



Department of Physics

College of Science

University of Salahaddin

Subject: Differential Equations

Course Book: Second Year Physics

Lecturer's name: MSc. *Karzan Ahmed Berdawood*

Academic Year: 2017/2018

Course Book

1. Course name	Differential equations
2. Lecturer in charge	Karzan Ahmed Berdawood
3. Department/ College	College of Science- Department of physics
4. Contact	e-mail: karzan.berdawood@su.edu.krd Tel: (optional)
5. Time (in hours) per week	Theory: 6 discussion: 2 Practical: 0
6. Office hours	Sunday (8:00-12:00)
7. Course code	
8. Teacher's academic profile	My name is Karzan Ahmed Berdawood, i born in Erbil, Iraq in 1983.I graduated from mathematical Department / college of science in Salahaddin University-Erbil in 2005-2006, in Erbil,Iraq.I got Master of science in Numerical solution for Integral Equations in 2013.I am working as a lecturer in mathematical department/college of science/Salahaddin University-Erbil.
9. Keywords	Differential equation , Laplace transform, power series
10. Course overview:	Provides an introduction to ordinary differential equations and their applications. Upon completion of this course the student will: To be able to identify and classify an ordinary differential equation, derive an ordinary differential equation as the mathematical model. To understand what it means for a function to be a solution of an ordinary differential equation and develop the skills to identify appropriate solution techniques for various classes of differential equations Emphasis is placed on first and second order equations with constant coefficients. The equations studied are often derived directly from physical considerations in applied problems.
11. Course objective:	introduce the students to the basic theory of ordinary differential equations and give a competence in solving ordinary differential equations, classify differential equations by order, linearity, and homogeneity, solve first order linear differential equations, solve linear equations with constant coefficients, use separation of variables to solve differential equations, solve exact differential equations, use variation of parameters to solve differential equations, use the method of D operator coefficients to solve differential equations, determine whether a set of functions is linearly independent using the Wronskian, use power series to solve differential equations and use Laplace transforms and their inverses to solve differential equations
12. Student's obligation	<ol style="list-style-type: none"> Students rein a commitment to come on time and remain in the classroom for the duration of scheduled classes and Labs. Nothingness speak students with each other during lecture.

- c. All devices must be turned off.
- d. When teacher ask question, Students will be to rise your hand before answer his question.

Students own an obligation to write tests and final examinations at the times scheduled by the teacher or the College.

13. Forms of teaching

Different ways of teaching will be used to reach the objectives. In general, a magic board is used for learning and discussing the objectives.

14. Assessment scheme

The academic year contain two obligatory exams with average 30% degree and 10% Quizzes. The other will be reserved for final exam .

15. Student learning outcome:

1. The student will learn to formulate ordinary differential equations (ODEs) and seek understanding of their solutions.
2. Students should understand the concept of a solution to an initial value problem.
3. The student will recognize basic types of differential equations which are solvable, and will understand the features of linear equations in particular.
4. Students will learn to use different approaches to investigate equations which are not easily solvable.

16. Course Reading List and References:

1. "differential equations", 2004 by Shepley L. Ross, 3rd Edition.
2. "A first course in differential equations with applications", by A.H.Siddiqi and P. Manchanda, Macmillan India Ltd., 2006.
3. "Applied differential equations" , by Murray R.Spiegel,2nd edition ,1958.
4. "differential equations", by Richard Bronson and Gabriel B.Costa, 2006 (Schaum's outline Series), The McGraw Companies.

17. The Topics:

Lecturer's name

Chapter One:

- Introduction
- Classifications of differential equations and ordinary differential equations
- Initial-Value Problem and boundary-Value Problems and existence of solutions
- Formulation differentials equations from its general solutions.

First-order and Higher-Order Ordinary differential equations.

- Separable differential equations
- Homogenous differential equations
- Exact differential equations
- Linear equations of first order
- Bernoulli and some special equations

Chapter two:

- Introduction of the equation is of first order and of higher degree

Chapter three:

- The general nth- order linear differential equation
- How we obtain complementary and particular solution
Case where more complicated functions appear on the right-hand side
 - The method of variation of parameters
 - method involving operators and equations can be transformed into linear equation with constant coefficients

Chapter four:

- Introduction of the Power series solutions of Ordinary differential equations

1- Power series

2- Power series about Ordinary points

3- Power series about regular Singular points

Chapter five:

- Introduction of the Solution of differential equations by the Laplace transformation

1-The Laplace transformation of some functions

2-Properties of Laplace transformation

3-Laplace transformation of derivatives

4-Inverse of Laplace transformations

5-Solution of differential equations by the Laplace transformation

6-Solution of linear system by the Laplace transformations

<p>Notes:</p> <ol style="list-style-type: none"> 1. The course program does not include the examination days, which need at least a couple of weeks during the year; thus the total number of weeks in a course year will be: (21 + 2). 2. This course is for second year students, who start the course at least 4 weeks later than the other grades. 	
<p>18. Practical Topics (If there is any)</p>	
<p>In this section The lecturer shall write titles of all practical topics he/she is going to give during the term. This also includes a brief description of the objectives of each topic, date and time of the lecture</p>	<p>Lecturer's name ex: (3-4 hrs) ex: 14/10/2015</p>
<p>19. Examinations:</p> <p>1. <i>Compositional:</i> In this type of exam the questions usually starts with Explain how, What are the reasons for...?, Why...?, How....? With their typical answers Examples should be provided</p> <p>2. <i>True or false type of exams:</i></p> <p>In this type of exam a short sentence about a specific subject will be provided, and then students will comment on the trueness or falseness of this particular sentence. Examples should be provided</p> <p>3. <i>Multiple choices:</i></p> <p>In this type of exam there will be a number of phrases next or below a statement, students will match the correct phrase. Examples should be provided.</p>	
<p>20. Extra notes:</p> <p>Here the lecturer shall write any note or comment that is not covered in this template and he/she wishes to enrich the course book with his/her valuable remarks.</p>	
<p>21. Peer review</p> <p style="text-align: right;">پیداچوونہوہی ھاوہل</p> <p>ئەم کۆرسبووکە دەبیت لەلایەن ھاوہلێکی ئەکادیمیەوہ سەیر بکریت و ناوەرۆکی بابەتەکانی کۆرسەکە پەسەند بکات و جەند ووشەیک بنووسیت لەسەر شیاوی ناوەرۆکی کۆرسەکە و واژووی لەسەر بکات. ھاوہل ئەو کەسەیکە کە زانیاری ھەبیت لەسەر کۆرسەکە و دەبیت پلەمی زانستی لە مامۆستا کەمتر نەبیت.</p>	