



**PARVATHANENI BRAHMAYYA**  
**SIDDHARTHA COLLEGE OF ARTS & SCIENCE**  
*Autonomous*  
 Siddhartha Nagar, Vijayawada-520010  
*Re-accredited at 'A+' by the NAAC*

<b>Course Code</b>				23PHVAP201			
<b>Title of the Course</b>				Python Programming for Physics			
<b>Offered to: (Programme/s)</b>				B. Sc Physics (H)			
<b>L</b>	<b>0</b>	<b>T</b>	<b>0</b>	<b>P</b>	<b>2</b>	<b>C</b>	<b>2</b>
<b>Year of Introduction:</b>		2023-24		<b>Semester:</b>		2	
<b>Course Category:</b>		VAC		<b>Course Relates to:</b>		GLOBAL	
<b>Year of Revision:</b>				<b>Percentage:</b>			
<b>Type of the Course:</b>				EMPLOYABILITY			
<b>Crosscutting Issues of the Course:</b>				Human Values and Professional Ethics			
<b>Pre-requisites, if any</b>				BASIC KNOWLEDGE			

### Course Aims and Objectives:

<b>S. N O</b>	<b>COURSE OBJECTIVES</b>
<b>1</b>	To help students understand the nature of light, its propagation and interaction with matter which is essential to constantly emerging newest technologies.
<b>2</b>	To create interest among the students about modern communication systems by studying wave optics
<b>3</b>	Students will be able to understand applications of interference, diffraction, and lasers in real-life situations.

### Course Outcomes

At the end of the course, the student will be able to...

<b>C O N O</b>	<b>COURSE OUTCOME</b>	<b>B T L</b>	<b>P O</b>	<b>P S O</b>
<b>CO 1</b>	Students will be able to install and work with Python, using its built-in functions, data types, and operators to solve computational problems	<b>K 2</b>	<b>1</b>	<b>1</b>
<b>CO 2</b>	Learners will write Python programs using control structures, strings, lists, and tuples, implementing real-world solutions in an efficient manner	<b>K 3</b>	<b>1</b>	<b>1</b>
<b>CO 3</b>	Students will demonstrate proficiency in Python sets, frozen sets, dictionaries, and lambda functions, applying functional programming techniques to complex problems.	<b>K 4</b>	<b>2</b>	<b>1</b>

CO 4	Learners will implement object-oriented programming concepts in Python to create modular, reusable, and efficient code	K6	1	1
CO 5	Through lab experiments, students will use Python to simulate and calculate physical laws like Newton's Second Law, Coulomb's Law, and Gravitational Force, reinforcing both physics and programming skills.	K3	2	2

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyze; K5: Evaluate; K6: Create

CO-PO MATRIX									
CO NO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1							2	
CO2	2							3	
CO3		4						3	
CO4	2							2	
CO5		3							3

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

### Unit -I

#### Introduction to Python

Installing Python, Interactive interpreter, Interactive mode, Built-in functions, Python Built-in data types, Numbers, strings and variables, List of operators,

### Unit -II

Strings, control structures, Data Structures – Python lists, Data structures – Python tuple

### UNIT – III:

Lambda functions, Data structures- set and frozen set, Python dictionary, Collection objects, functions, comprehensions, functional programming, object-oriented programming

#### Lab list:

1. Simple Harmonic Motion: Calculate Displacement
2. Projectile Motion: Maximum Height and Range
3. Ohm's Law: Calculate Resistance
4. Coulomb's Law: Force Between Two Charges
5. Newton's Second Law: Calculate Force
6. Snell's Law: Calculate the Angle of Refraction
7. Planck's Law: Calculate the Energy of a Photon
8. Gravitational Force: Between Two Masses

Reference: <https://learn.microsoft.com/en-us/training/paths/beginner-python/>

Note :

1. 6 (Six) experiments are to be done and recorded in the lab. These experiments will be evaluated in CIA.
2. For certification minimum of 7 (Seven) experiments must be done and recorded by

student who had put in 75 % of attendance in the lab.

3. 15 marks = 15 marks for CIA

4. 35 marks for practical exam.

**The marks distribution for the Semester End practical examination is as follows:**

Formula/ Principle / Statement with explanation of symbols	05
Diagram/Circuit Diagram / Tabular Columns	05
Setting up of the experiment and taking readings/Observations	10
Calculations (explicitly shown) + Graph + Result with Units	05
Procedure and precautions	05
Viva-voce	05
<b>Total Marks:</b>	<b>35</b>