Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Computer Application

Choice Based Credit System (CBCS) in the light of NEP-2020

B. C. A. (AI & ML)

SEMESTER-I (2026-27)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
				THEORY			PRACTICAL		L	T	P	CREDITS
			Marks	END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BCAAIML101	Major 1	Python Programming	Max	60	20	20	0	0	4	0	0	4
			Min	24	16		0	0				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. The goal of this course is to provide students with an understanding of basic concepts of Python Programming Language along with its features.

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)**.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

CO1	Apply basic concepts of python programming.
CO2	Write clear and effective python code based on conditional and iterative statements.
CO3	Will be having an idea about string, list, tuple and functions.
CO4	Create an applications using python programming.

TEACHING PEDAGOGY:

T1	Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
T2	ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

ATL1	Quiz
ATL2	Activity Based Learning
ATL3	Midterm Exams
ATL4	Flip Class
ATL5	Seminar Presentation
ATL6	Assignments
ATL7	Poster
ATL8	Oral Viva-voce examination

Chairperson Board of Studies Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Chairperson Faculty of Studies Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Controller of Examinations Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Registrar Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Dean Academic Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Vice Chancellor Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

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				THEORY			PRACTICAL		L	T	P	CREDITS
			Marks	END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BCAAIML101	Major 1	Python Programming	Max	60	20	20	0	0	4	0	0	4
			Min	24	16		0	0				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

PREREQUISITES:

Basic programming skills, logical thinking, basic mathematics.

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	**Unit-I** **Introduction:** Basic Concept of python, basics of Python Virtual Machine and its advantages in comparison to other programming environment, its characteristics, Features, Names of popular application in python, various flavors of python, limitations of python, versions of python, Python-2 and Python-3 differences. Identifiers, keywords, datatypes, use of comments in python, variables and constants, various operators used in python.	10	**ATL3** **ATL5** **ATL6** **ATL8**
II	**Unit-II** **Input-output and Conditional statements:** input and output statements and basic simple programs using it. Decision Making statements: if statement, if-else statement and nested if statement. **Iterative and Transfer Statements:** Iterative statements: For Loop, While loop, nested loops. Transfer statement: break and continue statement.	15	**ATL3** **ATL5** **ATL6** **ATL8**
III	**Unit-III** **Strings Used in Python Programming:** Definition, accessing characters or values of a String, Updating Strings, String Special Operators, String Formatting Operator. **List, Tuples, Dictionary, Sets, Functions,** Introductory concept of Python Lists and Python Tuples, Comparison among List, Tuples, Dictionary, and Sets, Basic concept of python functions.	15	**ATL3** **ATL5** **ATL6** **ATL8**

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			Marks	END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BCAAIML101	Major 1	Python Programming	Max	60	20	20	0	0	4	0	0	4
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Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

IV	**Unit-IV** **Python File Handling:** concept and types of files used in Python Programming language. Operations like opening and closing a file with various modes, deleting a file.	10	**ATL3** **ATL5** **ATL6** **ATL8**
V	**Unit-V** **Introduction of Python OOPs Concepts: Python Paradigm & difference with other Programming Paradigm,** Introduction of Class and Object, creating class and its instance, constructor (Parameterized Constructor and Non-Parameterized Constructor), destructors, polymorphism, inheritance (Multilevel and multiple), definition of data abstraction. **Introduction to Python library (NumPy, Pandas, MatPlotLib, Django).**	10	**ATL3** **ATL5** **ATL6** **ATL8**
	Total Hours	**60**	

ADDITIONAL RESOURCES

A. Value addition to course content/ Skill enhancement content:

B. Remedial classes for slow learners:

As per the AUMP SOP for slow and fast learners.

SUGGESTED READINGS:

Textbooks

1. Dr. Reema Thareja, "Python Programming: Using Problem Solving Approach" Oxford University Press India | 2nd & 3rd Edition (2022–2024)
2. E. Balagurusamy, "Problem Solving and Python Programming" McGraw-Hill Education India | Latest Edition (2023)

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Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

3. Yashavant P. Kanetkar & Aditya Kanetkar, “Let Us Python — 7th Edition” BPB Publications | 7th Edition (2023)

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5. Eric Matthes “Python Crash Course — 3rd Edition” , No Starch Press | 3rd Edition, January 2023 | 552 pages
6. Mark Lutz, “Learning Python — 5th Edition”, O'Reilly Media | 5th Edition, 2013

Suggested e- resources (Websites/e- books)

1. “The Joy of Computing using Python” - nptel.ac.in/courses/106106182
2. Programming, Data Structures & Algorithms using Python - nptel.ac.in/courses/106106145
3. Official Python Documentation & Tutorial - docs.python.org/3/tutorial

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	M	L							M	L
CO2	H	H	M	M							M	
CO3	H	H	M	M							M	
CO4	M	H	H	H		M		L	M		M	L

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				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BCAAIML101	Major 1	Python Programming	Max	60	20	20	0	0	4	0	0	4
			Min	24	16		0	0				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

H= more than 50% of CO is mapped to particular PO
M= more than 30% and less than 50% of CO is mapped to particular PO
L= Less than 20% of CO is mapped to particular PO

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				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BCAAIML101 (P)	Practical (Major-1)	Python Programming Lab	Max	0	0	0	30	20	0	0	4	2
			Min	0	0		13.5	9				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. The goal of this course is to provide students with an understanding of basic concepts of Python Pro

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)**.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

CO1	Apply basic concepts of python programming.
CO2	Write clear and effective python code based on conditional and iterative statements.
CO3	Will be having an idea about string, list, tuple and functions.
CO4	Create an applications using python programming.

TEACHING PEDAGOGY:

T1	Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
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ASSESSMENT TOOLS:

ATL1	Quiz
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BCAAIML101 (P)	Practical (Major-1)	Python Programming Lab	Max	0	0	0	30	20	0	0	4	2
			Min	0	0		13.5	9				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

PREREQUISITES:

There are no formal prerequisites **/ Basic computer / C programming skills, logical thinking, basic mathematics**

S No	Practical	CO Mapping
1	Write python program to print Hello World / SVVV.	CO1
2	Write python program to print your Bio Data / Resume.	CO1
3	Write a program to perform different Arithmetic Operations on numbers in Python.	CO1
4	Write python program to Hello World using string variable.	CO1
5	Write python program to show use of break statement.	CO2
6	Write python program to show use of continue statement.	CO2
7	Write a python program to find largest of three numbers.	CO2
8	Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula: c = (f-32)/1.8]	CO2
9	Write a python program to find Smallest of three numbers.	CO3
10	Write python program to store data in list and then try to print them.	CO3
11	Write a python Program to print first five even numbers.	CO2
12	Write a python Program to print odd numbers from 1 to N.	CO2
13	Write python program to print list of numbers using for loop.	CO2
14	Write a python program to find factorial of a number using loop.	CO2
15	Write a python program to find a given number is perfect number or not.	CO2
16	Write a python program to display Fibonacci series.	CO2
17	Write a python program to find a given string is palindrome or not.	CO2
18	Write a python program to print length of given string without using built-in	CO3

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function.

19	Write a python program to covert entered list into tuple.	CO3
20	Write a python program to store students data using dictionary.	CO3
21	Write a python program to generate random numbers using NumPy and find average of them.	CO4

ADDITIONAL RESOURCES

A. Value addition to course content/ Skill enhancement content:

B. As per the AUMP SOP for slow and fast learners.

SUGGESTED READINGS:

Textbooks

1. Dr. Reema Thareja, “Python Programming: Using Problem Solving Approach” Oxford University Press India | 2nd & 3rd Edition (2022–2024)
2. E. Balagurusamy, “Problem Solving and Python Programming” McGraw-Hill Education India | Latest Edition (2023)
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BCAAIML101 (P)	Practical (Major-1)	Python Programming Lab	Max	0	0	0	30	20	0	0	4	2
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Suggested e- resources (Websites/e- books)

1. **"The Joy of Computing using Python" - nptel.ac.in/courses/106106182**
2. **"Programming, Data Structures & Algorithms using Python" - nptel.ac.in/courses/106106145**
3. **"Official Python Documentation & Tutorial" - docs.python.org/3/tutorial**

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	M	L							M	L
CO2	H	H	M	M							M	
CO3	H	H	M	M							M	
CO4	M	H	H	H		M		L	M		M	L

H= more than 50% of CO is mapped to particular PO
M= more than 30% and less than 50% of CO is mapped to particular PO
L= Less than 20% of CO is mapped to particular PO

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				THEORY			PRACTICAL					
			Marks	END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BCCA105M	Minor -1	Programming Methodology and C	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		13.5	9				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. To familiarize the students with programming and to encourage them to develop their logic.
2. To make students well versed with C language to solve problems efficiently.
3. Using simple and well drawn illustrations develop their programming skills using modular programming.
4. To cover the various data structures and their applications.

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)**.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

CO1 Develop algorithms for problems.

CO2 Apply the programming concepts to solve the given problems.

CO3 Write the programs using modular programming.

CO4 Understand and write programs using various data structures very efficiently.

CO5 Write the programs using pointers and to manage memory.

TEACHING PEDAGOGY:

T1 Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching

T2 ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

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ASSESSMENT TOOLS:

ATL1	Quiz
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ATL6	Assignments
ATL7	Poster
ATL8	Oral Viva-voce examination

PREREQUISITES:

Basic computer skills, logical thinking, basic mathematics

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	**Unit-I** **An overview**: Problem identification, analysis, design, coding, testing & debugging, implementation, modification & maintenance; algorithms & flowcharts; Characteristics of a good program - accuracy, simplicity, robustness, portability, minimum resource & time requirement, modularization; Rules/ conventions of coding, documentation, naming variables; Top-down design; Bottom-up design.	12	**ATL3** **ATL5** **ATL6** **ATL8**
II	**Unit-II** **Fundamentals of C Programming**: History of C; Structure of a C Program; Data types; Constant & Variable, naming variables; Operators & expressions; Control Constructs – if-else, for, while, do-while; Case switch statement; Arrays; Ternary operator; Type conversion & type casting; Priority & associativity of operators.	12	**ATL3** **ATL5** **ATL6** **ATL8**

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SEMESTER-I (2026-27)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
				THEORY			PRACTICAL					
			Marks	END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BCCA105M	Minor -1	Programming Methodology and C	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		13.5	9				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

III	**Unit-III** **Modular Programming**: Functions; Arguments; Return value; Parameter passing – call by value, call by reference; Return statement; Scope, visibility and life-time rules for various types of variable, static variable; Calling a function; Recursion – basics.	12	**ATL3** **ATL5** **ATL6** **ATL8**
IV	**Unit-IV** **Advanced Programming Techniques**: Special constructs – Break, continue, exit (), goto & labels; Pointers - & and * operators, pointer expression, pointer arithmetic, dynamic memory management functions like malloc(), calloc(), free(); String; Pointer v/s array.	12	**ATL3** **ATL5** **ATL6** **ATL8**
V	Unit-V **Miscellaneous Features**: printf & scanf family; C preprocessor – basics, #Include, #define, #undef, conditional compilation directive like #if, #else, #elif, #endif, #ifdef and #ifndef	12	**ATL3** **ATL5** **ATL6** **ATL8**
	Total Hours	**60**	

List of Practicals :

1. Define an algorithm and flowchart. Draw algorithm and flow chart for a program that converts an input Fahrenheit degree into Celsius equivalent.
2. WAP for find numbers is Zero, Negative or Positive.
3. Write an algorithm and a C program to find the greatest among three numbers.
4. WAP to print an input string in lower case, upper case and mixed case using library function.
5. WAP a C program to reverse an input number.
6. WAP for generate table of given number N.
7. WAP to find a given number is prime or not prime.
8. Draw a flow chart and WAP to find prime number from 1 to N.
9. WAP to find a given number is perfect or not perfect.

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10. WAP to find to find perfect number between given number N to M.
11. WAP to find factorial of accepted number.
12. WAP to calculate factorial of a number using recursion.
13. WAP in C to generate Fibonacci series.
14. WAP in C to generate Pascal triangle.
15. WAP in C to swap values of two variables.
16. WAP in C to search a given element in an array using linear search.
17. WAP to sort an integer array in ascending and descending order according to user's choice.
18. Write a menu driven program to perform matrix addition, subtraction and multiplication.
19. WAP a C program to reverse a string by recursion.

ADDITIONAL RESOURCES

A. Value addition to course content/ Skill enhancement content:

B. Remedial classes for slow learners:

As per the AUMP SOP for slow and fast learners.

SUGGESTED READINGS:

Textbooks

1. **Programming in C — Reema Thareja (Oxford University Press)**
2. **C Programming: Absolute Beginner's Guide — Greg Perry & Dean Miller (Que / Pearson, 3rd Ed.)**
3. **C Programming: A Modern Approach — K.N. King (W.W. Norton & Company, 2nd Ed.)**

Reference Books

1. KanitkarYashwant, 'Let us C', BPB New Delhi
2. Balaguruswami, 'Ansi C', TMH, Delhi
3. Kerninghan& Ritchie "The C programming language", PHI
4. Schildt, "C:The Complete reference" 4th ed TMH.

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5. Cooper Mullish, "The Spirit of C", Jaico Publishing House, Delhi

Suggested e- resources (Websites/e- books)

1. **Introduction to Programming in C — IIT Kanpur (NPTEL)** https://nptel.ac.in/courses/106104128
2. **Practical Programming in C — MIT OCW** https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/
3. **CS50x — Harvard's Introduction to Computer Science** https://cs50.harvard.edu/x/

Mapping of Course Outcomes and Program Outcomes:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	H	M				L		L	M	
CO2	M	H	H	M				L		L	M	
CO3	M	H	M	H				M	L	L	M	
CO4	H	H	H	M				L		L	M	
Co5	M	H	M	H				L		L	M	

H= more than 50% of CO is mapped to particular PO
M= more than 30% and less than 50% of CO is mapped to particular PO
L= Less than 20% of CO is mapped to particular PO

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