

DEPARTMENT OF MATHEMATICS
SRM INSTITUTE OF SCIENCE AND TECHNOLOGY
SRM NAGAR, KATTANKULATHUR – 603 203
B.Tech –Second Year/ Third Semester(2021-22)

LESSON PLAN

Subject Name: TRANSFORMS AND BOUNDARY VALUE PROBLEMS
Subject Code: 18MAB201T

Module I			
Lecture Hour		Description	Reference
S-1	SLO-1	Formation of partial differential equation by eliminating arbitrary constants	Veerarajan T., Transform&partial differential equation, Tata McGraw-Hill, New Delhi,2012, Page: 1.1-1.21
	SLO-2	Formation of partial differential equation by eliminating two or more arbitrary constants	
S-2	SLO-1	Formation of partial differential equation by eliminating arbitrary functions	Veerarajan T., Transform&partial differential equation, Tata McGraw-Hill, New Delhi,2012, Page: 1.1-1.21
	SLO-2	Formation of partial differential equation by eliminating two or more arbitrary functions	
S-3	SLO-1	Formation of partial differential equation by eliminating arbitrary functions of the form $\phi(u, v) = 0$	Veerarajan T., Transform&partial differential equation, Tata McGraw-Hill, New Delhi,2012, Page: 1.1-1.21
	SLO-2	Solution of first order non-linear partial differential equations-standard type I $F(p,q)=0$	Veerarajan T., Transform&partial differential equation, Tata McGraw-Hill, New Delhi,2012, Page: 1.21-1.50

S-4	SLO-1	Problem solving using tutorial sheet 1	
	SLO-2	Problem solving using tutorial sheet 1	
S-5	SLO-1	Solution of first order nonlinear partial differential equations-standard type –II Clairaut's form .	Veerarajan T., Transform&partial differential equation, Tata McGraw-Hill, New Delhi,2012, Page: 1.21-1.50
	SLO-2	Solution of first order non-linear partial differential equations-standard type III $F(z, p, q)=0$	
S-6	SLO-1	Solution of first order non-linear partial differential equations-standard type-IV separation of variable $f(x, p) = g(y, q)$	Veerarajan T., Transform&partial differential equation, Tata McGraw-Hill, New Delhi,2012, Page: 1.21-1.50
	SLO-2	Lagrange's linear equation: Method of grouping	Veerarajan T., Transform&partial differential equation, Tata McGraw-Hill, New Delhi,2012, Page: 1.51-1.70
S-7	SLO-1	Lagrange's linear equation: Method of Multipliers	Veerarajan T., Transform&partial differential equation, Tata McGraw-Hill, New Delhi,2012, Page: 1.51-1.70.
	SLO-2	More problems in Lagrange's linear equation: Method of Multipliers	
S-8	SLO-1	Problem solving using tutorial sheet 2	
	SLO-2	Problem solving using tutorial sheet 2	
S-9	SLO-1	Linear Homogeneous partial differential equations of second and higher order with constant coefficients-CF and PI Type 1: e^{ax+by} .	Veerarajan T., Transform&partial differential equation, Tata McGraw-Hill, New Delhi,2012, Page: 1.71-1.96
	SLO-2	PI Type2.: $\sin(ax+by)$ or $\cos(ax+by)$	
S-10	SLO-1	Type 3: PI of polynomial	Veerarajan T., Transform&partial differential equation, Tata McGraw-Hill, New Delhi,2012, Page: 1.71-1.96
	SLO-2	Type 4 Exponential shifting $e^{ax+by}f(x,y)$ Orthogonal matrices	

S-11	SLO-1	Linear Homogeneous partial differential equations of second and higher order with constant coefficients type 5. General rule	Veerarajan T., Transform & partial differential equation, Tata McGraw-Hill, New Delhi, 2012, Page: 1.96-1.98
	SLO-2	Applications of Partial differential equations in Engineering	
S-12	SLO-1	Problem solving using tutorial sheet 3	
	SLO-2	Problem solving using tutorial sheet 3	
		Cycle Test-I	

Module-II			
Lecture Hour		Description	Reference
S-1	SLO-1	Introduction of Fourier series - Dirichlet's conditions for existence of Fourier Series	Veerarajan T., Transform & partial differential equation, Tata McGraw-Hill, New Delhi, 2012, Page: 2.1-2.2
	SLO-2	Fourier series –related problems in $(0, 2\pi)$	Veerarajan T., Transform & partial differential equation, Tata McGraw-Hill, New Delhi, 2012, Page: 2.2-2.11
S-2	SLO-1	Fourier series –related problems in $(-\pi, \pi)$	Veerarajan T., Transform & partial differential equation, Tata McGraw-Hill, New Delhi, 2012, Page: 2.2-2.11
	SLO-2	Change of interval Fourier series – related problems in $(0, 2l)$	Veerarajan T., Transform & partial differential equation, Tata McGraw-Hill, New Delhi, 2012, Page: 2.12-2.42
	SLO-1	Fourier series –related problems in $(-l, l)$	Veerarajan T., Transform & partial differential

S-3			equation, Tata McGraw-Hill, New Delhi, 2012, Page: 2.12-2.42
	SLO-2	Fourier series –half range cosine series related problems in $(0, \pi)$	Veerarajan T., Transform & partial differential equation, Tata McGraw-Hill, New Delhi, 2012, Page: 2.42-2.72
S-4	SLO-1	Problem solving using tutorial sheet 4	
	SLO-2	Problem solving using tutorial sheet 4	
S-5	SLO-1	Fourier series –half range cosine series related problems in $(0, l)$	Veerarajan T., Transform & partial differential equation, Tata McGraw-Hill, New Delhi, 2012, Page: 2.42-2.72
	SLO-2	Fourier series –half range sine series related problems in $(0, \pi)$	
S-6	SLO-1	Fourier series –half range sine series related problems in $(0, l)$	Veerarajan T., Transform & partial differential equation, Tata McGraw-Hill, New Delhi, 2012, Page: 2.42-2.72
	SLO-2	Parseval's Theorem (without proof)-related problems in Fourier series	
S-7	SLO-1	Parseval's Theorem (without proof)-related problems in cosine series	Veerarajan T., Transform & partial differential equation, Tata McGraw-Hill, New Delhi, 2012, Page: 2.42-2.72
	SLO-2	Parseval's Theorem (without proof)-related problems in sine series	
S-8	SLO-1	Problem solving using tutorial sheet 5	
	SLO-2	Problem solving using tutorial sheet 5	
S-9	SLO-1	Introduction to Harmonic Analysis	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 40th Edition, 2007, Page: 458-463
	SLO-2	Harmonic Analysis for finding harmonic in $(0, 2\pi)$	
	SLO-1	Harmonic Analysis for finding harmonic in $(0, 2l)$	B.S. Grewal, Higher Engineering Mathematics,

S-10	SLO-2	Harmonic Analysis for finding harmonic in periodic interval $(0, T)$	Khanna Publishers, 40th Edition, 2007, Page:458-463
S-11	SLO-1	Harmonic Analysis for finding cosine series	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 40th Edition, 2007, Page:458-463
	SLO-2	Harmonic Analysis for finding sine series	
S-12	SLO-1	Problem solving using tutorial sheet 6	
	SLO-2	Problem solving using tutorial sheet 6	

Module III			
Lecture Hour		Description	Reference
S-1	SLO-1	Classification of second order partial differential equations	P.Kandasamy, K.Thilagavathy,K.Gunavathy, Engineering Mathematics volume III, S.Chand &company Ltd, 2003, Page:171-179
	SLO-2	Method of separation of variables	
S-2	SLO-1	One dimensional Wave Equation and its possible solutions	Veerarajan T., Transform&partial differential equation, Tata McGraw-Hill, New Delhi,2012, Page: 3.1-3.23
	SLO-2	One dimensional Wave Equation-initial displacement with zero initial velocity-type 1 Algebraic function	
S-3	SLO-1	One dimensional Wave Equation-initial displacement with zero initial velocity-type 2 Trigonometric function	Veerarajan T., Transform&partial differential equation, Tata McGraw-Hill, New Delhi,2012, Page: 3.1-3.23
	SLO-2	One dimensional Wave Equation-initial displacement with zero initial velocity-type 3 –Midpoint of the string is displaced.	
S-4	SLO-1	Problem solving using tutorial sheet 7	
	SLO-2	Problem solving using tutorial sheet 7	

S-5	SLO-1	One dimensional Wave Equation-initial displacement with non-zero initial velocity Type 1 Algebraic function	Veerarajan T., Transform&partial differential equation, Tata McGraw-Hill, New Delhi,2012, Page: 3.24-3.54
	SLO-2	One dimensional Wave Equation-initial displacement with non-zero initial velocity Type 2 Trigonometric function	
S-6	SLO-1	Wave Equation-initial displacement with non- zero initial velocity Type 3 split function	Veerarajan T., Transform&partial differential equation, Tata McGraw-Hill, New Delhi,2012, Page: 3.24-3.54
	SLO-2	One dimensional heat equation and its possible solutions	Veerarajan T., Transform&partial differential equation, Tata McGraw-Hill, New Delhi,2012, Page: 3.61-3.65
S-7	SLO-1	One dimensional heat equation related problem	Veerarajan T., Transform&partial differential equation, Tata McGraw-Hill, New Delhi,2012, Page: 3.61-3.65
	SLO-2	One dimensional heat equation - Steady state conditions	
S-8	SLO-1	Problem solving using tutorial sheet 8	
	SLO-2	Problem solving using tutorial sheet 8	
S-9	SLO-1	One dimensional heat equation -Steady state conditions more problems	Veerarajan T., Transform&partial differential equation, Tata McGraw-Hill, New Delhi,2012, Page: 3.72-3.74
	SLO-2	One dimensional heat equation -Steady state conditions with zero boundary condition	
S-10	SLO-1	One dimensional heat equation -Steady state conditions with zero boundary condition more problems	Veerarajan T., Transform&partial differential equation, Tata McGraw-Hill, New Delhi,2012, Page: 3.72-3.74
	SLO-2	One dimensional heat equation -Steady state conditions with zero boundary condition more problems	

S-11	SLO-1	Steady state conditions and Non-zero boundary conditions- related problems	Veerarajan T., Transform&partial differential equation, Tata McGraw-Hill, New Delhi,2012, Page: 3.87-3.94
	SLO-2	Steady state conditions and Non-zero boundary conditions- more problems	
S-12	SLO-1	Problem solving using tutorial sheet 9	
	SLO-2	Problem solving using tutorial sheet 9	
		Cycle Test-II	


Module IV			
Lecture Hour		Description	Reference
S-1	SLO-1	Introduction of Fourier Transforms	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 40th Edition, 2007, Page:836-840
	SLO-2	Fourier Transforms- problems	
S-2	SLO-1	Properties of Fourier transforms	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 40th Edition, 2007, Page:840-849
	SLO-2	Standard results of Fourier transform	
S-3	SLO-1	Fourier Sine Transforms – problems	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 40th Edition, 2007, Page:840-849
	SLO-2	Fourier cosine Transforms – problems	
S-4	SLO-1	Problem solving using tutorial sheet 10	
	SLO-2	Problem solving using tutorial sheet 10	
S-5	SLO-1	Properties of Fourier sine Transforms	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 40th Edition, 2007, Page:840-849
	SLO-2	Fourier sine Transforms applications	
	SLO-1	Properties of Fourier cosine Transforms	B.S. Grewal, Higher

S-6	SLO-2	Fourier cosine Transforms applications	Engineering Mathematics, Khanna Publishers, 40th Edition, 2007, Page:840-849
S-7	SLO-1	Convolution of two function	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 40th Edition, 2007, Page:849-851
	SLO-2	Convolution theorem	
S-8	SLO-1	Problem solving using tutorial sheet 11	
	SLO-2	Problem solving using tutorial sheet 11	
S-9	SLO-1	Parseval's Identity for Fourier transform	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 40th Edition, 2007, Page:849-851
	SLO-2	Parseval's Identity for Fourier sine & cosine transforms	
S-10	SLO-1	Parseval's Identity for Fourier sine & cosine transforms-applications	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 40th Edition, 2007, Page:849-851
	SLO-2	Fourier Transforms Using Differentiation property	
S-11	SLO-1	Solving integral equation	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 40th Edition, 2007, Page:849-851
	SLO-2	Self-reciprocal using Fourier Transform, sine and cosine transform	
S-12	SLO-1	Problem solving using tutorial sheet 12	
	SLO-2	Problem solving using tutorial sheet 12	

Module V			
Lecture Hour		Description	Reference
S-1	SLO-1	Introduction of Z-transform	N.P.Bali and Manish Goyal, A text book for Engineering mathematics, Laxmi publications, 7 th edition, 2009, Page: 1358-1366
	SLO-2	Z-transform-elementary properties	


S-2	SLO-1	Z-transform- change of scale property, shifting property	N.P.Bali and Manish Goyal, A text book for Engineering mathematics, Laxmi publications, 7th edition,2009, Page: 1366-1375
	SLO-2	Z-transform of $a^n, \frac{1}{n}, \frac{1}{n+1}$	
S-3	SLO-1	Z-transform of $\frac{1}{n^2}, \frac{1}{(n+1)^2}$	N.P.Bali and Manish Goyal, A text book for Engineering mathematics, Laxmi publications, 7th edition,2009, Page: 1366-1375
	SLO-2	Z-transform of $r^n \cos n\theta$	
S-4	SLO-1	Problem solving using tutorial sheet 13	
	SLO-2	Problem solving using tutorial sheet 13	
S-5	SLO-1	Z-transform of $r^n \sin n\theta$	N.P.Bali and Manish Goyal, A text book for Engineering mathematics, Laxmi publications, 7th edition,2009, Page: 1366-1375
	SLO-2	Initial value theorem	
S-6	SLO-1	Final value theorem	N.P.Bali and Manish Goyal, A text book for Engineering mathematics, Laxmi publications, 7th edition,2009, Page: 1375-1382
	SLO-2	Inverse Z-transform- long division method	
S-7	SLO-1	Inverse Z-transform- long division method more problems	N.P.Bali and Manish Goyal, A text book for Engineering mathematics, Laxmi publications, 7th edition,2009, Page: 1375-1382
	SLO-2	Inverse Z-transform, Partial fraction method	
S-8	SLO-1	Problem solving using tutorial sheet 14	
	SLO-2	Problem solving using tutorial sheet 14	
S-9	SLO-1	Inverse Z-transform, Partial fraction method related problems	N.P.Bali and Manish Goyal, A text book for Engineering mathematics, Laxmi publications, 7th edition,2009, Page: 1375-1382
	SLO-2	Inverse Z-transform - residue theorem method	

S-10	SLO-1	Inverse Z-transform - residue theorem method-problems	N.P.Bali and Manish Goyal, A text book for Engineering mathematics, Laxmi publications, 7th edition, 2009, Page: 1375-1382
	SLO-2	Convolution theorem (without proof)	
S-11	SLO-1	Convolution theorem applications	N.P.Bali and Manish Goyal, A text book for Engineering mathematics, Laxmi publications, 7th edition, 2009, Page: 1382-1387
	SLO-2	Solution of linear difference equations with constant coefficients using Z-transform	
S-12	SLO-1	Problem solving using tutorial sheet 15	
	SLO-2	Problem solving using tutorial sheet 15	
		Cycle Test-III	


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HOD/Mathematics

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