

GOVT. HOLKAR AUTONOMOUS SCIENCE COLLEGE
INDORE
(CENTER FOR EXCELLENCE)
Academic Year: 2022-2023



Affiliated to Devi Ahilya Vishwavidyalaya, Indore

Syllabus for B.C.A.(IV Semester)

Computer Applications

(Faculty of Computer Science)

DEPARTMENT OF COMPUTER SCIENCE

GOVT. HOLKAR AUTONOMOUS SCIENCE COLLEGE INDORE

Semester Syllabus for Undergraduates (Computer Applications)

As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Academic Year: 2022-2023

Class: B.C.A.IV Semester (Computer Applications) for Regular Student

Govt. Holkar (Model Autonomous) Science College, Indore												
Computer Science Department												
Syllabus Session Year: 2022-23												
Programme :Diploma in Applications								Class :B.C.A. IV Semester				
S.No.	Paper	Paper Title	Paper Code	Theory Max. Marks 100				Practical Max. Marks 100				Total Credit
				Credits	CCE	Exter. Asses.	Min Marks	Credits	Inter. Asses.	Exter. Asses.	Min. Mark.	
1	Core Course	Database Management Systems Using PL/SQL	S4-51-I	4	40	60	35	2	40	60	35	6
2	Minor	Problem Solving and Python Programming	S4-51-M	4	40	60	35	2	40	60	35	6
3	Open Elective	Optimization Techniques	S4-51-O-A	4	40	60	35					4
4.	Open Elective	Organization Behaviour	S4-51-O-B	4	40	60	35					4
4	Vocational	Web Designing-II	S4-06/51-V	4	40	60	35					4

B.C.A. IV Semester Computer Applications
S4-51-I: Database Management Systems Using PL/SQL
Academic Year: 2022-2023

Part-A Introduction			
Program: Diploma	Class: B.C.A.	Semester: IV	Session: 2022-23
Subject: Computer Applications			
Course Code: S4-51-I	Course Title: Database Management Systems Using PL/SQL		
Course Type (Core Course/ Elective/ Generic Elective/ Vocational...):	Core Course		
Pre-requisite (If any):	To study this course, a student must have the basic knowledge of Computers.		
Course Learning Outcomes (CLO)	<p>After the completion of this course, a successful student will be able to do the following:</p> <ol style="list-style-type: none"> 1. Explain the features of database management systems and relational database. 2. Design conceptual models of a database using ER modelling for real life applications and construct queries in relational algebra. 3. Create and populate a RDBMS for a real-life application, with constraints and keys, using SQL. 4. Retrieve any type of information from a database by formulating complex queries in SQL. 5. Analyze the existing design of a database schema and apply concepts of normalization to design an optimal database. 		
Credit value	Theory – 4 Credits		
Total Marks	Max. Marks: 40+60	Min. Passing Marks: 35	

B.C.A. IV Semester Computer Applications
S4-51-I: Database Management Systems Using PL/SQL
Academic Year: 2022-2023

Part-B: Content of the Course		
No. of Lectures (in hours per week):		02 Hrs. per week
Total no. of Lectures:		60 Hrs.
Para	Topics	No. of Lectures
I	<p>Introduction to DBMS: Why database? Characteristics of data in database, DBMS. What are database advantages of DBMS? Database Architecture and Modeling: Conceptual, physical and logical database models, Role of DBA, Database design. Entity Relationship (ER) Model: Components of ER-model, ER modeling symbols, Relationships. Enhanced Entity Relationship (EER) Model: An introduction, Superclass and subclass entity types, Specialization, Generalization, Attribute inheritance, Categorization & aggregation.</p> <p>Keywords: DBMS, DBA, Entity Relationship (ER), EER, Superclass, Subclass, Specialization, Generalization, Categorization & Aggregation.</p>	12
II	<p>The Relational Data Model: Fundamental Concepts: Relations, Null Values, Keys, Foreign Key, Integrity Constraints - Entity Integrity & Relational Integrity.</p> <p>Normalization Process: First Normal Form, Functional Dependencies, Second Normal Form, Third Normal Form, Boyce-Codd Normal Form (BCNF), Fourth Normal Form; Other Normal Forms - Fifth Normal Form & Domain/Key Normal Form.</p> <p>Transforming a Conceptual Model to a Relational Model: Transforming Objects Sets and Attributes, Transforming Models without External Keys, Transforming Specialization and Generalization Object Sets, Transforming Relationships: One-One Relationships, One-Many Relationships, Many-Many Relationships; Transforming Aggregated Object Sets, Transforming Recursive Relationships.</p> <p>Keywords: Keys, Normalization, BCNF, Aggregated Object Sets, Recursive Relationships.</p>	12
III	<p>Relational database implementation:</p> <p>(a) Relational Algebra and Calculus:</p> <p>Relational Algebra: Union, Intersection, Difference, Product, Select, Project, Join - Natural, Theta & Outer Join, Divide, Assignment.</p> <p>Relational Calculus: Target list & Qualifying Statement, The Existential Quantifies, The Universal Quantifier.</p>	12

	Keywords: JOIN, Target list, Existential Quantifier, Universal Quantifier.	
IV	<p>Relational database implementation (continued): (b) Relational Implementation with SQL Relational Implementations: An Overview. Schema and Table Definition: Schema definition, Data types & domains, Defining Tables, Column Definition. Data Manipulation: Simple Queries (SELECT, FROM, WHERE), Multiple-Table Queries, Sub-queries, Correlated Sub-queries, EXISTS and NOT EXISTS operators, Built-in Functions (SUM, AVG, COUNT, MAX, and MIN), GROUP BY and HAVING clause, Built-In Functions with Sub-queries. Relational Algebra Operations: UNION, INTERSECT, EXCEPT, JOIN. Database Change Operations: INSERT, UPDATE, DELETE. Using SQL with Data Processing Languages; View Definition, Restrictions on View Queries and Updates.</p> <p>Keywords: Schema, SELECT, Data Manipulation, Database Change Operation, View.</p>	12
V	<p>Physical Database Systems: Introduction, Physical Access of the Database. Physical Storage Media. Secondary Storage, Physical Storage Blocks. Disk Performance Factors: Access Motion Time, Head Activation Time, Rotational Delay, Data Transfer Rate, Data Transfer Time. Data Storage Formats on Disk: Track Format, Record Format: Fixed-Length Records & Variable-Length Records, Input/output Management. File Organizing and Addressing Methods: Sequential File Organization, Indexed- Sequential File Organization, Direct File Organization, Hashing: Static Hash Functions and Dynamic Hash Functions.</p> <p>Keywords: Disk Performance Factors, Sequential File Organization, Indexed- Sequential File Organization, Direct File Organization, Hashing.</p>	12

B.C.A. IV Semester Computer Applications
S4-51-I: Database Management Systems Using PL/SQL
Academic Year: 2022-2023

Part-C: Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

Textbooks:

- Gary W. Hansen & James V. Hansen, “Database Management and Design”, 2nd Ed., 2007, Prentice Hall of India Pvt Ltd.
- Instructional Software Research & Development (ISRD) Group, Lucknow “Introduction to Database Management Systems”, 2006, Ace Series, Tata McGraw Hill Publishing Company Limited, New Delhi.
- Ramez Elmasri, Shamkant B. Navathe, “Fundamentals of Database Systems”, 7th Edition, 2016, Pearson.

Reference Books:

- Raghu Ramakrishnan & Johannes Gehrke, “Database Management Systems”, 3rd Edition, 2014, McGraw Hill Education
- C.J. Date, “An Introduction to Database System”, 8th Edition, 2003, Pearson
- Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, 6th Edition, 2010, Tata McGraw Hill
- Books published by M.P. Hindi Granth Academy, Bhopal

Suggestive digital platform web links :

1. <http://en.wikipedia.org/wiki/Relationalmodel>
2. <http://en.wikipedia.org/wiki/Relationalalgebra>
3. [cs.nyu.edu/courses/Fall 12/CSCI-GA.2400-001/lecture4.pdf](http://cs.nyu.edu/courses/Fall%2012/CSCI-GA.2400-001/lecture4.pdf)
4. <http://www.w3schools.in/dbms/database-normalization/>
5. <https://beginnerbook.com/2015/05/normalization-in-dbms/>
6. <https://ecomputernotes.com/fundamental/what-is-a-database/functional-dependence>
7. <http://www.mphindigranthacademy.org/>

Suggested equivalent online courses:

NPTEL:

1. INTRODUCTION TO DATABASE SYSTEMS or DATABASE DESIGN

B.C.A. IV Semester Computer Applications
S4-51-I: Database Management Systems Using PL/SQL
Academic Year: 2022-2023

Part-D: Assessment and Evaluation				
Internal Assessment: Continuous Comprehensive Evaluation (CCE): 40 Marks Shall be based on allotted assignments and Class Test. The division of marks is as follows:		External Assessment: University Exam (UE): 60 Marks Time: 03:00 Hours		
A. Submission of Assignment followed by Presentation		Section A: 03 Very Short Questions	03x02 = 06 Marks	
B. Class Test	Best Two test marks 20 Marks	Best two test Marks 40 Marks	Section B: Four Short Questions (200 Words Each)	04x08 = 32 Marks
Test I (Written Test)	20 Marks		Section C: Two Long Questions (500 Words Each)	02x11 = 22 Marks
Test I (Written Test)	20 Marks			
Test III (Quiz/ Seminar/ Assignment)	20 Marks			
Total Internal Assessment (Theory) Marks (A+B)	40 Marks		Total External Evaluation (Theory) Marks (A+B+ C)	60 Marks
Any remark/ Suggestion: Focus of the course/ teaching should be on developing ability of the student in analyzing a problem, building the logic and efficient code for the problem.				

B.C.A. IV Semester Computer Applications
S3-51-PI: DBMS Using PL/SQL Lab
Academic Year: 2022-2023

Part-A Introduction			
Program: Diploma	Class: B.C.A.	Semester: IV	Session: 2022-23
Subject: Computer Applications			
Course Code: S3-51-PI	Course Title: DBMS Using PL/SQL Lab		
Course Type (Core Course/ Elective/ Generic Elective/ Vocational...):	Core Course		
Pre-requisite (If any):	To study this course, a student must have the basic knowledge of Computers.		
Course Learning Outcomes (CLO)	<p>This lab is based on the theory course of DBMS. This lab course involves the development of the practical skills in DBMS using MS-Access/Visual-FoxPro/SQL-Server/etc. This course is an attempt to upgrade and enhance students' theoretical skills and provide the hands-on experience.</p> <p>After completing this lab course sessions, student will be able:</p> <ol style="list-style-type: none"> 1. To create Databases & Views, 2. Execute simple advance SQL queries, 3. Use DBMS tools in the areas of database applications. <p><u>Topics to be covered in the lab syllabus:</u></p> <ul style="list-style-type: none"> • Introduction to MS-Access/Visual-FoxPro/SQL-Server etc. • Hands on practice on the application package used in the lab (i.e. on MS-Access/Visual-FoxPro/SQL-Server/etc.) • Database creation using MS-Access/Visual-FoxPro/SQL-Server etc. • Simple SQL queries (Single table retrieval) U Use of Advanced SQL queries • Implementation of Views 		
Credit value	Practical- 2 Credits		
Total Marks	Max. Marks: 40+60	Min. Passing Marks: 35	

B.C.A. IV Semester Computer Applications
S3-51-PI: DBMS Using PL/SQL Lab
Academic Year: 2022-2023

Part-B: Content of the Course		
	No. of Lab Practical's (in hours per week):	1 Hrs. per week
	Total no. of Labs:	30 Hrs.
	Suggestive list of Practical's	No. of Labs.
	<p>Experiment-1: To draw ER Model and Relational Model for a given database. Show ER to Relational Model reduction.</p> <p>Experiment-2: Implementation Database</p> <ul style="list-style-type: none"> • Creation of Database with proper constraints (Primary Key, Foreign Key) • Insert into database using different types of insert statements • Display <p>Experiment-3: Data Definition (schema) Modification</p> <ul style="list-style-type: none"> • Alter table: add column, remove column, add constraint, remove constraint • Drop table • Show schema of any table • Applying different constraints check, not null, etc. <p>Experiment-4: Simple SQL queries (Single table retrieval)</p> <ul style="list-style-type: none"> • Make use of different operators (relational, logical etc.) • Selection of rows and columns, renaming columns, use of distinct keyword, String handling (% , etc.) • Update statement, case update • Delete, cascade delete (if possible) <p>Experiment-5: Advanced SQL Queries-1</p> <ul style="list-style-type: none"> • Group by, having clause, aggregate function • Set operations like union, union all and use of order by clause • Nested queries: in, not in, exists, not exists and any, all 	30

<p>Experiment-6: Advanced SQL Queries -2.</p> <ul style="list-style-type: none">• Join (Inner & Outer)• Exists & Union <p>Experiment-7: Implementation of views.</p> <ul style="list-style-type: none">• Creation of views• Usage of views• Creation of views using views• Drop views	
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B.C.A. IV Semester Computer Applications
S3-51-PI: DBMS Using PL/SQL Lab
Academic Year: 2022-2023

Part-C: Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

- Dr Rajeev Chopra, “Database Management System (DBMS) A Practical Approach”, 2010, S Chand
- Jitendra Patel, “DBMS Lab Manual” Kindle Edition, 2012
- Books published by M.P. Hindi Granth Academy, Bhopal

Reference Books:

- Raghu Ramakrishnan & Johannes Gehrke, “Database Management Systems”, 3rd Edition, 2014, McGraw Hill Education
- C.J. Date, “An Introduction to Database System”, 8th Edition, 2003, Pearson
- Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, 6th Edition, 2010, Tata McGraw Hill

Suggestive digital platform web links :

1. https://fec.kai.nic.to/iaibag/FileHandler/270-101d616b-255a-4add-8d9bdd_e22fec7c1.pdf
2. https://pesitsouth.pes.edu/pdf/2019/July/CS/LM_DBMS%20LAB.pdf
3. <http://www.mphindigranthacademy.org/>

Suggested equivalent online courses:

1. INTRODUCTION TO DATABASE SYSTEMS or DATABASE DESIGN

B.C.A. IV Semester Computer Applications
S3-51-PI: Computer Networks Lab
Academic Year: 2022-2023

Part-D: Assessment and Evaluation	
Internal Assessment (A):	40 Marks
Lab Record / Class interaction/ Quiz	15 Marks
Attendance in the Lab	05 Marks
Assignments (Industrial Training (10 hours) / Mini Project (Project Demo + Report))	20 Marks
End Semester External Evaluation (B):	60 Marks
Viva Voce on Practical	10 Marks
Practical Record File	10 Marks
Experiments	40 Marks
Total Marks (A+B)	100 Marks

B.C.A. IV Semester Computer Applications
S4-51-M: Problem Solving and Python Programming
Academic Year: 2022-2023

Part-A Introduction			
Program: Diploma	Class: B.C.A.	Semester: IV	Session: 2022-23
Subject: Computer Applications			
Course Code: S4-51-M	Course Title: Problem Solving and Python Programming		
Course Type (Core Course/ Elective/ Generic Elective/ Vocational...):	Minor		
Pre-requisite (If any):	Open for All		
Course Learning Outcomes (CLO)	After the completion of this course, a successful student will be able to do the following: <ol style="list-style-type: none"> 1. Write simple Python programs using common data structures 2. Use files for data input and output 3. Make use of sequences and standard libraries in programming 4. Apply object Oriented Programming concepts in problem solving 5. Gain knowledge of Python frameworks for web development. 		
Credit value	Theory – 4 Credits		
Total Marks	Max. Marks: 40+60	Min. Passing Marks: 35	

B.C.A. IV Semester Computer Applications
S4-51-M: Problem Solving and Python Programming
Academic Year: 2022-2023

Part-B: Content of the Course		
No. of Lectures (in hours per week):		2 Hrs. per week
Total no. of Lectures:		60 Hrs.
Para	Topics	No. of Lectures
I	<p>Introduction: History of Python, Need of Python Programming, The application area of python, Installation of Python IDE (PyCharm), Execute from command line and using IDE, Basic Python Syntax.</p> <p>Python Basics: Keyword, Literal, Constants, Numbers, Variable and Data Types, Type conversion in Python, String, Escape Sequences, Expression, Operator, Evaluation Order, Indentation ,Data input and output Function, Comments.</p> <p>Conditional Statements- if, if-else, Nested If-else, Iterative Statement- For, While, Nested Loops, Control statements- Break, Continue, lamda.</p>	12
II	<p>Sets Lists, Tuples and Dictionaries:</p> <p>Sets: Adding, deleting, Processing set elements, Different set operations.</p> <p>List: Introduction to List, List Creation, Processing List, Finding Items in Lists with the in Operator, built in function, Copying Lists.</p> <p>Tuple: Introduction to Tuples, Converting Between Lists and Tuples.</p> <p>Dictionaries: Introduction to Dictionaries, Creating a Dictionary, Processing Dictionaries, Adding, modification and deletion dictionary elements using dictionary methods.</p>	12
III	<p>Strings, Function and File Handling:</p> <p>Strings: String Indexing, Slicing, Modify, Concatenate, find, replace, format strings, join.</p> <p>Function: Define Function, main() in python, Calling function, Passing Argument, Keyword Arguments, Default Arguments, Variable length Argument, Anonymous Functions, Fruitful function(Function Returning Values), Scope of Variable in Function.</p> <p>File Handling: Read, Create/Write, Delete, and Rename, Reading and Writing CSV Files in Python.</p> <p>Introduction to numpy, arrays, matrix, operations on arrays and matrix.</p>	12
IV	<p>Classes and Object-Oriented Programming: Class and Object, Attributes, Methods, Scopes and Namespaces, Data hiding, Inheritance, Overloading, Overriding, Exception Handling, Except clause, Try finally clause, User Define Exceptions.</p>	12

V	Python frameworks: Django framework, Django dependencies, creating a new project, starting new project, creating static home page, Django models, model relationships, querying models & connecting to Mysql database, Django CRUD.	12
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B.C.A. IV Semester Computer Applications
S4-51-M: Problem Solving and Python Programming
Academic Year: 2022-2023

Part-C: Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

Textbooks:

- Gaddis Tony, "Starting out with Python", Pearson, 2018, 4th Edition
- Romano Fabrizio, Hiller, Gaston C, RavindranAmn , "Learn Web Development with Python", Packt Publishing, 2018.
- Ramalho Luciano, "Fluent Python: Clear, Concise, and Effective Programming" Orilley,2015,1st Ed.

Suggestive digital platform web links :

1. <https://docs.python.org/3/tutorial/index.html>
2. <http://egyankosh.ac.in/handle/123456789/72701>

Suggested equivalent online courses:

1. <https://onlinecourses.nptel.ac.in/noc21cs21/preview>
2. <https://spoken-tutorial.org/tutorial-search/?searchfoss=Python+3.4.3>

B.C.A. IV Semester Computer Applications
S4-51-M: Problem Solving and Python Programming
Academic Year: 2022-2023

Part-D: Assessment and Evaluation				
Internal Assessment: Continuous Comprehensive Evaluation (CCE): 40 Marks Shall be based on allotted assignments and Class Test. The division of marks is as follows:		External Assessment: University Exam (UE): 60 Marks Time: 03:00 Hours		
A. Submission of Assignment followed by Presentation		Section A: 03 Very Short Questions	03x02 = 06 Marks	
B. Class Test	Best Two test marks 20 Marks	Best two test Marks 40 Marks	Section B: Four Short Questions (200 Words Each)	04x08 = 32 Marks
Test I (Written Test)	20 Marks		Section C: Two Long Questions (500 Words Each)	02x11 = 22 Marks
Test I (Written Test)	20 Marks			
Test III (Quiz/ Seminar/ Assignment)	20 Marks			
Total Internal Assessment (Theory) Marks (A+B)	40 Marks		Total External Evaluation (Theory) Marks (A+B+ C)	60 Marks
Any remark/ Suggestion: Focus of the course/ teaching should be on developing ability of the student in analyzing a problem, building the logic and efficient code for the problem.				

B.C.A. IV Semester Computer Applications
S4-51-PM: Problem Solving and Python Programming Lab
Academic Year: 2022-2023

Part-A Introduction			
Program: Diploma	Class: B.C.A.	Semester: IV	Session: 2022-23
Subject: Computer Applications			
Course Code: S4-51-PM	Course Title: Problem Solving and Python Programming Lab		
Course Type (Core Course/ Elective/ Generic Elective/ Vocational...):	Minor		
Pre-requisite (If any):	Open for All		
Course Learning Outcomes (CLO)	<p>After the completion of this course, a successful student will be able to do the following:</p> <ol style="list-style-type: none"> 1. Write simple Python programs using common data structures. 2. Use files for data input and output. 3. Make use of sequences and standard libraries in programming. 4. Apply object Oriented Programming concepts in problem solving. 5. Gain knowledge of Python frameworks for web development. 		
Credit value	Practical- 2 Credits		
Total Marks	Max. Marks: 40+60	Min. Passing Marks: 35	

B.C.A. IV Semester Computer Applications
S4-51-PM: Problem Solving and Python Programming Lab
Academic Year: 2022-2023

Part-B: Content of the Course		
No. of Lab Practical's (in hours per week):		2 Hrs. per week
Total no. of Labs:		30 Hrs.
	Suggestive list of Practical's	No. of Labs.
	<ol style="list-style-type: none"> 1. Write a Python program which accepts the radius of a circle from the user and compute the area. 2. Write a Python program which accepts the user's first and last name and print them in reverse order with a space between them. 3. Write a Python program to print the calendar of a given month and year. 4. Write a Python program to find whether a given number is prime or not. 5. Write a Python program to find factorial of a number. 6. Write a Python program to find the least common multiple (LCM) of two positive integers. 7. Write a Python program to count a occurrence (frequency) of a number in a given list. 8. Write a Python program to find the length of string 9. Write a Python program to reverse the string alphabets 10. Write a Python program to search an alphabet in the string 11. Write a Python program to concatenate two strings 12. Write a Python program to compare two strings 13. Write a Python program to find a substring in the string 14. Write a python script to concatenate 2 Strings. 15. Write a Python script to find all the vowels in the given string 16. Write a Python program to reverse the order of the items in the array. 17. Write a Python program to find the sum of all elements in an array. 18. Write a Python program to sum all the items in a list. 19. Write a Python program to get the largest number from a list. 20. Write a Python program to remove duplicates from a list. 21. Write a Python program access the index of a list. 22. Write a Python program to create a tuple with numbers and print. 23. Write a Python program to add an item in a tuple. 24. Write a Python script to sort (ascending and descending) a dictionary by value 	30

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|--|---|--|
| | <ol style="list-style-type: none">25. Write a Python script to merge two Python dictionaries.26. Write a python script to print the last element of the given string27. Write a class for student. Having the following attributes name, roll no, address, course. Also write the accessor methods for all of the fields.28. Write a simple Django server that outputs hello world.29. Write a Django server which emits a simple webpage.30. Write a Django CRUD based application. | |
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B.C.A. IV Semester Computer Applications
S4-51-PM: Problem Solving and Python Programming Lab
Academic Year: 2022-2023

Part-C: Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

- Gaddis Tony, "Starting out with Python", Pearson, 2018, 4th Edition
- Romnno Fabrizio, Hil her, Gaston C, RavindranArun , "Learn Web Development with Python", Packt Publishing, 2018.
- Ramalho Luciano, "Fluent Python: Clear, Concise, and Effective Programming" Orilley, 2015,1st Ed.

Suggestive digital platform web links :

1. <https://docs.pytho.org/3/tutorial/index.html>
2. <http://egyankosh.ac.in/handle/123456789/72701>

Suggested equivalent online courses:

1. <https://onlinecourses.nptel.ac.in/noc21cs21/preview>
2. <https://spoken-tutorial.org/tutorial-search/?searchfoss=Python+3.4.3>

B.C.A. IV Semester Computer Applications
S4-51-PM: Problem Solving and Python Programming Lab
Academic Year: 2022-2023

Part-D: Assessment and Evaluation	
Internal Assessment (A):	40 Marks
Lab Record / Class interaction/ Quiz	15 Marks
Attendance in the Lab	05 Marks
Assignments (Industrial Training (10 hours) / Mini Project (Project Demo + Report))	20 Marks
End Semester External Evaluation (B):	60 Marks
Viva Voce on Practical	10 Marks
Practical Record File	10 Marks
Experiments	40 Marks
Total Marks (A+B)	100 Marks

B.C.A. IV Semester Computer Applications
S4-51-O-A: Optimization Techniques
Academic Year: 2022-2023

Part-A Introduction			
Program: Diploma	Class: B.C.A.	Semester: IV	Session: 2022-23
Subject: Computer Applications			
Course Code: S4-51-O-A	Course Title: Optimization Techniques		
Course Type (Core Course/ Elective/ Generic Elective/ Vocational...):	Open Elective		
Pre-requisite (If any):	To study this course, a student must have had Certificate Course.		
Course Learning Outcomes (CLO)	On the completion of this course student will be able – <ol style="list-style-type: none"> 1. Formulate real life problems into linear programming problem. 2. Apply the simplex method to find an optimal vector for the standard linear programming problem and the corresponding dual problem. 3. Find optimal solution of transportation. 4. Formulate and solve linear programming model of two person zero sum game. 5. Solve nonlinear programming problems using Kuhn-Tucker conditions. 		
Credit value	Theory – 4 Credits		
Total Marks	Max. Marks: 40+60	Min. Passing Marks: 35	

B.C.A. IV Semester Computer Applications
S4-51-O-A: Optimization Techniques
Academic Year: 2022-2023

Part-B: Content of the Course		
No. of Lectures (in hours per week):		2 Hrs. per week
Total no. of Lectures:		60 Hrs.
Para	Topics	No. of Lectures
I	Linear Programming Problem: 1.1 Basic concepts of linear programming problem 1.2 Simplex method and algorithm 1.3 Artificial variables technique 1.4 Two-phase method 1.5 Big-M method	12
II	Duality: 2.1 Definition and formulation of the dual problem 2.2 Primal-dual relationships 2.3 Economic interpretation of the dual 2.4 Dual simplex Method 2.5 Sensitivity analysis	12
III	Transportation Problems: 3.1 Mathematical model 3.2 Balanced and unbalanced problems 3.3 Degeneracy 3.4 Optimality conditions 3.5 Methods to find starting solution and optimal solution 3.6 Algorithm for solving transportation problem 3.7 Northwest-Corner method 3.8 Least cost method 3.9 Vogel approximation method for determination of starting basic solution	12
IV	Network Analysis: 4.1 Constraints in network 4.2 Construction of network 4.3 Critical Path Method (CPM) 4.4 PERT calculation 4.5 Resource leveling by network techniques	12

	4.6 Advances of network (PERT/CPM)	
V	Game Theory: 5.1 Formulation of two person zero sum games 5.2 Solving two person zero sum games 5.3 Games with mixed strategies 5.4 Graphical solution procedure 5.5 Linear programming solution of games 5.6 Non-Linear programming techniques 5.6.1 Kuhn-Tucker conditions 5.6.2 Non-negative constraints	12

B.C.A. IV Semester Computer Applications
S4-51-O-A: Optimization Techniques
Academic Year: 2022-2023

Part-C: Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

Text Book:

- KantiSwarup, P.K. Gupta and Manmohan: Operations Research, Sultan Chand and Sons, New Delhi, 2014.
- Guillermo Owen: Game Theory, Emerald Publishing Limited, 4th edition, 2013.
- S. D. Sharma: Operations Research, KedarNath Publication, 2012.
- Nita H. Shah, Ravi M. Gor and HardikSoni: Operations Research, PHI Learning Pvt. Ltd., 2007.
- Book published by M.P. Granth Academy , Bhopal

Reference Book:

- Mokhtar S. Bazaraa, John J. Jarvis and Hanif D. Sherali: Linear Programming and Network Flows, 2nd Ed., John Wiley and Sons, India, 2004.
- F.S. Hillier and G.J. Lieberman: Introduction to Operations Research, 9th Ed., Tata McGraw Hill, Singapore, 2009.
- Hamdy A. Taha: Operations Research, An Introduction, 8th Ed., Prentice-Hall India, 2006.
- Prem Kumar Gupta and D.S.Hira: Operations Research-An Introduction, S.Chand & Sons Company Ltd., New Delhi, 1995.

Suggestive digital platform web links :

1. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=25>
2. <https://www.highereducation.mp.gov.in/?page=xhzIQmpZwkylQo2b%2Fy5G7w%3D%3D>

Suggested Equivalent online courses:

1. <https://nptel.ac.in/courses/110106062/>
2. <https://nptel.ac.in/courses/111107128/>
3. https://ugemoocs.inflibnet.ac.in/index.php/courses/view_ug/275
4. <http://www.mphindigranthacademy.org/>

B.C.A. IV Semester Computer Applications
S4-51-O-A: Optimization Techniques
Academic Year: 2022-2023

Part-D: Assessment and Evaluation				
Internal Assessment: Continuous Comprehensive Evaluation (CCE): 40 Marks Shall be based on allotted assignments and Class Test. The division of marks is as follows:		External Assessment: University Exam (UE): 60 Marks Time: 03:00 Hours		
A. Submission of Assignment followed by Presentation		Section A: 03 Very Short Questions	03x02 = 06 Marks	
B. Class Test	Best Two test marks 20 Marks	Best two test Marks 40 Marks	Section B: Four Short Questions (200 Words Each)	04x08 = 32 Marks
Test I (Written Test)	20 Marks		Section C: Two Long Questions (500 Words Each)	02x11 = 22 Marks
Test I (Written Test)	20 Marks			
Test III (Quiz/ Seminar/ Assignment)	20 Marks			
Total Internal Assessment (Theory) Marks (A+B)	40 Marks		Total External Evaluation (Theory) Marks (A+B+ C)	60 Marks
Any remark/ Suggestion: Focus of the course/ teaching should be on developing ability of the student in analyzing a problem, building the logic and efficient code for the problem.				

B.C.A. IV Semester Computer Applications
S4-51-O-B: Organization Behaviour
Academic Year: 2022-2023

Part-A Introduction			
Program: Diploma	Class: B.C.A.	Semester: IV	Session: 2022-23
Subject: Computer Applications			
Course Code: S4-51-O-B	Course Title: Organization Behaviour		
Course Type (Core Course/ Elective/ Generic Elective/ Vocational...):	Open Elective		
Pre-requisite (If any):	Not Required		
Course Learning Outcomes (CLO)	After the completion of this course, a student shall be able to do the following: <ol style="list-style-type: none"> 1. Understand the effect of interpersonal behaviour in an organizational work-life. 2. Understand perspective in diverse cultural environment. 3. Understand the principles of organizational human behavior with relevance to the Indian business context. 		
Credit value	Theory – 4 Credits		
Total Marks	Max. Marks: 40+60	Min. Passing Marks: 35	

B.C.A. IV Semester Computer Applications
S4-51-O-B: Organization Behaviour
Academic Year: 2022-2023

Part-B: Content of the Course		
No. of Lectures (in hours per week):		2 Hrs. per week
Total no. of Lectures:		60 Hrs.
Unit	Topics	No. of Lectures
I	Concept, process and specific characteristics of Organization Development. Technics, Strategies, Evaluations and limits of Organization Development and required Conditions of Success.	12
II	Stress Management- Meaning, Causes, Effects and coping strategies for stress. Work Stress, Concepts and theories of motivation.	12
III	Organizational change, conflict and peer: Forces of change, planned change, resistance, approaches. Conflict management and negotiation techniques. Organization structure and personnel management.	12
IV	International Dimensions of Organizational Behavior, Equal Employment Opportunities, Organizational Culture, Managing Cultural Diversity, Learning Organization. Case Studies.	12
V	Nature of interpersonal Behaviour, Transactional Analysis, Concept of group, group cohesiveness, power and authority.	12

B.C.A. IV Semester Computer Applications
S4-51-O-B: Organization Behaviour
Academic Year: 2022-2023

Part-C: Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

Text Book:

- Udai Pareek, Understanding Organization Behaviour, 3rd Ed., Oxford University press, 2011
- Robbins S.P., Organizational Behaviour, 7th ED., New Delhi, PHI, 1996
- Huse, FE and Cunnings T G, Organization Development and Change, 3rd ed., New York. West, 1985
- Shekcharam Uma, Organizational Behaviour, Text & cases, New Delhi THM, 1989.
- Singh Dalip, Emotional Intelligence at work, Response Books, Sage Publication, Delhi 2001.
- Book published by M.P. Granth Academy, Bhopal

Reference Book:

- Luthans Fred., "Organizational Behaviour", McGraw Hill.
- Hellriegel, Slocum and Woodman, Organizational Behavior, South-Western, Thomson Learning, 9th edition, 200 I.
- Behavior in Organizations, Jerald Greenberg, 8ih ed, Pearson Education.
- Arnold, John, Robertson, Ivan t. and Cooper, Cary, I., "Work psychology: understanding human behavior in the workplace", Macmillan India Ltd., Delhi.
- Dwivedi, R. S., "Human relations and Organizational Behaviour: a global perspective", Macmillan India Ltd., Delhi.

Suggestive digital platform web links :

1. <https://www.coursera.org/courses?query-economics>
2. <https://www.mooc-list.com/tags/economics>
3. <https://www.coursera.org/learn>
4. <https://ocw.mit.edu/courses>
5. <https://nptel.ac.in/courses/macroeconomics>
6. <https://nptel.ac.in/courses/ManagerialEconomics>
7. <http://www.mphindigranthacademy.org/>

B.C.A. IV Semester Computer Applications
S4-51-O-B: Organization Behaviour
Academic Year: 2022-2023

Part-D: Assessment and Evaluation				
Internal Assessment: Continuous Comprehensive Evaluation (CCE): 40 Marks Shall be based on allotted assignments and Class Test. The division of marks is as follows:		External Assessment: University Exam (UE): 60 Marks Time: 03:00 Hours		
A. Submission of Assignment followed by Presentation		Section A: 03 Very Short Questions	03x02 = 06 Marks	
B. Class Test	Best Two test marks 20 Marks	Best two test Marks 40 Marks	Section B: Four Short Questions (200 Words Each)	04x08 = 32 Marks
Test I (Written Test)	20 Marks		Section C: Two Long Questions (500 Words Each)	02x11 = 22 Marks
Test I (Written Test)	20 Marks			
Test III (Quiz/ Seminar/ Assignment)	20 Marks			
Total Internal Assessment (Theory) Marks (A+B)	40 Marks		Total External Evaluation (Theory) Marks (A+B+ C)	60 Marks
Any remark/ Suggestion: Focus of the course/ teaching should be on developing ability of the student in analyzing a problem, building the logic and efficient code for the problem.				

B.Sc. IV / B.C.A. IV Semester
Computer Science / Computer Applications
S4-06/51-V: Web Designing -II
Academic Year: 2022-2023

Part-A Introduction			
Program: Diploma	Class: B.Sc./B.C.A.	Semester: IV	Session:2022-23
Course Code: S4-06/51-V	Course Title: Web Deigning - II		
Course Type (Core Course/ Elective/ Generic Elective/ Vocational...):	Vocational		
Pre-requisite (If any):	Open for All		
Course Learning Outcomes (CLO)	After studying this Course the student will be able to – <ul style="list-style-type: none"> • Write basic scripts. • Use Names, Objects, and Methods. • Create Dynamic Web Pages using Java Script & PHP in HTML forms. • Create Webpage with database connectivity. 		
Job Role	Web Designer / Front End Developer/ Creative Ad Designer		
Job Description	<p>Web designers develop functional and appealing web pages, websites, web applications, online advertisements for individuals, businesses and government agencies to establish their online presence. They use knowledge of computer programming and graphic design to create websites that meet client needs.</p> <p>Career Opportunities – Typical employers of web designers are –</p> <ul style="list-style-type: none"> • Software companies • IT consultancies • Specialist web design companies • Large corporate organizations • Any organization that uses computer systems • Self-employment/freelance work is often possible for individuals with appropriate experience. Vacancies are advertised online, by career services and by recruitment agencies. 		
Credit value	Theory – 4 Credits		
Total Marks	Max. Marks: 40+60	Min. Passing Marks: 35	

B.Sc. IV / B.C.A. IV Semester
Computer Science / Computer Applications
S4-06/51-V: Web Designing -II
Academic Year: 2022-2023

Part-B: Content of the Course		
No. of Lectures (in hours per week):		2 Hrs. per week
Total no. of Lectures:		60 Hrs.
Unit	Topics	No. of Lectures
I	<p>The JavaScript: Nature of JavaScript, Script Writing Basics, Enhancing HTML Documents with JavaScript, The Building Blocks.</p> <p>Introduction to JavaScript, JavaScript Engines, Values, Variables and Operators, Variable Mutation, Basic Operators, Operator Precedence, JavaScript Types, Types Definition, Types in JavaScript, Objects, Type Conversion and Coercion, Static vs Dynamic Type Checking.</p> <p>JavaScript Conditionals: Introduction to Conditionals, Conditionals in JavaScript, Ternary Operators and Conditionals. Conditional Ladder & Switch statement.</p> <p>JavaScript Arrays: Introduction to Arrays, Declaring and Mutating Arrays, Array Methods and Properties, Replication with Array Methods, Multi-dimensional Arrays.</p>	12
II	<p>JavaScript Loops: Introduction to Loops, Loops in JavaScript, While and Do/While Loops, For Loops, Break and Continue in Loops, Iterating Arrays, Iterating Objects.</p> <p>JavaScript Functions: Introduction to Functions, Functions in JavaScript, Nested Functions in JavaScript, Arrow Functions in JavaScript, Function as an Argument, Function as the Returned Object,</p> <p>JavaScript Scope: Scope Introduction, Scope in JavaScript, Lexical Scope, Module Scope.</p> <p>DOM Intro: DOM Methods, DOM Elements, DOM HTML, DOM CSS, DOM Events, Event Listener.</p>	12
III	<p>Method of Adding Interactivity to a Web Page, Creating Dynamic Web Pages; Concept of Java Script Forms.</p> <p>Java Script Forms, Basic Script Construction, Talking to the Form Objects, Organizing the Objects and Scripts, Field-Level Validation, Check Required</p>	12

	Fields like Validating Zip Code, Automated Formatting, Format Phone, Format Money, Automatic Calculation, Calculate Expiration Date, Calculate Amount etc.	
IV	PHP: Introduction , Syntax, Comments, Variables, Echo / Print, Data Types, Strings, Numbers, Math, Constants, Operators, If...Else...Else if, Switch, Loops, Functions, Arrays, Superglobals, RegEx, PHP Forms, Form Handling, Form Validation form required , Form Complete.	12
V	MySQL :Handling Database, DDL ,DML , DCL,TCL, Insert, Update , Delete, Altering Columns, Dropping columns ,Tables ,Database, MYSQL Joins, Types: Inner, Outer, Left, Right, Not Null Key, Unique Key, Primary Key, Foreign Key. Database Connectivity using MySQL.	12

B.Sc. IV / B.C.A. IV Semester
Computer Science / Computer Applications
S4-06/51-V: Web Designing -II
Academic Year: 2022-2023

Part-C: Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

- Jon Duckett, HTML And CSS: Design And Build Websites, Wiley
- Jon Duckett, JavaScript And JQuery: Interactive Front-End Web Development, Wiley
- Jennifer Niederst Robbins, Learning Web Design: A Beginner's Guide To HTML, CSS, JavaScript, And Web Graphics, O'reilly.
- Steven M. Schafer, Html, XHTML, And CSS Bible, Wiley
- Felke-Morris, Basics Of Web Design: Html5 & Css3, 5th Edition, Pearson Education, 2019.
- Felke-Morris, Web Development & Design Foundations With Html5, 10th Edition, Addison Wesley, 2020.
- Ian Pouncey, Richard York, Beginning CSS: Cascading Style Sheets For Web Design, Wiley India.
- Thomas A Powell, The Complete Reference To Html
- Lee Anne Philips, Using Html, PHI
- C. Xavier, World Wide Web Design With Html,
- Xavier C, Web Technology And Design, New Age International
- Laura Lemay, Mastering Html, CSS & JavaScript Web Publishing
- Dt Editorial Services, Html 5 Black Book - Covers CSS 3, JavaScript, XML, XHTML, AJAX, PHP and JQuery, DreamTech Press Publication

Suggestive digital platform web links :

- <https://www.w3schools.com/>
- <https://spoken-tutorial.org/>
- <https://www.doc-developpement-durable.org/file/Projets-informatiques/cours-&-manuels>
- <http://www.nematrian.com/Pages/HTMLCSSJSCcombined.pdf> (PDF: 514 pages)
- https://www.daoudisamir.com/references/vs_ebooks/html5_css3.pdf (PDF: 681 pages)

Suggested equivalent online courses:

- <https://nptel.ac.in/courses/106/105/106105084/> (NPTEL Course: Internet Technology - Part of the Course)
- https://onlinecourses.swayam2.ac.in/aic20_sp11/preview (HTML and CSS)
- <https://www.coursera.org/learn/html-css-javascript-for-web-developers#syllabus> (HTML, CSS, and JavaScript for Web Developers)
- <https://www.classcentral.com/course/html-css-javascript-for-web-developers-4270> (HTML, CSS, and JavaScript for Web Developers)
- <https://www.classcentral.com/course/duke-programming-web-4256>
- <https://www.coursera.org/learn/duke-programming-web> (Programming Foundations with JavaScript, HTML and CSS)

B.Sc. IV / B.C.A. IV Semester
Computer Science / Computer Applications
S4-06/51-V: Web Designing -II
Academic Year: 2022-2023

Part-D: Assessment and Evaluation			
Internal Assessment: Continuous Comprehensive Evaluation (CCE): 40 Marks Shall be based on allotted assignments and Class Test. The division of marks is as follows:		External Assessment: University Exam (UE): 60 Marks Time: 03:00 Hours	
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