جامعة الزيتونة الأردنية
Al-Zaytoonah University of Jordan
كلية العلوم وتكنولوجيا المعلومات
Faculty of Science and Information Technology

" عراقة وجودة"
"Tradition and Quality"

Detailed Course Description - Course Plan Development and Updating Procedures/ Mathematics Department	QF01/0408-3.0E

Faculty	**Faculty of Science and Information Technology**	Department	**Mathematics**
Course number	**0101372**	Course title	**Mathematical Modeling (1)**
Number of credit hours	**3**	Pre-requisite/co-requisite	**Principles of Programming (0120110)**

Brief course description
MATLAB (**Mat**rix **Lab**oratory) is a powerful computer software application program for solving mathematics problems. It is applicable for all natural sciences and engineering disciplines. MATLAB is rich with many functions that are provided to solve scientific problems.

	Course goals and learning outcomes
Goal 1	Work with the MATLAB interface.
Learning outcomes	1.1 Having access to MATLAB.
Goal 2	Learning how to use MATLAB.
Learning outcomes	2.1 Write MATLAB script files. 2.2 Do computations on vectors and arrays 2.3 Write and use function script files. 2.4 Know how to graph in 2D and 3D. 2.5 Know how to use control structures like conditional statements and loops.
Goal 3	To appreciate the limitations and features (symbolic, numeric, mathematical, visual, programming) of a symbolic mathematics system such as MATLAB.
Learning outcomes	3.1 Understand the difference between numeric and symbolic computation. 3.2 Perform and analyze a series of mathematical computations.
Goal 4	Develop a computational spirit that will allow the students to use MATLAB on a regular basis to investigate mathematical and scientific ideas.
Learning outcomes	4.1 Use MATLAB to explore a mathematical theorem, example, or concept.

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Textbook	" Mastering MATLAB" by Duane C. Hanselman and Bruce R. Littlefield, (2014), Pearson Education.
Supplementary references	1. "Essential MATLAB for Engineers and Scientists", by B. H. Hahn and D. T. Valentine, 5th Ed., (2013), Elsevier Ltd 2. "Learning MATLAB", Tobin A. Driscoll, (2009), Society for Industrial and Applied Mathematics, SIAM. 3. "Numerical Computing with MATLAB, Cleve B. Moler, (2004), the Society for Industrial and Applied Mathematics. 4. "Programming in MATLAB", by Marc E. Herniter, (2001), Brooks/Cole Thompson Learning.

Course timeline				
Week	**Number of hours**	**Course topics**			**Pages (textbook)**
01	1 1 1	**1. Introduction** Accessing MATLAB; The MATLAB Windows; Managing the MATLAB Workspace; Memory Management; Number Display Formats; The MATLAB Search Path in MATLAB;			**Later**
02	1 1 1	**2. Variables and Expressions** Entering Commands; Integer Data Types; Floating-Point Data Types; Character Data Types; Creating Variables; **Assignments 3 & 4**.			
03	1 1 1	Accessing and Modifying Data. **3. Files** M- Files; Creating Script Files; Running Scripts; Dividing Code into Sections. **Assignments 5 & 6**.			
04	1 1 1	**4. Getting Help and Using Some Useful Matlab Functions. Assignments 7 & 8**.			
05	1 1 1	**5. Arrays** Creating and Manipulating Arrays; Array Size; Performing Calculations with Arrays; Scalar-Array Mathematics;			
06	1 1 1	Array-Array Mathematics; Visualizing Array Data; **Assignments 9 & 10. Quiz 5% . Test 20%**			
07	1 1 1	**6. Polynomials:** Evaluation; Roots; Multiplication ; Addition; Derivatives and Integrals; Calling MATLAB Functions involving Polynomials. **Assignments 11 & 12.**			
08	1 1 1	**7. Control Structurs**: Logical Operators; For Loops; While Loops; If-Else-End Constructions **Assignments 13 & 14** .			
09	1 1 1	**8. Writing Functions:** M-File Function Construction Rules; Input and Output Arguments; Function Workspaces; Functions and the MATLAB Search Path; Nested Functions. **Assignments 15 & 16** .			

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10	1 1 1	Calling in built MATLAB Functions for Differentiation, Integration and root finding such as the Bisection Method and Newton's method. **Assignments 17 & 18 .**	
11	1 1 1	**Quiz 5%** **9. Graphing:** Two-Dimensional Graphics; The plot Function; Line styles; Markers and Colors; Axes and their Labels; Plot Grids; Plotting Polynomials. **Assignments 19 & 20 .**	
12	1 1 1	Curve Fitting; Interpolation; Plotting Some Basic Mathematical Functions. **Assignments 21 & 22 . Test 20%**	
13	1 1 1	Multiple Plots; Three-Dimensional Graphics: Scalar Functions of Two Variables; Mesh Plots; Surface Plots; Contour Plots. **Assignments 23 & 24 .**	
14	1 1 1	**Some Advanced Programming Assignments.** **Assignments 25 & 26 .**	
15	1 1 1	**Some Advanced Programming Assignments.** **Assignments 27 & 28 .**	
16	1 1 1	**Final Exam 50% (may consists of a written exam 40% + a project 10%)**	

Theoretical course evaluation methods and weight	Participation = 10% First exam 20% Second exam 20% Final exam 50%	**Practical (clinical) course evaluation methods**	Semester students' work = 50% (Reports, research, quizzes, etc.) Final exam = 50%

Approved by head of department		**Date of approval**	

Extra information (to be updated every semester by corresponding faculty member)

Name of teacher	**Amal H. Al-Saket**	Office Number	**9114**
Phone number (extension)	**430**	Email	**Amal_saket@zuj.edu.jo**
Office hours			