



Course Specifications

Course Title:	Mathematical Software Packages
Course Code:	4044202-3
Program:	Mathematics
Department:	Mathematical Science
College:	Applied Science
Institution:	Umm Al-Qura University

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A. Course Identification

1. Credit hours:	3
2. Course type	
a.	University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b.	Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered:	The seventh level
4. Pre-requisites for this course (if any):	Mathematical Statistics 4044303-3 and Numerical Analysis 4043702-3
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	✓	75%
2	Blended		
3	E-learning		
4	Correspondence		
5	Other (laboratory)	✓	25%

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	Lecture	30
2	Laboratory/Studio	15
3	Tutorial	-
4	Others (Exams & Quizzes)	8
	Total	53
Other Learning Hours*		
1	Study	70
2	Assignments	15
3	Library	-
4	Projects/Research Essays/Theses	-
5	Others (Exams & Quizzes)	20
	Total	105

* 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 provides an introduction of several Mathematical software packages which are useful for mathematical science students. Among the packages are Matlab® for numerical computation, Mathematica® for symbolic computation and SPSS® for statistical analysis.

2. Course Main Objective

1. Training the students on variant software's to solve real problems related to mathematical and statistical science.
2. Improving the programming skills of the students to handle mathematical and statistical science problems.
3. Modeling the mathematical and statistical science problems and build algorithms to solve it by the level language.

sample statistics.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge:	
1.1	Identify how to work in applications software.	
1.2	Recognize the environment of the mathematical package and how to use it to solve mathematical problems.	
1.3	Identify how to handle data and visualize it using one of the statistical packages.	
1.4	Construct algorithms to solve mathematical problems and implement it using matlab.	
2	Skills :	
2.1	Analyze mathematical and statistical problems and implement them.	
2.2	Solve mathematical and statistical problems using software packages.	
2.3	Utilize the Matlab programming tools and statements to implement a program.	
3	Competence:	
3.1	Construct an algorithmic approach for solving mathematical problems.	
3.2	Analyze data using statistical principles	
3.3	Use technology to enhance mathematical thinking and understanding.	
3.4	Show the ability to work independently and within groups.	
3.5	Ability to analyze a mathematical problems and to implement a program for solving it.	
3.6	Apply knowledge gained during the course using computer applications	
3.7	Use computer and its applications as office and computational tools	

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to Matlab	3
2	Programming in Matlab	3
3	Solving Mathematical problems using Matlab	6
4	Introduction to Mathematica	9
5	Solving Mathematical problems using Mathematica	9
6	Entering data to SPSS	6
7	Analyzing data using SPSS	6
8	Visualizing data using SPSS	3
Total		45

D. Teaching and Assessment

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

CLOs		Teaching Strategies	Assessment Methods
1	Knowledge:		
1.1	Identify how to work in applications software.	Lectures Tutorials Discussion Problem Solving	Exams Home work.
1.2	Recognize the environment of the mathematical package and how to use it to solve mathematical problems.		
1.3	Identify how to handle data and visualize it using one of the statistical packages.		
1.4	Construct algorithms to solve mathematical problems and implement it using matlab.		
2	Skills :		
2.1	Analyze mathematical and statistical problems and implement them.	Lectures Tutorials Solve Problem Brain Storming	Exams Quizzes. Homework. Discussion
2.2	Solve mathematical and statistical problems using software packages.		
2.3	Utilize the Matlab programming tools and statements to implement a program.		
3	Competence:		
3.1	Construct an algorithmic approach for solving mathematical problems.	Laboratory Tutorials Cooperative education Competitive education	Home work. Reports. Discussion Evaluation of laboratory written reports
3.2	Analyze data using statistical principles		
3.3	Use technology to enhance mathematical thinking and understanding.		
3.4	Show the ability to work independently and within groups.		
3.5	Ability to analyze a mathematical problems and to implement a program for solving it.		
3.6	Apply knowledge gained during the course using computer applications		
3.7	Use computer and its applications as office and computational tools		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	6 th week	20 %
2	Midterm 2	12 th week	20%
3	Homework + reports + Quizzes	During the semester	10%
4	Final exam	End of semester	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 :

- 1- There are student advisor committee for the students,
- 2- The office hours for the teaching staff is depicted on their office.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	J.H.Mathews and K.D.Fink, Numerical methods using matlab , Pearson education, Inc. 2004. S. Pallant, Spss survival manual: A step by step guide to data analysis using Spss for windows, Open University Press, 2007. Stephen Wolfram, The Mathematica Book, Fifth Edition, Publisher: Wolfram Media, Inc., 2003.
Essential References Materials	A. W. Kerr, H. K. Hall and S. A. Kozub, Doing statistics with Spss, Springer, 2002.
Electronic Materials	wolfram website Mathworks website
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	-Computer laboratory with capacity of 40-students. - Library
Technology Resources (AV, data show, Smart Board, software, etc.)	Laboratories are equipped by data show and needed Software Packages
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	deanship of registration and acceptance	Student feedback through electronic survey
Quality of learning resources	Program Leaders	Student feedback through electronic survey
Evaluation of the teachers by internal & external faculty members	Program Leaders	Course Reports, evaluation of random grading report
Program Quality	Peer Reviewer	Peer evaluation and feedback

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, , etc.)

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

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	