Course Specification
— (Bachelor)

Course Title: **MATHEMATICAL PROGRAMMING I**

Course Code: **MTHS 212**

Program: **APPLIED STATISTICS AND DATA MANAGEMENT**

Department: **MATHEMATICS**

College: **SCIENCE - ZULFI**

Institution: **MAJMAAH UNIVERSITY**

Version: **TP – 153 – 2023**

Last Revision Date: 26/9/2023

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A. General information about the course:

1. Course Identification

1. Credit hours: 3(2+2)

2. Course type

A.	☐University	☐College	☒Department	☐Track	Others
B.	☒Required			☐Elective	

3. Level/year at which this course is offered: (3rd level)

4. Course general Description:

Python is a programming language with a simple syntax and a large library. It's an interpreted language with a powerful debugger and profiler, as well as a comprehensive programming environment. While it is simple to learn, it is frequently utilized for data exploration in many scientific fields. This course is an introduction to the Python programming language for students without prior programming experience. We cover data types, control flow, Also It covers the basics of programming in Python including variables, expressions, loops, conditions, lists, strings, functions, and standard and file I/O in a hands-on fashion.

5. Pre-requirements for this course (if any):

None

6. Co-requisites for this course (if any):

None

7. Course Main Objective(s):

Understand basic principles of computers
Basic principles of programming language Python Introduction of Input / Output
Data types, variables, expressions
Understand the programming basics (operations, control structures, data types, etc.)
Understand Python Conditional Statements: IF…Else, ELIF & Switch Case & For & While Loops
Understand to implement various types of codes

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	75 %
2	E-learning	15	25 %
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	**30**
2.	**Laboratory/Studio**	**30**
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		**60**

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Reproduce fundamentals and concepts of Statistics and Data science	K1	Direct teaching: Inquiry-based instruction PowerPoints Discussions Aimed teaching: Discovery Oral questions Indirect teaching: Peer Learning	Homework Quiz Midterms Final Exams E-exam Oral Exam
1.2	Effectively use the terms, hypothesis, theories and practices associated with statistics and data science	K4	Direct teaching: Lectures Aimed teaching: Discovery Oral questions Indirect teaching: Peer Learning	Homework Quiz Midterms Final Exams

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
				E-exam Oral Exam
...				
2.0	**Skills**			
2.1	At the end of the course, the student should be able to Demonstrate the work independently and within a team. To implement algorithms in Python to solve simple to moderate programming problems.	S2	Direct teaching: Lectures Aimed teaching: Discovery Oral questions Indirect teaching: Cooperative Learning	Homework Quiz Midterms Final Exams
2.2	The students should Analyze and realize the codes of ethics and their importance, Be able to write treatise or thesis by Scientific workplace.	S2	Direct teaching: Lectures Aimed teaching: Discovery Oral questions Indirect teaching: Cooperative Learning	Homework Quiz Midterms Final Exams
...				
3.0	**Values, autonomy, and responsibility**			
3.1				
3.2				
...				

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction -- Relationship between computers and programs -- Basic principles of programming language Python Introduction of Input / Output	**8**
2.	Data types ،variables ،expressions ،and statements -- Assignment statements	**8**
3.	Python Operators :Arithmetic ،Logical ،Comparison ،Assignment ،Bitwise & Precedence	**8**
4.	Python Conditional Statements :IF…Else ،ELIF & Switch Case & For & While Loops	**12**
5.	Python Arrays :Create ،Reverse ،Pop with Python Array Examples & Python 2D Arrays :Two-Dimensional List Examples	**12**
6.	Python Function & Example	**8**

7.	Python Strings & Example	4
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Mid-Term 1	5th Week	30%
2.	Quizzes	Through of term	10%
3.	Home Works	Through of term	10%
4.	E-Exam	12th Week	10%
5.	Final Exam	End of the term	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	* A Beginners Guide to Python 3 Programming, John Hunt Midmarsh Technology Ltd Chippenham, Wiltshire, UK, Springer publication 2020, * Advanced Guide to Python 3 Programming, Ian Mackie, University of Sussex, Brighton, UK, Springer publication 2020, * Starting Out with Python plus My Programming Lab with Pearson e-Text --Access Card Package (3rd Edition) Tony Gaddis ISBN-13: 978-0133862256, Tony Gaddis, Pearson , 2014
Supportive References	Gowrishankar, S., & Veena, A. (2018). Introduction to Python Programming. CRC Press. , Gowrishankar, S., & Veena, A. , Chapman and Hall/CRC , 2018
Electronic Materials	https://www.online-python.com/ http://www.wolfram.com/ http://www.mathworks.com/ http://www.mackichan.com/ https://www.ibm.com/sa-en/spss
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom with capacity of 30-students .Computer Lab of Mathematics Department.
Technology equipment (projector, smart board, software)	Mathematical software packages like: PYTHON -1 MATHEMATICA. -2 MATLAB. -3 SPSS -4 SCIENTIFIC WORKPLACE.
Other equipment (depending on the nature of the specialty)	http://mathworld.wolfram.com/classroom/

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	**Students/ internal committee**	**Direct (Students evaluation electronically organized by Deanship of registration and admission)/ Verification of students' papers**
Effectiveness of Students assessment	**Staff members (Peer Reviewer)**	**Indirect (Frequent meetings consultation among the teaching staffs)**
Quality of learning resources	**Staff members (course coordinators)**	**Direct (meeting between course coordinator and tutors.**
The extent to which CLOs have been achieved	**Staff members (Peer Reviewer)**	**Indirect (Frequent meetings consultation among the teaching staffs)**
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	