



Department of Applied Mathematics		LP: MA18182
M.E/M.Tech : Applied Electronics	Regulation: 2018	Rev. No: 00
Sub. Code / Sub. Name : MA18181/ Applied Mathematics for Engineers		Date: 24.01.22
Unit : I		

Unit Syllabus: LINEAR ALGEBRA

Vector spaces – norms – Inner Products – Eigen values using QR transformations – QR factorization - generalized eigenvectors – Canonical forms – singular value decomposition and applications - pseudo inverse – least square approximations --Toeplitz matrices and some applications

Objective: To develop the ability to use the concepts of linear algebra and special functions for solving problems related to networks.

Session No *	Topics to be covered	Ref	Teaching Aids
1	Introduction – Unit syllabus: Vector spaces – norms	1-Ch.2;pp85-90	LCD/BB
2	Inner Products	1-Ch.5;pp295-303	LCD/BB
3	generalized eigenvectors	1-Ch.5;pp310, 384-389	LCD/BB
4	Canonical forms	1-Ch.5;390-395	LCD/BB
5	QR factorization	1-Ch.5;pp310-329	LCD/BB
6	Problems solved	1-Ch.5;pp330-331	LCD/BB
7	Least squares method	1-Ch.5;pp331-339	LCD/BB
8	Tutorial	1-Ch.5;pp339	LCD/BB
9	Singular value decomposition	1-Ch.5;pp310	LCD/BB
10	Toeplitz matrices and some applications	1-Ch.5;pp340-341	LCD/BB
11	Summarization of Unit I		LCD/BB
	CAT 1		

Content beyond syllabus covered (if any):

* Session duration: 50 mins



Sub. Code / Sub. Name: MA18181/ Applied Mathematics for Engineers
Unit : II

Unit Syllabus: LINEAR PROGRAMMING

Formulation – Graphical solution – Simplex method – Two phase method - Transportation and Assignment Models

Objective: To formulate and construct a mathematical model for a linear programming problem in real life situation.

Session No *	Topics to be covered	Ref	Teaching Aids
12	Introduction – Unit Syllabus	3. Ch.5; Pg,5.1 – 5.21	LCD
13	Formulation and Graphical Solution	3. Ch.5; Pg,5.1 – 5.21	LCD
14	Formulation and Graphical Solution – Problems	3. Ch.5; Pg,5.1 – 5.21	LCD
15	Simplex method	3. Ch.5; Pg,5.21 – 5.23	LCD/BB
16	Simplex method	3. Ch.5; Pg,5.23 – 5.25 & Pg 5.28 – 5.50	LCD
17	Tutorial		BB
18	Two – Phase method	3. Ch.5;Pg,5.23 – 5.25 & Pg 5.28 – 5.50	LCD
19	Two – Phase method	3. Ch.5;Pg,5.23 – 5.25 & Pg 5.28 – 5.50	LCD
20	Transportation problems	3. Ch.5; Pg,5.51 – 5.71	LCD
21	Transportation problems	3. Ch.5; Pg,5.51 – 5.71	LCD
22	Assignment problems	3. Ch.5; Pg,5.71 – 5.98	LCD
23	Assignment problems	3. Ch.5; Pg,5.71 – 5.98	LCD
24	Summarization of Unit II		
Content beyond syllabus covered (if any):			

* Session duration: 50 mins



Sub. Code / Sub. Name: MA18181/ Applied Mathematics for Engineers
Unit : III

Unit Syllabus: ORDINARY DIFFERENTIAL EQUATIONS

Runge Kutta Methods for system of IVPs, numerical stability, Adams-Bashforth multistep method, solution of stiff ODEs, shooting method, BVP: Finite difference method, orthogonal collocation method, orthogonal collocation with finite element method, Galerkin finite element method.

Objective: To expose the students to solve differential equations by various techniques.

Session No *	Topics to be covered	Ref	Teaching Aids
25	Runge kutta methods I and II order for system of IVPs	4-Ch.6: Pg.333-340 & 5-Ch.5 –pp.167-172	LCD
26	Runge kutta methods III and IV order for system of IVPs	4-Ch.6: Pg.333-340 & 5-Ch.5 –pp.167-172	LCD
27	Stability analysis of R.K methods	4-Ch.6: Pg.350-355 & 5-Ch.5 –pp.178-185	LCD/BB
28	Tutorial Class		
29	Adams Bashforth multi step method	4-Ch.6: Pg.385-388 & 5-Ch.5 –pp.157-160	LCD
30	Tutorial Class		
31	Solution of stiff ODEs	4-Ch.6: Pg.385-388 & 5-Ch.5 –pp.157-160	LCD
32	Shooting method	5-Ch.5 –pp.187-188	LCD
33	BVP : Finite difference method	4-Ch.6: Pg.417-419 & 5-Ch.6 –pp.260-264	LCD
34	Orthogonal collocation method	5-Ch.6 –pp.167-172	LCD/BB
35	Orthogonal collocation with finite element method	5-Ch.6 –pp.229-238	LCD
36	Galerkin finite element method	5-Ch.6 –pp.246-250	LCD/BB
37	Summarization of Unit II	5-Ch.6 –pp.252-259	LCD
	CAT II		

Content beyond syllabus covered (if any):

* Session duration: 50 mins



Sub. Code / Sub. Name: MA18181/ Applied Mathematics for Engineers

Unit : IV

Unit Syllabus: TWO DIMENSIONAL RANDOM VARIABLES

Joint distributions – Marginal and Conditional distributions – Functions of two dimensional random variables – Regression Curve – Correlation.

Objective: To provide necessary basic concepts in probability and random processes for applications such as random signals, linear systems etc in communication engineering.

Session No *	Topics to be covered	Ref	Teaching Aids
38	Introduction – Unit syllabus, Joint distributions	2 – Ch.2: Pg.2.1 – 2.2	LCD
39	Marginal distributions.	2 – Ch.2: Pg.2.4 – 2.5 & P.g.2.11 – 2.15	LCD
40	Conditional distributions	2 – Ch.2: Pg.2.23 – 2.26	LCD
41	Conditional distributions	2 – Ch.2: Pg.2.23 – 2.26	LCD
42	Covariance	2 – Ch.2: Pg.2.5 – 2.6 &P.g.2.15 – 2.23	LCD/BB
43	Properties, Problems or correlation	2 – Ch.2: P.g.2.23 – 2.26	LCD
44	Regression - Properties	2 – Ch.2: P.g.2.26 – 2.28	LCD
45	Problems on regression	2 – Ch.2: P.g.2.29 – 2.31	LCD/BB
46	Problems on regression	2 – Ch.2: P.g.2.29 – 2.31	LCD
47	Problems on Transformation of random variables	2 – Ch.2: P.g.2.37 – 2.41	LCD
48	Problems on Transformation of random variables	2 – Ch.2: P.g.2.37 – 2.41	LCD
			LCD/BB

Content beyond syllabus covered (if any):

* Session duration: 50 mins



Sub. Code / Sub. Name: MA18181/ Applied Mathematics for Engineers

Unit : V

Unit Syllabus: QUEUEING MODELS

Vector spaces – norms – Inner Products – Eigen values using QR transformations – QR factorization - generalized eigenvectors – Canonical forms – singular value decomposition and applications - pseudo inverse – least square approximations --Toeplitz matrices and some applications

Objective: To develop the ability to use the concepts of linear algebra and special functions for solving problems related to networks.

Session No *	Topics to be covered	Ref	Teaching Aids
49	Introduction – Unit syllabus.	4-Ch.4; Pg.499– 500	LCD
50	Poisson Process	4-Ch.4 Pg.506– 508	LCD
51	Markovian queues	4-Ch.4; Pg.509– 510	LCD/BB
52	Problems solved	4-Ch.4; Pg.511– 514	LCD
53	Single server Model	4-Ch.4; Pg.521– 524	LCD
54	Multi-server Model	4-Ch.4; Pg.530-531	LCD
55	Little's formula	4-Ch.4; Pg.532-534	LCD
56	Machine Interference Model	4-Ch.4; Pg.540-542	LCD/BB
57	Problems solved	4-Ch.4; Pg.499– 524	LCD
58	Steady State analysis	4-Ch.4; Pg.512-515	LCD/BB
59	Self Service queue	4-Ch.4; Pg.538-539	LCD
60	Summarizing the unit.	4-Ch.4; Pg.499– 500	LCD

Contnt beyond syllabus covered (if any):

* Session duration: 50 mins



Sub. Code / Sub. Name: MA18181/ Applied Mathematics for Engineers
--

REFERENCES:

1. Richard Bronson, Gabriel B.Costa, "Linear Algebra", Academic Press, Second Edition, 2007.
2. Richard Johnson, Miller & Freund's Probability and Statistics for Engineers, 7th Edition, Prentice – Hall of India, Private Ltd., New Delhi (2007).
3. Taha, H.A., Operations Research, An introduction, 7th edition, Pearson Education editions, Asia, New Delhi, 2002.
4. Donald Gross and Carl M. Harris, Fundamentals of Queuing theory, 2nd Edition, John Wiley and Sons, New York (1985).
5. Gupta S.K, "Numerical Methods for Engineers", New Age Publishers, 1995.

	Prepared by	Approved by
Signature		
Name	Dr R. MUTHUCUMARASWAMY	Dr R. MUTHUCUMARASWAMY
Designation	Professor & Head	Professor & Head
Date	24.01.2022	24.01.2022
Remarks *:		
Remarks *:		

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD