Course Specification

— (Bachelor)

Course Title:	**Mathematical programming 2**
Course Code:	**MTHS 214**
Program:	**Applied Statistics & Data Management**
Department:	**Mathematics**
College:	**College Of Science**
Institution:	**Majmaah University, Saudi Arabia**
Version:	**2023**
Last Revision Date:	28/9/2023

Table of Contents

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: (LEVE 3)

4. Course general Description:

This course introduces the following topic:
- The Definition of Basic algorithm, Time and space tradeoff on algorithm, Algorithm strategy, Asymptotic analysis of upper and average complexity bound, Identifying difference among best, average and worst case behavior, Big oh, omega, and theta notation.
- Design, specify, and implement ADT of insertion, search and adding/deleting process;
- Concept of the Basic data structure, abstract data type (ADT) as

(arrays, linked list, stack, queue, binary tree, graph).

5. Pre-requirements for this course (if any): mathematical programming 1 MTHS 212

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

7. Course Main Objective(s):

Concept of Object-Oriented Programming (OOP)
Core functionality of Python objects and classes.
You will learn to use inheritance & Multiple Inheritance in Python.
Understand of Operator Overloading

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	32	70%
2.	E-learning	12	30%
3.	Hybrid		

No	Mode of Instruction	Contact Hours	Percentage
	• Traditional classroom • E-learning		
4.	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	40
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	20
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	Define some mathematical problem and solve the problems by Python	K3	*Begin each topic with the explanation of various basic ideas giving plenty of examples* *Start each section by general idea and the benefit of it.* Demonstrate the course	*Exams* *Midterms* Final examination
1.2	Explain sensitivity analysis.	K3	Provide several ways to deal with the exercises	*Home work.* *Classroom activities* group work
1.3…	Understand the principles of code verification and regression testing-Calculate and expected value variable.	K3	Solve some examples during the lectures	Continuous discussions with the students during the lectures
1.4	Calculate the moments and	K3	exercises	discussions with the

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	formulates the Moment Generating Function.			students during the lectures
2.0	Skills			
2.1	*The students will **explain and interpret** the basic fundamentals in Python*	S2	Encourage the student to look for some application problems in other references.	Oral and written exams Quizzes
2.2	Enable students to **analyses** the mathematical problems.		Ask the student to attend lectures for practice solving problem.	*Doing homework.* Check the problems solution.
...				
3.0	Values, autonomy, and responsibility			
3.1	Ability for collaboration	V2		
...				

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction, basic definition of algorithm and Time and space tradeoff on algorithm.	7
2.	Asymptotic analysis of upper and average complexity bound. Difference among best, average and worst-case behavior, Big oh, omega, theta notation. Sorting and searching algorithm	7
3	Abstract data type: arrays and lists	11
4	Linked-lists: single, doubly and circular linked list and their applications	12
5	Stack: its implementation in arrays and linked list	12
6	Queue: its implementation in arrays and in linked list, circular queue	11
	Total	60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	**Midterm 1**	**6th week**	**30 %**
2.	**E-Test**	**9th week**	**10 %**
3.	**Quiz**	**During the semester week**	**10 %**
4...	**Homework**	**During the semester**	**10 %**
5	Final exam	**End of sem.**	**40 %**

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score

*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	Data Structures and Algorithmic Puzzles 5th Edition
Supportive References	Data Structures and Algorithms Narasimha Karumanchi ,2016.
Electronic Materials	Introduction to Python programming, by Ibraheem Al Olian,, Emanuel Parzen, John Wiley & Sons, wileym2001
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Class room
Technology equipment (projector, smart board, software)	- Hall is equipped with a computer. - Provide overhead projectors and related items - Smart board
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Indirect
Effectiveness of students assessment	Peer Reviewer	Direct
Quality of learning resources	Faculty	Direct
The extent to which CLOs have been achieved	Peer Reviewer	Direct
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	