



Arab Academy for Science, Technology & Maritime Transport
College of Engineering & Technology
Department of Basic and Applied Sciences

University/Academy: Arab Academy for Science, Technology & Maritime Transport
Faculty/Institute: College of Engineering & Technology
Program: B.Sc. Mechanical Engineering

Form No. (12)
Course Specification

1- Course Data

Course Code: BA 223	Course Title: Math 3	Academic Year/Level: 1 st year / 2 nd semester	
Specialization:	No. of Instructional Units	Lecture	Practical
	3 Credits	2hrs.	2hrs.

2-Course Aim

To study various methods of solving differential equations, which arise as mathematical modeling in many topics of engineering.

3-Intended Learning Outcome (ILO's)

a- Knowledge and Understanding	<p>K1) Concepts and theories of mathematics and sciences, appropriate to the discipline. Define and classify an ordinary D.E. Define solution of a D.E. Review on integration techniques and basic algebraic rules Recognize the form of the general solution from the corresponding characteristic equation. Explain the method of undetermined coefficients. Define Laplace transform. List properties of Laplace transform. Review on Partial fractions. Define the inverse Laplace transform. Define the Convolution of two functions. Define Fourier series. (</p>
b- Intellectual Skills	<p>I2) Select appropriate solutions for engineering problems based on analytical thinking. Solve a separable D.E. Solve a homogenous D.E. Solve an exact D.E. Solve a linear D.E. Solve a Bernoulli's D.E. Solve a 2nd order linear homogenous D.Es with constant coefficients Use method of undetermined coefficients to Solve a 2nd order linear non-homogenous D.E with constant coefficients. Use properties of Laplace transform to compute the Laplace transform of some functions. Use properties of inverse Laplace transform to compute the inverse Laplace transform of some functions. Use The Laplace Transform to solve initial value problems. Use The Laplace Transform to solve systems of differential equations. Solve problems on Fourier series.</p>

c- Professional Skills	
d- General Skills	

4- Course Content

Lecture		
Wk	Hrs	
1	2	Introduction to ordinary differential equations
2	2	Solving 1 st order D.Es. Separable D.Es / Initial value problem
3	2	Solving 1 st order D.Es. homogeneous and Exact D.Es
4	2	Solving 1 st order D.Es. Linear and Bernoulli's D.Es
5	2	Solving 2 nd order, linear, homogenous D.Es with constant coefficients
6	2	Solving 2 nd order, linear, non-homogenous D.Es with constant coefficients
7	2	7 th week exam
8	2	Laplace transform
9	2	Inverse Laplace transform
10	2	Unit step function/ Dirac delta function.
11	2	Applications: Solution of D.E. using Laplace Transform
12	2	12 th week exam
13	2	Applications to integral Equations
14	2	Fourier series
15	2	. Revision
16	2	Final Exam

5-Teaching and Learning Methods

<ol style="list-style-type: none"> 1. Lectures 2. Tutorials <p>Individual and group course homework</p>

6- Teaching and Learning Methods for Students with Special Needs

<ol style="list-style-type: none"> 1. Consulting with lecturer during office ours 2. Consulting with teaching assistant during office hours 3. Private sessions for redelivering the lecture contents 4. An academic supervisor is appointed for handicapped students. Constant follow ups are done for handicapped students after each assessment to evaluate their academic level of achievement.

7- Student Assessment

a- Procedures used:	<ol style="list-style-type: none"> 1. Written examinations to assess the Intended learning outcomes. <p>Continuous assessment (reports, discussions, etc.....) to assess the Intellectual skills.</p>
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b- Schedule:	Assessment 1: 7 th Week Written Exam Assessment 2: 12 th Week Written Exam Assessment 3: Continuous Assessments Assessment 4: 16 th Week Final Written Exam
c- Weighing of Assessment:	7 th Week Examination : 30 % 12 th Week Examination: 20 % Final-term Examination: 40 % Oral Examination : 0 % Practical Examination : 0 % Semester Work : 10 % Total : 100%

8- List of References:

a- Course Notes	Prepared by Lecturer
b- Required Books (Textbooks)	Advanced Engineering Mathematics Erwin Kreyszig
c- Recommended Books	Advanced Engineering Mathematics, D. G. Zill, W. S. Wright
d- Periodicals, Web Sites, ..., etc.	

Course coordinator:**Program Manager:**