National University
Of Computer & Emerging Sciences
Karachi

Course Outlines of BS (CS) Degree Program

Course Instructor	Muhammad Jamil Usmani	**Semester**	Spring
Batch/Section(s)	2018 / Sec A, B,C,D,E,F,G,H	**Year**	2019
Course Title	MT202 Differential Equations	**Credit Hours**	3
Prerequisite(s)	MT119- Calculus and Analytical Geometry	**Course TA**	

Text Book(s)

1.Title of book	Differential Equations with Modelling Application, 9th edition		
Author(s)	*Dennis G.Zill*	Publisher	John Wiley & Sons.

Reference Book(s)

Advanced Engineering Mathematics 10th edition		
Erwin Kreyszig	Publisher	McGraw-Hill

Differential Equations and Boundary Value Problems 3rd edition		
Edwards Penney	Publisher	Pearson

Introduction to Engineering Mathematics		
H.K.DASS	Publisher	S.Chand and Company ltd

Course Description:
This course based primarily on differential equations. The focus of this course will be on the applications of ordinary differential equations (ODE's) to problems from the physical, biological, and social sciences.

Course Objective:
This is an introductory course of the Differential equations which includes an in-depth coverage of methods of solving differential equations and mathematical modeling with differential equations.

Tentative Lecture Schedule: Differential Equations with Modelling Application, 9ᵗʰEdition.Zill

Week	Contents/Topics	Exercises	Questions
1	**Introduction to Differential Equations:** Differential Equations and their Classification Solutions or Integrals of Differential Equations **Initial Value Problems:** First and Second Order IVPS	1.1 1.2	1-8,11-18 21-24,27-32 37,38 ,44,47 1-14,31-33
2	**Solution of First Order Differential Equations:** Variable Separable form. Linear Differential Equations	2.2 2.3	1-30 1-24,25-30,31-34
3	Exact and Non Exact form (Integrating Factor)	2.4	1-16,21-25,37-30
4	Solution by substitution (Homogeneous) Bernoulli Differential Equations	2.5 2.5	1-14,23-30 15-22 **Quiz-1**
5	Applications of First Order Differential Equations (Linear Models) **Growth & Decay ,Newton Law of cooling, Series circuits**	 3.1	Example: 1,2,4,6 2-4,13-15,31-33
6	**Midterm 1**		
7	**Higher Order Differential Equations:** Initial and Boundary value problem. Homogeneous DEs', Linear Dependence and Independence, Wronskian Non-homogeneous Linear Differential Equation. Reduction of order	4.1 4.2	1-4,7,8,13,19, 23-30,31-34 1-14
8	Homogeneous Linear Equations with Constant Coefficients (complementary solution)	4.3	1-14,15-25,29-40
9	Undetermined coefficients Method (Superposition approach) Particular Solution	4.4	1-25,27-30 37-40 **Quiz-II**
10	Variation of parameters. Cauchy Euler equation.	4.6 4.7	1-18,19-22,25 1-15,19-24,25-30
11	**Power Series solution of Differential equation:** Review of Power series. Radius of convergence Solution about ordinary Points at x=0	6.1	1-6,17-28,29-32
12	**Midterm 2**		
13	**The Laplace Transform:** Laplace transform Inverse Laplace transforms Transforms of Derivatives	7.1 7.2	1-36 1-30,31-40 **Quiz-III**
14	Translation on the s-axis and t-axis Derivatives of Transform, Transforms of Integrals, Convolution Theorem	7.3 7.4	1-18,21-30,37-48 1-10
15	Application of Laplace transforms The Dirac Delta Function	7.5	1-10
16	Numerical solutions of ODE(if time permits)		

Grading Criteria:

Marks Distribution:

Particulars	% Marks
1. Class participation/Attendance	05
2. Quizzes	10
3. Assignments	05
4. First Mid Exam	15
5. Second Mid Exam	15
6. Final Exam	50
Total:-	**100**

Important Instructions to be followed for this Course

- Be in classroom on time. Any student who arrives more than 5 min late in the class would be marked LATE. Anybody coming to class more than 15 minutes late will be marked ABSENT.
- Turn off your cell phones or any other electronic devices before entering the class.
- Maintain the decorum of the class room all the time.
- Avoid a conversation with your classmates while lecture is in progress.
- Use parliamentary language in the class room as well as in assignments. Refrain from using impolite, vulgar or abusive language in the class room as well as in class presentations and assignments.
- Submit your assignments on time, no assignment will be accepted after the deadline.
- There would be no re- take of any quiz.

Instructions / Suggestions for satisfactory progress in this course:

- On average, most students find at least three hours outside of class for each class hour necessary for satisfactory learning.
- Chapters should be read and homework should be attempted before class.
- Do not get behind. You are encouraged to work with other students. Plus, I am always available during office hours to help you.
- The homework assigned is a minimum. You may always work extra hours on your own.
- Use the few minutes you usually have before the start of each class to review the prior meetings' notes and homework. This will save us valuable in-class time to work on new material.
- Develop a learning habit rather than memorizing.
- Work in groups, whenever appropriate.
- Apply the learned principles and gained knowledge.
- Be creative in thinking, but stick to the topic assigned for discussions, assignments and presentations.
- Always bring your text Books with you in the class.

Note: Students are welcome all the time to get help from the Teacher.

jamilusmani

Signature: _____   Date:15-01-2019