COMPLEX ANALYSIS AND PROBABILITY DISTRIBUTIONS

IV Semester: EEE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
AHSC11	**Foundation**	3	1	-	4	30	70	100
Contact Classes: 45	**Tutorial Classes: 15**	**Practical Classes: Nil**				**Total Classes: 60**		

Prerequisite: Linear Algebra and Calculus, Mathematical Transform Techniques

I. COURSE OVERVIEW:
This course Complex Analysis and Probability Distributions provides an introduction to complex analysis which is theory of complex functions with complex variable and random variables. The course includes complex functions and differentiation, complex integration, power series expansion of complex function, single random variables and probability distributions. The mathematical skills derived from this course form a necessary base to analytical and design concepts encountered in the program.

II. COURSE 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. The concepts of probability on single random variables and probability distributions.
  IV. The theory of random variables, basic random variate distributions and complex analysis for understanding the numerical growth rates.

III. COURSE SYLLABUS:
MODULE-I: COMPLEX FUNCTIONS AND DIFFERENTIATION (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.

MODULE-II: COMPLEX INTEGRATION (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 contourIntegration: Radius of convergence.

MODULE-III: POWER SERIES EXPANSION OF COMPLEX FUNCTION (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
$\int_0^{2\pi} f(cos\theta, sin\theta)d\theta, \int_{-\infty}^{\infty} f(x)dx$

MODULE-IV: SINGLE RANDOM VARIABLES (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 (09)
Binomial, Poisson and normal distributions and their properties.

IV. TEXT BOOKS:

1. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons Publishers, 10th Edition, 2014.
2. B S Grewal, "Higher Engineering Mathematics", Khanna Publishers, 42nd Edition, 2012.

V. REFERENCE BOOKS:

1. Churchill, RV and Brown, J W, "Complex Variables and Applications", Tata McGraw-Hill, 8th Edition, 2012.
2. A K Kapoor, "Complex Variables Principles and Problem Sessions", World Scientific Publishers, 1st Edition, 2011.
3. Murray Spiegel, John Schiller, "Probability and Statistics", Schaum"s Outline Series, 3rd Edition, 2010.

VI. 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

VII. E-TEXT BOOKS:

1. http://www.keralatechnologicaluniversity.blogspot.in/2015/06/erwin-kreyszig-advanced-engineering-mathematics-ktu-ebook-download.html
2. http://www.faadooengineers.com/threads/13449-Engineering-Maths-II-eBooks