Course Code	EM211
Course Title	**Ordinary Differential Equations**
No. of Credits	**2**
Pre-requisites	**-**
Compulsory/Optional	**Compulsory**

Aim(s): To introduce analytical solving techniques of linear ordinary differential equations.

Intended Learning Outcomes:

On successful completion of the course, the students should be able to;

- Identify and derive the mathematical models of many physical problems as differential equations.
- Solve first order separable, linear and exact differential equations and reducible forms.
- Solve higher order linear ordinary differential equations analytically using D-operators, method of undetermined coefficients and Laplace transformations and analyze the solution of such second order equations.
- Apply matrix methods and Laplace transform in solving systems of linear systems of ordinary differential equations.

Time Allocation (Hours):   Lectures 24 Tutorials 4   Practical   Assignments 4

Course content/Course description:

- **Introduction:** Differential Equations as a mathematical model and classification.
- **First order ordinary Equations:** Separable, linear, exact, reducible forms.
- **Higher order ordinary linear equations with constant coefficients:** D-operators, undetermined coefficients; bracket method; solution behaviors.
- **Linear Systems:** Eigenvalue and eigenvector method; decoupling; matrix exponential method.
- **Laplace Transforms:** Laplace transform of functions and derivatives, solving ordinary differential equations and linear systems, convolution.

Recommended Texts :

- R.K. Nagle, E.W. Saff, A.D. Snider,Fundamentals of Differential Equations, 8th edition, (2012), Pearson Education.
- E. Kreyszig, Advanced Engineering Mathematics,9th edition, (2006), John Wiley &sons Inc.
- Philip Franklin,Differential Equations for Engineers,5th edition, (1980), Dover Publications.

Assessment	Percentage Mark
In-course Tutorials Mid Semester Examination	10 30
End-semester	60