Institute:	Institute of Technology
Name of Programme:	B.Tech. Electronics & Communication Engineering
Course Code:	2EC801
Course Title:	Mathematics for Electronics & Communication Engineering
Course Type:	(■ Core/ ☐ Value Added Course/☐ Departmental Elective/ ☐ Institute Elective/ ☐ University Elective/ (☐ Open Elective Any other)
Year of Introduction:	2023-24

Credit Scheme

L	T	Practical component				C
		LPW	PW	W	S	
2	1	-	-	-	-	3

Course Learning Outcomes (CLOs):

At the end of the course, students will be able to

1. solve differential equations in the field of engineering BL 3
2. apply Laplace transform to solve initial value problems in engineering field BL 3
3. make use of vector differential calculus and function of complex variables in solving problems for electric circuits. BL 3
4. analyse two port electrical network using y, z, h and ABCD parameters BL 5

Unit No.	Syllabus	Teaching hours
I	**Ordinary and partial differential equations**: Linear differential equation of higher order. Complementary function and particular integral. Cauchy's & Legendre's equations, Formation of Partial differential equations, Method of separation of variables.	**06**
II	**Vector Differential Calculus:** Differentiation of Vectors, Scalars and vector fields, Gradient of a scalar function, Directional derivative, Divergence and Curl of a vector function and their physical meanings, Irrotational, Solenoidal and conservative vector fields	**06**
III	**Function of complex variables:** Analytic function, Cauchy – Riemann equation, Harmonic functions, Conformal mappings, Complex integration, Cauchy's theorem and integral formula.	**06**
IV	**Laplace Transforms:** Introduction of Transform, Laplace transforms of elementary functions, shifting theorem, inverse Laplace transforms, convolution theorem, application of Laplace transforms in solving ordinary differential equations, Laplace transforms of periodic, unit step and impulse functions	**06**
V	**Modelling and analysis of two port networks:** Introduction of two port network, modelling of two port networks using various parameters such as z parameter, y-parameter, t- parameter, ABCD parameter and h-parameter	**06**

Self Study:

The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

List of Tutorials:

Sr. No.	Topic	Hours
1.	Numerical problems on higher ordered homogeneous linear differential equation	2
2.	Numerical problems on higher ordered non-homogeneous linear differential equation	2
3.	Numerical problems on solution of PDE using method of separation of variables using	1
4.	Numerical problems on Directional derivative scalar field	1
5.	Numerical problems on curl and divergence of vector field	1
6.	Numerical problems on analytic and harmonic function	1
7.	Numerical problems on complex integral	1
8.	Numerical problems on Laplace transform	2
9.	Numerical problems on z-parameters, t-parameters and Y-parameters	2
10.	Numerical problems on h-parameters and ABCD-parameters	2

Suggested Readings:

1. Dr.B.S.Grewal- Higher Engineering Mathematics, Publisher: Khanna Publishers, New Delhi
2. M E Van Valkenburg, Network Analysis, PHI
3. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley Eastern Publications