

LNCT UNIVERSITY, BHOPAL

Programme:- BCA

Semester – III

wef: July 2022

Scheme of Examination

PROGRAMME: BCA

BRANCH : CA

wef: July 2022

SEMESTER: III

S. No	Paper Code	Paper Name	Maximum Marks Allotted								Credits Allotted				Total Credits	Remark
			Theory Slot				Practical Slot			Total Marks						
			EST	CAT			ESP	CAP								
				MST	Quiz, Assignment	Attendance		Performance, Lab Record &	Attendance		L	T	P	J		
1	BCA-301	Introduction to Python	70	20	05	05	-	-	-	100	3	1	-	-	04	One credit refers to one hour teaching in theory, tutorial, practical and Project : 26 hour workload per week corresponding to LTPJ
2	BCA-302	Discrete Mathematics	70	20	05	05	-	-	-	100	3	1	-	-	04	
3	BCA-303	Data Base Management System	70	20	05	05	-	-	-	100	3	1	-	-	04	
4	BCA-304	Software Engineering	70	20	05	05	-	-	-	100	3	1	-	-	04	
5	BCA-305	Soft skills	70	20	05	05	-	-	-	100	3	1	-	-	04	
6	BCA-306	Programming Lab in Python	-	-	-	-	30	10	10	50	-	-	2	-	02	
7	BCA-307	Programming Lab in DBMS	-	-	-	-	30	10	10	50	-	-	2	-	02	
8	BCA-308	Mini Project/Internship Evaluation-I	-	-	-	-	30	10	10	50	-	-	-	2	02	
9	BCA-309	* CRT Training – I	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total			350	100	25	25	90	30	30	650	15	5	4	1	26	

MST: Mid Semester Test

CAT: Continuous Assessment Theory

EST: End Semester Theory

ESP: End Semester Practical

CAP: Continuous Assessment Practical

L: Lecture

T: Tutorial

P: Practical

J: Project Work

*BCA -308 Internship Evaluation -I completed at I year level.

*BCA-309: Non-Gradable

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SYLLABUS

Name of Paper	Paper Code	Theory					
		Credit			Marks		
Introduction to Python	BCA-301	L	T	J	EST	CAT	Total
		3	1	0	70	30	100
Course Objective	The course is designed to provide Basic knowledge of Python.						
Units	Contents (Theory)						Hours /week
I	Introduction to Python: Features, History, Version, Application area, Install Python, Python path, Interactive mode and script mode. Data types & variables: Number, Integer, Boolean, Decimal, Octal, Hexadecimal, Floating point, Complex, None, Sequence string, Tuples, List, Sets, Mapping, Mutable and immutable variables, Variables expressions and statements, Values, Variables and keywords, Operators and operands in Python, Expressions and statements taking input using raw_input{} and input{} and displaying output, Print statement, Single and multiple line.						8
II	Control Structures: Selective statements – if, if-else, nested if, if –elif ladder statements Iterative statements - while, for, Nested loops, else in loops, break, continue and pass statements.						8
III	Collections: List- Concept of mutable lists>Create, Access, Slicing, Negative Indices, List Methods, and comprehension. Tuples-Immutable concept>Create, Initialize, Access, Indexing and Slicing, Operations on tuples. Dictionary-Concept of key value pair,create, add, and replace values, operations on dictionaries. Sets-Creat e and operations on set.						8
IV	Strings and Regular Expressions: Strings: Formatting, Comparison, Slicing, Splitting, Stripping, Negative indices, String functions. Regular expression: Matching the patterns, Search and replace.						8
V	Functions: Defining functions, Invoking functions, Scope, Passing parameters, Scope of variables, Void functions, Functions returning values, Recursion. Importing modules, Invoking built in functions, Functions from math, Module functions from random module, Function from date time module, functions from re-module composition,						8

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Text Books/ References Book:-			
Name of Authors	Titles of the Book	Edition	Name of the Publisher
Mark Lutz	Learning Python	5th Edition, 2013	O'REILLY Publication
Tim Hall and J-P Stacey	Python 3 for absolute beginners	2013	New York : Apress,
Fabrizio Romano	Learning Python	2015	Packt Publishing
Paul Barry	Head first Python	II, Head first series	O'REILLY Publication
COURSE OUTCOMES: Students will be able to			
CO1	To explore the basic knowledge of Python.		
CO2	Learn and use control structures.		
CO3	Work out using the core data structures as lists, dictionaries, tuples, and sets.		
CO4	Implement Strings and perform pattern matching		
CO5	Learn concept of functions.		

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Name of Paper	Paper Code	Theory					
		Credit			Marks		
Discrete Mathematics	BCA-302	L	T	J	EST	CAT	Total
		3	1	0	70	30	100
Course Objective	The objective of this course is to learn the basics about Discrete structure.						
Units	Contents (Theory)						Hours /week
I	Set Theory: Elements of a set, methods of describing a set, types of sets, Operations on sets, union, intersection and difference of sets, Venn diagrams, statement problems, Associative Laws, Distributive laws, DeMorgan’s laws, duality, partitioning of a set.						8
II	Relations and Functions: Basic definition of relation, types of relations, graphs of relations, properties of relations, Matrix representation of a relation. Function definition, Type of functions, One to one, into and onto function, Inverse function, Composition of functions, Recursively defined function, Pigeonhole principle.						8
III	Algebra Of Logic, Mathematical Induction: Propositions and Logic operations, truth tables, arguments and validity of arguments, propositions generated by a set, equivalence and implication laws of logic, mathematical system and propositions over a universe, Quantifiers, Principle of Mathematical Induction.						8
IV	Graph Theory: Various types of graphs- Simple and multi graphs, directed and undirected graphs, Eulerian and Hamiltonian graphs, Graph connectivity, graph traversals, graph optimizations, graph coloring, Trees, spanning trees.						8
V	Recursion And Recurrence Relations:Recursion, many faces of recursion, recurrence relations, some common recurrence relations, Matrix Operations- Addition, Subtraction, Multiplication and Inverse.						8
Text Books/ References Book:-							
Name of Authors		Titles of the Book			Edition		Name of the Publisher
Tremblay J.P. and Manohar R		Discrete Mathematical Structure with application to Computer Science			30th Reprint (2007)		McGraw Hill
Seymour Lipschutzand Marc Lipson.		Discrete Mathematics			Third Edition		Outline Series
Doerr A & Kenneth L.		Applied Discrete Structure of Computer Science			Paperback Edition		Galgotia Pub. Pvt.Ltd. New Delhi
Swami M.N.S &Thisiraman E		Graphics Networks and Algorithms			Second Edition		John Wiley & Sons

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COURSE OUTCOMES: Students will be able to			
CO1	Understand the Concepts of set theory, laws, venn diagrams.		
CO2	Describe the relations, types of relations, functions,		
CO3	Apply the concepts of Propositions and Logic operations, Principle of Mathematical Induction.		
CO4	Use Graph theory in various optimization problems.		
CO5	Apply many faces of recursion, recurrence relations, Matrix Operations.		

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Name of Paper	Paper Code	Theory					
		Credit			Marks		
Data Base Management System	BCA-303	L	T	J	EST	CAT	Total
		3	1	0	70	30	100
Course Objective	The objective of this course is to learn fundamentals of data models and to represent a data base system using ER diagrams, study of SQL and relational data base design.						
Units	Contents (<i>Theory</i>)						Hours /week
I	Database Concepts: Data, Information & Knowledge, Introduction to Database Management System (DBMS): Database Concepts, Why database, characteristics of data in database, Advantages of DBMS, Overview of Database Models: Hierarchical Model, Network Model, Relational Model and Object Oriented Model. Three levels of Database Architecture: Conceptual, Physical and Logical levels. Entity Relationship Model: Entity, Attributes, Relationships, E-R Modeling Symbols.						8
II	Relational DBMS: RDBMS Terminology, Relational Data Structure, Data Integrity, Codd's Rule, Overview of Relational Algebra and Relational Calculus, Relational Database Design: Primary Keys, Foreign Keys, Candidate Keys, Relationships, Normalization, Purpose of Normalization, First Normal Form, Second Normal Form, Third Normal Form.						8
III	SQL: SQL Data Types and Literals, DDL, DML, DQL, DCL, DAS, TCS, SQL operators, Creating Database, Creating, Modifying and Deleting Tables, Creating View, Indexes, Queries: Insert, Select, Update, Where Clause, Having Clause, Sub-Queries, Order By, Grouping, Creating Variables, Functions: Aggregate and Scalar, Joins, Unions, Triggers, Procedures.						8
IV	Transactions: Transaction concept, Transaction Properties, Transaction States, Concurrency Control: Concurrency Control Schemes - Lock Based Protocols, TimestampBased Protocols, Deadlock handling, User Defined Transactions.						8
V	Database Security: Data Security Risks, Data security requirements, Database Users, Database Backup, Database Recovery: Types of database Failures, Recovery Techniques -Deferred Update, Immediate Update and Shadow paging, Database Privileges – System Privileges and Object Privileges, Overview of Data Storage Devices.						8
Text Books/ References Book:-							
Name of Authors		Titles of the Book			Edition	Name of the Publisher	
Silberschatz, Korth&Sudarshan		Database System Concepts			7th ed., 2018	McGraw Hill. New York	
S. K. Singh		Database Systems, Concepts, Design and Applications			2011	Dorling Kindersley (India),	

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Raghu Ramakrishnan, Johannes Gehrke	Database Management Systems	2nd ed., Release, 2001	McGraw-Hill
Elmsari, Navathe	Fundamentals of Database Systems	5th Edition	Pearson Education
COURSE OUTCOMES: Students will be able to			
CO1	Understand database concepts and database management system software		
CO2	Understand RDBMS and Normalization.		
CO3	Write SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS.		
CO4	Understand Transactions		
CO 5	Identify database failures and understand database privileges.		

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Name of Paper	Paper Code	Theory					
		Credit			Marks		
Software Engineering	BCA-304	L	T	J	EST	CAT	Total
		3	1	0	70	30	100

Course Objective	The objective of this course is to enhance knowledge of basic SW engineering methods and practices, and their appropriate application, software designing , testing Strategies and UML models.
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Units	Contents (<i>Theory</i>)	Hours /week
I	Introduction:- Software Product and Process Characteristics, Software Process Models: Linear Sequential Model, Prototyping Model, RAD Model, Incremental Model, Spiral Model, Rational Unified process and Agile model .	8
II	Software Requirement Analysis: Requirement Specifications: Need for SRS, Nature of SRS, Characteristics, Components of SRS. Requirements analysis: Feasibility Study, Information Modeling, IEEE Standards for SRS, Cost Estimation: COCOMO Model, Designing Concepts: Design Principles, Module level concepts- Cohesion and Coupling, Design notations and specifications, Verification, Metrics.	8
III	Object Oriented Design: Concepts, Design Notation and Specification, Design methodology, metrics. Debugging Process: Information Gathering, Fault Isolation, Fault Confirmation, Documentation, Fixing fault isolation.	8
IV	Testing: Testing Fundamental, Functional Testing (Black Box), Structural Testing (White Box), Alpha And Beta Testing, Testing Object Oriented Programs, Testing Process: Comparison of Different Testing, Level of Testing. Project management for special classes of software projects: Using CASE tools, CBSE.	8
V	UML: An overview of UML- UML notations, UML Class diagrams- association, multiplicity, generalization, aggregation, interfaces.	8

Text Books/ References Book:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Ian Sommerville	Software Engineering	9th Edition	Pearson Education Ltd, 2010
Roger S. Pressman	Software Engineering, A Practitioner's approach	7th Edition	McGRAW-HILL Publication, 2010
Pankaj Jalote	An integrated approach to Software Engineering	3rd Edition	Narosa Publishing House, 2013

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COURSE OUTCOMES: Students will be able to			
CO1	Understand software development life cycles.		
CO2	Understand elicitation process and SRS		
CO3	Apply object oriented designing to an application		
CO4	Understand testing Strategies		
CO5	Prepare UML diagrams		

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Text Books/ References Book:-			
Name of Authors	Titles of the Book	Edition	Name of the Publisher
Meena.K and V.Ayothi	Soft Skills : A Road Map to Success	2013	P.R. Publishers & Distributors
Alex K.	Soft Skills – Know Yourself & Know the World	2012	S. Chand & Company LTD
M.AshrafRizivi	Effective Technical Communication	2009	Tata McGraw Hill
Meenakshi Raman and Sangeeta Sharma	Technical Communication - Principles and Practices	2010	Oxford University Press
COURSE OUTCOMES: Students will be able to			
CO1	Effectively communicate through verbal/oral communication and improve the listening skills .		
CO2	Write precise briefs or reports and technical documents.		
CO3	Actively participate in group discussion / meetings / interviews and prepare & deliver presentations.		
CO4	Function effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership quality.		
CO5	Prepare resume for the job as well as job skills will be developed.		

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Name of Paper	Paper Code	Practical				
		Credit		Marks		
Programming Lab in Python	BCA-306	P	J	ESP	CAP	Total
		2	-	30	20	50

Contents (Practical):-

1. Syntax basics: Arithmetic/String Operations, Input/Output.
2. Control Flow constructs: If-else, Relational and Logical Operators.
3. Iteration: While loop, for loop.
4. Collections: Lists, Tuples.
5. Collections: Sets, Dictionary.
6. Functions and Modules: Sys, Math, Time.
7. File Handling: Data streams, Access modes, Read/Write/Seek.
8. OOP's, Classes, Objects, Exception handling.
9. GUI programming: TkInter.
10. Complete Python based project.

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Name of Paper	Paper Code	Practical				
		Credit		Marks		
Programming Lab in DBMS	BCA-307	P	J	ESP	CAP	Total
		2	-	30	20	50

Contents (Practical):

1. Write a query to create information of 'employees' (table name) in an organization with field Emp_id, EName, Salary, Commission, Hire_date, Address.
2. Write a Query to selective insertion only for Name and salary. (We assume that NOT NULL constraint apply is not on other fields).
3. Write a Query to display Name and Salary of employees table where salary is equal 5000.
4. Write a Query to display total income of every employee.
5. Write a Query to display employees name in descending order with salary.
6. Write a Query to display salary of employees between 40,000 to 50,000.
7. Display the Ename, which is start with j, k, l or m.
8. Write a PL/SQL for select, insert, update and delete statements.
9. Display name, hire date of all employees using SQL.
10. Display details of first 5 highly paid employees in SQL.
11. Write a data base trigger, which should not delete from Emp table if the day is Sunday.
12. Solving the case studies using ER Data Model (design of the database) & implement a Mini Project for the any problem taken by you.

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Name of Paper	Paper Code	Practical				
		Credit		Marks		
Mini Project in Python /Internship Evaluation-I	BCA-308	P	J	ESP	CAP	Total
		0	1	30	20	50

Note:-Design a project using features of Python. And evaluation of Internship done after II sem will be done.

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Name of Paper	Paper Code	Practical				
		Credit		Marks		
CRT Training – I	BCA-309	P	J	ESP	CAP	Total
		-	-	-	-	-

Note: - This training will include aptitude skills related to verbal ability, quantitative aptitude, logical reasoning and data presentation.

Quantitative Ability:-

1. Number System
2. Percentage
3. Ratio and Proportion
4. Partnership
5. Profit & Loss
6. Simple & Compound Interest
7. Average

Logical Reasoning:-

1. Coding-Decoding
2. Sitting Arrangements
3. Direction Sense Test
4. Blood Relations
5. Syllogism
6. Series

Verbal Ability:-

1. Noun
2. Pronoun
3. Adjectives
4. Tenses
5. Verb
6. Preposition
7. Article
8. Synonyms
9. Vocabulary