



**B. Tech.**

CE / IT / AI & DS / CYBER SECURITY / CE (SE) / CSE / CSE (CC) /  
CSE (AI&ML) / CSE (CS)

**Semester II**

**THE JOY OF COMPUTING USING PYTHON**

**OC3002**

**EFFECTIVE FROM January - 2025**

**Syllabus version: 1.00**

Subject Code	Subject Title
OC3002	The Joy of Computing using Python

Teaching Scheme				Examination Scheme			
Hours		Credits		Theory Marks		Practical Marks	Total Marks
Theory	Practical	Theory	Practical	Internal	External	CIE	
3	0	3	0	25	75	-	100

### Objectives of the course:

- The course brings programming to your desk with anecdotes, analogies and illustrious examples.
- Turning abstractions to insights and engineering to art, the course focuses primarily to inspire the learner's mind to think logically and arrive at a solution programmatically.

### Course Outcomes:

Upon completion of the course, the student shall be able to,

CO1: Understand foundational concepts of python programming.

CO2: Apply probabilistic thinking to solve real-world problems.

CO3: Understand the role of encryption in secure communication.

CO4: Developing pattern recognition skills.

CO5: Applying graph theory and computational models to analyze connections.

CO6: Apply recursion and algorithmic thinking to solve complex problems.

Sr. No.	Topics	Hours
<b>Unit – I</b>		
<b>1</b>	<b>Introduction to Python :</b> Motivation for Computing, Introduction to Programming, Variables and Expressions: Design your own calculator, Loops and conditionals: Hopscotch once again, Lists, Tuples and conditionals: Lets go on a trip	<b>6</b>
<b>Unit – II</b>		
<b>2</b>	<b>Real-World Computing using Abstraction and Probability :</b> Abstraction everywhere : Apps in your phone, counting candies : Crowd to the rescue, Birthday paradox : Find your twin, Google translate : Speak in any language, Currency converter : Count your foreign trip expenses.	<b>6</b>
<b>Unit – III</b>		
<b>3</b>	<b>Exploring Logic, Search, and Analysis :</b> Monte Hall : 3 doors and a twist, Sorting : Arrange the books, Searching : Find in seconds, Substitution cipher : What's the secret !!, Sentiment Analysis : Analyse your Facebook data.	<b>6</b>

Unit – IV		
4	<b>Games, Patterns, and Logic :</b> 20 questions game : I can read your mind, Permutations : Jumbled Words, Spot the similarities : Dobble game, Count the words : Hundreds, Thousands or millions., Rock, Paper and scissor : Cheating not allowed !!	6
Unit – V		
5	<b>A Journey Through Fun and Computation :</b> Lie detector : No lies, only TRUTH Calculation of the Area : Don't measure. Six degrees of separation: Meet your favorites Image Processing : Fun with images Tic tac toe : Let's play.	6
Unit – VI		
6	<b>Unraveling Logic and Technology :</b> Snakes and Ladders: Down the memory lane. Recursion: Tower of Hanoi Page Rank : How Google Works !!	6

#### Books and References :

1. Prof. Sudarshan Iyengar “ The joy of computing using python “ , IIT – Ropar ,IITM.
2. Magnus Lie Hetland, "Beginning Python from Novice to Professional", Third Edition, Apress, 2017.
3. David Beazley and Brian K. Jones, "Python Cookbook", 3rd edition, O'Reilly Publication, 2016.
4. Brett Slatkin, "Effective Python: 59 Specific Ways to Write Better Python", Novatec, 2016.
5. Mark Lutz "Learning Python", 4th Edition, O'Reilly Publication, 2016.

#### Course objectives and Course outcomes mapping:

- To educate students about programming by developing an understanding about concepts of python programming: C01, C02, C03, C06.
- To unfold concepts of object-oriented programming paradigms: C04, C05.

#### Course units and Course outcomes mapping:

Unit no	Unit Name	Course Outcomes					
		C01	C02	C03	C04	C05	C06
1	Introduction to Python	√					
2	Real-World Computing using Abstraction and Probability		√				
3	Exploring Logic, Search, and Analysis			√			
4	Games, Patterns, and Logic				√		
5	A Journey Through Fun and Computation					√	
6	Unraveling Logic and Technology						√

**Programme outcomes:**

- PO 1: Engineering knowledge: An ability to apply knowledge of mathematics, science, and engineering.
- PO 2: Problem analysis: An ability to identify, formulates, and solves engineering problems.
- PO 3: Design/development of solutions: An ability to design a system, component, or process to meet desired needs within realistic constraints.
- PO 4: Conduct investigations of complex problems: An ability to use the techniques, skills, and modern engineering tools necessary for solving engineering problems.
- PO 5: Modern tool usage: The broad education and understanding of new engineering techniques necessary to solve engineering problems.
- PO 6: The engineer and society: Achieve professional success with an understanding and appreciation of ethical behavior, social responsibility, and diversity, both as individuals and in team environments.
- PO 7: Environment and sustainability: Articulate a comprehensive world view that integrates diverse approaches to sustainability.
- PO 8: Ethics: Identify and demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work.
- PO 9: Individual and team work: An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give/receive clear instructions.
- PO 11: Project management and finance: An ability to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO 12: Life-long learning: A recognition of the need for, and an ability to engage in life-long learning.

**Programme outcomes and Course outcomes mapping:**

Programme Outcomes	Course Outcomes					
	C01	C02	C03	C04	C05	C06
P01	✓	✓	✓	✓	✓	✓
P02		✓	✓	✓		✓
P03		✓		✓		
P04						
P05			✓		✓	
P06						
P07						
P08						
P09						
P010						
P011				✓	✓	
P012						