

**School of Engineering and Computer Science
Independent University Bangladesh
Course No: MAT 303
Course Title: Linear Algebra and Differential equations
Spring 2016, Sec 1**

Instructor: Dr. Habib Bin Muzaffar

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Class time: ST 8:00-9:30, BC6012, Tutorial: R 8:00-9:30, BC6012

Facebook group: MAT303/CSC201 IUB Autumn 2015

Office Hours: SMTW 10-12:30

Grading procedure:

Class tests and Mid-term: 60 %

Final Exam: 40 %

The final grade will be calculated as follows:

A	86- 100%
A-	80- 85%
B+	75-79%
B	70-74%
B-	65-69%
C+	60-64%
C	55-59%
C-	50-54%
D+	45-49%
D	40-44%
F	Below 40%

Text books

1. A First Course in Differential Equations with Modelling Applications, Tenth Edition by Dennis G. Zill
2. Elementary Linear Algebra by Howard Anton and Chris Rorres, eight edition

Course Notes: Complete course notes are available for the part of the course related to Differential equations

Course contents and schedule

Lecture	Topics	References (Notes)	References(Text)
1	Introduction to differential equations	Unit 1	Text 1, section 1.1
2	Separable equations, First order linear equations	Unit2, Unit 3	Text 1, sections 2.2, 2.3
3	First order homogeneous equations	Unit 4	Text 1, section 2.5
4	Bernoulli's equation	Unit 5	Text 1, section 2.5
5	Miscellaneous substitutions	Unit 6	Text 1, section 2.5
6	Applications of ODE's: LR circuits and falling bodies	Unit7, Unit 8	Text 1, sections 3.1, 3.2
7	Applications of ODE's: Escape velocity	Unit 9	

8	Class Test 1		
9	Introduction to second order linear differential equations	Unit 10	Text 1, section 4.1
10	Use of one known solution to find another	Unit 11	Text1, section 4.2
11	Homogeneous equations with constant coefficients	Unit 12	Text 1, section 4.3
12	Non-homogeneous equations (basic theory), Method of undetermined coefficients	Unit 13, Unit 14	Text 1, section 4.4
13	Method of undetermined coefficients (continued)	Unit 14	Text 1, section 4.4
14	Method of variation of parameters	Unit 15	Text 1, section 4.6
15	Cauchy-Euler equations	Unit 16	Text 1, section 4.7
16	Mid-term		
17	Laplace transforms	Unit 17	Text 1, section 7.1
18	Laplace transforms: Further properties with applications to initial value problems	Unit 18	Text 1, section 7.2
19	The unit step function	Unit 19	Text 1, section 7.3
20	Convolutions	Unit 20	Text 1, section 7.4
21	Series solutions	Unit 21	Text 1, section 6.2
22	Class Test 2		
23	Systems of Linear equations		Text 2, Sections 1.1, 1.2
24	Vector spaces, subspaces		Text 2, sections 5.1, 5.2
25	Linear dependence and independence		Text 2, section 5.3

Course objectives:

The first part of the course deals with ordinary differential equations. Differential equations are an indispensable tool for engineers and scientists. We will cover the most commonly used techniques for solving first order and second order equations. We will also cover some significant applications. In the second part, we will cover the basics of linear algebra. If you master the material of this course, you will be prepared to solve ordinary differential equations and linear systems which occur in science and engineering. Also, you will be ready to study more advanced mathematical subjects such as partial differential equations, boundary value problems, special functions etc.

Note: There will be no make up if anyone misses the final exam. For class tests, a make up test will only be allowed for a serious reason. This will be allowed at most once.