

LNCT UNIVERSITY, BHOPAL

Programme:- BCA (CA)

Semester - II

wef: July 2025

[illegible]

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Text Books/Reference Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Seymour Lipschutz	Data Structures	Schaum's Outline Series	Tata McGrawHill.
G.S.Baluja	Data Structures Through C++	4 th Edition	Dhanpat Rai & Co
Ellis Horowitz & Sartaj Sahni	Fundamentals of Data Structures	1977	Pitman Publishing Limited
Yashwant Kanetkar	Data Structure Through 'C'	2 nd Edition, 2017	BPB Publications

COURSE OUTCOMES: Students will be able to

CO1	Explore the basic knowledge of data structure used in computer systems and understand algorithms, Big O notation.
CO2	Impart knowledge about linear and non-linear data structures
CO3	Understand basic data structures such as arrays, linked lists, stacks and queues.
CO4	Understand graphs and trees
CO5	Apply Algorithm for solving problems like sorting and searching

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Name of Authors	Titles of the Book	Edition	Name of the Publisher
Galvin P., J. L. Abraham Silberschatz	Operating System Concepts	9 th Edition, 1989	John, Wiley & Sons Company
Deitel, H.M.	An Introduction to Operating Systems	2004	Addison Wesley Publishing Co.
Tanenbaum, A. S.	Modern Operating System	4 th Edition, 2016	Prentice Hall of India, Pvt. Ltd.,
D. M. Damdhere,	Operating Systems	4 th Edition, 2003	Tata McGraw Hill

COURSE OUTCOMES: Students will be able to

C01	Understand the components and services of operating system.
C02	Understand the importance of process and scheduling.
C03	Understand the concept and importance of synchronization.
C04	Identify deadlock and prevent it.
C05	Understand memory management concept.

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Name of Paper & Category	Paper Code	Theory					
		Credit			Marks		
Environmental Studies (GEC)	BCA-203	L	T	J	EST	CAT	Total
		3	1	0	70	30	100
Course Objective	To create awareness regarding Environmental issues and its effects on people, amongst students.						
Units	Contents (Theory)						Hours /week
I	Environment and Ecology - Definition, Scope and importance. -Ecosystem- Concepts, components, structure & function, energy flow, food chain, ecological pyramids & types.						8
II	Environment and Population -Population growth, disparities between countries. -Population explosion, family welfare programme. -Environment and human health.						8
III	Natural Resources, Problems and Conservation: Role of mankind -Introduction, definition and significance. - Types of Natural Resources and Social Problems and management to them. (a) Food resources – World food problem. (b) Energy resources – increasing demand for energy. (c) Land resources – Land as resources.						8
IV	Social Issues and the Environment, From unsustainable to Sustainable development, Urban problem related to energy, Resettlement and rehabilitation of people, its problem and concerns. Climate change, global warming, Acid rain, Ozone layer depletion						8
V	Environmental movements , Ethics &Environment conservation laws : Role of Indian and other religions and cultures in Environmental conservation. - Chipko and Silent Valley. (a) Conservation laws for air and water pollution. (b) Wildlife conservation laws. (c) Role of information technology in protecting environment & health.						8

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Text Books/ Reference Books:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
K.C. Agarwal	Environmental Biology	2001	Nidi Publ. Ltd. Bikaner
R.C. Brunner	Hazardous Waste Incineration	1989	McGraw Hill
Bharucha Erach	The Biodiversity of India	2006	Mapin Publishing Pvt. Ltd., Ahmedabad
H.P. Gleick	Water in crisis, Pacific Institute for Studies in Dev., Environment & Security	1993	Oxford Univ. Press

COURSE OUTCOMES: Students will be able to

CO 1	Develop Environmental concept, problems and solutions in them.
CO2	Understand the relation between the Environment, Population and Social Issues.
CO3	Understand Natural Resources and Social Problems, Management and Conservation laws.
CO4	Learn sustainable development and causes of global warming.
CO5	Understand laws of forest conversation

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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	30 th Reprint (2007)	McGraw Hill
Seymour Lipschutz and 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
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 Authors	Titles of the Book	Edition	Name of the Publisher
Mark Lutz	Learning Python	5 th 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

C01	To explore the basic knowledge of Python.
C02	Learn and use control structures.
C03	Work out using the core data structures as lists, dictionaries, tuples, and sets.
C04	Implement Strings and perform pattern matching
C05	Learn concept of functions.

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Name of Paper & Category	Paper Code	Practical				
		Credit		Marks		
Programming Lab in Data Structures (Major)	BCA-206	P	J	ESP	CAP	Total
		2	-	70	30	100

Contents (Practical):-

1. WAP to print the array elements in multiple dimensions.
2. WAP to sort array elements in ascending and descending order.
3. WAP to find maximum and minimum elements in array.
4. WAP to convert binary to decimal number in array.
5. WAP to convert decimal to binary number in array.
6. WAP to merge two sorted arrays into one sorted array.
7. WAP to perform basic operations (traversing, inserting, deleting, reversing and display) on array.
8. WAP to implement stacks of n elements using array and also perform push and pop operation.
9. WAP to implement simple queue of n element using array and also perform insertion and deletion operation.
10. WAP to implement circular queue of n element using array and also perform insertion and deletion operation.
11. WAP to implement singly linked and perform (traversing, inserting, deletion and Creating).
12. WAP to implement circular linked list and perform (traversing, inserting, deletion and Creating).
13. WAP to implement stack using linked list.
14. WAP to implement queue using linked list.

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Name of Paper & Category	Paper Code	Practical				
		Credit		Marks		
Programming Lab in PYTHON (Minor)	BCA-207	P	J	ESP	CAP	Total
		2	-	70	30	100

Contents (Practical):-

Q1: Write a program that takes two numbers as input and performs basic arithmetic operations (addition, subtraction, multiplication, division).

Q2: Develop a program that asks the user for their first name and last name, and then displays a welcome message by concatenating the names.

Q3: Create a program that converts temperatures between Celsius and Fahrenheit. Prompt the user for a temperature value and a conversion direction, and then display the converted temperature

Q.4: Write a program that takes a student's score as input and prints their corresponding letter grade based on the following criteria:

1. Score \geq 90:A
2. 80 \leq Score<90:B
3. 70 \leq Score <80:C
4. 60 \leq Score<70:D
5. Score<60:F

Q 5: Build a program that takes a single character as input and determines whether it's a vowel or a consonant. If the input is not a single character or is not a letter, display an error message

Q 6: Write a program that uses a for loop to reverse a given string. For example, if the input is "hello," the program should print "olleh."

Q 7: Write a Python program that takes a list of numbers as input and returns the sum of all the numbers in the list.

Q 8: Write a program that calculates the factorial of a given number using a while loop.

Q 9: How can you open and read the contents of a text file in Python, and what are the key methods and functions used for reading files?

Q.10: Develop a login system where the user provides a username and password. If the username is "admin" and the password is "12345", display a success message. Otherwise, show an error message.

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Name of Paper & Category	Paper Code	Theory					
		Credit			Marks		
भारतीय मूल परंपरा एवं नैतिक शिक्षा (AEC)	FC-112	L	T	J	EST	CAT	Total
		-	-	-	-	-	-
Course Objective		भारतीय मूल परंपरा एवं नैतिक शिक्षा का उद्देश्य, छात्रों में संस्कृति, मूल्य और नैतिक मूल्यों की समझ बढ़ाना एवं उन्हें समृद्धि और सही मार्गदर्शन के साथ समाज में उपयोगी नागरिक बनाना है।					
Units	Contents (Theory)						Hours /week
I	भारतीय ज्ञान परंपरा :- भारतीय ज्ञान का स्वरूप, विभिन्न कालों में ज्ञानार्जन के प्रमुख केंद्र एवं उद्देश्य (वैदिक, बौद्ध, जैन), भारतीय ज्ञान की विषय वस्तु, भारतीय ज्ञान का व्यवहारिक जीवन में महत्व आश्रम व्यवस्था :- अर्थ एवं अवधारणा (भारतीय समाज में), आश्रम व्यवस्था के प्रमुख चरण (ब्रम्चर्य, गृहस्थ, सन्यास, वानप्रस्थ), आश्रम व्यवस्था के मुलभूत उद्देश्य एवं प्राप्ति सोलह संस्कार :- संस्कार का अभिप्राय, सोलह संस्कारों का क्रमानुसार परिचय, हिन्दू धर्म में सोलह संस्कारों का महत्व अष्टांग योग :- परिचय, अष्टांग योग के आठ चरण, अष्टांग योग के लाभ						8
II	रामचरित मानस :- प्रमुख पात्रों का परिचय, विभाजनो (कांडों) का सार, मार्मिक अभिव्यक्तियां – राम भरत मिलाप, लक्ष्मण- परशुराम संवाद, राम-सुग्रीव की मित्रता भगवत गीता :- सामान्य परिचय, समस्त अध्यायों का अर्थपूर्ण सार, जीवन प्रबंधन में भगवत गीता की प्रासंगिकता चरित्र निर्माण एवं समग्र विकास :- उद्देश्य, गुण एवं प्रमुख आयाम						8

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III	महान नीतियों की विवेचना :- विदुर नीति -(परिचय, श्लोक सहित अर्थ) चाणक्य नीति -(निहित संदेश एवं उपयोगिता), विदुर नीति एवं चाणक्य नीति का तुलनात्मक अध्ययन	8
IV	नैतिक शिक्षा एवं मूल्य आधारित शिक्षा :- अर्थ एवं उद्देश्य , मूल्य आधारित शिक्षा के घटक, नैतिक मूल्यों के विकास में शिक्षण संस्थानों की भूमिका, महान विभूतियों के चरित्र का भारतीय संस्कृति पर प्रभाव :- (रानी दुर्गावती, अहिल्याबाई होल्कर, रानीलक्ष्मीबाई, स्वामी विवेकानंद, रवीन्द्रनाथ टैगोर, पंडित जवाहरलाल नेहरू, महात्मागाँधी, सुभाषचन्द्र बोस आदि)	8
V	आत्मनिर्भर भारत की संकल्पना :- आत्मनिर्भर भारत के पांच स्तम्भ, आत्मनिर्भर भारत अभियान के उद्देश्य, वर्तमान समय में प्रासंगिकता वसुधैव कुटुम्बकम् की अवधारणा :- 21 वीं सदी में उपयोगिता “अयं निजः परोवेति गणना लघुचेतसाम उदारचरितानाम् तु वसुधैव कुटुम्बकम्”	8
Text Books/ Reference Books:-		
Name of Authors		
श्री राम शर्मा आचार्य		
डॉ. के. सी. मल्लेया		
प्रो. सरोज शर्मा		
रजनीश कुमार शुक्ल		
डॉ. वसंत शिंदे		