



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	2025-26	10 – 12-2025

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	Deliver y 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	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	Distrttribution 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.probabilityandrandomvariables.com (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	Mrs P.DURGA BHAVANI	P. Durga
ii. Course Coordinator	Mrs P.DURGA BHAVANI	P. Durga
iii. Module Coordinator	Mr M.RAVINDRA BABU	M. Ravindrababu
iv. HOD of S & H	Dr. V. SWAMINADHAM.	V. Swamin



Principal

