هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد NCAAA T4 2020

Course Specifications

Course Title:	**Scientific computations**
Course Code:	**2024203-2**
Program:	**Bachelor in Mathematics**
Department:	**Mathematics and Statistics**
College:	**Science**
Institution:	**Taif University**

Table of Contents

A. Course Identification

1. Credit hours: 2 Hours
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: 11th Level, 4th year
4. Pre-requisites for this course (if any)**:** Linear Algebra (2022204-3) & Ordinary Differential Equations (2022201-4)
5. Co-requisites for this course (if any)**:**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	**4Hr /Week**	**100**
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	**30**
2	**Laboratory/Studio**	**10**
3	**Tutorial**	
4	**Others** (specify)	
	Total	**40**

B. Course Objectives and Learning Outcomes

1. Course 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.

2. Course Main Objective

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.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding:**	
1.1	**Memorize** a software package commands	K2
1.2	**Write** simple programming task**.**	K2
2	**Skills:**	
2.1	**Design** small programs using a software package.	S2
2.2	**Solve** nonlinear equation of a single variable with different methods	S2
2.3	**Use** various electronic resources for data analysis, scientific thinking and problem solving	S3
3	**Values:**	
3.2	**Illustrate** the concept of personal responsibility for achieving duties.	V2

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**.**	**4**
4	Algorithms and programming	**4**
5	Solving linear systems by direct methods and iterative methods using a software package.	**4**
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.	**4**
Total		**40**

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding:**		
1.1	**Memorize** a software package commands	• Lectures • Self-learning through the website	• Quizzes • Assignments • Exam
1.2	**Write** simple programming task**.**	• Lectures • Group discussions	• Exams • Assignments
2.0	**Skills:**		
2.1	**Design** small programs using a software package.	• Lectures • Self-learning through the website	• Exams • Assignments
2.2	**Solve** nonlinear equation of a single variable with different methods	• Lectures • Group discussions	• Exams • Quizzes
2.3	**Use** various electronic resources for data analysis, scientific thinking and problem solving	• Lectures • Group discussions	• Quizzes • Assignments
3.0	**Values:**		
3.1	Illustrate the concept of personal responsibility for achieving duties.	• Projects. • Lectures	• Through the oral presentation of the projects.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	**Quizzes + Home works**	**Continues**	**10 %**
2	**Midterm exam**	**5th-6th**	**30 %**
3	**Class Work (Homework- report- class test….)**	**8th**	**10 %**
4	**Final exam**	**11th**	**50 %**

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:
6 hours per week (as defined in the teaching schedule of the faculty member) for academic advice and consultations.
Teaching staff is also available using Blackboard web site and Taif University "Edugate" System.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	C. Woodford and C. Philips., "Numerical Methods with worked examples: MATLAB edition", Springer, 2012. (www.springer.com/978-94-007-1365-9).
Essential References Materials	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. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	**Lecture halls, containing white boards, and electronic monitors - The seats fit the number of students - Laboratories equipped with suitable numbers of computers**
Technology Resources (AV, data show, Smart Board, software, etc.)	**Matlab software**
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	**Wi-Fi internet connections**

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students	Indirect
Quality of learning resources	Peer Reviewer Students	Direct Indirect
Extent of achieving the course learning outcomes	Peer Reviewer Students	Direct Indirect

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Department of Mathematics and Statistics
Reference No.	11
Date	12-7-1443 H

قسم الرياضيات والإحصاء
Mathematics and Statistics Department
TU
جامعة الطائف
TAIF UNIVERSITY