COMPLEX ANALYSIS AND PROBABILITY DISTRIBUTION

IV Semester: EEE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
AHS004	Foundation	3	1	-	4	30	70	100
Contact Classes: 45	Tutorial Classes: 15	Practical Classes: Nil				Total Classes: 60		

I. COURSE OVERVIEW:

The course focuses on more Advanced Engineering Mathematics which provide with the relevant mathematical tools required in the analysis of engineering problems and scientific professions. The course includes complex functions and differentiation, complex integration, power series expansion of complex function and Probability of single random variables with its distributions. The mathematical skills derived from this course form a necessary base to analytical and design concepts encountered in the program.

II. OBJECTIVES:

The course should enable the students to:

I The applications of complex variable and conformal mapping in two dimensionalcomplex potential theories.

II The fundamental calculus theorems and criteria for the independent path oncontour integral used in problems of engineering

III Enrich the knowledge of probability on single random variables and probabilitydistributions

III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:

CO 1	**Identify** the fundamental concepts of analyticity and differentiability for finding complex conjugates, conformal mappingof complex transformations.	Apply
CO 2	**Apply** integral theorems of complex analysis and its consequences for the analytic function with derivatives of all orders in simple connected region.	Apply
CO 3	**Extend** the Taylor and Laurent series for expressing the function in terms of complex power series.	Apply
CO 4	**Apply** Residue theorem for computing definite integrals by using the singularities and poles of real and complex analytic functions over closed curves.	Apply
CO 5	**Explain** the concept of random variables and types of random variables by using suitable real time examples.	Understand
CO 6	**Interpret** the parameters of random variate Probability distributions by using their probability functions, expectation andvariance.	Understand

IV. SYLLABUS:

UNIT-I	COMPLEX FUNCTIONS AND DIFFERENTIATION	Classes: 10

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.

UNIT-II	COMPLEX INTEGRATION	Classes: 10

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.

UNIT -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

1. $\int_0^{2\Pi} f(\cos\theta, \sin\theta)d\theta$ 2. $\int_{-\infty}^{\infty} f(x)dx$,

Bilinear Transformation.

UNIT-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.

UNIT-V	PROBABILITY DISTRIBUTIONS	Classes: 07

Binomial, Poisson and normal distributions and their properties.

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.

Reference Books:

1. Churchill, R.V. and Brown, J.W, "Complex Variables and Applications", Tata Mc Graw-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.

Web References:

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

E-Text Books:

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

Course Home Page: