MUTAH UNIVERSITY
Faculty of Engineering
Department of Electrical Engineering

Course Syllabus
Study Plan 2017

Course Code	Course Name	Credits	Contact Hours
0401209	Numerical methods and Data analysis	3	3 T

INSTRUCTOR/COORDINATOR

Name	Prof. Mustafa Muheilan
Email	muheilan@mutah.edu.jo
Office Hours	1:00-2:00 (Sun, Mon,Tues)

TEXTBOOK

Title	Numerical methods for Engineers
Author/Year/Edition	6th , Steven C. Chapra, Raymond P. Canale. 2010

Other Supplemental Materials

Title	
Author/Year/Edition	

SPECIFIC COURSE INFORMATION

A. Brief Description of the Content of the Course (Catalog Description)

Numerical methods are techniques by which mathematical problems are formulated so that they can be solved with arithmetic operations. Although there are many kinds of numerical methods, they have one common characteristic: they invariably involve large numbers of tedious arithmetic calculations. It is little wonder that with the development of fast, efficient digital computers, the role of numerical methods in engineering problem solving has increased dramatically in recent years, therefor computers are main tools in this course also know more about analyze the difference between numerical and analytical solutions understand and apply various error measuring techniques, using numerical techniques to solve algebraic systems, use numerical techniques in differentiation and integration, use numerical techniques to solve ordinary differential equations.

B. Pre-requisites (P) or Co-requisites (C)

Ordinary Differential Equations 1 (0301203)

C. Course Type (Required or Elective)						
Required						
SPECIFIC GOALS						
A. Course Learning Outcomes (CLOs)						
By the end of this course, the student should be able to: **CLO1:** Analyze the difference between numerical and analytical solutions [1] **CLO2:** Understand and apply various error measuring techniques [1]. **CLO3:** Using numerical techniques to solve algebraic systems [1]. **CLO4:** Use numerical techniques in differentiation and integration [1]. **CLO5:** Use numerical techniques to solve ordinary differential equations [1].						
B. Student Learning Outcomes (SOs) Addressed by the Course						
1	**2**	**3**	**4**	**5**	**6**	**7**
✓						

BRIEF LIST OF TOPICS TO BE COVERED		
List of Topics	**No. of Weeks**	**Contact Hours**
Mathematical Modeling and Engineering Problem Salving	1	3
Programming and Software	1	3
Approximations and Round-Off Errors	1	3
Bracketing Methods	1	3
Open Methods	1	3
Roots of Polynomials	2	6
Gauss Elimination	1	3
LU Decomposition and Matrix Inversion	2	6
One-Dimensional Unconstrained Optimization Least-Squares Regression Interpolation Newton-Cotes Integration Formulas Numerical Differentiation Runge-Kutta Methods Ordinary differential equation	4	12
Total	*14*	*42*

EVALUATION

Assessment Tool	Due Date	Weight (%)
Mid Exam	According to the university calendar	30
Course Work (Homeworks, Quizzes, Projects, …etc.)	One week after being assigned	20
Final Exam	According to the university calendar	50

ABET's Students Learning Outcomes (Criterion # 3)		
Relationship to program outcomes		
ABET 1-7		**Engineering Student Outcomes**
1	√	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2		an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3		an ability to communicate effectively with a range of audiences.
4		an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5		an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6		an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7		an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.