

COURSE SYLLABUS

FACULTY OF SCIENCE

MATHEMATICS DEPARTMENT

COURSE NAME:	Differential Equations I						
COURSE NUMBER:	M	A	T	H	2	0	4
SEMESTER/YEAR:	1 st semester				2015/2016		
DATE:	25/8/2015						

Instructor Information

Name of the instructor: Dr. Rania Alharbey

Office location: Room:156 c

Building: 7

Office hours:

	Sun	Mon	Tue	Wed	Thu
Time	10-11		10-11		10-11

Contact number(s): 63635

E-mail address(s): rallehabi@kau.edu.sa

Course Information

Course name: Differential Equations (1)

Course number: 204

Course meeting times:

	Sun	Mon	Tue	Wed	Thu
Time	9-10 1-2		9-10		9-10

Place: Room:72C

Building:7

Course website address: <http://rallehabi.kau.edu.sa>

Course prerequisites and requirements:

Course name	Course number
Calculus	202

Contents:

- *Introduction to differential equations
- *First order differential equations
- * Higher order differential equations
- * The Laplace Transform

Important Dates:

Revision Exam	Thursday 19\11\1436
Exam 1	Thursday 25\12\1436
Exam 2	Thursday 7\2\1437

Course Objectives

By the end of the course the student will be able to:

- ☞ Classify and identify different types of differential equations
- ☞ Solve important classes of ordinary differential equations of the first ,second and higher orders
- ☞ Model some real life problems using differential equations and interpret the solution
- ☞ Apply the Laplace Transform to solve differential equations
- ☞ Use mathematical software to solve differential equations and draw vector fields and solutions
- ☞ Use reasoning and critical thinking to solve problems

Learning Resources

- Textbooks:**
1. A first course in differential equations with modeling applications
Author: Dennis G. Zill
 2. Fundamentals of differential equations
Author: Nagel, Saff and Snider

Course Requirements and Grading

Student assessment: <i>(A clear rationale and policy on grading)</i>	Test 1	20%
	Test 2	20%
	Lab	5%
	Project	5%
	Section	15%
	Final	35%

No makeup tests will be given. If a student misses a test *with my approval*, the score on the final exam will be used to replace the missing test score. In the event that a student misses a test without my approval, a zero will be assigned for that test score. Approval must be obtained **in advance** if at all possible

Expectations from students: I aim to treat all student with respect and fairness. Since I expect the same
(Attitudes, involvement, behaviors, skills, and ethics) consideration, please observe the following courtesies:

Attendance at each scheduled class meeting is expected. A DN will be given if the student misses 20% of the classes

All assignments must be handed in on time. No late assignment will be allowed

Arrive for class on time. Late class arrivals are disruptive and inconsiderate; moreover, they may be regarded as absences. Students who frequently arrive late may be asked not to return to class.

Silence cell phones. Use of cell phones in the class room will not be permitted; you should not bring one into the classroom unless the ringer is turned OFF. Students in violation of this policy may be asked to leave class.

Math 204 Syllabus

Textbook : A First Course in Differential Equations, Ninth Edition, Author : Dennis G. Zill

Chapter Title	Section	Theoretical (Definitions & Theorem)	Exam.	Exer.
Ch1: Introduction to Differential Equations	1.1 Definitions and Terminology	Definition 1.1.1, Classification by Type, Classification by Order, Classification by Linearity, Definition 1.1.2, Interval of Solution, Explicit and Implicit Solutions, Definition 1.1.3. Families of Solutions, Remarks	1,3,4,	2,5,10,13,17, 22,37
	1.2 Initial-Value Problems	Introduction, First and Second IVP, Existence & Uniqueness, Theorem 1.2.1, Interval of Existence/Uniqueness, Remarks	2-5	18,27
	1.3 DEs as Mathematical Models	Mathematical Models, Population Dynamics, Radioactive Decay, Newton's Law of Cooling/Warming, Spread of Disease, Chemical Reactions, Series Circuits, Falling Bodies.		1,5,7,15,17
Ch2: First order Differential Equations	2.1 Solution curve without a solution	Direction fields	1,2	
	2.2 Separable Equations	Definition 2.2.1, Losing a Solution Solutions Defined by Integrals, Remarks	1,2,3,4,5	14,20,22,28,29
	2.3 Linear Equations	Definition 2.3.1, Method of Solution, Discontinuous Coefficients, Remarks	1,2,3,4,6 ,7	17,22, 35
	2.4 Exact Equations	Introduction, Definition 2.4.1, Theorem 2.4.1, An Integrating Factor, Remarks	1,2,3,4	15,38
	2.5 Solution by Substitutions	Homogenous Equations, Bernoulli's Equations, Reduction to Separation of Variables	1-3	7,13,15,27,29,30 ,35,

Chapter Title	Section	Theoretical (Definitions & Theorem)	Examp.	Exer.
Ch4: Higher order Differential Equations	4.1 Preliminary Theory	Theorem 4.1.1, Differential Operators, Theorem 4.1.2, Definition 4.1.1, Definition 4.1.2, Theorem 4.1.3, Definition 4.1.3, Theorem 4.1.4, Theorem 4.1.5, Theorem 4.1.6, Theorem 4.1.7, Remarks	2,3,4,5,7,9-11	18,30,33
	4.2 Reduction of order		1,2	
	4.3 Homogeneous Linear Equations with Constant Coefficients	Introduction, Auxiliary Equation	1,4	14,20,30,40
	4.4 Undetermined Coefficients	Introduction, Particular Solution Using Undetermined Coefficients, Remarks	1-11	41
	4.5 Undetermined Coefficients – Annihilator Approach	Undetermined Coefficients – Annihilator Approach, Remarks	1-7	18,26,54,70
	4.6 Variation of Parameters	Assumptions, Particular Solution Using Variation of Parameters, Remarks	1,2,11	14,18
	4.7 Cauchy- Euler Equation	7 Cauchy- Euler Equation, Method of Solution, Reduction to Constant Coefficients	1-5	24,36
	4.8 Solving System of DEs by Elimination	Solution by Elimination	1-3	9

Chapter Title	Section	Theoretical (Definitions & Theorem)	Examp.	Exer.
Ch7: The Laplace Transform	7.1 Definition of Laplace Transform	Definition 7.1.1, Theorem 7.1.1, Definition 7.1.2, Theorem 7.1.2, Theorem 7.1.3, Remarks	1-5	26,36,38,40, 41,42, 46
	7.2 Inverse Transform and Transform of Derivatives	Theorem 7.2.1, Theorem 7.2.2, Remarks	1-5	29,38
	7.3 Operational Properties I	Theorem 7.3.1, Definition 7.3.1, Theorem 7.3.2, Alternative Form of Theorem 7.3.2	1-4	34
	7.4 Operational Properties II	Theorem 7.4.1, Transform of Integrals, Theorem 7.4.2	1-4	
	7.6 System of Linear DEs	Solution Using Laplace Transform	1	12

معلومات تفصيلية عن المادة

أولاً: اختبار المراجعة

بما أن المادة تعتمد كثيراً على التكاملات التي سبق دراستها في مادة 202 سيكون هناك اختبار مراجعة يوم الخميس 19 / 11 / 1436 في الفصول التالية
(Calculus by James Stewart 7th edition) 5.4 - 5.5 – 7.1 – 7.2 – 7.4
يمكن الاكتفاء بدراسة الأمثلة فقط وستكون مدة الاختبار 20 دقيقة فقط. ولا بد لكل الطالبات من اجتياز هذا الاختبار

ثانياً: توزيع الدرجات

20 درجة الاختبار الدوري الأول والذي سيكون في الباب الأول والثاني

20 درجة الاختبار الدوري الثاني والذي سيكون في الباب الرابع

35 درجة الاختبار النهائي

5 درجات معمل

5 درجات مشروع تطبيقي

15 درجة حل التمارين في محاضرة التمارين(السكشن): 5 درجات منها على الواجبات و 10 درجات اختبارات قصيرة ومشاركة

ثالثاً: الواجبات

سيتم وضع التمارين مطبوعة في مواقع أستاذات المادة كل أسبوع وستعطى الطالبات أسبوعاً كاملاً لحل التمارين. سيكون هناك واجباً في كل أسبوع: أحدهما سيحل مع الأستاذة في محاضرة التمارين والثاني (الأقصر) سيسلم للأستاذة لتصحيحه وتقييم الطالبات فيه. ولن يتم قبول أي واجب متأخر عن مواعده لأي سبب من الأسباب. الواجب المتأخر ستكون درجة الطالبة فيه صفر

الغياب عن الاختبارات

في حالة غياب الطالبة عن أحد الاختبارات الدورية بعذر مقبول (يسلم لأستاذة المادة خلال أسبوع من الاختبار) يتم احتساب نسبة من مجموع درجاتها في حالة غياب الطالبة عن أحد الاختبارات بدون عذر, سيتم احتساب درجة صفر لهذا الاختبار
يشترط للحصول على درجة غير مكتمل ان تكون الطالبة حضرت الاختبارات الدورية كلها و لا تزيد نسبة الغياب عن 20% من مجموع المحاضرات و أن يكون العذر مقبول من الشؤون التعليمية