



United International University

B.Sc. in Data Science

Course Syllabus

1. **Course Title:** Programming for Data Science
2. **Course Code:** DS 1501
3. **Trimester and Year:** Spring 2025
4. **Pre-requisites:** None.
5. **Credit Hours:** 3.0
6. **Section:**
7. **Class Hours:** 11:11 AM - 12:30 PM
8. **Class Room:**
9. **Instructor's Name:** Khushnur Binte Jahangir
10. **Email:** khushnur@cse.uiu.ac.bd
11. **Office:** 336(C)
12. **Counselling Hours:** See at glass door of R#336 (C)
13. **Text Book:**
 - (i) Python Crash Course, 3rd Edition: A Hands-On, Project-Based Introduction to Programming, Eric Matthes, No starch press.
14. **References:**
 - (i) Intro to Python for Computer Science and Data Science: Learning to Program with AI, Big Data and the Cloud, Deitel and Deitel.
 - (ii) Learn Python the Hard Way: A Very Simple Introduction to the Terrifyingly Beautiful World of Computers and Code Book by Zed Shaw
 - (iii) পাইথন দিয়ে প্রোগ্রামিং শেখা: তামিম শাহরিয়ার সুবিন, দ্বিমিক প্রকাশনী
 - (iv) <https://www.w3schools.com/python/>
 - (v) <https://www.hackerrank.com/domains/python>
15. **Course Contents (approved by UGC):** Branching and iteration; String Manipulation, Guess and Check, Approximations, Bisection; Decomposition, Abstractions, Functions; Tuples, Lists, Aliasing, Mutability, Cloning; Recursion, Dictionaries; Testing, Debugging, Exceptions, Assertions, Files and I/O.
16. **Course Outcomes:**
 - CO1** Understand basic concepts of Programming.
 - CO2** Comprehend basic and intermediate concepts of a programming language used in data science.
 - CO3** Apply programming language skills to solve basic and intermediate level programming problems.
 - CO4** Interpret programs written in a programming language used in data science.
 - CO5** Develop simple data science applications using a programming language used in data science.

17. **Teaching Methods:** Lecture, Slides, Demonstration

18. **CO with Assessment Methods:**

CO	Assessment Method	(%)
-	Attendance	5
-	Assignments	5
-	Class Tests	20
CO1,CO2,CO3	Midterm exam	30
CO3,CO4,CO5	Final exam	40

19. **Mapping of COs and Program outcomes:**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	x							
CO2	x							
CO3		x						
CO4	x							
CO5			x					

20. **Lecture Outline:**

Class	Topic	CO	Reading Ref	Activities/ Outcome
1	Introduction to Data Science and Python, how to run a python program.	CO1	Chapter 1	Lecture, Slides, Demonstration
2	Print Function, Comments in python Variables Logical and Mathematical Operators Precedence	CO1	2.1-2.5 (Deitel)	Lecture, Slides, Demonstration
3	Dynamic Typing, input() More on print function, formatted output builtin functions: min, max	CO1	2.6 (Deitel)	Lecture, Slides, Demonstration
4	Conditional Statements and Branches	CO1	2.7, 3.5, 3.6 (Deitel), Chapter 5 (crash)	Lecture, Slides, Demonstration
5	Decision Making with Conditional Statements and Branches	CO1	2.7, 3.5, 3.6 (Deitel), Chapter 5 (crash)	Lecture, Slides, Demonstration
6	Introduction to Lists, sublisting, indexing	CO2	5.1 (deitel), chapter 3 (crash)	Lecture, Slides, Demonstration
7	Loops: For	CO1	3.8 (Deitel)	Lecture, Slides, Demonstration
8	List, Iterator, Ranges and Augmented Assignments	CO2	3.8, 3.9 (Deitel), Chapter 3-4 (crash)	Lecture, Slides, Demonstration
9	While Loops	CO1	Chapter 7 (crash)	Lecture, Slides, Demonstration

Class	Topic	CO	Reading Ref	Activities/ Outcome
10	More on Loops: break, nested, continue	CO3	Chapter 7 (crash)	Lecture, Slides, Demonstration
11	More Builtin Functions Random numbers	CO3	2.9, 3.17, 4.4 (deitel)	Lecture, Slides, Demonstration
12	Review	-	-	
Mid Exam				
13	Tuples and More on Lists	CO3	5.3-5.6 (deitel)	Lecture, Slides, Demonstration
14	Dictionary	CO4	6.2 (deitel)	Lecture, Slides, Demonstration
15	Dictionary Extended	CO4	6.2 (deitel)	Lecture, Slides, Demonstration
16	Tuples, Sets	CO3	6.3 (deitel)	Lecture, Slides, Demonstration
17	Strings	CO3	Chapter 8 (deitel)	Lecture, Slides, Demonstration
18	User Defined Functions	CO2	Chapter 4 (deitel)	Lecture, Slides, Demonstration
19	User Defined Functions, Variable Scopes, Global Variables, recursion	CO3	Chapter 4 (deitel)	Lecture, Slides, Demonstration
20	Array operations with numpy	CO3	Chapter 7 (deitel)	Lecture, Slides, Demonstration
21	More on Array operations with numpy	CO4	Chapter 7 (deitel)	Lecture, Slides, Demonstration
22	Files	CO4	9.2-9.4 (deitel)	Lecture, Slides, Demonstration
23	Files	CO5	9.2-9.4 (deitel)	Lecture, Slides, Demonstration
24	Review	CO5	-	
Final Exam				

Letter Grades

Letter Grade	Grade Point	Marks	Assessment
A	4.00	90-100	Outstanding
A-	3.67	86-89	Excellent
B+	3.33	82-85	Very Good
B	3.00	78-81	Good
B-	2.67	74-77	82-85 Above Average
C+	2.33	70-73	Average
C	2.00	66-69	Below Average
C-	1.67	62-65	Poor
D+	1.33	58-61	Very poor
D	1.00	55-57	Pass
F	0.00	<55	Fail
I	0.00	-	Incomplete
W	0.00	-	Withdraw
R	0.00		Repeat/Retake

Program Outcomes

Graduates of the program will have an ability to:

- PO1** Analyze a complex problem and to apply principles of data science and other relevant disciplines to identify solutions.
- PO2** Design, implement, and evaluate solutions of complex problems to meet a given set of requirements.
- PO3** Apply theory, techniques, and tools throughout the data science lifecycle and employ the resulting knowledge to satisfy stakeholders' needs.
- PO4** Communicate effectively in a variety of professional contexts.
- PO5** Recognize professional responsibilities and make informed judgments based on legal and ethical principles in practice.
- PO6** Function effectively as a member or leader of a team engaged in activities to solve a wide variety of infrequently encountered problems in diverse areas.
- PO7** Acquire and apply new knowledge as needed, using appropriate learning strategies.
- PO8** Demonstrate understanding of the skills required to be an entrepreneur and ability to apply entrepreneurial skills.