**Department of Computer Science and Engineering**

**Semester**: FALL-2016

**Course Code**: MAT-131 **Credit Hours**: 3

**Course Title**: Ordinary & Partial Differential Equations.

# Course Intended Learning Outcome: Students will be able to

1. Classify differential equations by order, linearity and homogeneity
2. Solve first order linear equations
3. Solve linear equations with constant coefficients
4. Use separation of variables to solve differential equations
5. Solve exact differential equations
6. Use variation of parameters to solve differential equations
7. Determine whether a system of functions is linearly independent using the Wronksian
8. Model real life applications using differential equations
9. Solve systems of linear equations using matrix techniques and eigen values

# Theory Session Plan:

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| --- | --- | --- | --- |
| **Week No** | **Topics** | **Expected Learning Outcome** | **Assessments(ASSN/CT/Mid/Final)** |
| **WK1** | * Introduction * Formation , Classification of   ODE | ♦Identify the order ,degree, linearity and non-  linearity of ODE. |  |
| **WK2** | * Separation of Variables, Homogenous equation | ♦ To solve ODE in variable separable form  ♦How to reduce an equation to variable  separable form and homogeneous form | 2/3 problems related to discussion in the class |
| **WK3** | * Exact equation, Linear Equation | ♦How to reduce nonlinear equation to linear  form and solve it.  ♦Identify the equations which exact or not  ♦recognize and solve a linear differential  equation by use of an integrating factor. | **CLASS TEST1**  (Up-to last class of the week) |
| **WK4** | * Linear Differential equation with constant coefficients with right hand side Zero | ♦ find the complete solution of a  homogeneous differential equation with  constant coefficients | 2/3 problems related to discussion in the class |
| **WK5** | * Linear Differential equation with constant coefficients with right hand side non zero | ♦ find the complementary function and  particular Integral of ODE | **ASSIGNMENT-1** |
| **WK6** | ----- midterm week------ | ----- midterm week------ | **MIDTERMEXAM** |
| **WK7** | * Linear Differential equation with variable coefficients with right hand side zero | ♦Solve a Cauchy-Euler Equation. | **CLASS TEST2** |
| **WK8** | * Linear Differential equation with variable coefficients with right hand side non- zero | ♦Convert the ODE to constant coefficient and  solve it. |  |
| **WK9** | * Linear equation of second degree:   Variation of parameters. | ♦ find the complete solution of a  differential equation with constant  coefficients by variation of parameters. | **PRESENTATION** |
| **WK10** | * Formation of Partial differential equation | ♦ able to form the PDE from its Complete  integral | **CLASS TEST3** |
| **WK11** | * Linear Partial differential   equations: Lagrange Method | ♦ Solve PDE by Lagrange Method | **ASSIGNMENT-2** |
| **WK12** | * Non-linear Partial differential equation of order one:Charpits Method | ♦ Solve PDE by Charpits Method | 2/3 problems related to discussion in the class |
| **WK13** | * Various types of Application of Differential Equations | ♦ solve basic application problems  described by differential equations |  |
| **WK14** | ----- final exam week------ | ----- final exam week------ | **FINALEXAM** |

**Text Book(s)**:

**1. Differential Equations by B**.D Sharma

**2**. **Differential Equations by Raishighania**

**3. Differential Equations by Ross**

Marks distribution:

The final course grade will be given based on the marks distribution shown in the table below. Percentages of marks for the different

cases are given below:

Attendance: 07 %

Class Test: 15 %

Assignment: 05 %

Presentation: 08%

Mid Term Exam: 25 %

Final Exam: 40 %

Total: 100 %

**Google Class Room:**

Class Code: **22fber**

**Instructor’s Details:**

|  |  |  |
| --- | --- | --- |
| **Course tutor:** | **Office:** | **Counselling Time** |
| **Md. Mohiuddin**  Lecturer(Mathematics)  Department Of Natural Sciences  DIU  Dhanmondi, Dhaka. | Teachers Room, 1st Floor, Exam Building, DIU, Shukrabad.  Cell: 01991195533  Mail: [mohiuddin.ns@diu.edu.bd](mailto:mohiuddin.ns@diu.edu.bd) | Sun : 04:00 – 05:30  Mon: 2:30 – 04:00  Tues:11:30 – 01:00  Wed:2:30 – 04:00  Day off: Saturday |