SWARNANDHRA
COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous)
Accredited by NBA, AICTE, NEW DELHI • Accredited by NAAC with "A" Grade – 3.32/4.00 CGPA
Recognized by UGC Under Sections 2(f) & 12 (B) of UGC Act 1956
Approved by AICTE, New Delhi, Permanent Affiliated to JNTU K, Kakinada
Seetharampuram, NARSAPUR-534 280, W.G-Dist., Andhra Pradesh

DEPARTMENT OF S & H

TEACHING PLAN

Course Code	Course Title	Year/ Semester	Branch	Contact Periods/ Week	Academic Year	Date of Commencement of Semester
23BS4T01	COMPLEX VARIABLES PROBABILITY AND STATISTICS	II/IV	MECH & RBTS	60/6	2024-25	16 – 12-2024

Course Outcomes: ***After successful completion of this course, students should be able to:***

1	**CO1:** Apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic (K3)
2	**CO2:** evaluate the Taylor's and Laurent's expansions of simple functions, determine the nature of the singularities and calculate residues to evaluate certain integrals (K3)
3	**CO3:** Application of different distribution functions like Binomial, Poisson, Uniform, Normal (K3)
4	**CO4 : :** Apply Sampling Distribution and estimate the population parameters. (K3)
5	**CO5**: Examine the statistical inferential methods based on small and large sampling tests. (K3)

Unit	Outcome/ Bloom's Level	Topics No.	Topics/Activity	Text Book/ Reference	Contact Hour		Delivery Method
1	CO1:Students are able to apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic (K3)	**UNIT I: Functions of a complex variable and Complex integration**					
		1.1	Introduction	T_1,R_1,R_2	1	12	PPT,BB
		1.2	Continuity	T_1,R_1,R_2	1		PPT,BB
		1.3	Differentiability	T_1,R_1,R_2	1		PPT,BB
		1.4	Analyticity	T_1,R_1,R_2	1		PPT,BB
		1.5	Cauchy – Riemann Equations in Cartesian Co-Ordinates ,related problems	T_1,R_1,R_2	1		PPT,BB
		1.6	Cauchy – Riemann Equations in Polar Co-Ordinates, related problems	T_1,R_1,R_2	1		PPT,BB
		1.7	Harmonic functions and Conjugate harmonic functions related problems	T_1,R_1,R_2	1		PPT,BB
		1.8	Milne- Thompson Method, related problems	T_1,R_1,R_2	1		PPT,BB
		1.9	Complex integration: Line integral	T_1,R_1,R_2	1		PPT,BB
		1.10	Cauchy's Integral Theorem (without proof) ,related problems	T_1,R_1,R_2	1		PPT,BB
		1.11	Cauchy's integral formula (without proof), related problems	T_1,R_1,R_2	1		PPT,BB
		1.12	Generalized integral formula(without proof), related problems	T_1,R_1,R_2	1		PPT,BB

2	**CO2:** Students are able to evaluate the Taylor's and Laurent's expansions of simple functions, determine the nature of the singularities and calculate residues to evaluate certain integrals (K3)	**UNIT II: Series expansions and Residue Theorem**					
		2.1	Radius of convergence	T_1,R_1,R_2	1	13	PPT,BB
		2.2	Expansion in Taylor's series , related problems	T_1,R_1,R_2	1		PPT,BB
		2.3	Problems on Taylor's series	T_1,R_1,R_2	1		PPT,BB
		2.4	Maclaurin's series, related problems	T_1,R_1,R_2	1		PPT,BB
		2.5	Laurent's series, related problems	T_1,R_1,R_2	1		PPT,BB
		2.6	Problems on Residue theorem	T_1,R_1,R_2	1		PPT,BB
		2.7	Types of Singularities: Isolated , Essential singularities	T_1,R_1,R_2	1		PPT,BB
		2.8	Pole of order m, Residues, related problems	T_1,R_1,R_2	1		PPT,BB
		2.9	Residue theorem (without proof), related problems	T_1,R_1,R_2	1		PPT,BB
		2.10	Problems on Residue theorem	T_1,R_1,R_2	1		PPT,BB
		2.11	Evaluation of real integral of the type $\int_0^\infty f(x)\,dx$,related problems	T_1,R_1,R_2	1		PPT,BB
		2.12	Evaluation of real integral of the type $\int_0^{2\pi} f(cos\theta, sin\theta)\,d\theta$. related problems	T_1,R_1,R_2	1		PPT,BB
		CBS	Conformal mappings	T_1,R_1,R_2	1		PPT,BB
3	**CO3:** Students are able to apply different types of distribution functions like Binomial, Poisson, Uniform, Normal (K3)	**UNIT III: Probability & Distributions**					
		3.1	Reviesw of probability and Baye's theorem	T_2,R_1,R_2	1	12	PPT,BB
		3.2	Baye's theorem	T_2,R_1,R_2	1		PPT,BB
		3.3	Random variables	T_2,R_1,R_2	1		PPT,BB
		3.4	Discrete and contionous random variables	T_2,R_1,R_2	1		PPT,BB
		3.5	Distrtibution functions	T_2,R_1,R_2	1		PPT,BB
		3.6	Probability mass function	T_2,R_1,R_2	1		PPT,BB
		3.7	Probability density function	T_2,R_1,R_2	1		PPT,BB
		3.8	Cumulative distribution functions	T_2,R_1,R_2	1		PPT,BB
		3.9	Mathematical expectation and variance	T_2,R_1,R_2	1		PPT,BB
		3.10	Binomial distributions	T_2,R_1,R_2	1		PPT,BB
		3.11	Poission distributions	T_2,R_1,R_2	1		PPT,BB
		3.12	Uniform and Normal distributions	T_2,R_1,R_2	1		PPT,BB
4	**CO4**:Students are able to apply Sampling Distribution and estimate the population parameters. (K3)	**UNIT IV: Sampling theory**					
		4.1	Introduction	T_2,R_1,R_2	1	11	PPT,BB
		4.2	Population and Samples	T_2,R_1,R_2	1		PPT,BB
		4.3	Sampling distribution of Means and Variance (definitions only)	T_2,R_1,R_2	1		PPT,BB
		4.4	Central limit theorem (without proof)	T_2,R_1,R_2	1		PPT,BB
		4.5	Representation of the normal theory distributions	T_2,R_1,R_2	1		PPT,BB
		4.6	Introduction to t, χ^2 and F-distributions	T_2,R_1,R_2	1		PPT,BB
		4.7	Problems on t-test	T_2,R_1,R_2	1		PPT,BB
		4.8	Problems on χ^2 -test	T_2,R_1,R_2	1		PPT,BB
		4.9	Problems on F -test	T_2,R_1,R_2	1		PPT,BB

		4.10	point and interval estimations	T_2,R_1,R_2	1		PPT,BB
		4.11	maximum error of estimate.	T_2,R_1,R_2	1		PPT,BB
5	CO5:Students are able to the statistical inferential methods based on small and large sampling tests. (K3)	**UNIT V: Tests of Hypothesis:**					
		5.1	Introduction – Hypothesis	T_2,R_1,R_2	1	12	PPT,BB
		5.2	Null and Alternative Hypothesis	T_2,R_1,R_2	1		PPT,BB
		5.3	Null and Alternative Hypothesis	T_2,R_1,R_2	1		PPT,BB
		5.4	Type I and Type II errors	T_2,R_1,R_2	1		PPT,BB
		5.5	Type I and Type II errors	T_2,R_1,R_2	1		PPT,BB
		5.6	Level of significance	T_2,R_1,R_2	1		PPT,BB
		5.7	One tail and two-tail tests	T_2,R_1,R_2	1		PPT,BB
		5.8	One tail and two-tail tests	T_2,R_1,R_2	1		PPT,BB
		5.9	Tests concerning one mean and two means (Large and Small samples)	T_2,R_1,R_2	1		PPT,BB
		5.10	Tests concerning one mean and two means (Large and Small samples)	T_2,R_1,R_2	1		PPT,BB
		5.11	Tests on proportions	T_2,R_1,R_2	1		PPT,BB
		5.12	Tests on proportions	T_2,R_1,R_2	1		PPT,BB
				Cumulative Proposed Periods		**60**	

Text Books:

S.No.	Authors, Book Title, Edition, Publisher, Year of Publication
1	B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2012.
2	S.C.Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics,11/e, Sultan Chand &Sons Publications,2012.

Reference Books:

S. No	Authors, Book Title, Edition, Publisher, Year of Publication
1	Dr T.K.V.Iyengar & Dr B.Krishna Gandhi, Probability &Statistics S.Chand Publishing.
2	Miller and Freund's, Probability and Statistics for Engineers,7/e,Pearson,2008

Web Details

1	https://en.wikibooks.org/wiki/Calculus/Complex_analysis (Functions of a Complex Variable)
2	https://youtu.be/60ReaZWsvCA (complex power series)
3	https://www.probability and random variables (Probability and Random variables)
4	https://youtu.be/mBCiKUzwdMs (Sampling theory)
5	https://www.colorado.edu/amath/sites/default/files/attached-files/lesson9_hyptests.pdf

		Name	Signature with Date
i.	Faculty	Mr. T.V.LAKSHMANA RAO	
ii.	Course Coordinator	Mr. T.V.LAKSHMANA RAO	
iii.	Module Coordinator	Mrs. R.V. LAKSHMI	
iv.	HOD of S & H	Dr. V. SWAMINADHAM.	

Principal