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 MATHEMATICS

TEACHING PLAN

Course Code	Course Title	Year/ Semester	Branches	Contact Periods/ Week	Academic Year	Date of Commencement of Semester
20MA3T06	COMPLEX VARIABLES & RANDOM PROCESS	II/III	ECE	60/6	2021-22	25-10-2021

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

1	CO1: solve the fundamentals of the theory of analytic functions (K1,K2,K3)
2	CO2: expand the given function in Tailors series, Maclaurin's series and Laurent's series. (K1,K2,K3)
3	CO3: find residues at singular points, able to evaluate integrals. (K2,K3)
4	CO4 : construct the probability distribution function of random variables.(K1,K2,K3)
5	CO5: calculate expectations of random variables like variance and moments.(K1,K2,K3)

Unit	Outcome/ Bloom's Level	Topics No.	Topics/Activity	Text Book/ Reference	Contact Hour		Delivery Method
1	CO 1:Students are able to solve the fundamentals of the theory of analytic functions (K1,K2,K3)	**UNIT I: Functions of a complex variable**					
		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	Analytic function	T_1,R_1,R_2	1		PPT,BB
		1.5	Properties of analytic functions	T_1,R_1,R_2	1		PPT,BB
		1.6	Cauchy – Riemann Equations in Cartesian Co-Ordinates	T_1,R_1,R_2	1		PPT,BB
		1.7	Cauchy – Riemann Equations in Cartesian Co-Ordinates Related problems	T_1,R_1,R_2	1		PPT,BB
		1.8	Cauchy – Riemann Equations in Polar Co-Ordinates	T_1,R_1,R_2	1		PPT,BB
		1.9	Harmonic functions	T_1,R_1,R_2	1		PPT,BB
		1.10	Conjugate harmonic functions	T_1,R_1,R_2	1		PPT,BB
		1.11	Milne- Thompson Method	T_1,R_1,R_2	1		PPT,BB
		1.12	Milne- Thompson Method Related problems	T_1,R_1,R_2	1		PPT,BB
2	CO 2: Students are able to expand the given function in Tailors series, Maclaurin's series and	**UNIT II: Complex power series**					
		2.1	Radius of convergence	T_1,R_1,R_2	1	10	PPT,BB
		2.2	Expansion in Taylor's series	T_1,R_1,R_2	1		PPT,BB
		2.3	Expansion in Taylor's series -Related problems	T_1,R_1,R_2	1		PPT,BB
		2.4	Maclaruin`s series	T_1,R_1,R_2	1		PPT,BB

	Laurent's series. (K1,K2,K3)	2.5	Maclaruin's series-Related problems	T_1,R_1,R_2	1		PPT,BB
		2.6	Laurent's series	T_1,R_1,R_2	1		PPT,BB
		2.7	Laurent's series- Related problems	T_1,R_1,R_2	1		PPT,BB
		2.8	Laurent's series- Related problems	T_1,R_1,R_2	1		PPT,BB
		2.9	Singular point-Isolated point	T_1,R_1,R_2	1		PPT,BB
		2.10	pole of Order m – Essential singularity	T_1,R_1,R_2	1		PPT,BB
3	CO 3: Students are able to find residues at singular points, able to evaluate integrals. (K2,K3)	**UNIT III: Complex Integration and Residues**					
		3.1	Cauchy's Integral Theorem	T_1,R_1,R_2	1	12	PPT,BB
		3.2	Cauchy's Integral Theorem – Related problems	T_1,R_1,R_2	1		PPT,BB
		3.3	Cauchy's Integral formula- Related problems	T_1,R_1,R_2	1		PPT,BB
		3.4	Cauchy's Integral formula	T_1,R_1,R_2	1		PPT,BB
		3.5	Generalized Integral Formula	T_1,R_1,R_2	1		PPT,BB
		3.6	Generalized Integral Formula- Related problems	T_1,R_1,R_2	1		PPT,BB
		3.7	Residue- by Formula	T_1,R_1,R_2	1		PPT,BB
		3.8	Evaluation of residue by Laurent's series	T_1,R_1,R_2	1		PPT,BB
		3.9	Residue theorem	T_1,R_1,R_2	1		PPT,BB
		3.10	Residue theorem and related problems	T_1,R_1,R_2	1		PPT,BB
		3.11	Residue theorem and related problems	T_1,R_1,R_2	1		PPT,BB
		3.12	Residue theorem and related problems	T_1,R_1,R_2	1		PPT,BB
4	CO 4 :Students are able to construct the probability distribution function of random variables.(K1,K 2,K3)	**UNIT IV: The Random Variable and its distributions**					
		4.1	Introduction, Definition of a random variable,	T_2,R_2,R_3	1	13	PPT,BB
		4.2	Conditions for a Function to be a Random Variable	T_2,R_2,R_3	1		PPT,BB
		4.3	Discrete random variables	T_2,R_2,R_3	1		PPT,BB
		4.4	Distribution Function - related problems	T_2,R_2,R_3	1		PPT,BB
		4.5	Binomial Distributions	T_2,R_2,R_3	1		PPT,BB
		4.6	Binomial Distributions- related problems	T_2,R_2,R_3	1		PPT,BB
		4.7	Poisson Distributions	T_2,R_2,R_3	1		PPT,BB
		4.8	Poisson Distributions- related problems	T_2,R_2,R_3	1		PPT,BB
		4.9	Continuous Random variables	T_2,R_2,R_3	1		PPT,BB
		4.10	Distribution Function- related problems	T_2,R_2,R_3	1		PPT,BB
		4.11	Gaussian distributions	T_2,R_2,R_3	1		PPT,BB
		4.12	Gaussian distributions- related problems	T_2,R_2,R_3	1		PPT,BB
		4.13	Exponential distributions - related problems	T_2,R_2,R_3	1		PPT,BB
	CO 5 :Students are able to calculate expectations of random variables like variance and moments.(K1,	**UNIT V: Operation on Random Variables**					
		5.1	Introduction, expected value of a random variable	T_2,R_2,R_3	1	13	PPT,BB
		5.2	expected value of a function of a random variable	T_2,R_2,R_3	1		PPT,BB
		5.3	Moments: Moments about the origin	T_2,R_2,R_3	1		PPT,BB
		5.4	Moments about the origin - related problems	T_2,R_2,R_3	1		PPT,BB

5	K2, K3)	5.5	Central Moments - related problems	T_2,R_2,R_3	I		PPT,BB
		5.6	Variance	T_2,R_2,R_3	I		PPT,BB
		5.7	Functions that give Moments: Moment generating function	T_2,R_2,R_3	I		PPT,BB
		5.8	Functions that give Moments: Moment generating function- related problems	T_2,R_2,R_3	I		PPT,BB
		5.9	Introduction, vector random variables	T_2,R_2,R_3	I		PPT,BB
		5.10	Joint distribution and its properties	T_2,R_2,R_3	I		PPT,BB
		5.11	Joint distribution function	T_2,R_2,R_3	I		PPT,BB
		5.12	properties of joint distribution	T_2,R_2,R_3	I		PPT,BB
		5.13	marginal distributions	T_2,R_2,R_3	I		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, 42/e, Khanna Publishers, 2012.
2	Peytoon Z peebles , Probability, Random variables & Random Signal Principles, TMH, 4th Edition 2001.

Reference Books:

S. No	Authors, Book Title, Edition, Publisher, Year of Publication
1	B.V. Ramana, Higher Engineering Mathematics, Tata McGraw Hill, 2007
2	Dr. T.K.V.Iyengar, Complex variables&Statistical Methods ,First Edition, S.Chand publications,2012
3	K. Murugesan, P. Gurusamy , Probability & Statistics, 2nd Edition, Anuradha Publications, 2010

Web Details

1	https://youtu.be/sLF-ntGwOmA (Complex integration)
2	https://youtu.be/ijPSM3BBE2E (cauchy's integral formula)
3	https://youtu.be/wPNcbmbnp98 (residue theorem)
4	https://youtu.be/60ReaZWsvCA (complex power series)
5	https://youtu.be/_sexvOCO080 (random variables)
6	https://youtu.be/8URfl2yfrBY (moment generating functions)

		Name	Signature with Date
i.	Faculty I	Dr. S DHARAJA DEVI (ECE-D)	
ii.	Faculty II	Mr. K. D. N. MURTHY (ECE-A, B & C)	23/10/21
iii.	Course Coordinator	Mr. K. D. N. MURTHY	23/10/21
iv.	Module Coordinator	Mr. Ch. PEDDI RAJU	
v.	HOD of Mathematics	Dr. S. DHARAJA DEVI	

Principal