

Subject Code: 1SC2040103	Subject Title: ORDINARY DIFFERENTIAL EQUATIONS
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Course Objective:

- The objective of the course is to introduce some special functions that appear in different venues of applied mathematics.

Teaching scheme (hours) per week		Credit			Theory Marks		Practical Marks		Total
Lecture	Tutorial	Theory	Practical	Total	Uni. Assessment	Cont. Assessment	Uni. Assessment	Cont. Assessment	
4	1	5	-	5	60	40	--	--	100

Subject Contents			
Unit. No	Topic	Total Hours	Weight (%)
1	Classification of singularities, Series solution near an ordinary point, Frobenius method: series solution near regular singular point, Point at infinity.	18	25
2	Legendre equation, Legendre polynomial and its properties, Rodrigue's formula, Generating function for Legendre polynomial, Recurrence relations for $P_n(x)$.	18	25
3	Bessel's equation, Bessel's function of first and second kind and their properties, Generating function for Bessel's function, Recurrence relations for $J_n(x)$.	18	25
4	Gauss hypergeometric equation, Gauss hypergeometric function and its properties, Existence and uniqueness of solutions: the method of successive approximations, Picard's method of successive approximations, Systems of equations.	18	25

Course Outcome:

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

- At the end student will be able to use special function for solving real-life problems
- Construct meaningful connections between mathematics and other disciplines
- Model some physical cases as PDE and obtain their solution

List of References:

- "Introduction to Ordinary Differential Equations", A. L. Rabenstein, Academic Press.
- "Advanced Differential Equations", M. D. Raisinghania, S. Chand & Co.
- "Higher Engineering Mathematics", B. S. Grewal and J. S. Grewal, Khanna Publ., New Delhi.
- "Advanced Engineering Mathematics" E. Kreyszig, Narosa Publ. House, New Delhi.
- "Differential equations with applications and historical notes", G. F. Simmons, McGrawHill International Editions.