

SOCIETY OF ST. FRANCIS XAVIER, PILAR'S  
**FR. CONCEICAO RODRIGUES COLLEGE OF ENGINEERING**

(Approved by AICTE & Affiliated to University of Mumbai)

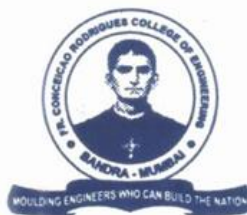
Fr. Agnel Ashram, Bandstand, Bandra (W), Mumbai - 400 050.

Phone : (022) 6711 4000, 6711 4101, 6711 4104

Website : [www.frcrce.ac.in](http://www.frcrce.ac.in) • Email : [crce@fragnel.edu.in](mailto:crce@fragnel.edu.in)

## Humanities and Sciences (Academic Year :2023-2024)

<b>Course Code: FEC 101</b>	
<b>Course Name: Engineering Mathematics – I(COMP A)</b>	
<b>Course Teacher: Prof. Gajendra Singh</b>	
<b>Course Outcomes (CO): <i>At the End of the course students will be able to</i></b>	
CO.1	Find the roots of complex number using De Moivre's theorem.
CO.2	Classify the complex number into real and imaginary parts.
CO.3	Demonstrate the higher order derivatives of a differentiable function using techniques of successive differentiation.
CO.4	List the extremum of a function of two variables using method of partial differentiation.
CO.5	Apply concepts of matrices to solve the system of linear equations.
CO.6	Apply Numerical Methods for solving engineering problems with the help of SCILAB software.



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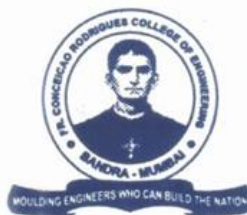
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## Course Lesson Plan

Sr. No.	Proposed Date	Topics	Delivery Mode	CO	Assessment Tool	Ref. book	Actual Date	Remark
1	22/08/23	Symmetric, skew- symmetric, Hermitian & Skew Hermitian matrices	Lecture	CO5	UT1,T1	1,2, R1		
2	23/08/23	Unitary, Orthogonal Matrices and properties of Matrices	Lecture	CO5	UT1,T1	1, R1		
3	24/08/23	Rank of a Matrix using Echelon form and Normal form	Lecture	CO5	UT1,T1	1, R1		
4	29/08/23	Reduction to normal form and PAQ form	Lecture	CO5	UT1,T1	1, 2,R1		
5	30/08/23	System of homogeneous and non –homogeneous equations, their consistency and solutions-I	Lecture	CO5	UT1,T1	1, R1		
6	31/08/23	System of homogeneous and non –homogeneous equations, their consistency and solutions-II	Lecture	CO5	UT1,T1	1, 2, R1		
7	5/09/23	Solution of Transcendental equations by Newton Raphson method	Lecture	CO6	UT1, T2	1, R1		
8	6/09/23	Solution of Transcendental equations by Regula-falsi method	Lecture	CO6	UT1, T2	1, R1		
9	7/09/23	Numerical solutions of system of equations using Gauss-Jacobi method	Lecture	CO6	UT1, T2	1, R1		
10	11/09/23	Numerical solutions of system of equations using Gauss-Seidal method		CO6	UT1, T2	1, 2, R1		
11	12/09/23	Taylor's Theorem (Statement only) and Taylor's series, Maclaurin's series	Lecture	CO6	UT1, T2	1, R1		
12	14/09/23	Expansion of $e^x$ , $\sin(x)$ , $\cos(x)$ , $\tan(x)$ , $\sinh(x)$ , $\cosh(x)$ , $\tanh(x)$ , $\log(1+x)$ , $(x)^n$ , $(x)^{-n}$ , $(x)^{1/n}$	Lecture	CO6	UT1, T2	1, R1		
13	18/09/23	Partial derivatives of first and higher order.	Lecture	CO4	UT2, T3	1, R1		
14	25/09/23	Differentiation of composite function-I	Lecture	CO4	UT2, T3	1, R1		
15	26/09/23	Differentiation of composite function-II	Lecture	CO4	UT2, T3	1, R1		



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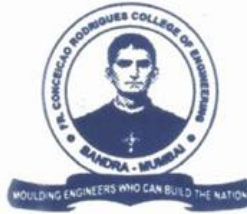
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16	3/10/23	Euler's Theorem on Homogeneous functions with two independent variables-I	Lecture	CO4	UT2, T3	1, 2, R1		
17	5/10/23	Euler's Theorem on Homogeneous functions with two independent variables-II	Lecture	CO4	UT2, T3	1, R1		
18	09/10/23	Deductions from Euler's Theorem.				1, R1		
19	10/10/23	Maxima and minima of a function with two variables				1, R1		
20	12/10/23	Maxima and minima of a function with two variables	Lecture	CO4	UT2, T3	1, R1		
21	16/10/23	Lagrange's method of undetermined multipliers with one constraint.	Lecture	CO4	UT2, T4	1, 2, R1		
22	17/10/23	nth derivative of standard functions	Lecture	CO4	UT2, T4	1, 2, R1		
23	19/10/23	Leibnitz theorem(without proof) problems -I	Lecture	CO4	UT2, T4	1, R1		
24	23/10/23	Leibnitz theorem(without proof) problems -II	Lecture	CO3	UT2, T4	1, R1		
25	26/10/23	De Moivre's theorem-I	Lecture	CO3	UT2, T4	1, 2, R1		
26	30/10/23	De Moivre's theorem-I	Lecture	CO3	UT2, T4	1, R1		
27	31/10/23	Expansion of powers of $\sin\theta$ , $\cos\theta$ in terms of sines and cosines of multiples of $\theta$ .	Lecture	CO1	UT2, T5	1, R1		
28	2/11/23	Expansion of $\sin n\theta$ , $\cos n\theta$ in powers of $\sin\theta$ , $\cos\theta$ .	Lecture	CO1	UT2, T5	1, R1		
29	6/11/23	Powers and roots of complex numbers-I	Lecture	CO1	UT2, T5	1, R1		
30	7/11/23	Powers and roots of complex numbers-II	Lecture	CO1	UT2, T5	1, 2, R1		
31	9/11/23	Circular functions of complex number and Hyperbolic functions.	Lecture	CO1	UT2, T5	1, 2, R1		
32	13/11/23	Inverse Circular and Inverse Hyperbolic functions	Lecture	CO1	UT2, T5	1, R1		
33	16/11/23	Separation of real and Imaginary parts of Logarithmic Functions.	Lecture	CO2	UT2, T6	1, R1		
34	20/11/23	Separation of real and imaginary-I	Lecture	CO2	UT2, T6	1, R1		
35	21/11/23	Separation of real and imaginary-II	Lecture	CO2	UT2, T6	1, 2, R1		
36	23/11/23	Separation of real and imaginary-III	Lecture	CO2	UT2, T6	1, R1		
37	28/11/23	Revision	Lecture					
38	30/11/23	Revision	Lecture					



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**Text Books:**

1. Engineering Mathematics-I by G.V. Kumbhojkar, J. Jamnadas Publication
2. Engineering Mathematics-I by Dr. N.R. Dasre, TechKnowledge Publication

**Reference Books:**

1. Advance Engineering Mathematics by H.K. Dass, S.Chand & Company Limited
2. Advance Engineering Mathematics by Peter O'Neil, Cengage Learning

**Web References:**

1. <https://archive.nptel.ac.in/courses/122/104/122104018/>
2. [https://onlinecourses.nptel.ac.in/noc22\\_ma53/preview](https://onlinecourses.nptel.ac.in/noc22_ma53/preview) [for strong learners]

**Course Instructor: Prof. Gajendra Singh**