Course Code	Course Name	Teaching Scheme			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/ Practical	Tutorial	Total
SEITC301	Applied Mathematics - III*	04	--	01	04	-	01	05

Subject Code	Subject Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test2	Avg. Of Test1 and Test2					
SEITC301	Applied Mathematics -III*	20	20	20	80	25	-	-	125

Course Objective

(1) Complex Variable (2) Laplace Transform (3) Fourier Series (4) Discrete Structures (5) Z-transform

These topics involve the study of analytic function and mapping of complex function, Laplace transform, Inverse Laplace transform and application of Laplace transform to solve differential equations, finding Fourier series, Sine and cosine Fourier integral and Z-transform. These topics help them to solve many engineering problems arising in course of their further studies and also while working in the practical life situations.

Student Learning Outcomes:

Students in this course will apply the Procedure and methods to solve technical problems.

Details of the Syllabus:-

Sr.No.	Topics	Hrs
Module 01	**Complex Variable & mapping** 1.1 Functions of a complex variable, Analytic functions, Cauchy-Riemann equations in Cartesian co-ordinates, Polar co-ordinates. 1.2 Harmonic functions, Analytic method and Milne Thomson methods to find f(z), Orthogonal trajectories. 1.3 Conformal Mapping, Linear, Bilinear transformations, Cross ratio, fixed points and standard transformation such as rotation and magnification, invertion, translation.	**(10)**
Module 02	**Laplace Transform** 2.1 Introduction, Definition of Laplace transform, Laplace transform of constant, trigonometrical, exponential functions. 2.2 Important properties of Laplace transform: First shifting theorem, Laplace transform of L{t^n f(t)}, L{ f(t)/t}, $L\left\{\frac{d^n f(t)}{dt^n}\right\}$, $L\{\int_0^t f(u)du\}$, L{f(at)} without proof. 2.3 Unit step function, Heavi side function, Dirac-delta function, Periodic function and their Laplace transforms, Second shifting theorem. 2.4 Inverse Laplace transform with Partial fraction and Convolution theorem (without proof). 2.5 Application to solve initial and boundary value problem involving ordinary differential equations with one dependent variable and constant coefficients.	**(10)**
Module 03	**Fourier series** 3.1 Dirichlet's conditions, Fourier series of periodic functions with period 2π and 2L. 3.2 Fourier series for even and odd functions. 3.3 Half range sine and cosine Fourier series, Parsevel's identities (without proof). 3.4Orthogonal and Ortho-normal functions, Complex form of Fourier series. 3.5 Fourier Integral Representation.	**(10)**
Module 04	**Vector Algebra and Calculus** 4.1 Vector Algebra: Scalar and vector product of three and four Vectors and their	**(10)**

	properties. 4.2 Vector Calculus: Vector differential operator ∇ , Gradient of a scalar point function, Diversions and Curl of Vector point function, $\nabla (uv)$, $\nabla.(\phi \bar{u}), \nabla \times (\phi \bar{u}), \nabla \times (\bar{u} \times \bar{v})$. 4.3 Vector Integration: Line integral; conservative vector field, Green's theorem in a plane (Without proof) 4.4 Gauss-Divergence theorem & Stokes' theorem (Without proof and no problems on verification of above theorems).	
Module **05**	**Z transform** 5.1 Z-transform of standard functions such as $Z(a^n)$, $Z(n^p)$. 5.2 Properties of Z-transform :Linearity, Change of scale, Shifting property, Multiplication of K, Initial and final value, Convolution theorem (all without proof) 5.3 Inverse Z transform: Binomial Expansion and Method of Partial fraction.	**(8)**

Term work:
Term work shall consist of minimum four SCILAB practicals and six tutorials.
SCILAB practicals : 08 marks
Tutorials : 12 marks
Attendance : 05 marks
Total : 25 marks

Recommended Books:

1. Higher Engineering Mathematics by Grewal B. S. 38th edition, Khanna Publication 2005.
2. Advanced Engineering Mathematics by Kreyszig E. 9th edition, John Wiley.
3. A Text Book of Applied Mathematics Vol. I & II by P.N.Wartilar & J.N.Wartikar, Pune, Vidyarthi Griha Prakashan., Pune.
4. Vector Calculus by Shanti Narayan, S Chand & Co.

Reference Books:

1. Advanced Engg. Mathematics by C. Ray Wylie & Louis Barrett.TMH International Edition.
2. Mathematical Methods of Science and Engineering by Kanti B. Datta, Cengage Learning.
3. Lapplace Treansforms by Murray R. Spiegel, Schaun's out line series-McGraw Hill Publication.
4. Vector Analysis by Murray R. Spiegel, McGraw Hill publication.

Theory Examination :

- Question paper will comprise of 6 questions, each carrying 20 marks.
- Total 4 questions need to be solved.
- Q.1 will be compulsory, based on entire syllabus wherein sub questions of 2 to 3 marks will be asked.
- Remaining question will be randomly selected from all the modules.

Weightage of marks should be proportional to number of hours assigned to each module.