



Course Specification

— (Bachelor)

Course Title: **Scientific Computing**

Course Code: **501125-2**

Program: **Bachelor of Computer Science**

Department: **Department of Computer Science**

College: **College of Computers and Information Technology**

Institution: **Taif University**

Version: **1**

Last Revision Date: **01-02-2024**



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A. General information about the course:

1. Course Identification

1. Credit hours: (2)

2. Course type

A. University College Department Track Others
 B. Required Elective

3. Level/year at which this course is offered: (2/1)

4. Course general Description:

The course introduces the practical aspects of scientific computing where students will be exposed to fundamental coding elements and concepts to solve a wide range of computing and engineering problems.

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

None

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

None

7. Course Main Objective(s):

- Topics cover algorithms for standard problems in computational science.
- as well as the basics of scientific programming, to facilitate the student's implementation of algorithms.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3	100%
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> • 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	15
3.	Field	-
4.	Tutorial	-
5.	Others (specify)	-
Total		45

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	Understand scientific programming environment and solve simple mathematical problems using a computer program.	K1	Lectures Tutorials	Direct Assessment Tool Quizzes / Homework/Project/ Exams Indirect Assessment Tool Course Exit Survey
2.0	Skills			
2.1	Use common built-in mathematical functions in a computer program.	S1	Lectures Tutorials	Direct Assessment Tool Quizzes / Homework/Project/ Exams Indirect Assessment Tool Course Exit Survey
2.2	Create-two/three- dimensional plots	S1	Lectures Tutorials	Direct Assessment Tool Quizzes / Homework/Project/ Exams Indirect Assessment Tool Course Exit Survey
2.3	Create user-defined functions with user-controlled input and output	S1	Lectures Tutorials	Direct Assessment Tool Quizzes / Homework/Project/ Exams Indirect Assessment Tool Course Exit Survey
2.4	Apply selection and repetition structures to solve real problem	S1	Lectures Tutorials	Direct Assessment Tool Quizzes / Homework/Project/ Exams Indirect Assessment Tool Course Exit Survey



Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.5	Apply the basic operations of matrix to solve a set of equations in linear algebra on a computer.	S1	Lectures Tutorials	Direct Assessment Tool Quizzes / Homework/Project/ Exams Indirect Assessment Tool Course Exit Survey

C. Course Content

No	List of Topics	Contact Hours
1.	About Matlab	3
2.	Matlab Environment	3
3.	Built-in Matlab Functions	6
4.	Manipulating Matlab Matrices	6
5.	Plotting	6
6.	User-defined Functions	6
7.	User-controlled Input and Output	3
8.	Logical Functions and Selection Structure	3
9.	Repetition Structures	6
10.	Matrix Algebra	3
Total		45

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	HomeWorks /Student Participation-Attendance	Every week	10 %
2.	Quizzes	Week 4 & Week 12	10%
3.	Mid-Term	Week 7	20%
4.	Final Labs exam	Week 13	15%
5.	Final Examination	Week 16	45%

*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	MATLAB for Engineers (5th Edition), Holly Moore, ISBN-13: 978-0134589640
Supportive References	Getting Started with MATLAB: A Quick Introduction for Scientists and Engineers, Rudra Pratap, ISBN-13: 978-0190602062.
Electronic Materials	Learn with MATLAB. https://www.mathworks.com/support/learn-with-matlab-tutorials.html . Online edition.
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	<ul style="list-style-type: none"> A Lecture room appropriate for maximum 25 students with a personal computer, a data show and a smart board.
Technology equipment (projector, smart board, software)	<ul style="list-style-type: none"> Video projector / data show
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	<ul style="list-style-type: none"> Students Faculty members Coordinator Council Curriculum Committees 	<ul style="list-style-type: none"> Course exit survey Feedback from Faculty members Feedback from Course Coordinator Feedback from council Feedback from Curriculum Committees
Effectiveness of Students assessment	<ul style="list-style-type: none"> Students Faculty members Coordinator Council Curriculum Committees 	<ul style="list-style-type: none"> Course exit survey Feedback from Faculty members Feedback from Course Coordinator Feedback from council Feedback from Curriculum Committees
Quality of learning resources	<ul style="list-style-type: none"> Students 	<ul style="list-style-type: none"> Course exit survey



Assessment Areas/Issues	Assessor	Assessment Methods
	<ul style="list-style-type: none"> Faculty members Coordinator Council Curriculum Committees 	<ul style="list-style-type: none"> Feedback from Faculty members Feedback from Course Coordinator Feedback from council Feedback from Curriculum Committees
The extent to which CLOs have been achieved	<ul style="list-style-type: none"> Students Faculty members Coordinator Council Curriculum Committees 	<ul style="list-style-type: none"> Course exit survey Feedback from Faculty members Feedback from Course Coordinator Feedback from council Feedback from Curriculum Committees
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	CS council
REFERENCE NO.	Meeting #11
DATE	07/03/2024

