As Per NEP 2020

University of Mumbai

Syllabus for Basket of Minor Courses	
Board of Studies in Computer Science	
UG First Year Programme	
Semester	II
Title of Paper	Credits 2/ 4
I) Programming with Python	2
From the Academic Year	2024 – 2025

Minor Courses

Name of the Course: Programming with Python

Sr. No.	Heading	Particulars
1	**Description the course:**	**Introduction:**
		This course provides a comprehensive understanding of Python programming, focusing on designing and developing Python applications. Students will delve into the intricacies of Python programming, exploring its components and structure to gain a solid foundation in this versatile language.
		Relevance:
		Python is one of the most popular programming languages globally, widely used in various domains including web development, data science, artificial intelligence, and automation. Learning Python programming is highly relevant in today's technology-driven world, offering abundant opportunities for career growth and innovation.
		Usefulness:
		Learning Python programming equips students with a valuable skill set applicable across a wide range of industries and professions. Whether aspiring to become a software developer, data analyst, machine learning engineer, or web developer, proficiency in Python opens doors to diverse career paths and opportunities.
		Application:
		Throughout the course, students will apply their knowledge of Python programming to design, develop, and implement real-world applications. From simple scripts to complex algorithms, students will gain hands-on experience in solving practical problems using Python.
		Interest:
		Python's simplicity, readability, and versatility make it an engaging and accessible programming language for learners of all levels. Students are likely to find the process of learning Python enjoyable and rewarding, fostering a keen interest in exploring its capabilities

		further.
		Connection with Other Courses:
		Python programming forms a foundational skill set that complements and enhances learning in various other courses. Whether in data science, web development, machine learning, or automation, proficiency in Python programming serves as a common thread connecting different domains of technology.
		Demand in the Industry:
		The demand for Python programmers is steadily increasing across industries, driven by its versatility, ease of use, and robust community support. Companies are actively seeking professionals proficient in Python to drive innovation, streamline processes, and tackle complex challenges.
		Job Prospects:
		Completion of this course opens up a wide array of job prospects in industries ranging from software development to data analysis, artificial intelligence, cybersecurity, and beyond. Graduates can pursue roles such as software developer, data analyst, Python developer, machine learning engineer, and more, with promising career advancement opportunities.
2	**Vertical:**	Minor
3	**Type:**	Practical
4	**Credits:**	2 credits (1 credit = 30 Hours of Practical work in a semester)
5	**Hours Allotted:**	60 hours
6	**Marks Allotted:**	50 Marks
7	**Course Objectives (CO):** **CO 1.** To learn to design and program Python applications. **CO 2.** To explore the components of Python programming and understand its structure. **CO 3.** To define the structure and components of a Python program. **CO 4.** To learn writing loops and decision statements in Python. **CO 5.** To understand inbuilt input/output operations and compound data types in Python.	
8	**Course Outcomes (OC):** After successful completion of this course, students would be able to - **OC 1.** Store, manipulate, and access data effectively in Python.	

	OC 2. Implement basic input/output operations and file handling in Python.
	OC 3. Define the structure and components of Python programs confidently.
	OC 4. Write loops, decision statements, and functions proficiently in Python.
	OC 5. Utilize and manipulate compound data types in Python with ease.
	OC 6. Handle exceptions gracefully and effectively in Python programs.
9	**Modules:**

Module 1: Introduction to Python (30 hours):

Overview of Python: Introduction to Python, its significance, its evolution, and applications. Install Anaconda, configure Jupyter Notebook, and navigate its interface.

Python Basics: Writing and executing simple Python programs.

Data Types and Variables: Exploring basic data types like numbers, strings, lists, and dictionaries. Understanding variables and their usage.

Input and Output: Learning how to take user input and display output in Python programs.

Control Statements: Introduction to decision-making with if statements and looping with for and while loops.

Operators: Basic arithmetic, logical, and comparison operators. Exploring their usage in Python.

Module 2: Advanced Python Concepts (30 hours):

Introduction to Modules: Understanding the concept of modules in Python. How to import and use modules in Python programs.

Functions: Defining and calling functions, returning values, and using built-in functions. Introduction to lambda functions.

Strings and Lists: Manipulating strings and lists in Python. Understanding common operations and methods.

Tuples and Dictionaries: Introduction to tuples and dictionaries. Exploring their usage and operations.

Advanced Data Structures:

Arrays: Introduction to arrays and basic array operations. Understanding indexing, slicing, and basic array processing.

NumPy: Introduction to the NumPy library for numerical computing. Exploring advanced array operations and attributes.

Working with Files: Reading from and writing to files in Python.

Handling Exceptions: Understanding error handling in Python using try-except blocks.

10	**Text Books** 1. Practical Programming: An Introduction to Computer Science Using Python 3, Paul Gries , Jennifer Campbell, Jason Montojo, Pragmatic Bookshelf, 2nd Edition, 2014 2. Programming through Python, M. T Savaliya, R. K. Maurya& G M Magar, Sybgen Learning India, 2020	
11	**Reference Books** 1. Python: The Complete Reference, Martin C. Brown, McGraw Hill, 2018 2. Beginning Python: From Novice to Professional, Magnus Lie Hetland, Apress, 2017 3. Programming in Python 3, Mark Summerfield, Pearson Education, 2nd Ed, 2018 4. Python Programming: Using Problem Solving Approach, ReemaThareja, Oxford University Press, 2017	
12	**Internal Continuous Assessment: 40%**	**Semester End Examination: 60%**
13	The internal evaluation will be determined by the completion of practical tasks and the submission of corresponding write-ups for each session. Each practical exercise holds a maximum value of 10 marks. The total evaluation, out of 100 marks, should be scaled down to a final score of 20 marks.	A **Semester End Practical Examination** of **2 hours duration** for **30 marks** as per the paper pattern given below. **Certified Journal** is **compulsory** for appearing at the time of Practical Exam
	Total: 20 marks	**Total: 30 Marks**

14	**Format of Question Paper:**

Total Marks: 30   **Duration: 2 Hours**

Question	Practical Question Based On	Marks
Q. 1	Module 1	12
Q. 2	Module 2	12
Q. 3	Viva	06

University of Mumbai

Subject: <u>Computer Science</u>

MINOR COURSES

Year	Sem.	Theory / Practical	Course Title	No of Credits	No of Lectures Hours	Total Credits
1	II	Pr	Programming with Python	2	30	2
II	III	Pr	Algorithms and Data Structures	2	30	4
		Pr	Web Design & Development	2	30	
	IV	Pr	Open Source Database: MySQL	2	30	4
		Pr	Introduction to IoT	2	30	
III	V	Pr	Computer Networks & Applications	2	30	4
		Pr	Cyber Security	2	30	
	VI	Pr	AI and Data Science	2	30	4
		Pr	Data Analysis & Visualization	2	30	

Sign of the BOS Chairman   **Sign of the Offg. Associate Dean**   **Sign of Offg. Dean**
Dr. Jyotshna Dongardive   **Dr. Madhav R. Rajwade**   **Prof. Shivram S. Garje**
Ad-hoc BOS (Computer Science)   Faculty of Science & Technology   Faculty of Science & Technology