SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Applied Mathematics	LP: MA18151 Rev. No:00 Date: 24/09/2021
B.E/B.Tech : Common to all branches except Marine Engineering Regulation:2018 Sub. Code / Sub. Name : MA18151/Engineering Mathematics-I **Unit : I Matrices**	

Unit Syllabus:

Eigen values and Eigen vectors of a real matrix – Characteristic equation – Properties of Eigen values and Eigen vectors – Statement and Applications of Cayley-Hamilton Theorem – Diagonalization of matrices– Reduction of a quadratic form into canonical form by orthogonal transformation-Nature of quadratic forms.

Objective:

On completion of the unit, the students are expected to develop the use of matrix algebra techniques that is needed by engineers for practical applications.

Session No *	Topics to be covered	Ref	Teaching Aids
1	Eigen values and Eigenvectors of a real matrix, characteristic equation	2-Ch 3,pg 227-228	PPT/BB
2	Problems on Eigen values and Eigenvectors	2-Ch 3, pg 228-229	PPT/BB
3	Properties of Eigen values and Eigenvectors	3- Ch 2, pg 62-63	PPT/BB
4	Tutorial Class	2,3 & R3	PPT/BB
5	Statement and Applications of Cayley – Hamilton Theorem	2- Ch 3,pg 231-232	PPT/BB
6	Orthogonal Transformation, Diagonalization	R4- Ch 14, pg 14.8	PPT/BB
7	Orthogonal Transformation of a symmetric matrix to Diagonal form-Distinct Eigen values	R4- Ch 14, pg 14.8-14.9	PPT/BB
8	Orthogonal Transformation of a symmetric matrix to Diagonal form-Repeated Eigen values	R4- Ch 14, pg 14.8-14.9	PPT/BB
9	Tutorial class	R4- Ch 14, pg 14.8-14.9	PPT/BB
10	Nature of Quadratic forms	3- Ch 2, pg 70-72	PPT/BB
11	Reduction of quadratic form to canonical form by orthogonal transformation	3- Ch 2, pg 70-72	PPT/BB
12	Tutorial class	2- Ch 3, pg 23-239 3- Ch 2, pg 70-72	PPT/BB
Content beyond syllabus covered (if any): Applications of Matrices in Physics and Computer Graphics. Uses of Matrices in Page Ranking Algorithm that ranks the pages in Google Search.			

* Session duration: 50 min

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COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: MA18151/Engineering Mathematics-I

Unit : III Applications of Differential Calculus

Unit Syllabus:

Curvature in Cartesian co-ordinates – Centre and radius of curvature – Circle of curvature – Evolutes – Envelopes

Objective:

On completion of the unit, the students are expected to understand effectively the geometrical aspects of curvature, involutes and evolutes of plane curves.

Session No *	Topics to be covered	Ref	Teaching Aids
13	Introduction to Curvature and Radius of curvature	3-Ch 4, pg 179-180, R4- Ch 2, pg 2.44-2.45	PPT/BB
14	Curvature and Radius of curvature of simple curves in Cartesian co-ordinates	3- Ch 4, pg 180-184, R4- Ch 2, pg 2.44-2.47	PPT/BB
15	Tutorial Class	1, 3 & R4	PPT/BB
16	Centre of curvature	3- Ch 4, pg 185, R4- Ch 2, pg 2.57-2.58	PPT/BB
17	Circle of curvature	R4- Ch 2, pg 2.58-2.60	PPT/BB
18	Evolutes-Introduction	3- Ch 4, pg 186, R4- Ch 2, pg 2.57-2.58	PPT/BB
19	Evolute of standard curves	R4- Ch 2, pg.62-2.64	PPT/BB
20	Tutorial class	1, 3 & R4	PPT/BB
21	CAT-I		
22	Envelope of a family of curves(single parameter)	3- Ch 4, pg 187-188, R4- Ch 2, pg 2.65-2.66	PPT/BB
23	Envelope of a family of curves(two parameters)	R4- Ch 2, pg 2.672.68	PPT/BB
24	Tutorial class	1, 3 & R4	PPT/BB
Content beyond syllabus covered (if any): Use of calculus in day to day life.			

* Session duration: 50 min

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: MA18151/Engineering Mathematics-I

Unit : IV Differential Calculus of Several Variables

Unit Syllabus :

Limits and Continuity - Partial derivatives – Total derivatives – Differentiation of implicit functions – Jacobians and properties– Taylor's series for functions of two variables – Maxima and Minima of functions of two variables – Lagrange's method of undetermined multipliers.

Objective:

On completion of the unit, the students are expected to familiarize with functions of several variables which are needed in many branches of engineering.

Session No *	Topics to be covered	Ref	Teaching Aids
25	Limits and Continuity	2-Ch 5, pg 398, 3- Ch 5, pg 211-212	PPT/BB
26	Partial derivatives	2- Ch 5, pg 399-409 3- Ch 5, pg 213-217	PPT/BB
27	Total derivatives	2- Ch 5, pg 419-426 3- Ch 5, pg 223-225	PPT/BB
28	Tutorial class	1, 2 & 3, R5	PPT/BB
29	Differentiation of implicit functions	3- Ch 5, pg 223-225	PPT/BB
30	Jacobians	2- Ch 5, pg 428 3- Ch 5, pg 229	PPT/BB
31	Properties of Jacobians	2- Ch 5, pg 429-431 3- Ch 5, pg 230-233	PPT/BB
32	Taylor's series for functions of two variables	2- Ch 5, pg 432-436, 3- Ch 5, pg 235-237	PPT/BB
33	Tutorial class	1, 2 & 3, R5	PPT/BB
34	Maxima and minima of functions of two variables	2- Ch 5, pg 437-445, 3- Ch 5, pg 242-244	PPT/BB
35	Lagrange's method of undetermined multipliers	2- Ch 5, pg 446-449, 3- Ch 5, pg 245-249	PPT/BB
36	Tutorial class	1, 2 & 3, R5	PPT/BB
Content beyond syllabus covered (if any):			

* Session duration: 50 min

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: MA18151/Engineering Mathematics-I

Unit : V Multiple Integrals

Unit Syllabus:

Double integrals in Cartesian and polar coordinates – Change of order of integration – Area enclosed by plane curves - Change of variables in double integrals – Triple integrals – Volume of solids.

Objective:

On completion of the unit, the students are expected to be acquainted with mathematical tools needed in evaluating multiple integrals and their usage.

Session No *	Topics to be covered	Ref	Teaching Aids
37	Evaluation of Double integrals in Cartesian co-ordinates	2- Ch 6, pg 470-475, 3- Ch 7, pg 295-296	PPT/BB
38	Evaluation of Double integrals in Polar co-ordinates	2- Ch 6, pg 476-479, 3- Ch 7, pg 301-303	PPT/BB
39	Change of order of integration	2- Ch 6, pg 479-482, 3- Ch 7, pg 297-300	PPT/BB
40	More problems on Change of order of Integration	2 & 3	PPT/BB
41	Tutorial class	1, 2, 3 & R2	PPT/BB
42	Area enclosed by plane curves	3- Ch 7, pg 303-305	PPT/BB
43	Change of variables in double integrals	2- Ch 6, pg 485-491	PPT/BB
44	Tutorial class	1, 2, 3 & R2	PPT/BB
45	Triple integration	2- Ch 6, pg 499-500, 3- Ch 7, pg 305-307	PPT/BB
46	Volume as Triple integrals	2- Ch 6, pg 499-500, 3- Ch 7, pg 305-307	PPT/BB
47	Volume of solids	2- Ch 6, pg 501-502, 3- Ch 7, pg 307-310	PPT/BB
48	Tutorial class	1, 2, 3 & R2	PPT/BB

Content beyond syllabus covered (if any): Applications of Multiple integrals: In Electromagnetism, Maxwell's equation can be written using Multiple integrals; In Mechanics, the Moment of inertia is calculated as the volume integral.

* Session duration: 50 min

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COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: MA18151/Engineering Mathematics-I

Unit : II Statistical Methods

Unit Syllabus:

Scatter diagram- Karl Pearson coefficient of correlation for raw data- Spearman's rank correlation coefficient- lines of regression – Regression equation of X on Y and Y on X- Curve fitting by Principle of least squares – Fitting a straight line $y = ax + b$ and a parabola $y = ax^2 + bx + c$.

Objective:

On completion of the unit, the students are expected to have knowledge in correlation, regression and curve fitting.

Session No *	Topics to be covered	Ref	Teaching Aids
49	Introduction, Scatter Diagram, Correlation	R1-Ch 10, pg 10.1-10.3 3-Ch 25, pg 845-846	PPT/BB
50	Karl Pearson's Coefficient of Correlation for raw data	R1-Ch 10, pg 10.4 3-Ch 25, pg 846-848	PPT/BB
51	Spearman's rank correlation coefficient	R1-Ch 10, pg 10.7 3-Ch 25, pg 853-854	PPT/BB
52	Tutorial Class	1,3 & R1	PPT/BB
53	Lines of regression	3-Ch 25, pg 848-852	PPT/BB
54	Problems on lines of regression	3-Ch 25, pg 848-852	PPT/BB
55	Tutorial Class	1,3 & R1	PPT/BB
56	Curve fitting by Principle of least squares	R1-Ch 24, pg 816	PPT/BB
57	Fitting a straight line $y = ax + b$	R1-Ch 24,pg 817-820	PPT/BB
58	Fitting a parabola $y = ax^2 + bx + c$	R1-Ch 24,pg 817-820	PPT/BB
59	Tutorial Class	1,3 & R1	PPT/BB
60	CAT-III		
Content beyond syllabus covered (if any):			

* Session duration: 50 min

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TEXT BOOKS:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 8th Edition, John Wiley, (1999).
2. N P Bali and Manish Goyal, "A Text book of Engineering Mathematics", Eighth Edition, Laxmi Publications Pvt Ltd., (2011).
3. B S Grewal, "Higher Engineering Mathematics", 41st Edition, Khanna Publications, Delhi, (2011).

REFERENCES:

1. S C Gupta and V K Kapoor, Fundamentals of Mathematical Statistics, S Chand Private Ltd.,11th Edition (2005).
2. Glyn James, "Advanced Modern Engineering Mathematics", 3rd Edition, Pearson Education, (2012).
3. Peter V.O'Neil, "Advanced Engineering Mathematics", 7th Edition, Cengage learning, (2012).
4. B V Ramana , "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company New Delhi, (2008).
5. P Sivarama Krishna Das and E Rukmangadachari, "Engineering Mathematics", Volume I, Second Edition, Pearson Publishing (2011).

	Prepared by	Approved by
Signature	A Suba K. Vijayalakshmi	
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Designation	Assistant Professor	Professor & Head
Date	24/09/2021	24/09/2021
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