09-06-2026 09:22:01 AM

FUNDAMENTALS OF PYTHON PROGRAMMING **Course Code : 313007**

Programme Name/s	**: Architecture Assistantship/ Architecture and Interior Design/ Automobile Engineering./ Architecture/ Interior Design & Decoration/ Interior Design/ Mechanical Engineering/ Mechatronics/ Manufacturing Technology/ Production Engineering**
Programme Code	**: AA/ AD/ AE/ AT/ IX/ IZ/ ME/ MK/ MRT/ PG**
Semester	**: Third / Fourth / Fifth**
Course Title	**: FUNDAMENTALS OF PYTHON PROGRAMMING**
Course Code	**: 313007**

I. RATIONALE

Comprehension of programming languages is crucial for diploma engineering graduates, especially as they engage with various software applications in the mechanical engineering domain. Python, being easy to code, potent, and stands out as an ideal language for introducing computing and problem-solving concepts to beginners. This course enables students to write Python programs and utilize various built-in functions/methods of Python modules/libraries to solve specific problems.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

An ability to prepare python programs for solving simple engineering problems.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Use program designing tools and IDE for python.
- CO2 - Employ python building blocks and data types in the programming.
- CO3 - Implement conditional and looping statements in the python programming.
- CO4 - Implement built in functions and modules in the python programming.
- CO5 - Use NumPy for performing operations on list and array.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme					Credits	Assessment Scheme												
				Actual Contact Hrs./Week			SLH	NLH		Paper Duration	Theory				Based on LL & TL				Based on SL		Total Marks
															Practical						
				CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
313007	FUNDAMENTALS OF PYTHON PROGRAMMING	FPP	AEC	-	-	2	-	2	1	-	-	-	-	-	25	10	25@	10	-	-	50

FUNDAMENTALS OF PYTHON PROGRAMMING **Course Code : 313007**

Total IKS Hrs for Sem. : 0 Hrs
Abbreviations: CL- ClassRoom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment
Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @$ Internal Online Examination
Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's)aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Describe the functions of different components of computers and peripherals. TLO 1.2 List the applications of computers in the domain of Mechanical Engineering. TLO 1.3 Create flow chart of given programming problem. TLO 1.4 Describe the given feature of Python programming language.	**Unit - I Introduction to Python Programming** 1.1 Revision of Computer Components (CPU, I/O devices) 1.2 Applications of computer and programming languages in Mechanical engineering domain. 1.3 Program Designing Tools: Algorithm, Flow Chart. 1.4 Introduction and Features of Python: Open source, Interactive, Interpreted, Object-oriented, Platform independent etc., Installation & working of IDEs.	Presentations Hands-on
2	TLO 2.1 Use different Python building blocks. TLO 2.2 Describe different data types of Python programming. TLO 2.3 Differentiate normal and container data types of Python programming language. TLO 2.4 Write simple Python programs by taking the user's input to solve expressions.	**Unit - II Python building blocks & data types** 2.1 Python building blocks: Identifiers, Indentation, Comments, Variables, Arithmetic and assignment operators and Expressions. 2.2 Data Types: Integers, float, complex, string and their declaration, data type conversion. 2.3 Accepting input from user: I/O functions. 2.4 Container Types: List, tuple, set and their declaration. 2.5 Write simple python program to display "Welcome" message.	Presentations Hands-on
3	TLO 3.1 Use basic relational and logical operators in python programs. TLO 3.2 Employ decision control statements in python programs. TLO 3.3 Employ looping statements in python programs.	**Unit - III Python operators and Control flow** 3.1 Relational and Logical operators. 3.2 Decision making statements: if, if-else, if- elif - else statements. 3.3 Looping statements: while loop, for loop, Nested loops. 3.4 Loop manipulation using continue, pass, break statements.	Demonstration Hands-on

FUNDAMENTALS OF PYTHON PROGRAMMING **Course Code : 313007**

Sr.No	Theory Learning Outcomes (TLO's)aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
4	TLO 4.1 Use built-in functions in Python programs. TLO 4.2 Use built-in modules in Python programs. TLO 4.3 Develop user-defined functions in Python for the given purpose.	**Unit - IV Python functions and modules** 4.1 Functions: Use of built-in functions, data conversion functions, abs, pow, min, max, round, ceil, floor etc. 4.2 Modules: Use of built-in modules- math cmath, random and statistics. 4.3 User-defined function: Function definition, function calling, function arguments and parameter passing, Return statement, scope of variables.	Demonstration Hands-on
5	TLO 5.1 Manipulate the given list. TLO 5.2 Perform different operations on list. TLO 5.3 Use NumPy arrays for faster operations.	**Unit - V List and arrays in python** 5.1 List: define list (one and multi-dimension), accessing, deleting and updating values in list. 5.2 Basic list operations: slicing, repeating, concatenation and iteration. 5.3 NumPy array: Generate NumPy arrays and construct multidimensional arrays.	Demonstration Hands-on

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Install python IDE. LLO 1.2 Explore the IDE's settings and preferences.	1	Install Python IDE.	2	CO1
LLO 2.1 Draw flow chart for the given problem. LLO 2.2 Write algorithm for the given problem.	2	*Prepare a flow chart and algorithm for simple problem.	2	CO1
LLO 3.1 Use print function to display the message.	3	Write a simple program to display a simple message. (Ex: “Welcome to Python programming”)	2	CO2
LLO 4.1 Write and execute a python program to solve a given expression.	4	Write a simple Python program by taking user’s input to - - find the area of rectangle - find the area or circle.	2	CO2
LLO 5.1 Write and execute a python program.	5	*Write a program to accept value of Celsius and convert it to Fahrenheit.	2	CO2
LLO 6.1 Use the if - else statement in the python program.	6	Write a python program to find whether the given number is even or odd using if - else statement.	2	CO3
LLO 7.1 Implement the if-elif-else statement in the python program.	7	*Write a python program to check whether a input number is positive, negative or zero using if – elif-else statement.	2	CO3
LLO 8.1 Use appropriate decision-making control statement to solve the given problem.	8	Write a program to accept the three sides of a triangle to check whether the triangle is isosceles, equilateral, right angled triangle.	2	CO3
LLO 9.1 Identify suitable loop and conditional statement for the problem. LLO 9.2 Inscribe the loop and conditional statement in the python program.	9	Write a program that allows the user to input numbers until they choose to stop, and then displays the count of positive, negative, and zero numbers entered (Use while loop).	2	CO3

09-06-2026 09:22:01 AM

FUNDAMENTALS OF PYTHON PROGRAMMING **Course Code : 313007**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 10.1 Identify suitable looping statement for multiplication table. LLO 10.2 Implement the for loop for the multiplication table.	10	*Write a python program for printing multiplication table of a given number using for loop. (Ex. 12x1=12 12x2=24 …. 12x10=120)	2	CO3
LLO 11.1 Identify a suitable module for importing a given function. LLO 11.2 Use various mathematical functions available in cmath module.	11	*Write a Python program to demonstrate the use of different mathematical functions (Ex. ceiling, floor etc).	2	CO4
LLO 12.1 Use various functions available in statistics module.	12	*Write a python program to find mean, mode, median and standard deviation using statistics module.	2	CO4
LLO 13.1 Use list data type of Python.	13	Write a python program utilizing a list to display the name of a month based on a given month number.	2	CO5
LLO 14.1 Write programs using Multidimensional list in Python.	14	Write a python program to add or subtract two matrices using multidimensional list.	2	CO5
LLO 15.1 Write programs using Multidimensional list in Python.	15	*Write a python program to multiply two matrices using multidimensional list.	2	CO5
LLO 16.1 Perform metrics operation using NumPy Module	16	*Write a python program to multiply two matrices using NumPy.	2	CO5

Note : Out of above suggestive LLOs -

- '*' Marked Practicals (LLOs) Are mandatory.
- Minimum 80% of above list of lab experiment are to be performed.
- Judicial mix of LLOs are to be performed to achieve desired outcomes.

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)

Micro project

- Not Applicable

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Computer System with all necessary peripherals and internet connectivity.	All

FUNDAMENTALS OF PYTHON PROGRAMMING **Course Code : 313007**

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
2	Any relevant python IDE like IDLE/PyCharm/VSCode/Jupiter Notebook/Online Python Compiler.	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table) : NOT APPLICABLE

X. ASSESSMENT METHODOLOGIES/TOOLS

Formative assessment (Assessment for Learning)

- Term Work

Summative Assessment (Assessment of Learning)

- Practical

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	2	2	2	3	-	-	2			
CO2	2	2	2	3	-	-	2			
CO3	2	2	2	3	-	-	2			
CO4	2	2	2	3	-	-	2			
CO5	2	2	2	3	-	-	2			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Kenneth A. Lambert	Fundamentals of Python : First Programs , 2E	Cengage Learning India Private Limited, ISBN: 9789353502898
2	Yashavant Kanetkar, Aditya Kanetkar	Let Us Python - 6th Edition	BPB Publications, ISBN: 9789355515414

XIII . LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://www.w3schools.com/python/	Python Programming
2	https://www.tutorialspoint.com/python/index.htm	Python Programming
3	https://www.python.org/	Python Programming
4	https://spoken-tutorial.org/tutorial-search/?search_foss=Pyt	Python Programming

09-06-2026 09:22:01 AM

FUNDAMENTALS OF PYTHON PROGRAMMING **Course Code : 313007**

Sr.No	Link / Portal	Description

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

MSBTE Approval Dt. 02/07/2024 **Semester - 3 / 4 / 5, K Scheme**