SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN – THEORY

Department of Applied Mathematics	LP: MA22151
	Rev. No: 00
B.E / B.Tech : Common to all branches except Marine Engineering	Date: 02/11/2022
Regulation : 2022	
Sub. Code / Sub. Name : MA22151 / Applied 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 to canonical form by orthogonal transformation-Nature of quadratic forms.

Objective:

On completion of the unit, the students should be made to compute eigen values and eigen

vectors and use them in diagonalization and classification of real quadratic forms.

Session No *	Topics to be covered	Ref	Teaching Aids
1	Eigen values and Eigen vectors of a real matrix, characteristic equation	R1-Ch 3,pg 227-228	PPT/BB
2	Problems on Eigen values and Eigen vectors	R1-Ch 3, pg 228-229	PPT /BB
3	Properties of Eigen values and Eigen vectors	2- Ch 2, pg 62-63	PPT /BB
4	Tutorial Class	2 & R1	PPT /BB
5	Statement and Applications of Cayley – Hamilton Theorem	R1- Ch 3, pg 231-232	PPT /BB
6	Orthogonal Transformation, Diagonalization	3- Ch 14, pg 14.8	PPT /BB
7	Orthogonal Transformation of a symmetric matrix to Diagonal form -Distinct Eigen values	3- Ch 14, pg 14.8-14.9	PPT /BB
8	Orthogonal Transformation of a symmetric matrix to Diagonal form -Repeated Eigen values	3- Ch 14, pg 14.8-14.9	PPT /BB
9	Tutorial class	3- Ch 14, pg 14.8-14.9	PPT /BB
10	Nature of Quadratic forms	2- Ch 2, pg 70-72	PPT /BB
11	Reduction of quadratic form to canonical form by orthogonal transformation	2- Ch 2, pg 70-72	PPT /BB
12	Tutorial class	1 & 2	PPT /BB

Content beyond syllabus covered (if any): Applications of Matrices in Physics and Computer Graphics. Their use in Page Rank Algorithm that ranks the pages in a Google page search.

* Session duration: 50 minutes

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN – THEORY

Sub. Code / Sub. Name : MA22151 / Applied Mathematics I
Unit II : Applications of Differential calculus

Unit Syllabus:

Curvature and Radius of Curvature - Centre of Curvature – Circle of Curvature – Evolutes – Envelopes – Evolute as envelope of normals.

Objective:

On completion of the unit, the students should be made to study differential calculus and its

applications to relevant Engineering Problems.

Session No *	Topics to be covered	Ref	Teaching Aids
13	Introduction to Curvature and Radius of curvature	2-Ch 4, pg 179-180, 3- Ch 2, pg 2.44-2.45	PPT/BB
14	Curvature and Radius of curvature of simple curves in Cartesian co-ordinates	2- Ch 4, pg 180-184, 3- Ch 2, pg 2.44-2.47	PPT/BB
15	Tutorial Class	1, 2 & 3	PPT/BB
16	Centre of curvature	2- Ch 4, pg 185, 3- Ch 2, pg 2.57-2.58	PPT/BB
17	Circle of curvature	3- Ch 2, pg 2.58-2.60	PPT/BB
18	Evolutes – Introduction	2- Ch 4, pg 186, 3- Ch 2, pg 2.61	PPT/BB
19	Evolute of standard curves	3- Ch 2, pg.62-2.64	PPT/BB
20	Tutorial class	1,2 & 3	PPT/BB
	CAT-I		
21	Envelope of a family of curves (single parameter)	2- Ch 4, pg 187-188, 3- Ch 2, pg 2.65-2.66	PPT/BB
22	Envelope of a family of curves (two parameter)	3- Ch 2, pg 2.672.68	PPT/BB
23	Evolute as envelope of normals	3- Ch 2, pg 2.73-2.74	PPT/BB
24	Tutorial class	2 & 6	PPT/BB
Content beyond syllabus covered (if any): Use of calculus in everyday life.			

* Session duration: 50 minutes

| Sub. Code / Sub. Name   : MA22151 / Applied Mathematics I |
| Unit III   : Differential Calculus for 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 should be made to compute derivatives using the chain rule or total differentials.

Session No *	Topics to be covered	Ref	Teaching Aids
25	Limits and Continuity	R1-Ch 5, pg 398, 2- Ch 5, pg 211-212	PPT/BB
26	Partial derivatives	R1-Ch 5, pg 399-409, 2 - Ch 5, pg 213-217	PPT/BB
27	Total derivatives	R1- Ch 5, pg 419-426, 2 - Ch 5, pg 223-225	PPT/BB
28	Tutorial class	1 , 2 & R1	PPT/BB
29	Differentiation of implicit functions	2- Ch 5, pg 223-225	PPT/BB
30	Jacobians	R1- Ch 5, pg 428, 2- Ch 5, pg 229	PPT/BB
31	Properties of Jacobians	R1- Ch 5, pg 429-431, 2- Ch 5, pg 230-233	PPT/BB
32	Taylor's series for functions of two variables	R1- Ch 5, pg 432-436, 2- Ch 5, pg 235-237	PPT/BB
33	Tutorial class	1, 2 & R1	PPT/BB
34	Maxima and minima function of two variables	R1- Ch 5, pg 437-445, 2- Ch 5, pg 242-244	PPT/BB
35	Lagrange's method of undetermined multipliers	R1- Ch 5, pg 446-449, 2- Ch 5, pg 245-249	PPT/BB
36	Tutorial class	1, 2 & R1	PPT/BB
	CAT – II		

Content beyond syllabus covered (if any):

* Session duration: 50 minutes

SRI VENKATESWARA COLLEGE OF ENGINEERING

Sub. Code / Sub. Name : MA22151 / Applied Mathematics I	
Unit IV : Applications of Definite Integrals	

Unit Syllabus:

Integration by Parts – Bernoulli's formula for integration – Definite integrals and its Properties – Solids of Revolution – Disk Method – Washer Method – Rotation about both x and y axis – Shell Method.

OBJECTIVE:

On completion of the unit, the students should be made to understand the rotation of two-dimensional geometry using definite integrals.

Session No *	Topics to be covered	Ref	Teaching Aids
37	Integration by Parts, Bernoulli's Formula	3 - Ch 8, pg 452	PPT/BB
38	Definite Integrals	3 - Ch 5, pg 265-268	PPT/BB
39	Properties of Definite Integrals	3 - Ch 5, pg 265-268	PPT/BB
40	Tutorial Class	3 - Ch 5	PPT/BB
41	Solids of Revolution	3 - Ch 6, pg 316	PPT/BB
42	Disk Method	3 - Ch 6, pg 316	PPT/BB
43	Washer Method	3 - Ch 6, pg 319	PPT/BB
44	Tutorial Class	3 - Ch 6	PPT/BB
45	Rotation about x-axis	3 - Ch 6, pg 320	PPT/BB
46	Rotation about y-axis	3 - Ch 6, pg 321	PPT/BB
47	Shell Method	3 - Ch 6, pg 327	PPT/BB
48	Tutorial Class	3 - Ch 6	PPT/BB
Content beyond syllabus covered (if any):			

* Session duration: 50 minutes

SRI VENKATESWARA COLLEGE OF ENGINEERING

Sub. Code / Sub. Name   : MA22151 / Applied 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 – Area of a curved surface - Triple integrals – Volume of solids.

Objective:

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

Session No *	Topics to be covered	Ref	Teaching Aids
49	Evaluation of Double integrals in Cartesian co-ordinates	R1- Ch 6, pg 470-475, 2- Ch 7, pg 295-296	PPT/BB
50	Evaluation of Double integrals in Polar co-ordinates	R1- Ch 6, pg 476-479, 2- Ch 7, pg 301-303	PPT/BB
51	Change of order of integration	R1- Ch 6, pg 479-482, 2- Ch 7, pg 297-300	PPT/BB
52	Tutorial class	R1 & 2	PPT/BB
53	Area enclosed by plane curves	2- Ch 7, pg 303-305	PPT/BB
54	Change of variables in double integrals	R1- Ch 6, pg 485-491	PPT/BB
55	Tutorial class	R1 & 2	PPT/BB
56	Area of a curved surface	2- Ch 7, pg 316-318	PPT/BB
57	Triple integration	R1- Ch 6, pg 499-500, 2- Ch 7, pg 305-307	PPT/BB
58	Volume as Triple integrals	R1- Ch 6, pg 499-500, 2- Ch 7, pg 305-307	PPT/BB
59	Volume of solids	R1- Ch 6, pg 501-502, 2- Ch 7, pg 307-310	PPT/BB
60	Tutorial class	R1 & 2	PPT/BB
	CAT-III		

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 minutes

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TEXT BOOKS:

1. Erwin Kreyszing, Herbert Kreyszing, Edward Norminton, "Advanced Engineering Mathematics", 10th Edition, John Wiley, (2015)
2. Grewal .B.S, Grewal .J.S "Higher Engineering Mathematics",43rd Edition, Khanna Publications, Delhi, (2015).
3. Joel Hass, Christopher Heil, Maurice D. Weir, " Thomas' Calculus", 14th Edition, Pearson Education, (2018).

REFRENCE BOOKS:

1. Bali N.P and Manish Goyal, "A Text book of Engineering Mathematics", Nineth Edition, Laxmi Publications Pvt. Ltd.,(2014).
2. Glyn James, "Advanced Modern Engineering Mathematics", 4th Edition, Pearson Education,(2016).
3. Ramana B.V, "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, New Delhi, (2013).

Web Link:

1. https://home.iitk.ac.in/~peeyush/102A/Lecture-notes.pdf
2. https://www.sydney.edu.au/content/dam/students/documents/mathematics-learning-_entre/integration-definite-integral.pdf

	Prepared by		Approved by
Signature			
Name	Dr. D. Meiyappan, Dr. A. Suba		Dr. R. Muthucumaraswamy
Designation	Assistant Professor		Professor and Head
Date	02/11/2022		02/11/2022
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