



DEPARTMENT OF MATHEMATICS

Semester : IV

Integrated M.Sc. Mathematics

Academic Year : 2017-18

Subject : 060090402 CC9 Higher Order Differential Equations and Transforms

Teaching Schedule

Course Objectives: To study the concepts of solutions of higher order differential equations by mathematical methods of series solution and transforms, so that students get sound knowledge and important aspects of the subjects.

Unit	Sub Unit	No. of Lect.(s)	Topics	Reference Chapter/ Additional Reading	Teaching Methodology to be used
Unit 1: Series Solutions					[16]
1	1.1	2	Introduction of power series, ordinary and singular points	Ch#I-8,9,10,11 Advanced differential equations M.D.Raisinghania	Chalk& Talk
	1.2	2	series solution near an ordinary points		
	1.3	3	series solution about regular singular point, Frobenius method for solution near regular singular point		
	1.4	2	Solution of legendre's equation of order n		
	1.5	2	Legendre polynomial $P_n(x)$ of first kind, Basic properties of Legendre polynomial		
	1.6	2	solution of bessel's equation of order n		
	1.7	3	Bessel's function $J_n(x)$ of first kind, Basic properties of Bessel's function (where n is a non- negative integer).		
Unit 2: Laplace transforms:					[17]
2	2.1	2	Definition of the laplace transform	Ch#IV-1,2 Advanced differential equations M.D.Raisinghania	Chalk & Talk
	2.2	2	Laplace transforms of some elementary functions		
	2.3	2	Properties of laplace transform		
	2.4	3	Inverse laplace transform, Properties of inverse laplace transform		
	2.5	2	Convolution theorem		
	2.6	3	Laplace transform of periodic functions, Heaviside unit step function and shifting theorems		
	2.5	2	Partial Fraction		
	2.7	3	Application to differential equations and other various applications.		
Unit 3: Fourier Series					[16]
3	3.1	2	Periodic function, Fourier series		
	3.2	2	Euler's formulae		



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	3.3	2	Fourier series of discontinuous functions	Ch#V-1 Advanced differential equations M.D.Raisinghanian	Chalk & Talk
	3.4	2	Fourier series of Even and odd functions		
	3.5	3	Fourier series of functions having period $2L$		
	3.6	2	Half-Range Fourier series		
	3.7	3	various applications.		
Unit 4: Fouries Transforms					[16]
4	4.1	4	Fourier Transform and some properties,	Ch#V-2 Advanced differential equations M.D.Raisinghanian	Chalk & Talk
	4.2	4	Fourier cosine and sine transform		
	4.3	4	Finite fourier cosine and sine transform		
	4.4	4	various applications.		

Text books:

1. Dr.M.D.Raisinghanian, Advanced differential equations, S.Chand, (7th Edition) 2014.
2. S.L.Ross, Differntial equations, Wiley India (3rd Edition),2004

Reference books:

1. E.Kreyszig, Advanced engineering mathematics , John Wiley(9th Edition)2006.
2. T.M.Apostol, Calculus , Volume-2 Wiley Eastern(2nd Edition),1980
3. Dr. S Shreenath, S. Ranganatham, Fourier series and Integral transforms (1st Edition) 2014.
4. B.V. Ramana, Higher engineering mathematics (11th Edition) 2008



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