SE Electronics Engineering
Semester III
Syllabus of Theory Subjects

Subject Code	Subject Name	Teaching Scheme			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tutorial-work	Total
EXS 301	Applied Mathematics III	04	--	01	04	-	01	05

Subject Code	Subject Name	Examination Scheme							
		Theory Marks				Tutorial as Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test 1	Test 2	Ave. Of Test 1 and Test 2					
EXS 301	Applied Mathematics III	20	20	20	80	25	--	--	125

Course Prerequisite:

FE C 101: Applied Mathematics I FE C 201: Applied Mathematics II

Course Objective:

- To provide students with a sound foundation in Mathematics and prepare them for graduate studies in Electronics Engineering
- To make students to understand mathematics' fundamentals necessary to formulate, solve and analyze engineering problems.

Expected Outcome:

- Students will demonstrate basic knowledge of Laplace Transform. Fourier Series, Bessel Functions, Vector Algebra and Complex Variable.
- Students will demonstrate an ability to identify formulate and solve electronics Engineering problems using Applied Mathematics.
- Students will show the understanding of impact of engineering mathematics in the engineering
- Students will become capable and eligible to participate and succeed in competitive exams like GATE, GRE.

Module No.	Unit No.	Topics	Hrs.
1. 0		**Laplace Transform**	**12**
	1.1	**Laplace transform (LT) of standard functions:** Definition. Unilateral and bilateral Laplace transform, LT of *sin(at), cos(at),* e^{at} ,t^{n} , *sinh(at), cosh(at), erf(t),* Heavi-side unit step, direct- delta function, LT of periodic function	
	1.2	**Properties of Laplace transform:** linearity, first shifting theorem,	
		second shifting theorem, multiplication by t^{n} , division by t , Laplace transform derivatives and integrals, change of scale, convolution theorem, initial and final value theorem, Parsevel's identity	
	1.3	**Inverse Laplace Transform:** Partial fraction method, long division method, residue method, theorem of LT to find inverse	
	1.4	**Applications of Laplace transform :** Solution of ordinary differential equations	
2.0		**Fourier Series**	**10**
	2.1	**Introduction:** Definition, Dirichlet's conditions, Euler's formulae	
	2.2	**Fourier series of functions:** exponential, trigonometric functions, even and odd functions, half range sine and cosine series	
	2.3	Complex form of Fourier series, Fourier integral representation	
3.0		**Bessel functions**	**08**
	3.1	**Solution of Bessel differential equation:** series method, recurrence relation, properties of Bessel Function of order +1/2 and -1/2	
	3.2	Generating function, orthogonality property	
	3.3	Bessel Fourier series of a functions	
4.0		**Vector Algebra**	**12**
	4.1	**Scalar and vector product**: Scalar and vector product of three and four vectors and their properties	
	4.2	**Vector differentiation :** Gradient of scalar point function, divergence and curl of vector pint function	
	4.3	**Properties:** Solenoidal and Irrotational vector fields, conservative vector field	
	4.4	**Vector integral:** Line integral, Green's theorem in a plane, Gauss Divergence theorem, Stokes' theorem	
5.0		**Complex Variable**	**10**
	5.1	**Analytic function:** Necessary and sufficient conditions, Cauchy Reiman. equations in polar form	
	5.2	Harmonic function, orthogonal trajectories	
	5.3	**Mapping:** Conformal mapping, bilinear transformations, cross ratio, fixed points, bilinear transformation of straight lines and circles.	
		Total	**52**

Recommended Books

1. P. N. Wartikar and J. N. Wartikar, *"A Text Book of Applied Mathematic",* Vol. I & II, Vidyarthi Griha Prakashan, Pune
2. A Datta, *"Mathematical Methods in Science and Engineerin",* 2012
3. Dr. B.S. Grewal, *"Higher Engineering Mathematics",* Khanna Publication
4. B. S. Tyagi, "*Functions of a Complex Variable*," Kedarnath Ram Nath Publication
5. B V Ramana, "*Higher Engineering Mathematics*", Tata McGraw-Hill Publication
6. Wylie and Barret, "*Advanced Engineering Mathematics*", McGraw-Hill 6th Edition
7. Erwin Kreysizg, "*Advanced Engineering Mathematics*", John Wiley & Sons, Inc
8. Murry R. Spieget, "*Vector Analysis", Schaun's Out Line Series*, McGraw Hill Publication

Internal Assessment (IA):

Two tests must be conducted which should cover 80% of syllabus. The average marks of two tests will be considered as final IA marks

End Semester Examination:

1. Question paper will comprise of 6 questions, each carrying 20 marks.
2. The students need to solve total 4 questions.
3: Question No.1 will be compulsory and based on entire syllabus. 4: Remaining questions (Q.2 to Q.6) will be set on all the modules. 5: Weight age of marks will be as per Blueprint.

Term Work:

At least **08** assignments covering entire syllabus must be given during the **Class Wise Tutorial.** The assignments should be students' centric and an attempt should be made to make assignments more meaningful, interesting and innovative. Term work assessment must be based on the **overall performance** of the student with **every assignment graded from time to time.** The grades should be converted into marks as per the **Credit and Grading System** manual and should be **added and averaged**. The grading and term work assessment should be done based on this scheme.