Course Specifications

Course Title:	Mathematical software
Course Code:	**314 Math-3**
Program:	**Mathematics**
Department:	**Mathematics**
College:	**Science and Arts**
Institution:	**Najran university**

Table of Contents

A. Course Identification 3

6. Mode of Instruction (mark all that apply) 3

B. Course Objectives and Learning Outcomes 3

1. Course Description 3

2. Course Main Objective 3

3. Course Learning Outcomes 4

C. Course Content 4

D. Teaching and Assessment 4

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods 4

2. Assessment Tasks for Students 5

E. Student Academic Counseling and Support 5

F. Learning Resources and Facilities 5

1.Learning Resources 5

2. Facilities Required 5

G. Course Quality Evaluation 6

H. Specification Approval Data 6

A. Course Identification

1. Credit hours:3	
2. Course type	
a. University ☐ College ☐ Department ☑ Others ☐	
b. Required ☑ Elective ☐	
3. Level/year at which this course is offered: 5 / 3	
4. Pre-requisites for this course (if any)**:101 CS-3**	
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**		40%
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**	3	60%

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	15
2	**Laboratory/Studio**	30
3	**Tutorial**	
4	**Others** (Exams)	3
	Total	48
Other Learning Hours*		
1	**Study**	20
2	**Assignments**	5
3	**Library**	5
4	**Projects/Research Essays/Theses**	5
5	**Office hours**	15
	Total	98

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

This course introduces two mathematical software (Maple, Mathematica, Matlab) and their application to the solution of mathematical problems. The topics include: Introduction to the mathematical software: (programs, variables, work space, vectors and matrices, functions, common functions, programming style, effects, expressions,

data, output, IF and IF- ELSE statements. , Logic Effects, Logic Functions, Matrix Modeling Programming: Solving Equations and Boundaries Graphics: Curve Drawing, 2D Graphics, 3D Graphics, Loops: FOR and while statements, Errors, Vectors as Arrays, Simulations. Solve problems in different subjects in mathematics using mathematical software. Other scientific applications.

2. Course Main Objective

The main objective of this course is to solve deferent problems of calculus and algebra, and write programs for algorithms using two mathematical software.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge:**	
1.1	Know how to start a program session in either Document or Worksheet mode,	
1.2	Know how to use help files and symbol palettes.	
1.3		
1...		
2	**Skills :**	
2.1	Use built-in commands in program software to solve several types of mathematical problems	
2.2	Utilize graphing tools in program, and export plots into various image formats.	
2.3		
2...		
3	**Competence:**	
3.1	Applied the software to solve mathematics problems.	
3.2		
3.3		
3...		

C. Course Content

No	List of Topics	Contact Hours
1	Light introduction to MAPLE, MATHEMATICA or MATLAB fundamentals: programs, Variables and the workspace	2
2	vectors and matrices, Functions, some common functions,	2
3	Programming Style, operators, expressions, and statements, output , repeating with for, deciding with IF and ELSE-IF ladder, script file (or script m-file).	3
4	file management, logical operators و relational and logical functions, modeling with matrices. Programming: Solving equations and polynomials. Graphics: curve fitting, 2- dimensional graphics, 3-dimensional graphics.	3
5	Loops: deterministic repetition with FOR, non-deterministic repetition with while, errors, function m-files, vectors as arrays, simulation.	2
6	Solving problems in different subjects of Mathematics Software. Other scientific applications.	3

Total	45

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		
1.1	Know how to start a program session in either Document or Worksheet mode,	Lectures discussions	- Oral exam - (observation card)
1.2	Know how to use help files and symbol palettes.	Lectures discussions	- Oral exam - (observation card)
…			
2.0	Skills		
2.1	Use built-in commands in program software to solve several types of mathematical problems	Lectures discussions	- Practical test - Theatrical test - Assignments
2.2	Utilize graphing tools in program, and export plots into various image formats.	Lectures discussions	- Practical test - Theatrical test - Assignments
…			
3.0	Competence		
3.1			-
3.2			
…			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Assignments	open	5
2	Quizzes	open	5
3	Oral test	7	5
4	Practical tests	7 & 13	30
5	Project (group)	10	5
6	Final exam(practical)	16	20
7	Final exam (theoretical)	End of the Semester	30
8			

*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 :

- **Introduce the syllabus, the assessment task and the percentage of total assessment score for the course in the first lecture.**
- **Office hours for a teaching stuff (one hour peer week).**

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	**1. Meade et al., Getting started with Maple, Wiley; 3rd edition. 2009.** **2.** Hahn, B. D. and Valentine, D. T.; Essential Matlab for Engineers and Scientists. Elsevier Ltd,2007. **3. Martha L. Abell and James P. Braselton . Mathematica by Example. ; 3rd edition. 2009**
Essential References Materials	**1. Meade et al., Getting started with Maple, Wiley; 3rd edition. 2009.** **2. Stormy Attaway. Matlab: A Practical Introduction to Programming and Problem Solving.2009.** **3. Martha L. Abell and James P. Braselton . Mathematica by Example. ; 3rd edition. 2009**
Electronic Materials	1- https://www.maplesoft.com/ 2- https://mustafasadiq0.com/2014/10/12/كل-شيء-عن-البرمجة-بأستخدام-الماتلاب-matlab-program/- https://mustafasadiq0.com/2014/10/12/كل-شيء-عن-البرمجة-بأستخدام-الماتلاب-matlab-program/ 3- http://www.wolfram.com/mathematica/
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	**lab include 20 computes.**
Technology Resources (AV, data show, Smart Board, software, etc.)	**Data show** **Smart Board** **Maple software** **Matlab software** **Mathematica software** **Printer** **Wi-Fi**
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	**None**

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Student course evaluation survey at the end of	**students**	**Indirect (questionnaire)**

semester		
Effectiveness of teaching and assessment	Peer reviewer	Indirect (observation card)

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	
Reference No.	
Date	