To implement inheritance, advanced features like delegates, event handling, lambda expressions, exception handling

Unit	Lecture	Contents/Topic	Credit
I	14	**Introduction:** Overview of. Netframework, Features of .Net ,CLR, CommonLanguageSpecification, JITcompilation, MSIL, Namespace, FCL, Assemblies, Common Type System, Cross-Language Interoperability, Garbage Collection.Data types of variables, Constant, Type Conversions, Operators, Control Structure: Conditional Statement, loops(Do...loop, for loop, while loop, for –Next loop), arrays, Declaring arrays and dynamic arrays, Types, Structure, Enumeration, SubProcedure, Functions.	04
II	15	**Windows Forms:** Working with visual Studio IDE, creatinga. NET Solution, simple forms, MDI forms, windows forms: Control class, Text Box, Rich text boxes, Labels, Button, Check box, Radio Button, Panels, Group box, List box, Checked list box, Combo box, Picture box, Timer,Scrollbar,Timer,Track bar, Progress bar. Message box, Function,Message Box. Show Method, Input box function, Creating MDI application. Menus, creating Menu, sub menu items, Context menu	
III	15	**Class and objects**, creating classes, objects, creating data member, creating class shared data member, shared methods, shared properties , overloading methods and properties, with statement, constructor, Destructor, inheritance, overriding base class member, inheriting constructor, overloading base class member.	
IV	16	Database concept, Ado.net Architecture, .Net Data Provider (Connection class: OledbConnection, SQL Connection, Command class: SQL command class, OleDbCommand class, Data Adaptor class,Data Reader class), Dataset Component, Creating Database application using windows forms (DB connectivity through ADO.net), accessing data from database, navigate in data, working with Data Grid.	
Total	60		

Dot Net Technology 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+ Practical Sessional)	**-15**
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. WAP to find maximum between three numbers.
2. To check whether a number is negative, positive or zero.
3. To check whether a character is alphabet or not.
4. To find all roots of a quadratic equation.
5. Design an application to input marks of five subjects Physics, chemistry, Biology, Maths and computer. Calculate percentage and grade.

   Percentage >
   90% : Grade A
   Percentage >=
   80% : Grade B
   Percentage >
   70% : Grade C
   Percentage >60%
   : Grade D
   Percentage >= 40% : Grade E Percentage < 40%: Grade F
6. Write a program to convert decimal to binary number system using bitwise operator.
7. Write a program to swap two numbers using bitwise operator
8. Write a program to create Simple Calculator using select case.
9. Write a program to check whether a number is Armstrong number or not
10. Design a digital clock using timer control.
11. Design an application that accepts the item name from the user and add it to a list box and combo box.
12. Create an application that offers various food items to select from check boxes and a mode of payment using radio button. It then display the total amount payable.
13. Create an application to implement the working of Context menu on textbox
14. WAP to illustrate all functionalities of list box and combo box.
15. WAP using check names for the following font effects Bold Italic Underline Increase Font size Decrease Font size Font Color
16. WAP for temperature conversion using radio button.
17. WAP to launch a rocket using Picture Box and Timer control
18. WAP to change the back color of any control using scroll box.
19. WAP to search an element for one dimensional array.

20. Design a menu such that it contain submenu such as Addition, Subtraction, Scalar Multiplication, Transpose of two metrics.

21. Design the following application using radio button and checkbox:

22. Design an application to create the Payroll form shown below. Number of hours well as the appropriate rate.

Gross salary = rate* hours.

Net salary = gross salary - deductions.

23. Develop an application which is similar to notepad using menus.

24. Develop an application for facilitating purchasing order

25. Develop an application for billing system in coffee shop

26. Develop an application which is similar to login form

27. Define a class account include following data members: Name of the depositor account no. type of Account, balance amount, Member Functions: To deposit an amount, To withdraw an amount after checking balance, to show balance also provide proper validation wherever necessary write a main program to test above class

28. Develop a project which display the student information in the relevant field from the database which already exist.

29. Create a class circle with data member radius provide member function to calculate area driver class fare from class circle provide member function to calculate volume derived class cylinder from class is fair with additional data member for height and member function to calculate volume

30. consider an example for declaring the examination result design 3 classes student exam result the student class has data member such as representing roll number name of subject create the class exam which contain the data member representing name of subject minimum marks maximum marks obtained marks for 3 subject derived class result from both students and exam classes test the results class in main function

31. write a program that implement the concept of encapsulation

32. write a program to demonstrate concept of polymorphism function overloading and constructor overloading

33. Create a class student having data member to store roll number name of the student name of three subject Max marks, Min marks, obtained marks. Declare an object of class student. Provide facilities to input data in data members and display result of students.

34. Create a class student having data members to store roll number name of Student name of a subject Max marks, min marks, obtained marks declare array of object to hold data of three students. Provide facilities to display result of all students provide also facility to display the result of specific student whose roll number is given.

35. Create a class array having an array of integer having five elements at data member provide following facilities:

a) constructor to get number in array element
b) sort the elements
c) find the largest element
d) search the present of particular value in an array element.

36. Write a program to display records of table using eing data adaptor and code for items buttons to move at first record next record previous record last record in the table.

37. Create a table for employee write a program using data set to add delete edit and navigate records.

38. Write a program to access a database using ado.net and display key column in the combo box or list box when an item is selected in it its corresponding records is shown in data grid control.

Department of Computer Application

BCA- V Semester

DSC – XIV Software Engineering

Session 2025-26	**Programme- UG**
Semester - V	**Subject- Software Engineering**
Course Type - DSC	**Course Code- UBCCT502**
Credit – 3+1=4	**Lecture -60**
MM – 100	**Min Marks-40**

Course Title	**Software Engineering**
Course Objective	The course's goal is to provide a professionally guided education in 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.
Course Learning Outcome	After completion of course the students will able to:- • Acquires skills and knowledge to support a professional pathway, including communication, analytic, and technical skills. • An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives. • An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

Unit	**Lecture**	**Contents/Topic**	**Credits**
I	**15**	Introduction to software engineering, software engineering principles, software process, process framework, Umbrella activities, Process adaptation, software crisis, process model – Waterfall model, prototype model, Increment Model, Spiral Model, RAD Model.	**04**
II	**15**	Requirement engineering, Analysis Model- DFD, ERD, Decision Table, software requirement specification, Structure of SRS, pseudo code, Software design: Design process, design concept- Abstraction, partitioning,Modularity, information hiding, refinement, refactoring, function oriented design, object oriented design, cohesion, coupling.	
III	**15**	Software Metrics, software quality assurance,Programming Style : Structured programming, coding standard, internal documentation, Software testing: testing techniques: White box, black box, cyclomatic complexity, Test plan, Debugging- Debugging procee, debugging strategie.	
IV	**15**	Risk management: software risk, risk identification, Introduction to software maintenance, Categories of maintenance, Belady & Lehman Model, Boehm Model, Project Management concept:people, product, process, project, software team, software project planning, Software project estimation, cost estimation model (COCOMO, Putnam-slim, Watson and feliix), software reengineering.	
Total	**60**	**04 Unit**	

Department of Computer Application
BCA- V Semester
DSC – XV Statistical Analysis

Session 2025-26	**Programme- UG**
Semester –V	**Subject- Statistical Analysis**
Course Type – DSC	**Course Code- UBCCT503**
Credit – 3+1=4	**Lecture -60**
MM – 100	**Min Marks-40**

Course Title	**Statistical Analysis**
Course Objective	The main goal of this program, a student would have in depth understanding of the key statistical, mathematical, computer programming & economics concepts to have a strong knowledge base in Analytics domain.
Course Learning Outcome	After completion of course the students will able to:- • Students will be introduced to the concepts of Data Science and Analytics with an emphasis on the applications • Students will learn to apply various statistical theories to solve real life situations by doing projects • They will be able to perform well in group and develop professional presentation skills

Unit	Lecture	Contents/Topic	Credits
I	**15**	UNIT-I: COMBINATORICS: Permutation and Combination, Repetition an Constrained Repetition, Binomial Theorem. Frequency distribution, Histogra and frequency polygons, Measures of central tendency: Mean, Mode, Media Dispersion, Mean deviation and standard, deviation Moments, Skewnes kurtosis	
II	**15**	UNIT-II: Elementary probability theory: Definition, conditional probability, Probability distribution , mathematical expectation. Theoretical distribution: Binomial, Poisson and Normal distribution, relation between the binomial, poisoned Normal distribution.	**04**
III	**15**	UNIT-III: Correlation and Registration:Linear Correlation, Measure of Correlation,Least Square Regression lines.Curve fitting: Method of least square, least square line, least squares Parabola. Chi-square test: definition of chi-square; signification test: contingency test, coefficient of contingency.	
IV	**15**	UNIT-IV: Basics of sampling theory : sample mean and variance, students t-test, test of Hypothesesand significance, degree of freedom, Z-test, small and large sampling, Introduction of Monte Carlo method.	
Total	**60**	**04 Unit**	

Department of Computer Application

BCA- V Semester

DSE– III Mobile & Wireless communication

Session 2025-26	**Programme- UG**
Semester – V	**Subject- Mobile & wireless communication**
Course Type – DSE	**Course Code- UBCCG504**
Credit – 3+1=4	**Lecture -60**
MM – 100	**Min Marks-40**

Course Title	**Mobile & wireless communication**
Course Objective	The purpose of a wireless network is to enable communication and data transfer between devices without the need for physical, wired connections.
Course Learning Outcome	After completion of course the students will able to:- • Identify the issues in transport and application layers. • understand the new trends in mobile/wireless communications networks • analyze various routing algorithms used in mobile/wireless networks. • Test the performance of various wireless protocols.

Unit	Lecture	Contents/Topic	Credits
I	15	**UNIT-I:**Data communication :Definition, Mode – Half/full duplex, Transmission mode, Switching, Network topology, OSI reference model, Network protocol(TCP?IP).	04
II	15	**UNIT — II** Introduction Mobile & wireless device, history, application, wireless transmission, signals, antennas, signal propogation, multiplexing, modulation, Wireless LAN & WAN, spread spectrum, celluar system, MAC.	
III	15	**UNIT — III** Telecommunication & Broadcast System GSM, mobile service, system architecture, GSM subnets, GSM Communication frames, Security, new data service, satellite system application, GEO, LEO, MEO, routing, localization, broadcast system.	
IV	15	**UNIT—IV** Wireless LAN, infrared vs radio transmission, infrastructure& adhoc networks, IEEE 802.11, MAC frames, MAC Management, roaming, HIPERLAN, Bluetooth, application, physical layer, modes MAC layer, packet format, networking security, link management, GPRS.	
Total	**60**	04 Unit	

Department of Computer Application

BCA- V Semester

DSE – IV Internet of Things

Session 2025-26	**Programme- UG**
Semester - V	**Subject- Internet Of things**
Course Type - DSE	**Course Code-**
Credit – 3+1=4	**Lecture -60**
MM - 100	**Min Marks-40**

Course Title	**Internet of things**
Course Objective	The Internet of Things (IoT) is aimed at enabling the interconnection and integration of the physical world and the cyber space. It represents the trend of future networking, and leads the third wave of the IT industry revolution. IoT covers a wide spectrum of applications, including the detailed real-time sensing of our environment and the embedding of connected intelligence into everyday objects.
Course Learning Outcome	After completion of course the students will able to:- • Identify the level of IOT stack and be familiar with the key technologies & protocol. • Apply the knowledge & skills acquired during the course to build and test a complete. • Working IOT system involving prototyping, programming and data analysis.

Unit	Lecture	Contents/Topic	Credits
I	15	**UNIT-I:** Fundamentals of IoT: Introduction, Definitions & Characteristics of IoT, IoT Architectures, Physical & Logical Design of IoT, Enabling Technologies in IoT, History of IoT, M2M and IOT technology fundamental -Device, gateways, local & wide area network, Everything as a service(Xaas),	04
II	15	**UNIT — II** : IOT Architecture: Introduction state of Art, Refrence Model& architecture, IOT refrence architecture, functional view, information view, deployment & operational view, PHY/MAC layer(3GPP MTC, IEEE802.11,IEEE 802.15), Z wave, Bluetooth, Zigbee smart energy, DASH7- Network layer- IPv4,IPv6, 6LoWPAN, DHCP,ICMP, RPL.	
III	15	UNIT — III Transport Layer: Transmission control protocol(TCP), Multipath Transmission Control Protocol(MPTCP), User Datatgram Protocol(UDP),Stream control Transmission protocol(SCTP), Transport layer security(TLS), Session Layer: Hyper Text Transfer protocol(HTTP),Extensible Messaging & presence protocol(XMPP), Advance message Queuing Protocol(AMQP), Message Queue Telemetry Transport(MQTT)	
IV	15	**UNIT—IV Service Layer** : One M2M, European telecommunication, standard institute(ETSI),M2M(machine to machine), OMA, BBF- security in IOT protocol – Mac 802.15.4, Routing protocol for low power & lossy network, Application layer, Applications of IoT.	
Total	**60**	**04 Unit**	

Department of Computer Application

V Semester

SEC – V(PHP with MySQL-I)

Session 2025-26	**Programme- UG**
Semester – V	**Subject- PHP with MySQL-I**
Course Type – SEC	**Course Code-**
Credit – 2	**Lecture -30**
MM – 50	**Min Marks-17**

Course Title	**PHP with MySQL-I**
Course Objective	The objective of the PHP is a widely used programming language which works on the principal of server-side scripting to produce dynamic Web pages. To introduce how PHP can be combined with MySQL to integrate database functions into Websites
Course Learning Outcome	After completion of course the students will able to:- • To implement PHP script using Decisions and Loops • To develop PHP applications using Strings, Arrays and Functions. • To design object-oriented programming (OOP) principles for PHP and use HTML form elements that work with any server-side language. • To display and insert data using PHP and MySQL

Unit	Lecture	Contents/Topic	Credits
I	15*2	Embedding PHP in web pages, redirecting output to browser, data types, expressions, control structures; Functions– Creation, passing arguments ,default argument values, returning values, recursive functions; Arrays-Creating,processing,sorting, merging, slicing, splicing, and dissecting arrays. Constructors, static class members, auto loading objects, inheritance, interfaces, abstract classes, error logging, exceptional handling; Strings - regular expressions and other string functions. Introduction to MySQL - Data types, attributes, working with databases, working with tables, altering table structure; Database Connectivity-Using the MYSQLI extension, setting up the connection, handling errors, querying the database, working with prepared statements, auto commit mode, committing and rolling back a transaction.	02
Total	30		

Learning Resources
BCA-5TH SEMESTER

Course	Book/Reference Recommended
DOT NET TECHNOLOGY	• Visual Basic .NET Programming Black Book" by Steven Holzner • Dot Net Technology" by Damini Grover.
LAB DOT NET TECHNOLOGY	• Murach's V.B.NET database Programming with ADO.NET" by Anne Prince • Visual Basic .NET Programming Black Book" by Steven Holzner
SOFTWARE ENGINEERING	• Software Engineering, 10th edition Published by Pearson • Software Engineering, 10/e [Paperback] Sommerville, Ian
STATISTICAL ANALYSIS	• Probability & Statistics by Dr.H.K.Pathak • Statistical Methods by Dr. H.K. Pathak
MOBILE & WIRELESS COMMNUNICATION	• Mobile Communications" by Jochen Schiler • Introduction to Wireless and Mobile Systems" by Dharma Prakash Agarwal and Qing An Zeng
IOT INTERNET OF THINGS	• Internet of things -IoT by Raj Kamal • Internet of Things (IoT): Dr. Rajiv Chopra