DEPARTMENT OF MATHEMATICS

FACULTY OF ENGINERING AND TECHNOLOGY

SRM UNIVERSITY

SEMESTER - I **MA2020- APPLIED MATHEMATICS** **ACADEMIC YEAR: 2013-14**

LECTURE SCHEME / PLAN

The objective is to develop analytical capability and to impart knowledge in Statistical methods and Queuing theory and their applications in Engineering and Technology, the knowledge of Statistical methods and its applications so as to enable them to apply them for solving real world problems.

The list of instructions (provided below) may be followed by a faculty relating to his/her own schedule includes warm-up period, controlled/free practice, and the respective feedback of the classes who handle. The lesson plan has been formulated based on high quality learning outcomes and the expected outcomes are as follows

Each subject must have a minimum of 50 hours, which in turn, 45 hours for lecture and rest of the hours for tutorials. The faculty has to pay more attention in insisting the students to have ≤ 95 % class attendance.

UNIT I : Z - TRANSFORM			
Lect. No.	Lesson schedule	Learning outcomes	Cumulative hours
1.1	To refresh and enhance the prerequisite fundamental mathematical knowledge for the topic		1
L1.2	▪ Introduction to Z-transform ▪ To find the Z-transforms of some standard functions ▪ To find Z-transforms of given sequences	▪ To inculcate in the students, the concepts of discrete valued sequences, continuous valued functions	2
L1.3	▪ Properties of Z-transforms ▪ To find Z-transforms using properties	▪ To solving in detail Z-transform	3
L1.4	▪ Initial and final value theorems – problems using these theorems.	▪ To equip the student with the capability of applying Z-transform to solve difference equations	4
L1.5	▪ To find inverse Z-transform of given function, using convolution theorem		5
L1.6	• To find inverse Z-transform using fraction method		6
L1.7	To find inverse Z-transform using		7

	long division method		
L1.8	To find inverse Z-transform using residue method.		8
L1.9	Z-transform of derivatives of sequences. To solve differential equations using Z-transform.		9
L1.10	To solve differential equations using Z- transform.		10
CYCLE TEST – I			**DATE: 04.09.2013**
UNIT-II: LAPLACE TRANSFORM			
L2.1	Brief overview of Laplace transforms and the distinction between Laplace and Z-Transform.	➢ The students will be able to understand clearly the nuances of Laplace transforms ➢ To be familiar with the applications of L-Transforms to boundary value problems ➢ To be able to solve wave equation using Fourier transform	11
L2.2	To classify the Partial Differential Equations.		12
L2.3	To reduce the given PDE to canonical form.		13 & 14
L2.4	• Laplace transform of some standard functions • Properties of Laplace transform		15
L2.5	To find Laplace transform of functions using the properties.		16
L2.6	To solve one dimensional wave equation using D'Alembert's method.		17
L2.7	• Laplace transforms of derivatives of functions. • To solve one dimensional wave equation, using Laplace transform.		18 &19
L2.8	• Fourier transforms definitions • Properties of Fourier transforms to solve equations of vibrating string using Fourier transform.		20
UNIT-III: FOURIER SINE AND COSINE TRANSFORM			
L3.1	• Introduction to Fourier Sine and Cosine transforms • Inversion formulae	.	21 &22
L3.2	To find Fourier Sine and cosine transform of given functions.	➢ To understand the Fourier Sine and Cosine transform pair. ➢ Apply them to solve heat conduction	23 &24
L3.3	• Inverse Fourier Sine transform • Inverse Fourier Cosine transform • Solving problems using inversion formulae		25 & 26

L3.4	• Applications of Fourier sine transform to boundary value problems. • To solve heat flow equations	problems.	27 & 28
L3.4	To solve heat conduction problems using Fourier sine and cosine transforms		29 &30
UNIT-IV: CALCULUS OF VARIATIONS			
L4.1	To solve simple variations problems with fixed boundaries.	▪ To study the concept of Euler's equation ▪ To understand and solve variational problems using Euler's equation ▪ To solve isoperimetric problems by different methods	31 & 32
L4.2	• Definitions of Euler's equations • To solve problems of several variables using Euler's equations.		33 & 34
L4.3	• To study the Isoperimetric problems • To find the solutions of Isoperimetric problems.		35 & 36
L4.4	To solve such problems using Ritz method		37 & 38
L4.5	More problems to be solved using Euler's equation and review of study on variational problems		39 & 40
UNIT-V: BESSEL FUNCTIONS AND LEGENDRE POLYNOMIAL			
L5.1	▪ To understand the Bessel equations and Bessel functions ▪ Series solution of Bessel's differential equations	▪ To study in detail the Bessel functions and its orthogonal property. ▪ To learn Legendre polynomials and their recurrence formula ▪ To establish the orthogonal property of Legendre polynomials	41 & 42
L5.2	▪ To understand in detail the recurrence relation ▪ To establish generation functions		43 & 44
L5.3	▪ To prove the orthogonal property of Bessel functions		45
L5.4	▪ Introduction to Legendre polynomial ▪ To prove the recurrence formulae		46 & 47
L5.5	▪ To prove Rodrigue's formula for Legendre polynomial		48
L5.6	▪ To prove the orthogonal property of Legendre polynomials		49
L5.7	▪ Review of special functions		50
MODEL EXAM		**20.11.2013 (Duration: 3 Hours)**	
LAST WORKING DAY : 27.11.2013			

REFERENCES:

- Veerarajan T, Mathematics IV , Tata McGraw Hill,2000
- Grewal B.S.,Higher Engineering Mathematics,Khanna Publishers. 34th Edition, 2005
- Sankara Rao K., Introduction to Partial Differential Equations, PHI,2007
- Narayanan s., Manicavachagom Pillai T.K. and Ramanaiah G., Advanced Mathematics for Engineering students, Vol II S. Viswanathan & co., 2001
- Venkatraman M.K., Higher Engineering Mathematics, National Publishing Co., 2000

WEB RESOURCES:

http://www.wikipedia.org/

http://oce.mit.edu

Internal marks Total: 50

Internal marks split up: Cycle Test 1: 20 Marks Model Exam: 20 Marks

Surprise Test: 5 marks Attendance: 5 marks

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