



Course Specification

— (Bachelor)

Course Title: Scientific computations

Course Code: 2024203-2

Program: Bachelor in Mathematics

Department: Mathematics and Statistics Department

College: Faculty of Sciences

Institution: Taif University

Version: 1

Last Revision Date: 15/10/2023



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A. General information about the course:

1. Course Identification

1. Credit hours: 2(1,2,0)

2. Course type

A. University College Department Track Others

B. Required Elective

3. Level/year at which this course is offered: Level 8 / Second Year

4. Course general Description:

The course is an application of a software package (including, Matlap, Maple, Mathematica). Use software packages to Know basic mathematical algorithms, implement it for a variety of mathematical applications, execute the mathematical operations, execute vectors and matrices operations, make dimensions and dimensions graphs, and implement different numerical methods algorithms, Solution of nonlinear equations using a software package and solving ordinary differential equation using a software package.

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

Linear Algebra (2022204-3) & Ordinary Differential Equations (2022201-4)

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

None

7. Course Main Objective(s):

The student will be taught as follows:

- 1- Developing 2-Dimensions and 3-Dimensions graphs using a software package.
- 2- Implementing different numerical methods algorithms using a software package.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3Hr /Week	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	15
2.	Laboratory/Studio	30
3.	Field	NA
4.	Tutorial	NA
5.	Others (specify)	NA
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	Memorize a software package commands	K2	<ul style="list-style-type: none"> Lectures Self-learning through the website ` 	<ul style="list-style-type: none"> Quizzes Assignments Exam
1.2	Write simple programming task.	K2	<ul style="list-style-type: none"> Lectures Group discussions 	<ul style="list-style-type: none"> Exams Assignments
2.0	Skills			
2.1	Design small programs using a software package.	S2	<ul style="list-style-type: none"> Lectures Self-learning through the website 	<ul style="list-style-type: none"> Exams Assignments
2.2	Solve nonlinear equation of a single variable with different methods	S2	<ul style="list-style-type: none"> Lectures Group discussions 	<ul style="list-style-type: none"> Exams Quizzes
2.3	Use various electronic resources for data analysis, scientific thinking and problem solving	S3	<ul style="list-style-type: none"> Lectures Group discussions 	<ul style="list-style-type: none"> Quizzes Assignments
3.0	Values, autonomy, and responsibility			
3.1	Illustrate the concept of personal responsibility for achieving duties.	V2	<ul style="list-style-type: none"> Projects. Lectures 	<ul style="list-style-type: none"> Through the oral presentation of the projects.



C. Course Content

No	List of Topics	Contact Hours
1,2	Basics of commands and complete simple programming tasks using a software package.	8
3	2-dimensions and 3-dimensions graphs using a software package.	5
4	Algorithms and programming	5
5	Solving linear systems by direct methods and iterative methods using a software package.	5
6,7	Midterm exam, Solution of nonlinear equations using a software package	8
8,9	Interpolation and curve fitting using a software package.	8
10	Solving ordinary differential equation using a software package.	6
Total		45

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes	Continuous Evaluation	10 %
2.	Assignments, report, Laboratory	Continuous Evaluation	10 %
3.	Midterm 1 Exam	8-9	15%
4.	Midterm 2 Exam	12-13	15%
5.	Final Exam	15-16	50%

*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	C. Woodford and C. Philips., "Numerical Methods with worked examples: MATLAB edition", Springer, 2012. (www.springer.com/978-94-007-1365-9).
Supportive References	G.R. Lindfield and J.E. Penny," Numerical Methods: Using MATLAB".





	Academic Press, 2012.
Electronic Materials	https://www.mathworks.com/help/matlab/ https://www.maplesoft.com http://www.tutorialspoint.com/execute_matlab_online.php
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms
Technology equipment (Projector, smart board, software)	Data show, Blackboard
Other equipment (Depending on the nature of the specialty)	Laboratory

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Department Council
REFERENCE NO.	4
DATE	October 2023

