COMPLEX ANALYSIS AND PROBABILITY DISTRIBUTIONS

IV Semester: EEE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
AHSB06	Foundation	3	1	-	3	30	70	100
Contact Classes: 45	Tutorial Classes: 15	Practical Classes: Nil				Total Classes: 60		

OBJECTIVES:

The Students will Try To Learn:

I	The applications of complex variable and conformal mapping in two dimensional complex potential theories.
II	The fundamental calculus theorems and criteria for the independent path on contour integral used in problems of engineering
III	Enrich the knowledge of probability on single random variables and probability distributions

COURSE OUTCOMES:

After successful completion of the course, Students will be able to:

CO 1	**Recall** the fundamental concepts of analyticity and differentiability for calculus of complex functions and their role in applied context.
CO 2	**Utilize the** concepts of analyticity for finding complex conjugates and their role in applied contexts.
CO 3	**Make use of the** conformal mapping technique for transferring geometric structure of complex functions with much more convenient geometry.
CO 4	**Apply** integral theorems of complex analysis and its consequences for the analytic function with derivatives of all orders in simple connected region.
CO 5	**Extend** the Taylor and Laurent series for expressing the function in terms of complex power series.
CO 6	**Classify** Singularities and Poles of Complex functions for evaluating definite and indefinite Complex integrals.
CO 7	**Apply** Residue theorem for computing definite integrals of real and complex analytic functions over closed curves.
CO 8	**Explain** the concept of random variables and types of random variables by using suitable real time examples.
CO 9	**Solve** the expected values, variances of the discrete and continuous random variables for making decisions under randomized probabilistic conditions.
CO10	**Interpret** the parameters of random variate Probability distributions such as Binomial, Poisson and Normal distribution by using their probability functions, expectation and variance.
CO11	**Apply** the concepts of discrete and continuous probability distribution for solving real time problems under probabilistic conditions

MODULE-I	COMPLEX FUNCTIONS AND DIFFERENTIATION	Classes: 09

Complex functions differentiation and integration: Complex functions and its representation on argand plane, concepts of limit, continuity, differentiability, analyticity, Cauchy-Riemann conditions and harmonic functions; Milne-Thomson method, Bilinear Transformation. linearity property, first and second shifting theorems, change of scale property, multiplied by s, divided by s; Convolution theorem and applications to ordinary differential equations.

MODULE -II	COMPLEX INTEGRATION	Classes: 09
Line integral: Evaluation along a path and by indefinite integration; Cauchy's integral theorem; Cauchy's integral formula; Generalized integral formula; Power series expansions of complex functions And contour Integration: Radius of convergence.		
MODULE -III	**POWER SERIES EXPANSION OF COMPLEX FUNCTION**	**Classes: 09**
Expansion in Taylor's series, Maclaurin's series and Laurent series. Singular point; Isolated singular point; Pole of order m; Essential singularity; Residue: Cauchy Residue Theorem. Evaluation of Residue by Laurent Series and Residue Theorem. Evaluation of integrals of the type $\int_0^{2\pi} f(\cos\theta, \sin\theta)d\theta$ and $\int_0^{\infty} f(x)dx$.		
MODULE -IV	**SINGLE RANDOM VARIABLES**	**Classes: 09**
Random variables: Discrete and continuous, probability distributions, mass function-density function of a probability distribution. Mathematical expectation. Moment about origin, central moments, moment generating function of probability distribution.		
MODULE -V	**PROBABILITY DISTRIBUTIONS**	**Classes: 09**
Binomial, Poisson and normal distributions and their properties.		

Text Books:

1. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 36th Edition, 2010.
2. N.P. Bali and Manish Goyal, "A text book of Engineering Mathematics", Laxmi Publications, Reprint, 2008.
3. Ramana B.V., "Higher Engineering Mathematics", Tata McGraw Hill New Delhi, 11th Reprint,2010.

Reference Books:

1. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons, 9th Edition, 2006.
2. Veerarajan T., "Engineering Mathematics for first year", Tata McGraw-Hill, New Delhi, 2008.
3. D. Poole, "Linear Algebra: A Modern Introduction", Brooks/Cole, 2nd Edition, 2005.
4. Dr. M Anita, "Engineering Mathematics-I", Everest Publishing House, Pune, First Edition, 2016.

Web References:

1. http://www.efunda.com/math/math_home/math.cfm
2. http://www.ocw.mit.edu/resourcs/#Mathematics
3. http://www.sosmath.com
4. http://www.mathworld.wolfram.com

E-Text Books:

1. http://www.e-booksdirectory.com/details.php?ebook=10166
2. http://www.e-booksdirectory.com/details.php?ebook=7400re