



Syllabus*: Programming for Data Science and Artificial Intelligence (2010042250)

Second Semester 2021/2022

COURSE INFORMATION	
Course Name: Programming for Data Science and Artificial Intelligence Semester: Second Department: Department of Information Technology Faculty: Prince Al-Hussein bin Abdullah II Faculty for Information Technology	Course Code: 2010042250 Section: 2 Core Curriculum: Data Science and Artificial Intelligence
Day(s) and Time(s): Sunday: 10:00-11:00 Tuesday: 10:00-11:00 Thursday: 10:00-11:00 (online) Classroom: IT.102	Credit Hours: 3 Prerequisites: 1910011100
COURSE DESCRIPTION	
This course focuses on the fundamentals of computer programming using Python programming language. Python is simple and powerful programming language that includes several prebuilt libraries, such as <i>Numpy</i> for scientific computation and <i>Pybrain</i> for machine learning-based computation, that saves application development time for data scientists and artificial intelligence experts. In this course, data types, variables, control structures, loops, and program development with functions, lists and dictionaries are introduced. The course also introduces the main principles of object-oriented programming. The course will enable students to solve real-world problems and develop complete applications.	
DELIVERY METHODS	
The course will be delivered through a combination of active learning strategies. These will include: • PowerPoint lectures and active classroom based discussion. • Weekly worksheets. • Practical lectures using Anaconda Python distribution. • E-learning resources: e-reading assignments and worksheets through Microsoft Teams.	

FACULTY INFORMATION	
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REFERENCES AND LEARNING RESOURCES
Required Textbook: Fundamentals of Python: First Programs (2 nd edition), Kenneth Lambert, Course Technology, 2019, ISBN-13:978-1-337-56009-2.
Suggested Additional Resources:
1. Fundamentals of Python Programming, Richard L. Halterman, Southern Adventist University, 2018.
2. Python Programming Fundamentals (2 nd edition), Kent D. Lee, Springer, 2014.
3. Think Python: How to Think Like a Computer Scientist (2 nd edition), Allen Downey, <i>Green Tea Press</i> , 2014.
Software:
1. Anaconda Version 2021.05 including Python 3.9, for Windows, Mac, or Linux: (Download the software from: https://www.anaconda.com/download/)

STUDENT LEARNING OUTCOMES MATRIX*

Core Curriculum Learning Outcomes	Program Learning Outcomes	Course Student Learning Outcomes	Assessment Method
CC-LO-3 Preparing the competitiveness of graduates at a level capable of supplying the Jordanian and international market with	PLO-4: Develop relevant programming abilities.	Recognize the basic programming elements including variables, constants, arithmetic operators and expressions.	• Exams • Worksheets • Assignments
		Use appropriate control structure to solve particular problem.	• Exams • Worksheets • Assignments
		Construct functions, lists and dictionaries in programs.	• Exams • Worksheets • Assignments

qualified scientific competencies.		Utilize object-oriented concepts in developing programs.	• Exams • Worksheets • Assignments
	PLO-2: Demonstrate proficiency in different AI algorithms and techniques.	Be able to implement, compile, test and run programs, to address a particular real-world problem.	• Exams • Worksheets • Assignments

ACADEMIC SUPPORT

It is The Hashemite University policy to provide educational opportunities that ensure fair, appropriate and reasonable accommodation to students who have disabilities that may affect their ability to participate in course activities or meet course requirements. Students with disabilities are encouraged to contact their Instructor to ensure that their individual needs are met. The University through its Special Need section will exert all efforts to accommodate for individual's needs.

Special Needs Section:

Tel: 0539033333 EXT 5023/4583

Location: (<https://hu.edu.jo/facnew/index.aspx?typ=68&unitid=70000000>)

Email: (huniv@hu.edu.jo)

COURSE REGULATIONS

Participation

Class participation and attendance are important elements of every student's learning experience at The Hashemite University, and the student is expected to attend all classes. A student should not miss more than 15% of the classes during a semester. *Those exceeding this limit of 15% will receive a failing grade regardless of their performance.* It is a student's responsibility to monitor the frequency of their own absences. **Attendance record begins on the first day of class irrespective of the period allotted to drop/add and late registration. It is a student's responsibility to sign-in; failure to do so will result in a non-attendance being recorded.**

In exceptional cases, the student, with the instructor's prior permission, could be exempted from attending a class provided that the number of such occasions does not exceed the limit allowed by the University. The instructor will determine the acceptability of an absence for being absent. A student who misses more than 25% of classes and has a valid excuse for being absent will be allowed to withdraw from the course.

Plagiarism

Plagiarism is considered a serious academic offence and can result in your work losing marks or being failed. HU expects its students to adopt and abide by the highest standards of conduct in their interaction with their professors, peers, and the wider University community. As such, a student is expected not to engage in behaviours that compromise his/her own integrity as well as that of the Hashemite University.

Plagiarism includes the following examples and it applies to all student assignments or submitted work:

- **Use of the work, ideas, images or words of someone else without his/her permission or reference to them.**
- **Use of someone else's wording, name, phrase, sentence, paragraph or essay without using quotation marks.**
- **Misrepresentation of the sources that were used.**

The instructor has the right to fail the coursework or deduct marks where plagiarism is detected

Late or Missed Assignments

In all cases of assessment, students who fails to attend an exam, class project or deliver a presentation on the scheduled date without prior permission, and/or are unable to provide a medical note, will automatically receive a fail grade for this part of the assessment.

- Submitting a term paper on time is a key part of the assessment process. Students who fail to submit their work by the deadline specified will automatically receive a 10% penalty. Assignments handed in more than 24 hours late will receive a further 10% penalty. Each subsequent 24 hours will result in a further 10% penalty.
- In cases where a student misses an assessment on account of a medical reason or with prior permission; in line with University regulations an incomplete grade for the specific assessment will be awarded and an alternative assessment or extension can be arranged.

Student Complaints Policy

Students at The Hashemite University have the right to pursue complaints related to faculty, staff, and other students. The nature of the complaints may be either academic or non-academic. For more information about the policy and processes related to this policy, you may refer to the students' handbook.

COURSE ASSESSMENT

Course Calendar and Assessment

Students will be graded through the following means of assessment and their final grade will be calculated from the forms of assessment as listed below with their grade weighting taken into account.

Assessment	Grade Weighting	Deadline Assessment
First Exam	25%	To be announced
Second Exam	25%	To be announced
Assignments	10%	To be announced
Worksheets	Zero	Weekly
Final Exam (3)	40%	To be announced

Description of Exams

Test questions will predominately come from material presented in the lectures. Semester exams will be conducted during the regularly scheduled lecture period. Exam will consist of a combination of multiple choice, short answer, true and false and/or descriptive questions.

Worksheets: Will be given weekly, students are supposed to work on them and complete them when I finish the chapter.

You are also expected to work on in-chapter examples, self-tests and representative number of end of chapter problems. The answers of self-tests and end of chapter exercises are given at the end of the book.

Assignments: Will be given as scheduled, you should submit them before the deadline.

No make-up exams, homework or assignments will be given. Only documented absences will be considered as per HU guidelines.

Grades are not negotiable and are awarded according to the following criteria*:

Letter Grade	Description	Grade Points
A+	Excellent	4.00
A		3.75
A-		3.50
B+	Very Good	3.25
B		3.00
B-		2.75
C+	Good	2.50
C		2.25
C-		2.00
D+	Pass	1.75
D	Pass	1.50
F	Fail	0.00
I	Incomplete	-

WEEKLY LECTURE SCHEDULE AND CONTENT DISTRIBUTION

Topics Covered					
Topic	Chapter in Text	Week #	Lecture	Content	Delivery Method
Conceptual introduction, installing Python; basic syntax, interactive shell, editing, saving, and running a script.	Ch1	Week1	Lect. 1	Conceptual introduction and installing Python	Face to face
			Lect. 2	Getting Started with Python Programming, Detecting and Correcting Syntax Errors	Face to face
			Lect. 3	Worksheet1	Online
Data types, variables, assignments, arithmetic operators and expressions, comments in the program and understanding error messages.	Ch2	Week2	Lect. 1	Strings, Assignment, and Comments	Face to face
			Lect. 2	Numeric Data Types and Character Sets	Face to face
			Lect. 3	Worksheet 2 Part I	Online
		Week3	Lect. 1	Expressions	Face to face
			Lect. 2	Using Functions and Modules	Face to face
			Lect. 3	Worksheet 2 Part II	Online
Loops and Selection Statements.	Ch3	Week4	Lect. 1	Definite Iteration: The for Loop	Face to face
			Lect. 2	Formatting Text for Output	Face to face
			Lect. 3	Worksheet 3	Online
		Week5	Lect. 1	Selection: if and if-else Statements	Face to face
			Lect. 2	Conditional Iteration: The while Loop	Face to face
			Lect. 3	Assignment 1	online
Strings and Text Files.	Ch4	Week6	Lect. 1	Accessing Characters and Substrings in Strings	Face to face
			Lect. 2	Strings and Number Systems	Face to face
			Lect. 3	Worksheet 4 Part I	Online
		Week7	Lect. 1	String Methods	Face to face
			Lect. 2	Text Files	Face to face
			Lect. 3	Worksheet 4 Part II	Online
Lists and Dictionaries.	Ch5	Week8	Lect. 1	List Literals and Basic Operators, Replacing an Element in a List	Face to face
			Lect. 2	List Methods for Inserting and Removing Elements, Searching a List, Sorting a List	Face to face
			Lect. 3	Worksheet 5 Part I	Online
		Week9	Lect. 1	Dictionary Literals, Adding Keys and Replacing Values	Face to face
			Lect. 2	Accessing Values, Removing Keys, Traversing a Dictionary	Face to face
			Lect. 3	Worksheet 5 Part II	Online

Design with Functions.	Ch6	Week10	Lect. 1	A Quick Review of What Functions Are and How They Work	Face to face
			Lect. 2	Design with Recursive Functions	Face to face
			Lect. 3	Worksheet 6 Part I	Online
		Week11	Lect. 1	Higher-Order Functions	Face to face
			Lect. 2	More Examples on Functions	Face to face
			Lect. 3	Worksheet 6 Part II	Online
Design with Classes.	Ch9	Week12	Lect. 1	Getting Inside Objects and Classes	Face to face
			Lect. 2	Method Definitions	Face to face
			Lect. 3	Worksheet 7	Online
		Week13	Lect. 1	Accessors and Mutators	Face to face
			Lect. 2	The Lifetime of Objects	Face to face
			Lect. 3	Assignment 2	Online
		Week14	Lect. 1	Examples and Discussion	Face to face
			Lect. 2	Examples and Discussion	Face to face
			Lect. 3	Examples and Discussion	Online