GOVERNMENT POLYTECHNIC CHAPRA

COURSE FILE

DIPLOMA IN COMPUTER SCIENCE AND ENGINEERING

(3rd SEMESTER)

Session: 2023-2026

(PYTHON PROGRAMMING)

(2418305)

PROF. RAMA SINGH

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

STATE BOARD OF TECHNICAL EDUCATION

Bihar, Patna

&

विज्ञान एवं प्रावैधिकी विभाग

Department of Science and Technology

Government of Bihar

CONTENTS

Department of Computer Science Engineering

Vision

Computers play a vital role in present day life, more so, in the professional life of technician engineers. In order to enable the students, use the computers effectively in problem solving, this course offers the modern programming language Python along with exposition to various engineering applications of computers.

Mission

- Installing the Python IDLE.
- Use variables to store, retrieve and calculate information
- Describe the basics of the Python programming language
- Write programs in Python

Course Objectives:

- Develop simple command-line programs in Python.
- Set up Python and develop a simple application.
- Declare and perform operations on simple data types including strings, numbers, and dates.
- Declare and perform operations on data structures, including lists, ranges, tuples, dictionaries, and sets.
- Write conditional statements and loops.
- Define and use functions, classes, and modules.
- Manage files and directories through code.
- Deal with exceptions

Python Programming (2418305)

SUBJECT CODE: 2418305	Theory			No. of period in one session: 42			Credits
	No. of Periods per Week			Full Marks:	:	100	03
	L	T	P/S	ESE	:	70	
	03	-	-	T. A	:	20	
				C.T	:	10	

CONTENTS: Theory		Hrs.[45]
UNIT – 01	Fundamentals of Python Programming Syntax 1.1 Introduction to Python Character Set, Python Tokens, Variables, Lvalue and Rvalue Concepts, and the Use of Comments. 1.2Overview of Data Types: • Number Types: Integer, Floating Point, Complex • Boolean Type • Sequence Types: String, List, Tuple • None Type • Mapping Type: Dictionary • Distinction between Mutable and Immutable Data Types 1.3 Understanding Operators: • Arithmetic Operators • Relational Operators • Logical Operators • Assignment Operator • Augmented Assignment Operators • Expressions and Statements • Type Conversion and Input/Output Mechanisms • Precedence of Operators • Expression Evaluation	
UNIT – 02	Conditional and Iterative statements 2.1 Conditional statements: • simple if statement • if- else statemen • if-elif-else statement 2.2 Iterative statements: • while loop • for loop • range function • break and continue statements • nested loops	
UNIT – 03	String, List, Tuples, set and Dictionary 3.1 String: • Indexing • string operations (concatenation, repetition, membership & slicing) • traversing a string using loops • built-in functions. 3.2 Lists: • Introduction • Indexing in list • list operations: concatenation, repetition, membership & slicing, traversing a list, built- in list functions, linear search on list of numbers and counting the	

	frequency of elements in a list 3.3 Tuples: Creating, initializing, accessing elements, tuple assignment, performing operations on tuples, tuple methods and built-in functions, nested tuples 3.4 Set: Creating set, traversing, adding, removing data in set, performing set operations like join, Union intersection, difference 3.5 Dictionary: accessing items in a dictionary using keys, mutability of dictionary: adding a new item, modifying an existing item, built-in dictionary functions.	
UNIT – 04	Python Functions, Modules and packages 4.1 Functions: types of function (built- in functions, functions defined in module, user defined functions), creating user defined function, arguments and parameters, default parameters, positional parameters, Lambda functions, returning value, scope of a variable: global scope, local scope 4.2 Modules and Packages: Importing module using 'import' Regular Expressions, Exception Handling, PyPI Python Package Index, Pip Python package manager, Importing Libraries and Functions	
UNIT – 05	Numpy 5.1 Introduction to NumPy 5.2 Installation of NumPy 5.3 NumPy Arrays: • Understanding the NumPy array • The fundamental data structure in NumPy. • Creation of arrays using different methods: np.array(), np.zeros(), np.ones(), etc. • Exploring array attributes like shape, size, and dimensions. 5.4 Array Indexing and Slicing: • Accessing elements and subarrays in NumPy arrays using indexing and slicing •Demonstration of the difference between one-dimensional and multi-dimensional array indexing. 5.5 Array Operations: • Performing element-wise operations on NumPy arrays. • Exploring universal functions (ufuncs) for mathematical operations. 5.6 Linear Algebra with NumPy: • Introduction to linear algebra operations using NumPy. • Matrix multiplication, determinant, inverse, and solving linear equations. 5.7 File input and output with Numpy 5.8 Broadcasting in Numpy	
UNIT – 06	Exception and File Handling in Python 6.1 Exception Handling: syntax errors, exceptions, need of exception handling, user-defined exceptions, raising exceptions, handling exceptions, catching exceptions, Try - except - else clause, Try - finally clause, recovering and continuing with finally, built-in exception classes. 6.2 File Handling: text file and binary file, file types, open and close files, reading and writing text files, reading and writing binary files, file access modes	

References:

1. Let Us Python second edition by Yashavant Kanetkar and Aditya Kanetkar
2. ‘O’ LEVEL made simple MODULE-3 Programming and Problem solving Through ‘Python’ Language by Satish Jain & Shashi Singh

Course outcomes (COs):

After completion of the course, the students will be able to

CO-1: Use various data types and operators in formation of expressions.

CO-2: Write and execute programs using control statements.

CO-3: Perform relevant operations on Sequence data types

CO-4: Create functions in modules

CO-5: Use numpy in writing python programs

CO-6: Handle data files and exceptions.

PYTHON PROGRAMMING

	1st 10:00-11:00	2nd 11:00-12:00	3rd 12:00-1:00		4th 2:00-3:00	5th 3:00-4:00	6th 4:00-5:00
MON	✓					(Lab)	(Lab)
TUE	✓			L U N C H			
WED							
THU	✓						
FRI							
SAT		(Lab)	(Lab)				

STUDENT DETAILS

Roll Number	Name Of the Student
311136723001	SANJU KUMARI
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311136723003	AMIT KUMAR RAM
311136723004	SONU KUMAR
311136723005	KANISHKA KUMARI
311136723006	ABHINANDAN KUMAR
311136723009	RITESH KUMAR
311136723010	LAV KUMAR
311136723012	ROHIT SINGH
311136723013	SURAJ KUMAR
311136723014	SHUBHAM KUMAR SINGH
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311136723055	SONI KUMARI
311136723056	CHANDRABHUSHAN KUMAR
311136723057	Ashutosh Kumar
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Lecture Plan		Lecture No.[45]
UNIT – 01	Fundamentals of Python Programming Syntax Introduction to Python Character Set, Python Tokens, Variables, Lvalue and Rvalue Concepts, and the Use of Comments. Overview of Data Types: • Number Types: Integer, Floating Point, Complex • Boolean Type • Sequence Types: String, List, Tuple • None Type • Mapping Type: Dictionary • Distinction between Mutable and Immutable Data Types	01-04
	Understanding Operators: • Arithmetic Operators • Relational Operators • Logical Operators • Assignment Operator • Augmented Assignment Operators • Expressions and Statements • Type Conversion and Input/output Mechanisms • Precedence of Operators • Expression Evaluation	05-07
UNIT – 02	Conditional and Iterative statements Conditional statements: • simple if statement • if- else statement • if-elif-else statement	08-10
	Iterative statements: • while loop • for loop • range function • break and continue statements and nested loops	11-13
UNIT – 03	String, List, Tuples, set and Dictionary String: • Indexing • string operations (concatenation, repetition, membership & slicing) • traversing a string using loops • built-in functions. Lists: • Introduction • Indexing in list • list operations: concatenation, repetition, membership & slicing, traversing a list, built- in list functions, linear search on list of numbers and counting the frequency of elements in a list Tuples: Creating, initializing, accessing elements, tuple assignment, performing operations on tuples, tuple methods and built-in functions, nested tuples Set:Creating set, traversing, adding, removing data in set, performing set operations like join, Union intersection, difference	14-22

	Dictionary: accessing items in a dictionary using keys, mutability of dictionary: adding a new item, modifying an existing item, built-in dictionary functions.	
UNIT – 04	Python Functions, Modules and packages Functions: types of function (built- in functions, functions defined in module, user defined functions), creating user defined function, arguments and parameters, default parameters, positional parameters, Lambda functions, returning value, scope of a variable: global scope, local scope Modules and Packages: Importing module using 'import' Regular Expressions, Exception Handling, PyPI Python Package Index, Pip Python package manager, Importing Libraries and Functions	23-30
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	Array Indexing and Slicing: • Accessing elements and subarrays in NumPy arrays using indexing and slicing •Demonstration of the difference between one-dimensional and multi-dimensional array indexing. 5.5 Array Operations: • Performing element-wise operations on NumPy arrays. • Exploring universal functions (ufuncs) for mathematical operations.	35-38
	Linear Algebra with NumPy: • Introduction to linear algebra operations using NumPy. • Matrix multiplication, determinant, inverse, and solving linear equations. File input and output with Numpy Broadcasting in Numpy	39-41
UNIT – 06	Exception and File Handling in Python Exception Handling: syntax errors, exceptions, need of exception handling, user-defined exceptions, raising exceptions, handling exceptions, catching exceptions, Try - except - else clause, Try - finally clause, recovering and continuing with finally, built-in exception classes. File Handling: text file and binary file, file types, open and close files, reading and writing text files, reading and writing binary files, file access modes	42-45

THIS DOCUMENT IS APPROVED BY:-

Designation	Name	Signature
COURSE COORDINATOR + HOD	Prof. Rama Singh	
PRINCIPAL	Dr. Anil Kumar Singh	
DATE		