ENGINEE	ERING MATHE	EMATICS-IV		
As per Choice Ba	ased Credit Syst	em (CRCS) sal	al.	
(Effective from	m the academic	year 2017 -2018)	e)	
	SEMESTER	– IV		
Subject Code	17MAT41	IA Marks		
Number of Lecture Hours/Week	04	Exam Marks		40
Total Number of Lecture Hours	50			60
	CREDITS -	Exam Hours		03
Module 1	CICEDITS	- 04		
				Teachin
Numerical Methods: Numerical solution and first degree, Taylor's series method	on of ordinary 1	· cc		Hours
and first degree, Taylor's series method of fourth order, Milne's and Adams-Bas	l modified En	ifferential equations	of first orde	10 Hour
of fourth order, Milne's and Adams De-		s method. Runge -	Kutta method	1
derivations of formulae-single sten com-	putation and	and corrector metho	ds (No	
Module 2	putation only).			
Numerical Methods: Numerical solution	- C			
Numerical Methods: Numerical solution Runge-Kutta method and Milne's me computation only).	on of second order	er ordinary different	ial equations,	10 Hours
computation only).	- tro dell	vations of formula	e-single step	
Special Functions: Series solution of	D			1
Bessel's function of first kind. Basic	properties and	ntial equation lead	ing to $J_n(x)$ -	
Bessel's function of first kind. Basic particles differential equation leading formula, problems	properties and o	orthogonality. Series	solution of	
formula, problems	ing to P _n (x)-Leg	endre nolynomials	D	1
		polyholinais.	Rodrigue's	
Module 3				
Module 3 Complex Variables: Review of a fun	ation C			
Module 3 Complex Variables: Review of a fund lifferentiability. Analytic functions Cov	ction of a comp	lex variable, limits	, continuity,	
Module 3 Complex Variables: Review of a fund differentiability. Analytic functions-Cau forms. Properties and construction of one	ction of a comp	lex variable, limits	, continuity,	
Module 3 Complex Variables: Review of a fund differentiability. Analytic functions-Cau forms. Properties and construction of one	ction of a comp	lex variable, limits	, continuity,	
Module 3 Complex Variables: Review of a functions-Caulifferentiability. Analytic functions-Caulifferentiability. Analytic functions of analytic function of analytic function of analytic function and Cauchy's integral formula without proof) and problems	ction of a comp schy-Riemann ed alytic functions. (a, Residue, poles	lex variable, limits quations in cartesia. Complex line integrals, Cauchy's Residue	, continuity, n and polar ils-Cauchy's e theorem (
Module 3 Complex Variables: Review of a functions-Caulifferentiability. Analytic functions-Caulifferentiability. Analytic functions of analytic function of analytic function of analytic function and Cauchy's integral formula without proof) and problems	ction of a comp schy-Riemann ed alytic functions. (a, Residue, poles	lex variable, limits quations in cartesia. Complex line integrals, Cauchy's Residue	, continuity, n and polar ils-Cauchy's e theorem (
Module 3 Complex Variables: Review of a functions-Caudifferentiability. Analytic functions-Caudorms. Properties and construction of ana heorem and Cauchy's integral formula without proof) and problems. Cransformations: Conformal transformations:	ction of a comp ichy-Riemann ed alytic functions. (a, Residue, poles	lex variable, limits quations in cartesia Complex line integra s, Cauchy's Residue	, continuity, n and polar ils-Cauchy's e theorem (
Module 3 Complex Variables: Review of a functions-Caulifferentiability. Analytic functions-Caulifferentiability. Analytic functions-Caulifferentiability. Analytic functions-Caulifferentiability. Analytic functions of analytic forms. Properties and construction of analytic form and Cauchy's integral formula without proof) and problems. Transformations: Conformal transformations: $(z \neq 0)$, Bilinear transformations.	ction of a comp ichy-Riemann ed alytic functions. (a, Residue, poles	lex variable, limits quations in cartesia Complex line integra s, Cauchy's Residue	, continuity, n and polar ils-Cauchy's e theorem (
Module 3 Complex Variables: Review of a functions-Caudifferentiability. Analytic functions-Caudorms. Properties and construction of analytic heorem and Cauchy's integral formula without proof) and problems. Cransformations: Conformal transformatics, $w = z + (1/z)$ ($z \neq 0$), Bilinear transformationle 4	ction of a compuchy-Riemann equilytic functions. (a., Residue, poles ations-Discussion ermations-problem	lex variable, limits quations in cartesia Complex line integras, Cauchy's Residuent of transformations ms.	, continuity, n and polar als-Cauchy's e theorem (: w = z ² , w	
Module 3 Complex Variables: Review of a functions-Causifferentiability. Analytic functions-Causimes. Properties and construction of analytic heorem and Cauchy's integral formula without proof) and problems. Transformations: Conformal transformatics, $w = z + (1/z)$ ($z \neq 0$), Bilinear transformationles. Random we repositely Distributions: Random we	ction of a comp uchy-Riemann ed alytic functions. (a, Residue, poles ations-Discussion ermations-problem	lex variable, limits quations in cartesian Complex line integrals, Cauchy's Residuent of transformations ms.	, continuity, n and polar als-Cauchy's theorem (: w = z ² , w	10 Hours
Module 3 Complex Variables: Review of a functions-Caudifferentiability. Analytic functions-Caudifferentiability. Analytic functions-Caudifferentiability. Analytic functions-Caudifferentiability in Management of and construction of analytic forms. Properties and construction of analytic formula formula without proof) and problems. Cransformations: Conformal transformatics, $w = z + (1/z)$ ($z \neq 0$), Bilinear transformatics, $w = z + (1/z)$ ($z \neq 0$), Bilinear transformatics. Poisson distributions: Random valuations. Poisson distributions geometries	ction of a compuchy-Riemann edulytic functions. (a., Residue, poles ations-Discussion remations-problemariables (discrete	lex variable, limits quations in cartesian Complex line integrals, Cauchy's Residuent of transformations ms.	, continuity, n and polar als-Cauchy's e theorem (: w = z ² , w	
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Module 3 Complex Variables: Review of a functions-Causifferentiability. Analytic functions-Causimes. Properties and construction of analytic hearmand Cauchy's integral formula without proof) and problems. Transformations: Conformal transformatics, $w = z + (1/z)$ ($z \neq 0$), Bilinear transformations. Poisson distributions, geometrical normal distributions. Problems Total	ction of a compachy-Riemann edulytic functions. (a., Residue, poles ations-Discussion ormations-problemariables (discrete distribution, un	lex variable, limits quations in cartesia. Complex line integrals, Cauchy's Residuent of transformations ms.	, continuity, n and polar als-Cauchy's e theorem (: w = z ² , w	10 Hours
Module 3 Complex Variables: Review of a function of a function of an are differentiability. Analytic functions-Cause orms. Properties and construction of an are decremed and Cauchy's integral formular without proof) and problems. Cransformations: Conformal transformations: Conformal transformations: $z = z + (1/z)$ ($z \neq 0$), Bilinear transformation of $z = z + (1/z)$ ($z \neq 0$), Bilinear transformations. Poisson distributions, geometrical distributions, Problems. Joint stribution for two variables, expectation, todule 5	ction of a compachy-Riemann edulytic functions. (a., Residue, poles ations-Discussion ormations-problemariables (discrete distribution, un nt probability (a., covariance, correction, covariance, correction)	lex variable, limits quations in cartesian complex line integrals, Cauchy's Residuent of transformations and continuous), miform distribution; distribution: Joint relation coefficient.	probability probability probability probability	10 Hours
Module 3 Complex Variables: Review of a functions-Causifferentiability. Analytic functions-Causifferentiability. Analytic functions-Causifferentiability. Analytic functions-Causifferentiability. Analytic function of analytic function of analytic function of analytic function of and problems. Transformations: Conformal transformations: Conformal transformations: Conformal transformation of analytic function of the function of	ction of a compachy-Riemann enalytic functions. On Residue, poles ations-Discussion remations-problem ariables (discrete distribution, un the probability of covariance, compactions).	lex variable, limits quations in cartesias Complex line integrals, Cauchy's Residuent of transformations and continuous), niform distribution, distribution; relation coefficient.	probability probability probability probability	10 Hours
Module 3 Complex Variables: Review of a function of a function of a function of an appearance of the corms. Properties and construction of an appearance of the corm and Cauchy's integral formular without proof) and problems. Cransformations: Conformal transformations: Conformal transformations: $z = z + (1/z)$ ($z \neq 0$), Bilinear transformations. Poisson distributions, geometrical distributions, Problems. Join stribution for two variables, expectation, and could be complianted from the corporations. Confidence of the complete of the corporations.	ction of a compachy-Riemann edulytic functions. (a, Residue, poles ations-Discussion ormations-problem ariables (discrete ic distribution, un t probability of covariance, condistributions, stations, stations, stations, stations, covariance, stations, stati	lex variable, limits quations in cartesian complex line integrals, Cauchy's Residuent of transformations and continuous), miform distribution, distribution; distribution coefficient.	probability exponential Probability hypothesis	10 Hours
Module 3 Complex Variables: Review of a function forms. Properties and construction of analytic functions. Properties and construction of analytic functions. Properties and construction of analytic function of analytic function of analytic function of and problems. Transformations: Conformal transformaties, $w = z + (1/z)$ ($z \neq 0$), Bilinear transformaties, $w = z + (1/z)$ ($z \neq 0$), Bilinear transformation. Poisson distributions: Random variables, Problems. Join stribution for two variables, expectation, and Indule 5 Impling Theory: Sampling, Sampling or means and proportions, confidence is used distribution as a test of goodness.	ction of a compachy-Riemann edulytic functions. Constitutions of a compachy-Riemann edulytic functions. Constitutions of a compaching of a compaching of a compaching of a compach constitution, and a compach constitutions of a compach constitutions of a compach constitution of a	lex variable, limits quations in cartesian complex line integrals, Cauchy's Residue of transformations and continuous), niform distribution, distribution; relation coefficient.	probability exponential Probability hypothesis ution, Chi-	10 Hours
Module 3 Complex Variables: Review of a function of an alliferentiability. Analytic functions-Causard forms. Properties and construction of an all heorem and Cauchy's integral formula without proof) and problems. Transformations: Conformal transformations: Conformal transformations: Polytime of the conformal transformation of the conformation of the conformation of the conformation of the conformation of two variables, expectation, and the conformation of two variables, expectation, and the conformation of the conformat	ction of a compachy-Riemann edulytic functions. Constitutions of a compachy-Riemann edulytic functions. Constitutions of a compaching of a compaching of a compaching of a compach constitution, and a compach constitutions of a compach constitutions of a compach constitution of a	lex variable, limits quations in cartesian complex line integrals, Cauchy's Residue of transformations and continuous), niform distribution, distribution; relation coefficient.	probability exponential Probability hypothesis ution, Chi-	10 Hours
Module 3 Complex Variables: Review of a function forms. Properties and construction of analytic functions-Cause forms. Properties and construction of analytic functions formula forms. Properties and construction of analytic function formula formu	ction of a compachy-Riemann edulytic functions. On the Residue, poles ations-Discussion ormations-problem ariables (discrete ic distribution, unt probability of the covariance, correspond in the covariance covariance correspond in the covariance c	lex variable, limits quations in cartesian complex line integrals, Cauchy's Residue of transformations in s. e and continuous), inform distribution, distribution: Joint relation coefficient. andard error, test of the student's t-distribution of transformations in the second of transformation of transformation distribution.	probability exponential Probability hypothesis ution, Chi-	10 Hours
Module 3 Complex Variables: Review of a function of a function of the corms. Properties and construction of analytic heaviling and problems. Properties and problems. Cransformations: Conformal transformations: Conformal transformations: Conformal transformations: $z = z + (1/z)$ ($z \neq 0$), Bilinear transformations. Poisson distributions, geometrical distributions, Problems. Join stribution for two variables, expectation, and Indule 5 Impling Theory: Sampling, Sampling or means and proportions, confidence is used distribution as a test of goodness obability vector, stochastic matrices, fix axins, higher transition probability. Itrse Outcomes: After studying this courting the courting the courting the courting the courting this courting the courting the courting this courting the courtin	ction of a compaction of a com	lex variable, limits quations in cartesian Complex line integrals, Cauchy's Residue of transformations and continuous), and continuous), and continuous distribution; distribution; distribution coefficient. Indiand error, test of a student's t-distribution coefficient.	probability exponential Probability Probability hypothesis ution, Chitic process, es, Markov	10 Hours 10 Hours
Module 3 Complex Variables: Review of a functions-Causifferentiability. Analytic functions-Causifferentiability. Analytic functions-Causifferentiability. Analytic functions-Causifferentiability. Properties and construction of analytic function of analytic function of an appropriate formula without proof) and problems. Transformations: Conformal transformatice², w = z + (1/z) (z ≠ 0), Bilinear transformatice², w = z + (1/z) (z ≠ 0), Bilinear transformatice. Todule 4 Tobability Distributions: Random variables and point of two variables, expectation, stribution for two variables, expectation, and normal distributions, Problems. Joint stribution for two variables, expectation, stribution for two variables, expectation, and proportions, confidence is unare distribution as a test of goodness obability vector, stochastic matrices, fix ains, higher transition probability. Transformations: Random variables are proportions at the confidence is unare distribution as a test of goodness obability vector, stochastic matrices, fix ains, higher transition probability. Transformations: Random variables are proportions. Joint of the confidence is unare distribution as a test of goodness obability vector, stochastic matrices, fix ains, higher transition probability. Transformations: Random variables are proportions at the confidence is unare distributions.	ction of a compachy-Riemann edulytic functions. On Residue, poles ations-Discussion remations-problem ariables (discrete distribution, unt probability of covariance, compactions, stations for means of fit. Stochastic ded points, regularise, students will nary differential to the stochastic distributions of fit.	lex variable, limits quations in cartesian Complex line integrals, Cauchy's Residue of transformations and continuous), and continuous), and continuous distribution; distribution; distribution coefficient. Indiand error, test of a student's t-distribution coefficient.	probability exponential Probability Probability hypothesis ution, Chitic process, es, Markov	10 Hours 10 Hours
Complex Variables: Review of a functions-Causifferentiability. Analytic functions-Causifferentiability. Analytic functions-Causifferentiability. Analytic functions-Causifferentiability. Analytic functions-Causifferentiability integral formula forms. Properties and problems. Cransformations: Conformal transformations: Conformal transformations: Conformal transformations. Poisson distributions: Random variables and propositions, Problems. Joing stribution for two variables, expectation, and Industributions and proportions, confidence is unare distribution as a test of goodness obability vector, stochastic matrices, fix ains, higher transition probability. Irse Outcomes: After studying this coursingle step and multistep numerical single step and multistep numerical	ction of a compachy-Riemann edulytic functions. Constitutions of a compachy-Riemann edulytic functions. Constitutions of ations-Discussion ormations-problem of ariables (discrete ic distribution, unterprobability of covariance, compaching for means of fit. Stochastic and points, regularise, students will mary differential through the description.	lex variable, limits quations in cartesian complex line integrals, Cauchy's Residue of transformations and continuous), and continuous), and continuous of transformation; distribution; distribution; distribution; distribution coefficient. Indianal error, test of a student's t-distribution coefficient. Indianal error, test of a student's t-distribution; are stochastic matrices are stochastic matrices are stochastic matrices. In the process: Stochastic matrices are stochastic matrices are stochastic matrices are stochastic matrices.	probability exponential Probability exponential Probability itic process, es, Markov	10 Hours 10 Hours ems using
Complex Variables: Review of a functions of the corms. Properties and construction of analytic functions. Properties and construction of analytic functions. Properties and construction of analytic functions of theorem and Cauchy's integral formularytic functions. Properties and problems. Transformations: Conformal transformaties², w = z + (1/z) (z ≠ 0), Bilinear transformaties², w = z + (1/z) (z ≠ 0), Bilinear transformaties², w = z + (1/z) (z ≠ 0), Bilinear transformaties², w = z + (1/z) (z ≠ 0), Bilinear transformaties², w = z + (1/z) (z ≠ 0), Bilinear transformaties of normal distributions; Random valuations. Poisson distributions, geometrical distribution for two variables, expectation, stribution for two variables, expectation, and proportions, confidence is unare distribution as a test of goodness obability vector, stochastic matrices, fix ains, higher transition probability. Insecution of the confidence of	ction of a compachy-Riemann edulytic functions. Con, Residue, poles ations-Discussion remations-problem ariables (discrete ic distribution, un the probability of the covariance, compaching for means of fit. Stochastic ded points, regularise, students will mary differential limethods.	lex variable, limits quations in cartesian complex line integrals, Cauchy's Residue of transformations in second continuous), inform distribution, distribution; distribution; relation coefficient. Indiand error, test of a student's t-distribution coefficient in student's t-distribution in the student's t-distributio	probability exponential Probability hypothesis ution, Chi- tic process, es, Markov	10 Hours 10 Hours ems using
Complex Variables: Review of a functions of the differentiability. Analytic functions of analytic functions of analytic functions. Properties and construction of analytic functions of and problems. Transformations: Conformal transformatic functions: Conformal transformatic functions of a possibility of transformations. Poisson distributions, geometric functions. Poisson distributions, Problems. Joint stribution for two variables, expectation, and functions of two variables, expectation, and functions of two variables, expectation, and functions are distribution as a test of goodness obability vector, stochastic matrices, fix anis, higher transition probability. Transformations: Conformal transformatic functions. Poisson distributions: Random variables, geometric functions. Poisson distributions, geometric functions. Poisson distributions functions functions. Poisson distribut	ction of a compachy-Riemann edulytic functions. Con, Residue, poles ations-Discussion ormations-problem ariables (discrete ic distribution, unt probability of covariance, correction of fit. Stochasticed points, regularise, students will mary differential methods.	lex variable, limits quations in cartesian Complex line integrals, Cauchy's Residue of transformations in s. e and continuous), inform distribution; distribution; Joint relation coefficient. endard error, test of the student's t-distribution of transformatic in student's t-distribution; ar stochastic matrices ar stochastic matrices ar stochastic matrices are consistent of the student of the	probability exponential Probability exponential Probability chypothesis ution, Chitic process, es, Markov for flow proble and polar for process, es, Markov	10 Hours 10 Hours ems using

Explain the concepts of analytic functions, residues, poles of complex potentials and describe

conformal and Bilinear transformation arising in field theory and signal processing.

- Develop probability distribution of discrete, continuous random variables and joint probability distribution occurring in digital signal processing, information theory and design
- Demonstrate testing of hypothesis of sampling distributions and illustrate examples of Markov chains related to discrete parameter stochastic process.

Question paper pattern:

The question paper will have ten questions.

There will be 2 questions from each module.

Each question will have questions covering all the topics under a module.

The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

- 1. B.V.Ramana "Higher Engineering Mathematics" Tata McGraw-Hill, 2006.
- 2. B. S. Grewal," Higher Engineering Mathematics", Khanna publishers, 42nd edition, 2013.

Reference Books:

- Bali and Manish Goyal, "A text book of Engineering mathematics", Laxmi 1. N P publications, latest edition.
- 2. Kreyszig, "Advanced Engineering Mathematics" 9th edition, Wiley, 2013.
- 3. H. K Dass and Er. RajnishVerma, "Higher Engineering Mathematics", S. Chand, 1st ed,

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