



KIT - Kalaignarkarunanidhi Institute of Technology

An Autonomous Institution

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai
Accredited by NAAC with 'A' GRADE & NBA (AERO, CSE, ECE, EEE, MECH & MBA)

An ISO 9001 : 2015 Certified Institution, Coimbatore - 641 402.

Regulations, Curriculum & Syllabus - 2023

(For Students admitted from the Academic Year 2023-24 and onwards)

BACHELOR OF ENGINEERING DEGREE

IN

COMPUTER SCIENCE AND ENGINEERING



Department of Computer Science and Engineering



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Department of Computer Science and Engineering

Conceptual Frame work (For Students admitted from the Academic Year 2023-24 and onwards)					
Semester	Level of Course	Hours / Week	No of Courses	Range of Credits / Courses	Total Credits
PART - I					
A - Foundation Courses					
I to VII	Humanities and Social Sciences (HS)	1-5	6	1-4	10
I to IV	Basic Sciences (BS)	4-5	6	4	24
I to II	Engineering Sciences (ES)	3-5	5	2-4	17
B - Professional Core Courses					
III to VII	Professional Core (PC)	3 - 4	27	2 - 4	74
C - Elective Courses					
V to VIII	Professional Elective (PE)	3 - 5	6	3	18
V to VIII	Open Elective (OE)	3 - 5	4	3	12
D - Project Work					
VI, VII & VIII	Project Work (PW)	4 -16	3	2 - 8	12
E - Mandatory Courses Prescribed by AICTE/UGC (Not to be Included for CGPA)					
V & VI	Mandatory Course (MC)	3	2	NC	NC
Total Credit					167
PART - II					
F- Career Enhancement Courses (CEC)					
II	Soft Skills	2	1	-	NC
IV	Professional Certificate course	-	1	1	1
V	Summer Internship	-	1	1	1
Total Credit					02
Total Credit to be Earned					169

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Curriculum and Scheme of Assessment	
(For Students admitted from the Academic Year 2023-24 and onwards)	

Semester - I										
Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
B23IPT101	Induction Programme	HS	-	-	-	-	0	-	-	-
Theory / Theory with Practical										
B23ENT101	Professional English	HS	3	3	0	0	2	40	60	100
B23HST101	தமிழர்மரபு / Heritage of Tamils	HS	1	1	0	0	1	40	60	100
B23MAT101	Matrices and Differential Calculus	BS	4	3	1	0	4	40	60	100
B23PHI101	Engineering Physics	BS	5	3	0	2	4	50	50	100
B23MET101	Engineering Graphics	ES	5	3	2	0	4	40	60	100
B23CSI101	C Programming	ES	5	2	0	4	4	50	50	100
Total credits to be earned							19			

Semester - II										
Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
Theory / Theory with Practical										
B23ENI201	Professional Communication	HS	5	3	0	2	4	50	50	100
B23HST201	தமிழரும் தொழில்நுட்பமும் / Tamils and Technology	HS	1	1	0	0	1	40	60	100
B23MAT201	Integral Calculus and Complex Analysis	BS	4	3	1	0	4	40	60	100
B23CHI101	Engineering Chemistry	BS	5	3	0	2	4	50	50	100
B23ECT203	Digital Logic and System Design	ES	3	3	0	0	3	40	60	100
B23ADI201	Python Programming	ES	5	2	0	4	4	50	50	100
B19CET201	Soft Skills	CEC	2	2	0	0	NC	100	-	100
Practical										
B23MEP101	Engineering Practices Laboratory	ES	4	0	0	4	2	60	40	100
Total credits to be earned							22			



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Semester - III										
Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
Theory / Theory with Practical										
B23MAT302	Discrete Mathematics	BS	4	3	1	0	4	40	60	100
B23CST301	Computer Organization and	PC	3	3	0	0	3	40	60	100
B23CST302	Data Structures	PC	3	3	0	0	3	40	60	100
B23CST303	Computer Networks	PC	3	3	0	0	3	40	60	100
B23CSI301	Operating Systems	PC	5	3	0	2	4	50	50	100
B23CSI302	Object Oriented Programming using C++	PC	5	3	0	2	4	50	50	100
Practical										
B23CSP301	Data Structures Laboratory	PC	4	0	0	4	2	60	40	100
Total credits to be earned							23			

Semester - IV										
Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
Theory / Theory with Practical										
B23MAT401	Probability and Queuing Theory	BS	4	3	1	0	4	40	60	100
B23CST401	Database Management Systems	PC	3	3	0	0	3	40	60	100
B23CST402	Design and Analysis of Algorithms	PC	4	3	1	0	4	40	60	100
B23CST403	Java Programming	PC	3	3	0	0	3	40	60	100
B23CST404	Artificial Intelligence and Machine Learning	PC	3	3	0	0	3	40	60	100
B23CST405	Software Engineering	PC	3	3	0	0	3	40	60	100
Practical										
B23CSP401	Database Management and Systems	PC	4	0	0	4	2	60	40	100
B23CSP402	Java Programming Laboratory	PC	4	0	0	4	2	60	40	100
B23CEP401	Professional Certificate Course	CEC	-	-	-	-	1	100	-	100
Total credits to be earned							25			
Summer Internship – Three Weeks (Review will be conducted in first week of Semester V and its credit will be included in Semester V) / NPTEL / Product Development / Mini Project / Model Development										



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Semester - V										
Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
Theory / Theory with Practical										
B23CST501	Theory of Computation	PC	4	3	1	0	4	40	60	100
	Microprocessors and Microcontrollers	PC	3	3	0	0	3	40	60	100
B23CST502	Internet Programming	PC	3	3	0	0	3	40	60	100
	Professional Elective - I	PE	3	3	0	0	3	40	60	100
	Open Elective - I	OE	3	3	0	0	3	40	60	100
B23MCT501	Environmental Sciences	MC	3	3	0	0	NC	100	-	100
Practical										
	Microprocessors and Microcontrollers Laboratory	PC	4	0	0	4	2	60	40	100
B23CSP501	Internet Programming Laboratory	PC	4	0	0	4	2	60	40	100
B23CEP501	Summer Internship	CEC	-	-	-	-	1	100	-	100
Total credits to be earned							21			

Semester - VI										
Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
Theory / Theory with Practical										
B23CSI601	Fundamentals of Cyber Security	PC	5	3	0	2	4	50	50	100
B23CSI602	Compiler Design	PC	5	3	0	2	4	50	50	100
B23CST601	Cloud Computing	PC	3	3	0	0	3	40	60	100
	Professional Elective - II	PE	3	3	0	0	3	40	60	100
	Professional Elective - III	PE	3	3	0	0	3	40	60	100
	Open Elective - II	OE	3	3	0	0	3	40	60	100
B23MCT601	Indian Constitution	MC	3	3	0	0	NC	100	-	100
Practical										
B23CSP601	Cloud Computing Laboratory	PC	4	0	0	4	2	60	40	100
B23CSP603	Mini Project	PW	4	0	0	4	2	40	60	100
Total credits to be earned							24			


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Semester - VII										
Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
Theory / Theory with Practical										
B23HST701	Universal Human Values	HS	3	3	0	0	2	40	60	100
B23CST701	BigData Analytics	PC	3	3	0	0	3	40	60	100
B23CST702	Internet of Things	PC	3	3	0	0	3	50	50	100
	Professional Elective – IV	PE	3	3	0	0	3	40	60	100
	Professional Elective – V	PE	3	3	0	0	3	40	60	100
	Open Elective - III	OE	3	3	0	0	3	40	60	100
Practical										
B23CSP701	BigData Analytics Laboratory	PC	4	0	0	4	2	60	40	100
B23CSP702	Project work Phase-I	PW	6	0	0	6	2	40	60	100
Total credits to be earned							21			

Semester - VIII										
Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
Theory / Theory with Practical										
	Professional Elective - VI	PE	3	3	0	0	3	40	60	100
	Open Elective - IV	OE	3	3	0	0	3	40	60	100
Practical										
B23CSP801	Project Work Phase - II	PW	16	0	0	16	8	40	60	100
Total credits to be earned							14			



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HUMANITIES AND SOCIAL SCIENCES (HS)										
Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
B23IPT101	Induction Programme	HS	-	-	-	-	0	-	-	-
B23ENT101	Professional English	HS	3	3	0	0	2	40	60	100
B23HST101	தமிழர் மரபு / Heritage of Tamils	HS	1	1	0	0	1	40	60	100
B23ENI101	Professional Communication	HS	5	3	0	2	4	50	50	100
B23HST201	தமிழரும் தொழில் நுட்பமும் / Tamils and Technology	HS	1	1	0	0	1	40	60	100
B23HST701	Universal Human Values	HS	3	3	0	0	2	40	60	100

BASIC SCIENCES (BS)										
Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
B23MAT101	Matrices and Differential Calculus	BS	4	3	1	0	4	40	60	100
B23CHI101	Engineering Chemistry	BS	5	3	0	2	4	50	50	100
B23PHI101	Engineering Physics	BS	5	3	0	2	4	50	50	100
B23MAT201	Integral Calculus and Complex Analysis	BS	4	3	1	0	4	40	60	100
B23MAT302	Discrete Mathematics	BS	4	3	1	0	4	40	60	100
B23MAT401	Probability and Queuing Theory	BS	4	3	1	0	4	40	60	100

ENGINEERING SCIENCES (ES)										
Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
B23MET101	Engineering Graphics	ES	5	3	2	0	4	40	60	100
B23CSI101	C Programming	ES	5	3	0	2	4	50	50	100
B23ADI201	Python Programming	ES	5	3	0	2	4	50	50	100
B23MEP101	Engineering Practices Laboratory	ES	4	0	0	4	2	60	40	100
B23ECT203	Digital Logic and System Design	ES	3	3	0	0	3	40	60	100


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PROFESSIONAL CORE (PC)										
Course Code	Course Name	CT	Instructional Hours				Assessment			
			CP	L	T	P	C	CIA	ESE	Total
B23CST301	Computer Organization and Architecture	PC	3	3	0	0	3	40	60	100
B23CST302	Data Structures	PC	3	3	0	0	3	40	60	100
B23CSI301	Operating Systems	PC	5	3	0	2	4	50	50	100
B23CSI302	Object Oriented Programming using C++	PC	5	3	0	2	4	50	50	100
B23CST303	Computer Networks	PC	3	3	0	0	3	40	60	100
B23CSP301	Data Structures Laboratory	PC	4	0	0	4	2	40	60	100
B23CST401	Database Management Systems	PC	3	3	0	0	3	40	60	100
B23CST402	Design and Analysis of Algorithms	PC	3	3	1	0	4	40	60	100
B23CST403	Java Programming	PC	3	3	0	0	3	40	60	100
B23CST404	Artificial Intelligence and Machine Learning	PC	3	3	0	0	3	40	60	100
B23CST405	Software Engineering	PC	3	3	0	0	3	40	60	100
B23CSP401	Database Management and Systems Laboratory	PC	4	0	0	4	2	40	60	100
B23CSP402	Java Programming Laboratory	PC	4	0	0	4	2	60	40	100
B23CST501	Theory of Computation	PC	4	3	1	0	4	40	60	100
	Microprocessors and Microcontrollers	PC	3	3	0	0	3	40	60	100
B23CST502	Internet Programming	PC	3	3	0	0	3	40	60	100
	Microprocessors and Microcontrollers Laboratory	PC	4	0	0	4	2	40	60	100
B23CSP501	Internet Programming Laboratory	PC	4	0	0	4	2	60	40	100
B23CSI601	Fundamentals of Cyber Security	PC	5	3	0	2	4	50	50	100
B23CSI602	Compiler Design	PC	5	3	0	2	4	50	50	100
B23CST601	Cloud Computing	PC	3	3	0	0	3	40	60	100
B23CSP601	Cloud Computing Laboratory	PC	4	0	0	4	2	60	40	100
B23CST701	BigData Analytics	PC	3	3	0	0	3	40	60	100
B23CST702	Internet of Things	PC	3	3	0	0	3	40	60	100
B23CSP701	BigData Analytics Laboratory	PC	4	0	0	4	2	60	40	100



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PROJECT WORK (PW)										
Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
B23CSP603	Mini Project	PW	4	0	0	4	2	40	60	100
B23MEP702	Project work Phase – I	PW	6	0	0	6	2	40	60	100
B23MEP801	Project Work Phase - II	PW	16	0	0	16	8	40	60	100

MANDATORY COURSE (MC)										
Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
B23MCT501	Environmental Sciences	MC	3	3	0	0	NC	100	-	100
B23MCT601	Indian Constitution	MC	3	3	0	0	NC	100	-	100

CAREER ENHANCEMENT COURSE (CEC)										
Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
B19CET201	Soft Skills	CEC	2	2	0	0	NC	100	-	100
B23CEP401	Professional Certificate Course	CEC	-	-	-	-	1	100	-	100
B23CEP501	Summer Internship	CEC	-	-	-	-	1	100	-	100



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Semester - I

B.E / B.Tech	B23CSI101 – C PROGRAMMING (Common to CSE(AI&ML), AI&DS, BME, ECE, EEE)	L	T	P	C
		2	0	4	4

Course Objectives

1.	To know the basics of problem-solving techniques.
2.	To provide exposure to problem-solving through programming.
3.	To develop C programming language with conditional statements and loops.
4.	To develop modular applications in C using functions pointers and structures
5.	To do input/output and file handling in C

UNIT - I	INTRODUCTION TO PROBLEM SOLVING & COMPUTER	8
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Problem Solving: Problem Solving Techniques - Logical Thinking – Step for Solving the Problems – Compare Problem Solving and Logical Thinking – Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion).

UNIT - II	BASICS OF C PROGRAMMING	10
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Introduction to programming paradigms - Structure of C program - Phases of developing a running computer program in C – Applications of C Language - C programming: Data Types – Storage Class - Constants – Enumeration Constants - Keywords – Operators: Operators – Types of Operators - Expressions - Precedence and Associativity – Input / Output statements – Decision making statements - Looping statements with example of Pattern – Preprocessor directives.

UNIT - III	ARRAYS AND POINTERS	9
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Introduction to Arrays: Declaration, Initialization – One dimensional array – Two dimensional arrays with example of Matrices Operations – Pointers: Pointer Declaration – Initialization - Pointer operators – Pointer Arithmetic – Dynamic Memory Allocation – Selection sort, Insertion sort, Bubble sort - Searching.

UNIT - IV	FUNCTION AND STRINGS	9
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Function: definition of function, Declaration of function – Function Call - Prototype Declaration - Pass by value, Pass by reference – Recursion - Linear recursion, Binary Search using recursive functions - C standard functions and libraries - String operations: length, compare, concatenate, copy - String Arrays.


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UNIT - V	STRUCTURES AND FILE HANDLING	9
Introduction: need for structure data type, structure definition, Structure declaration, Structure within a structure – Array Structure - Union – File Handling: File Operations – File Types: Sequential and Random access – Case Study: AI Processing System using C.		

Expt. No.	Description of the Experiments
1.	Experiment with I/O statements, operators, expressions
2.	Develop a C programs for Decision Making Construct. a)if-else b)switch-case c)goto, break-continue
3.	Develop a C programs for Loop Control statements. a)for b) Nested for c) while and do-while
4.	Develop a C programs for Array a)One Dimensional – Sorting and Searching b)Two Dimensional – Matrix Operations c) Traversal
5.	Develop a C program to perform the pointers. Linear Search b) Binary Search c) Pointer Operation
6.	Build a C programs for the recursive function
7.	Implement a C programs for string operations String operations using build in methods
8.	Develop a C program to experiment with Pass by value and Pass by Reference
9.	Develop a c program for structure and union a)Payroll using structure and union.b)Student records using structure and union.
10.	Develop a C program to perform file operations
Total Instructional hours : (45+30) = 75	

Course Outcomes : Students will be able to	
CO1	Demonstrate knowledge on C programming constructs
CO2	Construct C programs using decision making and control statements.
CO3	Experiment with programs in C using an array.
CO4	Build programs in C using strings, pointers, functions.
CO5	Model the applications in C using Structures, Union and File Operations



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Requirements for a Batch of 30 Students		
Sl. No.	Description of the Equipment	Quantity required (Nos.)
1.	HP Make, Core i5, 11 th Generation, 16GB RAM PCs, Operating systems: Windows* 10 or later, macOS, and Linux. Turbo C/C++ 4.5	30

Text Books	
1.	Yashavant P. Kanetkar. "Let Us C", 19th Edition, BPB Publications, 2022
2.	H. M. Deitel, P. J. Deitel, C: How to program, 9th edition, Pearson Education, 2020.

Reference Books	
1.	Reema Thareja, "Programming in C", Oxford University Press, Second Edition, 2016
2.	Kernighan, B.W and Ritchie, D.M, "The C Programming language", Second Edition, Pearson Education, 2015
3.	Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", 1st Edition, Pearson Education, 2013
4.	Pradip Dey, Manas Ghosh, "Computer Fundamentals and Programming in C", Second Edition, Oxford University Press, 2013.



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B.E / B.Tech	B23CSI102 – PROBLEM SOLVING AND PYTHON PROGRAMMING (Common to AERO, AGRI, BT, and MECH)	L	T	P	C
		2	0	4	4

Course Objectives

1.	To develop python programs with conditional statements and loops
2.	To learn how to use strings, functions and pass arguments in Python
3.	To use python data structures such as lists, tuples, and dictionaries
4.	To use file concepts and to build a package using Python modules for reusability
5.	To learn the fundamentals of data manipulations with Python

UNIT - I	INTRODUCTION TO PYTHON PROGRAMMING	9
Introduction: Python basics and its scripting modes – Variables, Operators - Control Structures: if, if-else, nested if, if – elif ladder statements - Iterative statements : while, for, Nested loops, else in loops, break, continue and pass statements.		

UNIT - II	STRINGS AND FUNCTIONS	9
Strings: Formatting, Comparison, Slicing, Splitting, Stripping, Negative indices, String functions. Regular expression: Matching the patterns, Search and replace. Functions: Types, parameters, arguments: positional arguments, keyword arguments, parameters with default values, functions with arbitrary arguments		

UNIT - III	COLLECTIONS	9
List: Create, Access, Slicing, Negative Indices, List Methods, and comprehensions, Tuples: Create, Indexing and Slicing, Operations on tuples. Dictionary: Create, add, and replace values, operations on dictionaries		

UNIT - IV	SETS AND FILE HANDLING	9
Sets: Create and operations on set, Files: Manipulating files and directories, text files: reading/writing text and numbers from/to a file; creating and reading a formatted file (csv or tab separated)		

UNIT - V	MODULES AND PACKAGES	9
Modules: Importing module, standard modules, executing modules. Packages: Importing Packages, simple programs using built-in functions of packages like pandas, jumpy, matplotlib		

Expt. No.	Description of the Experiments
1.	Programs Using Simple Statements a. Exchange the values of two variables, b. Circulate the values of n variables, c. Distance between two points.


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2.	Programs Using Conditionals and Iterative Statements a. Number Series b. Number Patterns c. Pyramid Pattern
3.	Programs Using built-in and user defined Functions a. Factorial of a Number b. Largest Number in a list c. Area of Shape
4.	Programs using Strings a. Reversing a String b. Checking Palindrome in a String c. Counting Characters in a String d. Replacing Characters in a String
5.	Operations of Lists a. Basic Operations (Insertion, Updating, deletion, accessing, List Comprehensions) b. Implement linear search and binary search using list. c. Matrix operations using Nested List. d. Implement Merge, Bubble and Insertion sort
6.	Create a tuple and perform its operations for the following: a. Basic Operations (Insertion, Updating, deletion, accessing) b. Items present in a library c. Components of a car d. Materials required for construction of a laboratory
7.	Operations of Dictionaries a. Python program to create a dictionary with integer keys, and print the keys, values & key-value pairs b. Python program to randomize (shuffle) values of dictionary
8.	Operations of Sets Basic operations of set (Membership, Operations and Modifications)
9.	Programs using File Handling a. Copy from one file to another. b. Word count c. Longest word
10.	Python programs using Time and Calendar related functions a. Print the current time using time module. b. Display the calendar of given month of the year using calendar module
11.	Implementing programs using written modules and Python Standard Libraries (pandas, numpy, Matplotlib, scipy)

Total Instructional hours : (45+30) = 75

Course Outcomes : Students will be able to	
CO1	Construct Python programs using iterative and conditional statements
CO2	Experiment with user-defined functions and Strings.
CO3	Build python programs with list, tuples, dictionaries and set
CO4	Develop Python application using file operations and modules.
CO5	Apply data manipulation concepts using libraries


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Requirements for a Batch of 30 Students		
Sl. No.	Description of the Equipment	Quantity required (Nos.)
1.	HP Make, Core i5, 11 th Generation, 16GB RAM PCs, Operating systems: Windows* 10 or later, macOS, and Linux. Python* version: 3.10.X	30

Text Books	
1.	Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd Edition, Updated for Python 3, Shroff/ O 'Reilly Publishers, 2016
2.	Reema Thereja, "Python Programming using Problem Solving Approach", 4th Impression, Oxford University Press, 2019.
3.	Bernd Klein, Python Course Data Analysis with Python, 2021.

Reference Books	
1.	John V Guttag, "Introduction to Computation and Programming Using Python", Revised and expanded Edition, MIT Press, 2013.
2.	Robert Sedgewick, Kevin Wayne, Robert Dondero, "Introduction to Programming in Python: An Inter-disciplinary Approach", Pearson India Education Services Pvt. Ltd, 2016
3.	Timothy A. Budd, "Exploring Python", Mc-Graw Hill Education (India) Private Ltd, 2015
4.	Kenneth A. Lambert, "Fundamentals of Python: First Programs", CENGAGE Learning, 2012



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