S-4 SLO-2 P	201	SLO-2	S-3 SLO-1 e	SLO-2 e	SLO-1	SLO-2	SLO-1 e	Duration (hour)	CLO-6: Relate	CLO-5: Relate.				CLO-1 : Determ	Course Learning	CLR-6: Predict					Course Learning	Course Offering Department	Pre-requisite Courses		
Solution of first order nonlinear partial	Problem solving using tutorial sheet 1	Solution of first order non-linear partial differential equations-standard type 1 F	Formation of partial differential equation eliminating arbitrary functions of the form $\phi(u, v) = 0$	ormation of partial c liminating two or mo	Formation of partial differential eliminating arbitrary functions	cormation of partial a	Formation of partial differential eliminating arbitrary constants		PDE. Fourier series,	Relate signal analysis with that of z transform	he relationship between	a proper form of solu	the expansion of a a	Determine Partial differential equation	Course Learning Outcomes (CLO):	ing the importance o	Conclude that the purpose of studying z transform	to the various rines of	e most general form t	Fourier series expan	Course Learning Rationale (CLR):	Department	18MAB102T	18MAB201T	
Solution of first order nonlinear partial differential equations-standard type –II	ng tutorial sheet 1	Solution of first order non-linear partial differential equations-standard type 1 F(p,q)=0	Formation of partial differential equation by eliminating arbitrary functions of the form— $\phi(u, v) = 0$	Formation of partial differential equation by eliminating two or more arbitrary functions	Formation of partial differential equation by eliminating arbitrary functions	Formation of partial differential equation by eliminating two or more arbitrary constants	Formation of partial differential equation by eliminating arbitrary constants	12	Boundary value probler	hat of z transform	en aperiodic signals and	tion for the differential e	iscontimious function as	al equation		f PDE, Fourier series, B	studving z transform is t	finterral transforms	o the PDF and relate to	cion in cohing problem	The purpose of le			Course TR	
Fourier series -half range cosine series related	Problem solving using tutorial sheet 4	Fourier series -half range cosine series related problems $(0, \pi)$	Fourier-series-related problems in (=1,1)	Change of interval fourier series -related problems in (0,21)	Fourier series -related problems in $(-\pi, \pi)$	Fourier series –related problems in $(0,2\pi)$	Introduction of Fourier series - Dirichlet's conditions for existence of Fourier Series	12	Relate PDE. Fourier series, Boundary value problems, Fourier and 2 transforms		Justify the relationship between aperiodic signals and linear combination of exponentials.	Decide a proper form of solution for the differential equations which are of hyperbolic and parabolic type	Explain the expansion of a discontinuous function as an infinite form of trigonometric sine and cosine series.		At the end of this course, learners will be able to:	Predicting the importance of PDE. Fourier series, Boundary value problems and Fourier Z - transform applications	Conclude that the purpose of studying z transform is to solve linear difference equations having constant coefficients	Evaluate the various types of integral transforms	Infer the most general form to the PDF and relate to half rappa sine and posine series as the case man h	Relate Fourier series expansion in solving problems under PMS value and Harmonic Anglysis	The purpose of learning this course is to:		Co-requisite Nil	TRANSFORMS AND BOUNDARY VALUE PROBLEMS	
One dimensional Wave Equation-initial displacement with non-zero initial velocity Type	Problem solving using tutorial sheet 7	One dimensional Wave Equation-initial displacement with zero initial velocity-type 3 Midpoint of the string is displaced	One dimensional Wave Equation-initial displacement with zero initial xelocity-type.2 Trigonometric function	One dimensional Wave Equation-inital displacement with zero initial velocity-type I Algebraic function	One dimensional Wave Equation and its possible solutions	Method of separation of variables	Classification of second order partial differential equations	12	+	2 85	2	2	2	-	Level of	Think	ing (Blo	oom		Learning	Data Book / Codes/Standards Nil		E PROBLEMS Course Category	
Type Properties of	Problem soi		2Fourier Sine	I Standard resi	Properties of	Fourier	ial Introduction		+	80	80	0.8	80	80	Expected	l Attai	nme	nt (%)		ning		ses Nil	В	
s of Fourier sine Transforms	solving using tutorial sheet 10	Fourier Cosine Transforms - problems	Sine.Transforms — problems ————	t results of Fourier transform	es of Fourier transforms	Fourier Transforms- problems	tion of Fourier Transforms	12	7	M H L		H	Н	H L	Engineer Problem Design & Analysis, Modern Society & Environ	Analy & Devi Designation of the Culti- Tool Unit of the Culti-	elop gn, R Jsag ure	mei ese	nt	-	3			Basic Sciences	
Z-transform of $r^n \sin n\theta$	Problem solving using tutorial sheet 13	Z-transform of r ⁿ cos nθ	Z-transform of $\frac{1}{n^2}$, $\frac{1}{(n+1)^2}$	Z-transform of a^n , a^n , a^n , a^n	Z-transform- change of scale property, shifting property	Z-transform-elementary properties	Introduction of Z-transform	12	T H H H - H	M H	H		. H . T	. H - M -	Environi Sustaina Ethics Individua Commui Project M Life Lon PSO - 1	bility al & T nicatio	eam on Fina	ance		1 0 2 11 11 11 11 11	Outcomes (PLO)			S L T P	

Learning Resources	J-12		30 1	S-11	S-10			S-9	S-8	٧	0		S-6	
ng Ces	SLO-2	SLO-1	SLO-2	SLO-I	SLO-2	SLO-1	SLO-2	SLO-1	SLO-1 SLO-2	SLO-2	SLO-1	SLO-2	SLO-1	SLO-2
B. H. Erwin Kreyszig, Advanced Engineer B.S. Grewal, Higher Engineering Mathen Weerarajan T., Transforms and Partial E	w	using tutorial sheet 3	Applications of Partial differential equations in Engineering	Linear Homogeneous partial differential equations of second and higher order with constant coefficients type 5 General rule	Type 4 Exponential shifting $e^{ax+by}f(x,y)$	Type 3: PI of polynomial	PI Type2:: sin(ax+by) or cos(ax+by)	Linear Homogeneous partial differential equations of second and higher order with constant coefficients-CF and PI Type 1: \[\text{e}^{\alpha x + b y} \]	Problem solving using tutorial sheet 2	More problems in Lagrange's linear equation: Method of multipliers	Lagrange's linear equation: Method of multipliers	Lagrange's linear equation: Method of grouping	Solution of first order non-linear partial SLO-1 differential equations-standard type-IV separation of variable $f(x, p) = g(y, q)$	Solution of first order non-linear partial SLO-2 differential equations-standard type III $F(z, p, q)=0$
B. H. Erwin kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons, 2006 B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 43 rd Edition, 2015 Veerarajan T., Transforms and Partial Differential Equations, Tata McGraw-Hill, New Delhi, 2012	Problem solving using tutorial sheet 6	Problem solving using tutorial sheet 6	Harmonic Analysis for finding sine series	Harmonic Analysis for finding cosine series	Harmonic Analysis for finding harmonic in periodic interval (0, T)	Harmonic Analysis for finding harmonic in (0,2l)	Harmonic Analysis for finding harmonic in $(0,2\pi)$	Introduction to Harmonic Analysis	Problem solving using tutorial sheet 5	Parseval's Theorem (without proof)-related problems in sine series	Parseval's Theorem (without proof)-related problems in cosine series	Parseval's Theorem (without proof)-related problems in Fourier series	Fourier series –half range sine series related problems(0, l)	Fourier series –half range sine series related problems $(0,\pi)$
6. 4.	Problem solving using tutorial sheet 9	Problem solving using tutorial sheet 9	Steady state conditions and Non-zero boundary conditions- more problems	Steady state conditions and Non-zero boundary conditions-related problems	One dimensional heat equation -Steady state conditions with zero velocity more related problems	One dimensional heat equation -Steady state conditions with zero velocity more problems	One dimensional heat equation -Steady state conditions with zero velocity	One dimensional heat equation -Steady state conditions more problems	Problem solving using tutorial sheet 8	One dimensional heat equation -Steady state conditions	One dimensional heat equation related problems	One dimensional heat equation and its possible solutions	Wave Equation-initial displacement with non- zero initial velocity Type 3 split function	One dimensional wave Equation-initial displacement with non-zero initial velocity Type 2 Trigonometric function
Ramana B.V., Higher Engineering Mathematics. Tata McGraw Hill New Delhi, 3 rd Edition, 2010 N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, for third semester, Laxmi Pu 3 rd Edition, 2014		Problem solving using tutorial sheet 12	Self-reciprocal using Fourier Transform, sine and cosine transform	Solving integral equation	Fourier Transforms Using Differentiation property	Parseval's Identity for Fourier sine & cosine transforms applications	Parseval's Identity for Fourier sine & cosine transforms	Parseval's Identity for Fourier transform	Problem solving using tutorial sheet 11	Convolution Theorem	Convolution of two function	Fourier cosine Transforms applications	Properties of Fourier cosine Transforms	Fourier sine Transforms applications
ing Mathematics, Tata McGrow Hill New Delhi, 3rd Edition, 2010 ext book of Engineering Mathematics, for third semester, Laxmi Publications,	Problem solving using tutorial sheet 15	Problem solving using tutorial sheet 15	Solution of linear difference equations with constant coefficients using Z-transform	Convolution theorem applications	Convolution theorem (without proof)	Inverse Z-transform - residue theorem method- problems	Inverse Z-transform - residue theorem method	Inverse Z-transform, Partial fraction method related problems	Problem solving using tutorial sheet 14	Inverse Z-transform, Partial fraction method	Inverse Z-transform, related problems, long division method	Inverse Z-transform- long division method	Finial value theorem	Initial value theorem

	Bloom's			Contin	Continuous Learning Assessment (50% weightage)	essment (50% weig	htage)			1	/= \n
	Level of	CLA -	CLA - 1 (10%)	CLA -	CLA - 2 (15%)	CLA - 3 (15%)	(15%)	CLA - 4 (10%)#	(10%)#	Final Examination (50% weightage	(50% weightag
	Thinking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
	Remember					200					
Level 1	Understand	40.70	1	30.70	٠	30 70	,	30.70		30%	,
l and a	Apply	70 0/	8	40.0%	8888	70 07		40.0%	8	400%	8
LEVEL 7	Analyze	40 /0	-	40 %		+0 /0		0/ 04		40/0	
I and 2	Evaluate	70 UC		70 OE		70 OE		70 02		2002	
TEACLO	Create	20 /0		20 /0		20 /0		20 /0		30/0	1
	Total	10	100%	100	100%	100%	%	100%	%	100%	%

CLA - 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

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