Name of Laper						T	heory		
Categ	ory	Code		Credi	t		Marks		
Data Stru	ictures		L	Т	J	EST	CAT	Tota	ıl
(Majo		BCA-201	3	1	0	70	30	100	
Cour Object		to organize th	e data	ı. Dev	elop g	o teach about how good understanding cluding hierarchic	g of how operatio		_
Unite (Contents (Theory)							Hours /week		
I	<b>Introduction</b> : Definition, Types of Data structures, Data structure operations, Abstract data type, Algorithm, Complexity, Time and Space tradeoffs.								8
п	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						Operations on linl cular linked list, Ap	• •		8
IV	Singly linked list, Doubly linked list, Circular linked list, Applications of linked list.  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	

Text Bo	oks/Refere	nce 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 <sup>th</sup> Edition	Dhanpat Rai & Co
Ellis Horowitz & Sartaj Sahni		Fundamentals of Data Structures	1977	Pitman Publishing Limited
Yashwa Kanetka		Data Structure Through 'C'	2 <sup>nd</sup> Edition, 2017	BPB Publications
COURS	SE OUTCO	MES: Students will be able to		
CO1	_	e basic knowledge of data structure, Big O notation.	used in computer syst	tems and understand
CO2	Impart kno	wledge about linear and non-linear	data structures	
CO3	Understand	d basic data structures such as array	s, linked lists, stacks a	and queues.
CO4	Understand	d graphs and trees		
CO5	Apply Alg	orithm for solving problems like so	rting and searching	

Name of F	Paper &	Doman Code	Theory						
Categ	gory	Paper Code		Cred	it		Marks		
Operating	x Swatom		L	T	J	EST	CAT	To	tal
(Min		BCA-202	3	1	0	70	30	10	0
Cour Objec		The objective and their function			ourse i	s to understand o	pperating system an	d its con	nponents
Units Contents (Theory)								Hours /week	
I	Operating Systems: Introduction of operating system, Evolution of Operating Systems, Operating system components, Operating-System Services, Types of operating systems: Batch, Multi-programmed, Multitasking, Multiprocessor, Real-time, Distributed, Parallel and Open source, Concept of System calls.								8
II	<b>Process management and Synchronization:</b> Processes, Process Scheduling algorithms, Inter process Communication, Threads, Thread issues, Critical-Section Problem and Semaphores.							8	
III							lock prevention, D Banker's Algorithm		8
IV	Memory Management and Allocation Methods: Address binding, Logical and Physical address space, Contiguous allocation methods – Static & Dynamic partitioned memory allocation, Concepts of fragmentation, Swapping, Noncontiguous memory allocation methods – Paging and its basic principle, Segmentation and its basic principle						Oynamic Non–	8	
V	Virtual Memory: Demand paging, Page fault, Page replacement algorithms – FIFO, LRU, OPT, Thrashing.							8	

Text Bo	ooks/Reference Bo	oks:-		
Naı	me of Authors	Titles of the Book	Edition	Name of the Publisher
Galvin P., J. L. Abraham Silberschatz		Operating System Concepts	9 <sup>th</sup> 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 <sup>th</sup> Edition, 2016	Prentice Hall of India, Pvt. Ltd.,
D. M. D	Damdhere,	Operating Systems	4 <sup>th</sup> Edition, 2003	Tata McGraw Hill
COURS	SE OUTCOMES:	Students will be able to		
CO1	Understand the co	omponents and services of ope	erating system.	
CO2	Understand the ir	mportance of process and sche	duling.	
CO3	Understand the co	oncept and importance of sync	chronization.	
CO4	Identify deadlock	and prevent it.		
CO5	Understand mem	ory management concept.		

Program	me:- BC	CA (CA)		Seme	ester -	II	wef: J	uly 2025	
Name of	Paper &	Paper				T	heory		
Cate	gory	Code	Credit				Marks		
E	4 - 1		L T J		J	EST	ST CAT To		ıl
Enviror Stud (GI	dies	BCA-203	3	3 1 0 70 30					)
Cou Objec		To create av		ess re	gardin	g Environmenta	l issues and its	effects on	people
Units		Contents (Theory)							Hour /week
I	Environment and Ecology - Definition, Scope and importanceEcosystem- Concepts, components, structure & function, energy flow, food chain, ecological pyramids & types.							8	
II	Environment and Population -Population growth, disparities between countriesPopulation explosion, family welfare programmeEnvironment and human health.							8	
Ш	-Introdu - Types (a) Food (b) Ener	ction, definitio	n and ources orld for increase	signifi and S ood pr sing d	cance. ocial I oblem emand	Problems and man			8
IV	Urban p	roblem related	to en	ergy, I	Resettl	ement and rehabil	to Sustainable do litation of people, Ozone layer deplet	its problem	8

Environmental movements, Ethics & Environment conservation laws:

(c) Role of information technology in protecting environment & health.

- Chipko and Silent Valley.

(b) Wildlife conservation laws.

(a) Conservation laws for air and water pollution.

 $\mathbf{v}$ 

Role of Indian and other religions and cultures in Environmental conservation.

8

Text Bo	oks/ Refere	ence Books:-		
Name o	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
COURS	SE OUTCO	MES: Students will be able to		
CO 1	Develop E	nvironmental concept, problems and solution	ons in them.	
CO2	Understand	l the relation between the Environment, Po	pulation and	Social Issues.
CO3	Understand	l Natural Resources and Social Problems,	Managemer	nt and Conservation laws.
CO4	Learn susta	ainable development and causes of global v	varming.	
CO5	Understand	l laws of forest conversation		

Name of	Paper &	Paper				T	heory		
Cate	_	Code		Credi	t		Marks		
Diamete	Madha		L	Т	J	EST	CAT	Tota	ıl
Discrete (AE		BCA-204	3	3 1 0 70 30 10					
Cour Objec		The objective	of thi	s cours	se is to	learn the basics a	bout Discrete struc	cture.	
Units Contents (Theory)								Hours /week	
I	<b>Set Theory:</b> 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	
П	relations definitio		of re	lations	, Ma	trix representation	on of a relation	. Function	8
	Compos	ition of function	ons, R			efined function, P			
III	Algebra tables, equivale	a of Logic, Ma arguments an	athem d val	atical idity laws	Induction of articles of log		igeonhole principals and Logic operations generated system and propo	ations, truth by a set,	8
III	Algebra tables, equivale a univer  Graph undirect	arguments an ence and impliese, Quantifiers  Theory: Varied graphs, E	nthem d val cation , Princ ous t	atical idity laws ciple o	Induction of art of log f Mathon of grand Ham	efined function, P etion: Proposition guments, proposic, mathematical	igeonhole princip	ations, truth by a set, sitions over	8

Text Boo	oks/ Refere	nce Books:-		
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 <sup>th</sup> 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 N Thisiram		Graphics Networks and Algorithms	Second Edition	John Wiley & Sons
COURS	E OUTCO	MES: Students will be able to		
CO1	Understand	the Concepts of set theory, laws, Venn	diagrams.	
CO2	Describe th	ne relations, types of relations, functions,		
CO3	Apply the Induction.	concepts of Propositions and Logic opera	ations, Principle of	f Mathematical
CO4	Use Graph	theory in various optimization problems.		
CO5	Apply man	y faces of recursion, recurrence relations	s, Matrix Operatio	ons.

NI 61	D 0	Paper				T	Cheory		
Name of I		Code		Credi	t		Marks		
Introduc	ction to		L	T	J	EST	Tota	ıl	
PYTI (AE	HON	BCA-205	3	1	0	70	30	100	)
Cour Objec		The course is	desigr	ned to	provid	le Basic knowledg	ge 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	stateme						nested if, if -els else in loops, brea		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-Create and operations on set.							8	
IV	Strippin	_	indice	es, St		-	Comparison, Slicinar expression: Ma		8
V	of varia Invokir	ables, Void fun ng built in fur	ctions nction	, Func s, Fun	tions 1	returning values, I	pe, Passing parame Recursion. Importion odule functions from re-module compos	ng modules, om random	8

Text Boo	oks/ Refere	ence Books:-		
Name of Authors		Titles of the Book	Edition	Name of the Publisher
Mark Lutz		Learning Python	5 <sup>th</sup> 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	Paul Barry Head first Python		II, Head first series	O'REILLY Publication
COURSI	E OUTCO	MES: Students will be able to		
CO1	To explore	the basic knowledge of Python.		
CO2	Learn and	use control structures.		
CO3	Work out u	asing the core data structures as list	es, dictionaries, tuple	s, and sets.
CO4	Implement	Strings and perform pattern mate	ching	
CO5	Learn cond	cept of functions.		

Programme:- BCA (CA) Semester - II wef: July 2025

Name of Paper & Category	Paper Code		Practical					
Name of Paper & Category	Taper Coue	Credit		Marks				
Programming Lab in Data		P	J	ESP	CAP	Total		
Structures	BCA-206							
(Major)		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.

Programme:- BCA (CA) Semester - II wef: July 2025

Name of Paper & Category	Paper Code	Practical						
rame of Taper & Category	Taper Coue	Credit						
Programming Lab in	D.C.A. 207	P	J	ESP	CAP	Total		
PYTHON (Minor)	BCA-207	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>=90:A
  - 2. 80<=Score<90:B
  - **3.** 70<=Score <80:C
  - 4. 60<=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.

Name of Paper & Category भारतीय मूल परंपरा		Paper Code	Theory							
				Credi	t	Marks				
		FC-112	L	Т	J	EST	CAT	Tota	Total	
एवं नैतिक शिक्षा										
(AEC)			_			-				
		भारतीय मूल प		एतं र्री	नेक डि	ोक्षा का उटटेश्य	छात्रों में मंस्कृति सत	त्य भीर हैति	क मल्यों	
Course		भारतीय मूल परंपरा एवं नैतिक शिक्षा का उद्देश्य, छात्रों में संस्कृति, मूल्य और नैतिक की समझ बढ़ाना एवं उन्हें समृद्धि और सही मार्गदर्शन के साथ समाज में उपयोगी न								
Objective		बनाना है।								
Units			Contents (Theory)							
	भारतीय ज्ञान परंपरा :-									
	भारतीय ज्ञान का स्वरुप, विभिन्न कालों में ज्ञानार्जन के प्रमुख केंद्र एवं उद्देश्य (वैदिक, बौद्ध,									
	जैन), भारतीय ज्ञान की विषय वस्त्, भारतीय ज्ञान का व्यवहारिक जीवन में महत्व									
	आश्रम व्यवस्था :-									
	अर्थ एवं अवधारणा (भारतीय समाज में), आश्रम व्यवस्था के प्रमुख चरण (ब्रम्चर्य, गृहस्थ,									
I	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									
	रामचरित मानस :-									
II	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 :-									
	उदेश्य, गुण एवं प्रमुख आयाम									

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 उदेश्य , 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 नेहरु, 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 कुटुम्बकम की अवधारणा :- 21 वीं सदी में उपयोगिता  "अयं निज: परोवेति गणना लघुचेतसाम  उदारचिरतानाम् तु वसुधैव कुटुम्बकम"	8
	ks/ Reference Books:-	
Name of A		
श्री राम शर	र्मा आचार्य	
डॉ. के. सी.	मल्लेया	
प्रो. सरोजः	शर्मा	
रजनीश क्	नमार शुक्ल	
डॉ. वसंत ि	शंदे	