

LNCT UNIVERSITY, BHOPAL

Programme:- BCA (AI & DA)

Semester - II

wef: July 2022

Name of Paper	Paper Code	Theory					
		Credit			Marks		
Data Analysis using Python, Numpy, Pandas, Matplotlib, and Seaborn	BAI-201	L	T	J	EST	CAT	Total
		3	1	0	70	30	100
Course Objective	The objective of this course is to teach students the concepts of Python Programming Language with Libraries						
Units	Contents (Theory)						Hours /week
I	Python programming Basic: Python interpreter, IPython Basics, Tab completion, Introspection, %run command, magic commands, matplotlib integration, python programming, language semantics, scalar types. Control flow.						8
II	Data Structure, functions, files: tuple, list, built-in sequence function, dict, set, functions, namespace, scope, local function, returning multiple values, functions are objects, lambda functions, error and exception handling, file and operation systems						8
III	NumPy-Array and vectorized computation: Multidimensional array object. Creating nd arrays, arithmetic with numpy array, basic indexing and slicing, Boolean indexing, transposing array and swapping axes, universal functions, array-oriented programming with arrays, conditional logic as arrays operations, file input and output with array						8
IV	Pandas: Pandas data structure, series, DataFrame, Index Object, Reindexing, dropping entities from an axis, indexing, selection and filtering, integer indexes, arithmetic and data alignment, function application and mapping, sorting and ranking, correlation and covariance, unique values, values controls and membership, reading and writing data in text format						8
V	Visualization with Matplotlib: Figures and subplots, colors, markers, line style, ticks, labels, legends, annotation and drawing on subplots, matplotlib configuration Plotting with pandas and seaborn: line plots, bar plots, histogram, density plots, scatter and point plots, facet grids and categorical data						8
Note- Study Material will be provided							
COURSE OUTCOMES: Students will be able to							
CO 1	Execute Python code in a variety of environments						
CO2	Work in python libraries						
CO3	Apply arithmetic operations on arrays using Numpy						
CO4	Work in pandas data structure						
CO5	Visualize data in matplotlib and plot charts						

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Name of Paper	Paper Code	Theory					
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Data Structures	BAI-202	L	T	J	EST	CAT	Total
				3	1	0	70
Course Objective	The objective of this course is to teach about how the data organizes and the techniques to organize the data. Develop good understanding of how operations are performed on data in various data structures including hierarchical representation.						
Units	Contents (Theory)						Hours /week
I	Introduction:- Definition , Types of Data structures, Data structure operations, Abstract data type, Algorithm , Complexity , Time and Space tradeoffs.						8
II	Stack: Operations on stack, Applications of stack, Conversion of Infix to Prefix and Postfix, Expressions and Expression evaluation. Queues: Operations on queues, Types of Queue, Circular queue, D-queue, Priority Queues, Applications of queue.						8
III	Linked list: Introduction to linked list, Operations on linked list, Types of linked list, Singly linked list, Doubly linked list, Circular linked list, Applications of linked list.						8
IV	Trees: Basic terminology, Binary trees, Algebraic expressions, Complete binary tree, Extended binary tree, Traversing binary trees, Binary search Tree. Graphs: Introduction, Types of graphs, Sequential representations of graphs, Adjacency Matrices, Traversal, Spanning trees, Minimum cost spanning trees.						8
V	Sorting& Searching: Insertion sort, Bubble sort, Selection sort, Quick sort, Merge sort, Sequential search, Binary search.						8

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Text Books/ References Book:-			
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++	4th Edition.	DhanpatRai& Co
Ellis Horowitz& SartajSahni	Fundamentals of Data Structures	1977	Pitman Publishing Limited
YashwantKanetkar	Data Structure Through 'C'	2nd 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 Paper	Paper Code	Theory					
		Credit			Marks		
Computer Oriented Statistical Methods	BAI-203	L	T	J	EST	CAT	Total
		3	1	0	70	30	100
Course Objective	The objective of this course is to give comprehensive knowledge about the data collection, presentation of data, pictorial representation, and measures of central tendency, measures of dispersion, control charts, correlation, regression, time series, probability, estimation and inference.						
Units	Contents (<i>Theory</i>)						Hours /week
I	Introduction to Statistics and Data Collection: Definition of statistics, scope of statistics, limitation of Statistic, distrust of statistics. Statistical data collection- primary and secondary data, methods of collecting primary data Sources and secondary data, Census and sample investigation. Presentation of statistical data-classification, Tabulation, frequency distribution, graphic representation of a frequency distribution,						8
II	Describing Business Data: Requisites for an ideal measure of central tendency-Arithmetic- Mean, median, mode, Harmonic Mean, weighted Average, Relationship amongst different averages. Measures of Dispersion, Range, Quartile deviation, Mean Deviation, Standard Deviation-The coefficient of Variation.						8
III	Sample Space, Events and Probability: Definition of sample space, Discrete sample space, Events, Types of events, Mutually exclusive events, Exhaustive event, Simple examples, Classical definition of probability, Addition theorem of probability, conditional probability, Independence of two events.						8
IV	Graphical representation: Diagrammatic and Graphical representation of Numerical Data - Formation of frequency distribution - Histogram, Cumulative Frequency - Polygon and Ogives, Column, Pie chart, Line, Bar, Area, Scatter & Bubble Chart.						8
V	Statistical Control Charts: Statistical Control Charts- Introduction - Types of Control Charts – Setting up a Control Procedure – X bar (Mean) Chart and R Chart–c Chart–p Chart–Advantages and Limitation of Control Charts. Statistical Software like Excel, SPSS.						8

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Text Books/ References Book:-			
Name of Authors	Titles of the Book	Edition	Name of the Publisher
Trivedi K.S.	Probability and Statistics with Reliability, Queueing and computer Science applications	1994	Prentice Hall of India.
David. Levin, David. Stephen	Statistics for managers using MS-Excel	2013, 7Th Edition	Pearson Education (India)
S. M. Shukla,	Business Mathematics	12th ed, 2018	SahityaBhawan Publications
H. S. Sharma	Mathematical Statistics	First Edition, 2017	RamPrasas Pub
S. P. Gupta	Business Statistics and Statistical Methods	2014	S. Chand Pub.
Andy Field	Discovering Statistics Using IBM SPSS Statistics	2013, 4th Edition	Sage Publication
COURSE OUTCOMES: Students will be able to			
CO1	Organize, present and interpret statistical data, both numerically and graphically		
CO2	Perform regression analysis, and compute and interpret the coefficient of correlation.		
CO3	Use various methods to compute the probabilities of events.		
CO4	Analyse and interpret data using appropriate statistical hypothesis and parametric testing techniques.		
CO 5	Construct control charts and work on tools like SPSS and Excel		

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Name of Paper	Paper Code	Theory					
		Credit			Marks		
Object Oriented Programming with C++	BAI-204	L	T	J	EST	CAT	Total
				3	1	0	70
Course Objective	The aim of this course is to learn object oriented features and programming concepts of C++.						
Units	Contents (<i>Theory</i>)						Hours /week
I	Introduction: Procedure-oriented programming, Concepts of Object-oriented programming, Structure of C++ program. Tokens, Keywords, Identifiers and constants, Basic Data Types, User-defined data types, Derived data Types, Symbolic constants, Type compatibility, Declaration of variables, Dynamic initialization of variables, Reference variables, Operators in C++, Scope resolution operator, Member dereferencing operators, Memory management operators, Manipulators, Type cast operator, Expressions and their types, Special assignment expressions, Operator overloading, Operator precedence, Control structures.						8
II	Functions: The main function, Function prototyping, Call by Reference, Return by Reference, Inline functions, Default arguments, const arguments, Function overloading, Friend and Virtual functions.						8
III	Classes and Objects: Specifying a Class, Defining member functions, Making an Outside function Inline, Nesting of member functions, Private member functions, Arrays within a Class, Static data members, Static member functions, Arrays of Objects, Objects as function arguments, friendly functions, Returning Objects, const member functions, Pointers to members.						8
IV	Constructors and Destructors: Constructors, Parameterized constructors, Multiple constructor in a class, Constructors with default arguments, Dynamic initialization of objects, Copy constructor, Dynamic constructor, Constructing Two-dimensional arrays, const Objects, Destructors.						8
V	Inheritance and Polymorphism: Programming concepts and types. Console I/O Operations: C++ streams, C++ stream classes, Unformatted I/O operations, Formatted I/O operations, managing output with manipulators.						8

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Text Books/ References Book:-			
Name of Authors	Titles of the Book	Edition	Name of the Publisher
E. Balagurusamy	Object Oriented Programming with C++ -	6th Edition	Tata McGraw-Hill Publishing
Robert Lafore.	OOPS and C++	4th Edition	CourseSams Publishing
Stephen Prata.	C++ primer plus	6th edition	Addison-Wesley Professional
Al Stevens.	Teach yourself C++	5th edition, 1997	Wiley
COURSE OUTCOMES: Students will be able to			
CO1	Understand the concepts of Object-oriented programming, data types, variables, Operators, Control structures.		
CO2	Describe inline functions in C++.		
CO3	Apply the concepts of Object-Oriented programming.		
CO4	Illustrate the process of data file manipulations using C++		
CO5	Use exception handling in C++ programs.		

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Name of Paper	Paper Code	Theory					
		Credit			Marks		
Basic Communication	BAI-205	L	T	J	EST	CAT	Total
		3	1	0	70	30	100
Course Objective	The objective of this course is to understand details of communication and various media of communication.						
Units	Contents (<i>Theory</i>)						Hours /week
I	Communication: Meaning and process of communication, Importance of effective communication, Communication situation, Barriers to communication, Objectives of communication, Types of communication, Principles of communication, Essentials of effective communication.						8
II	Media of Communication: Written, Oral, Face-to-face, Visual, Audio-Visual, Merits and demerits of written and oral communication.						8
III	Communication Skills: Developing communication skills, Listening, Speaking, Reading-Writing (oral & written), Body language, Utility of aids in Communication.						8
IV	Spoken Skills: Preparing for oral presentation, Conducting presentations, Debates, Seminar, Speeches, Lectures, Interviews, Telephonic Conversation, Negotiations, Group Discussions.						8
V	Writing Skills: Preparing of bio-data, Seminar, Paper, Bibliography, Official correspondence, Mechanics of writing, Formal & Informal writings, Letters, Paragraphing, Precise, Report writing, Technical reports, Length of written reports, Organizing reports, Writing technical reports, Creative writing, Common Errors in Language.						8

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Text Books/ References Book:-			
Name of Authors	Titles of the Book	Edition	Name of the Publisher
Rajendra Pal and J.S. Korlahalli	Essentials of Business Communication	13th Edition	Sultan Chand & Sons Publishers, New Delhi
U. S. Rai & S. M. Rai	Business Communications	6 th Edition	Himalaya Publishing House.
Menzal and D. H. Jones	Writing a technical Paper	1961	McGraw Hill,
Scot Ober	Contemporary Business Communication	5 th Edition	Wiley India.
COURSE OUTCOMES: Students will be able to			
CO1	Learn the basics of English language		
CO2	Enhance their reading and writing skills.		
CO3	Improve their vocabulary through comprehension.		
CO4	Write different types of reports.		
CO5	Give presentations		

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Name of Paper	Paper Code	Practical				
		Credit		Marks		
Programming Lab in C++	BAI-206	P	J	ESP	CAP	Total
		2	-	30	20	50

Contents (Practical):-

1. Write a C++ program to calculate the average of three numbers.
2. Write a C++ program to find the biggest of three numbers.
3. Write a C++ program to find minimum and maximum of two numbers using functions.
4. Write a C++ program to check the given number is palindrome or not
5. Write a C++ program to sum of all even and odd numbers.
6. Write a C++ program to perform arithmetic operations using classes and objects.
7. Write a C++ program to define a student class with user name, to name, total, average for “n” students.
8. Write a C++ program to illustrate the use of static member function.
9. Write a C++ program to find the mean value using friend function..
10. Write a C++ program to show the use of copy constructor.
11. Write a C++ program to implement multiple inheritances.
12. Write a C++ program to read a string with get line function.
13. Write a C++ program to implement processing shopping list using a class with arrays as data members.
14. Write a C++ program to show the use of over loaded constructor.
15. Write a C++ program to construct variables at run time using dynamic initialization.
16. Write a C++ program to demonstrate single inheritance.
17. Write a C++ program to implement multilevel inheritance.
18. Create a project using object oriented features and file handling in C++.

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Name of Paper	Paper Code	Practical				
		Credit		Marks		
Programming Lab in Data Structures	BAI-207	P	J	ESP	CAP	Total
		2	-	30	20	50

Contents (Practical):

1. Write a program to find factorial of a given number using recursion.
2. Write a program to print the fibonacci series and also to find the sum using recursion.
3. Write a program to merge two sorted array into one sorted array.
4. Write a program to add, subtract and multiply two matrices.
5. Write a program to perform swapping of two numbers using call by value and call by reference.
6. Write a program to find maximum and second maximum element in an array.
7. Write a program to implement stacks of n elements using arrays. Also perform push and pop operation.
8. Write a program to implement stack using linked representation.
9. Write a program to implement queue using an array.
10. Write a program to implement circular queue using array and linked list.
11. Write a program to evaluate postfix expression.
12. Write a program to convert infix expression to postfix expression.
13. Write a program to convert prefix expression to postfix expression.
14. Write a program to reverse a singly linked list.
15. Write a program to delete alternate nodes of a linked list.

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Name of Paper	Paper Code	Practical				
		Credit		Marks		
		P	J	ESP	CAP	Total
Mini Project in C++	BAI-208	0	1	30	20	50

Note:-Design a project using features and file handling of C++ Language to automate the working of an application.

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Name of Paper	Paper Code	Practical				
		Credit		Marks		
		P	J	ESP	CAP	Total
Seminar/Presentation-II	BAI-209	-	-	-	-	-

Note:- Each and Every student has to give presentation on any Technical topic.

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Name of Paper	Paper Code	Theory					
		Credit			Marks		
Disaster Management	*BAI-211	L	T	J	EST	CAT	Total
				-	-	-	
Course Objective	The Programme has been framed with an intention to provide a general concept in the dimensions of disasters caused by nature beyond human control as well as the disasters and environmental hazards induced by human activities with emphasis on Natural disaster, Man-made disaster.						
Units	Contents (<i>Theory</i>)						Hours /week
I	Introduction: Hazard, Risk, Vulnerability, Disaster; Disaster Management, Meaning, Nature Importance, Dimensions & Scope of Disaster Management, Disaster Management Cycle. National disaster management framework; financial arrangements for Disaster management, International Strategy for Disaster reduction						2
II	Natural Disasters: Meaning and nature of natural disasters, their types and effects , Hydrological Disasters - Flood, Flash flood , Drought, cloud burst, Geological Disasters- Earthquakes, Landslides, Avalanches, Volcanic eruptions, Mudflow Unit,Wind related- Cyclone, Storm, Storm surge, tidal waves, Heat and cold Waves, Climatic Change, Global warming, Sea Level rise, Ozone Depletion						2
III	Manmade Disaster: CBRN – Chemical disasters, biological disasters, radiological disasters, nuclear disasters ,Fire – building fire, coal fire, forest fire, Oil fire						2
IV	Types of Man – made Disasters: Accidents- road accidents, rail accidents, air accidents, sea accidents Pollution and deforestation- air pollution, water pollution, deforestation, Industrial wastewater pollution, deforestation						2
V	Disaster Determinants: Factors affecting damage – types, scale population, social status, habitation pattern, physiology and climate. Factors affecting mitigation measures, prediction, preparation, communication, area and accessibility, population, physiology and climate						2

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Text Books/ References Book:-			
Name of Authors	Titles of the Book	Edition	Name of the Publisher
S.L. Goel	Disaster Administration and Management, Text & Case studies-		Deep and Deep Publications
G. K. Ghosh	Disaster Management		A.P.H. Publishing Corporation
Vinod K Sharma-	Disaster Management		IIPA
S. K .Singh, S.C. Kundu, Shobha Singh	Disaster Management		William Publications
COURSE OUTCOMES: Students will be able to			
CO1	Explain disaster management theory		
CO2	Prevent and control Public Health consequences of Disasters		
CO3	Know man-made disasters		
CO4	Classify man-made disasters		
CO5	Reveal unfounded myths about human behavior in disasters.		