SREYAS
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Sreyas Institute of Engineering and Technology

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Department of Humanities and Sciences-Mathematics

Fourth BoS Meeting Minutes

Minutes of Board of Studies of Mathematics Meeting was held on 14th August 2025 at 11 AM

AGENDA

Item-1: Introduction of Board of Studies (BoS) Members and review of the previous minutes.

Item-2: Approval of Mathematics Courses for I B.Tech –I, II sem, II B.Tech–I, II semesters.

Item-3: Approval of Syllabus of Mathematics Courses for I B.Tech –I, II sem, II B.Tech–I, II semesters.

The following are the "Minutes of BoS Meeting, and the associated Resolutions

Item-1: The chairperson of the BoS has introduced the new members of the BoS and confirmed the minutes of the third BoS meeting.

Item-2: The members approved the following courses for R-25 with effect from 2025-26 admitted batches.

S.No.	Course	Year-Sem.	Branch	L	T	P	Credits
1	Matrices and Calculus	I-I	Common to MECH, ECE, CSE, CSE(AI&ML)	3	1	0	4
2	Ordinary Differential Equations and Vector Calculus	I-I	Common to MECH, ECE, CSE, CSE(AI&ML)	3	1	0	4
3	Computer Oriented Statistical Methods	II-II	CSE	3	0	0	3
4	Mathematical and Statistical Foundations	II-I	CSE(AI&ML)	3	0	0	3
5	Numerical Methods and Complex Variables	II-II	ECE	3	0	0	3
6	Probability, Statistics and Complex Variables	II-I	MECH	3	0	0	3

7	Computational Mathematics Lab (Using Python/MATLAB software)	II-I	MECH,CSE(AI&ML)	0	0	2	1
		II-II	ECE,CSE				

Item-3: With the permission of the BoS members, the Chairperson of BoS presented the proposed syllabus for the above listed courses, and the following points were discussed and recommended for possible inclusion.

S.No.	Subject	Points discussed
1	Matrices and Calculus	• **In UNIT – I:** Matrices: It is suggested to add Gauss Jacobi iteration method along with Gauss seidal method. • **In UNIT – III:** Single Variable Calculus: Curve tracing in Cartesian coordinates is to be removed as it is not directly connected with the present unit. • **In UNIT – V:** Multivariable Calculus (Integration): It is suggested to delete change of variables for triple integrals.
2	Ordinary Differential Equations and Vector Calculus	• Syllabus is well framed as per the course tilte, so no changes are suggested.
3	Computer Oriented Statistical Methods	• **In UNIT-II:** Continuous Distributions and sampling: Uniform distribution topic is not connected to the present unit, it is suggested to remove Uniform Distribution. • In **UNIT-IV**: Testing of Hypotheses (Large and small samples), it is suggested to elaborate the topic of small sample with t-test, F-test. • **UNIT-V**: Stochastic process: It is suggested to replace unit-V with applied statistics as it has more use in Machine learning techniques.
4	Mathematical and Statistical Foundations	• **In UNIT-III:** Continuous Distributions and sampling: Uniform distribution topic is not connected to the present unit, it is

		suggested to remove Uniform Distribution. • In **UNIT-IV**: Testing of Hypotheses (Large and small samples), it is suggested to elaborate the topic of small sample with t-test, F-test.
5	Numerical Methods and Complex Variables	• **In UNIT–II:** Numerical Methods-I: Central differences and symbolic relations may be ignored and elaborate the topics of forward and backward methods.
6	Probability, Statistics and Complex Variables	• **In UNIT-II:** Continuous Distributions and sampling: Uniform distribution topic is not connected to the present unit, it is suggested to remove Uniform Distribution.
7	Computational Mathematics Lab (Using Python/MATLAB software)	• New Lab course is introduced from this academic year. • The syllabus is covering the applications of Mathematics using Python/MATLAB software. • It is suggested to use Python as per the current trend in CSE

The BoS formally authorize the BoS chairperson to make all the minor modifications suggested by the members in the syllabi.

All the members approved the courses and the syllabi of Mathematics discipline and the BoS meeting was concluded with vote of thanks.

Dr. T Haripriya
Chairperson BoS-Mathematics

S.No	Name, & Address of the member	BOS Position	Signatures
1.	Dr. T Haripriya, Dept. of Mathematics, Sreyas Institute of Engineering & Technology, Nagole , Hyderabad	Chairperson	
2.	Dr. MN Raja Shekar Department of Mathematics, JNTUH University College of Engineering Nachupally (Kondagattu), Kodimial Mandal,Jagtial Dist.Telangana - 505 501 .	Member- JNTUH Nominee	

3.	Dr.T.Ramakrishna Goud Department of Mathematics, University college of Technology, Osmania University,Hyderabad.	Subject Expert-1	
4.	Dr. MD. Shamsuddin Department of Mathematics, SR University, Warangal.	Subject Expert-2	
5.	Dr.Y.Prabhakar Reddy Senior Developer Omnicomm Media Group, Hyderabad.	Industry Expert	
6.	Mrs Dasoju Divya Student of Sreyas Inst.of Engineering & Technology, Nagole ,Hyderabad.	Member Alumni	
7.	Dr. B. Suresh Babu	Member Internal Faculty	
8.	Dr. Vasavi Cheruku	Member Internal Faculty	
9.	Dr. Vanaja Gosty	Member Internal Faculty	
10.	Mr. K. Santhosh	Member Internal Faculty	
11.	Mrs. D. Madhavi Latha	Member Internal Faculty	
12.	Mrs. J. V.Maha lakhmi	Member Internal Faculty	
13.	Mrs. J. Laxmi Sravanthi	Member Internal Faculty	
14.	Mrs. M. Sandhya Rani	Member Internal Faculty	
15.	Mr. P. Kumaraswamy	Member Internal Faculty	
16.	Mrs. M. Tulasi Rakshana	Member Internal Faculty	

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R25 B.Tech Syllabus

MA101BS: MATRICES AND CALCULUS
(Common to MECH ECE,CSE,CSE(AIML))

I B.Tech – I Sem

L	T	P	C
3	1	0	4

Pre-requisite: Mathematical Knowledge at pre-university level

Course Objectives: To learn

1. Applying basic operations on matrices and their properties.
2. Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
3. Concept of Eigen values and Eigen vectors and to reduce the quadratic form to canonical form
4. Geometrical approach to the mean value theorems and their application to the mathematical problems.
5. Finding maxima and minima of functions of two and three variables.
6. Evaluation of multiple integrals and their applications.

Course Outcomes: After learning the contents of this paper, the student must be able to

1. Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations
2. Find the Eigen values and Eigenvectors
3. Reduce the quadratic form to canonical form using orthogonal transformations.
4. Solve the applications of the mean value theorems.
5. Find the extreme values of functions of two variables with/without constraints.
6. Evaluate the multiple integrals and apply the concept to find areas and volumes.

UNIT – I: Matrices

Rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss- Jordan method. System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations. Gauss Jacobi iteration method, Gauss Seidel Iteration Method.

UNIT – II: Eigen values and Eigen vectors

Linear Transformation and Orthogonal Transformation: Eigen values, Eigen vectors and their properties, Diagonalization of a matrix, Cayley Hamilton Theorem (without proof) Finding inverse and power of a matrix by Cayley-Hamilton Theorem. Quadratic forms and Nature of the Quadratic Forms Reduction of Quadratic form to canonical form by Orthogonal Transformation.

UNIT – III: Single Variable Calculus

Limit and Continuous of functions and its properties. Mean value theorems: Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications Cauchy's Mean value Theorem, Taylor's Series (All the theorems without proof). Maclaurin's series.

UNIT – IV: Multivariable Calculus (Partial Differentiation and applications)

Definitions of Limit and continuity, Partial Differentiation: Euler's Theorem, Total derivative, Jacobian–Functional dependence & independence, Applications: Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

UNIT – V: Multivariable Calculus (Integration)

Evaluation of Double Integrals (Cartesian and polar coordinates), Change of order of integration (only Cartesian form), Change of variables for double integrals (Cartesian to polar).
Evaluation of Triple Integrals.
Applications: Areas by double integrals and volumes by triple integrals.

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Editon, 2016.

REFERENCE BOOKS:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
3. N.P. Bali and Manish Goyal, A textbook of Engineering Mathematics, Laxmi Publications, Reprint, 2008
4. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited.

Useful Links

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R25 B.Tech Syllabus

MA201BS: ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS
(Common to MECH ECE,CSE,CSE(AIML))

I B.Tech – II Sem

L	T	P	C
3	1	0	4

Pre-requisite: Mathematical Knowledge at pre-university level

Course Objectives: To learn

1. Methods of solving the differential equations of first and higher order.
2. Concept, properties of Laplace transforms.
3. Solving ordinary differential equations using Laplace transforms techniques.
4. The physical quantities involved in engineering field related to vector valued functions
5. The basic properties of vector valued functions and their applications to line, surface, and volume integrals

Course Outcomes: After completion of the course, the student must be able to

1. Identify whether the given differential equation of first order is exact or not
2. Solve higher differential equation and apply the concept of differential equation to real world problems.
3. Use the Laplace Transforms techniques for solving Ordinary Differential Equations.
4. Evaluate the Line, Surface and Volume integrals and converting them from one to another

UNIT – I: First Order Ordinary Differential Equations

Exact differential equations, Equations reducible to exact differential equations, linear and Bernoulli's equations, Orthogonal Trajectories (only in Cartesian Coordinates).

Applications: Newton's law of cooling, Law of natural growth and decay.

UNIT – II: Ordinary Differential Equations of Higher Order

Higher order linear differential equations with constant coefficients: Non-Homogeneous terms of the type e^{ax}, $sin\ ax$, $cos\ ax$, polynomials in x, $e^{ax}V(x)$ and $x^k\ V(x)$, Method of variation of parameters.

UNIT – III: Laplace Transforms

Laplace Transforms: Laplace Transform of standard functions, first shifting theorem, Laplace transforms of functions multiplied by 't' and divided by 't' Laplace transforms of derivatives and integrals of function, Evaluation of integrals by Laplace transforms, Laplace transform of periodic functions , Inverse Laplace transform by different methods, convolution theorem (without proof). Applications: solving Initial value problems by Laplace Transform method.

UNIT – IV: Vector Differentiation

Vector point functions and scalar point functions, Gradient, Divergence and Curl, Solenoidal and Irrotational vectors, Directional derivatives, Scalar potential functions, Vector Identities.

UNIT – V: Vector Integration

Line, Surface and Volume Integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications.

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Edition, 2016.

REFERENCE BOOKS:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson, Reprint, 2002.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008. 4. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, New Delhi.

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R25 B.Tech CSE(AI&ML)
Syllabus

MA401BS:MATHEMATICAL AND STATISTICAL FOUNDATIONS

II B.Tech – I Sem

L	T	P	C
3	0	0	3

Pre-requisite: Mathematics course of first year of study

Course Objectives: To learn

1. To learn the Number Theory basic concepts useful for cryptography etc.
2. To learn the theory of Probability, and probability distributions of single random variables.
3. To learn the sampling theory and testing of hypothesis and making inferences
4. To learn the curve fitting correlation and regression for the given data.

Course Outcomes: After learning the contents of this paper, the student must be able to

1. Apply the number theory concepts to cryptography domain.
2. Apply the concepts of probability and distributions to some case studies.
3. Correlate the material of one unit to the material in other units.
4. Resolve the potential misconceptions and hazards in each topic of study.
5. Fit the curve, correlation and regression for the given data.

UNIT-I: Basics of Number Theory

Greatest Common Divisors and Prime Factorization: Greatest common divisors – The Euclidean algorithm – The fundamental theorem of arithmetic – Factorization of integers and the Fermat numbers. Congruence: Introduction to congruence – Linear congruence.

UNIT-II: Random Variables and Probability Distributions

Concept of a Random Variable – Discrete Probability Distributions – Continuous Probability Distributions – Mean of a Random Variable – Variance of a Random Variable.
Discrete Probability Distributions: Binomial Distribution – Poisson distribution

UNIT-III: Continuous Distributions and Sampling

Normal Distribution – Areas under the Normal Curve – Applications of the Normal Distribution – Normal Approximation to the Binomial Distributions. Fundamental Sampling **Distributions:** Random Sampling – Some Important Statistics – Sampling Distributions – Sampling Distribution of Means – Central Limit Theorem.

UNIT-IV: Tests of Hypotheses (Large and Small Samples)

Statistical Hypotheses: General Concepts – Testing a Statistical Hypothesis. Single sample: Tests concerning a single mean. Two samples: Tests on two means (Unknown for equal variance). One sample: Test on a single proportion. Two samples: Tests on two proportions. Small sample –Student t-test for single mean and Two means, F-test(Analysis of variances)

UNIT-V: Applied Statistics

Curve fitting by the method of least squares – Fitting of straight lines – Second degree parabolas and more general curves – Correlation and Regression – Rank correlation.

TEXT BOOKS:

1. Kenneth H. Rosen, Elementary Number Theory & its applications, sixth edition, Addison Wesley, ISBN 9780-321-50031-1.
2. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics for Engineers & Scientists, 9thEd. Pearson Publishers.
3. S C Gupta and V K Kapoor, Fundamentals of Mathematical Statistics, Khanna publications.

REFERENCE BOOKS:

1. T.T. Soong, Fundamentals of Probability and Statistics for Engineers, John Wiley & Sons, Ltd, 2004.
2. Sheldon M Ross, Probability and statistics for Engineers and scientists, academic press.
3. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications.
4. Mathematical and statistical foundations, S.CHAND Publications, TKV IYENGAR, B Krishna Gandhi, S Ranganatham, MVSSN Prasad.

Useful Links

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R25 B.Tech CSE Syllabus

MA401PC: COMPUTER ORIENTED STATISTICAL METHODS

II B.Tech –II Sem

L	T	P	C
3	0	0	3

Pre-requisite: Mathematics courses of first year of study

Course Objectives: To learn

1. The theory of Random variable Probability distributions of single random variables
2. The sampling theory, testing of hypothesis and making statistical inferences
3. The curve fitting, correlation and regression for the given data.

Course Outcomes:

1. Apply the concepts of Random variable and distributions to case studies.
2. Formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data.
3. Apply concept of estimation and testing of hypothesis to case studies.
4. Fit the curve, correlation and regression for the given data.

UNIT-I: Random Variables and Probability Distributions

Concept of a Random Variable – Discrete Probability Distributions – Continuous Probability Distributions – Mean of a Random Variable – Variance of a Random Variable

UNIT-II: Continuous Distributions and sampling

Normal Distribution – Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial Distributions. Fundamental Sampling Distributions: Random Sampling, Some Important Statistics, Sampling Distributions, Sampling Distribution of Means, Central Limit Theorem.

UNIT-III: Estimation

Introduction, Statistical Inference, Classical Methods of Estimation – Single Sample: Estimating the mean – Standard error of a point estimate. Two samples: Estimating the difference between two means– Single sample: Estimating a proportion – Two samples: Estimating the difference between two proportions– Two samples: Estimating the ratio of two variances.

UNIT-IV: Tests of Hypotheses (Large and Small Samples)

Statistical Hypotheses: General Concepts – Testing a Statistical Hypothesis. Single sample: Tests concerning a single mean. Two samples: Tests on two mean (Unknown for equal variance). One sample: Test on a single proportion. Two samples: Tests on two proportions. Small samples: t-test for single and two means, Two-sample tests concerning variances: F-test

UNIT-V: Applied Statistics

Curve fitting by the method of least squares, Fitting of straight lines, Second degree parabolas and more general curves, Correlation and Regression, Rank correlation.

TEXT BOOKS:

1. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications
2. S.D.Sharma, Operations Research, Kedarnath and Ramnath Publishers, Meerut, Delhi.
3. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics for Engineers & Scientists, 9th Ed. Pearson Publishers.

REFERENCE BOOKS:

1. Sheldon M Ross, Probability and statistics for Engineers and scientists, academic press
2. Miller and Freund's, Probability and Statistics for Engineers, 8th Edition, Pearson Educations.
3. T.T. Soong, Fundamentals of Probability and Statistics for Engineers, John Wiley & Sons, 2004.

Useful Links

1) 2) 3) 4) M. Sharmistha 5) 6)

7) 8) 9) 10) K. Santosh 11) 12) 13)

14) 15) P. Ray 16)

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R25 B.Tech ECE Syllabus

MA401BS: NUMERICAL METHODS AND COMPLEX VARIABLES

II B.Tech – II Sem

L	T	P	C
3	0	0	3

Pre-requisite: Mathematics courses of first year of study.

Course Objectives: To learn

1.Expressing periodic function by Fourier series and anon-periodic function by Fourier transforms
2. Various numerical methods to find roots of polynomial and transcendental equations.
3. Concept of finite differences and to estimate the value for the given data using interpolation.
4. Evaluation of integrals using numerical techniques
5. Solving ordinary differential equations of first order using numerical techniques.
6. Differentiation and integration of complex valued functions.
7. Evaluation of integrals using Cauchy's integral formula and Cauchy's residue theorem.
8. Expansion of complex functions using Taylor's and Laurent's series.

Course Outcomes: After learning the contents of this paper, the student must be able to

1. Express any periodic function in terms of sine and cosine.
2. Find the root of a given polynomial and transcendental equations.
3. Estimate the value for the given data using interpolation
4. Find the numerical solutions for a given first order ODE's
5. Analyze the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems.
6. Taylor's and Laurent's series expansions in complex function.

UNIT – I: Fourier Series & Fourier Transforms

Fourier series—Dirichlet's Conditions—Half-range Fourier series—Fourier Transforms: Fourier Integral Theorem (Only statements), Fourier Sine and Cosine transforms (Elementary illustrations)

UNIT – II: Numerical Methods-I

Solution of polynomial and transcendental equations: Bisection method – Iteration Method – Newton – Raphson method and Regula-Falsi method.

Finite differences: forward differences —backward differences —Interpolation using Newton's forward and backward difference formulae – Lagrange's method of interpolation.

UNIT – III: Numerical Methods-II

Numerical integration: Trapezoidal rule-Simpson's $1/3^{rd}$ and $3/8^{th}$ rules.

Ordinary differential equations: Taylor's series, Euler's method, Runge-Kutta method of fourth order for first order ODE.

UNIT – IV: Complex Differentiation

Differentiation of Complex functions, Analyticity, Cauchy-Riemann equations (without proof), Harmonic Functions , Finding harmonic conjugate , Milne-Thomson method, Elementary analytic functions (exponential, trigonometric, logarithm) and their properties.

UNIT – V: Complex Integration

Line integral, Cauchy's theorem, Cauchy's Integral formula, Zeros of analytic functions, Singularities, Taylor's series, Laurent's series. Residues, Cauchy Residue theorem (All theorems without Proof).

TEXT BOOKS:

1. B.S.Grewal, Higher Engineering Mathematics, Khanna Publishers,36th Edition,2010.
2. S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition,2005.

REFERENCE BOOKS:

1. MurrayR.Spiegel,Ph.D.,SeymourLipschutz,Ph.D.,JohnJ.Schiller,Ph.D.,Dennis Spellman, Ph.D., Complex Variables (Schaum's outline).
2. M.K.Jain, S.R.K.Iyengar, R.K.Jain, Numerical methods for Scientific and Engineering Computations, New Age International publishers.
3. Erwin Kreyszig, Advanced Engineering Mathematics, 9thEdition, John Wiley &Sons, 2006.
4. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Edition, Mc-Graw Hill, 2004.

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R25 B.Tech MECH Syllabus

MA301BS: PROBABILITY, STATISTICS AND COMPLEX VARIABLES

II B.Tech –I Sem

L	T	P	C
3	0	0	3

Pre-requisite: Mathematics courses of first year of study

Course Objectives: To learn

1. The ideas of random variables and various discrete and continuous probability distributions and their properties.
2. The statistical methods of studying data samples
3. Differentiation and integration of complex valued functions
4. Evaluation of integrals using Cauchy's integral formula and Cauchy's residue theorem.
5. Expansion of complex functions using Taylor's and Laurent's series.

Course Outcomes:

1. Apply the concepts of Random variable and distributions to some case studies
2. Correlate the concepts of one unit to the concepts in other units.
3. Understood sampling theory and apply hypothesis testing in real-world scenarios
4. Analyze the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems
5. Taylor's and Laurent's series expansions in complex function.

UNIT - I: Random Variables and Probability Distributions

Concept of a Random Variable – Discrete Probability Distributions – Continuous Probability Distributions – Mean of a Random Variable – Variance of a Random Variable Discrete Probability Distributions: Binomial Distribution – Poisson distribution

UNIT - II: Continuous Distributions and sampling

Normal Distribution – Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial Distributions. Fundamental Sampling Distributions: Random Sampling, Some Important Statistics, Sampling Distributions, Sampling Distribution of Means, Central Limit Theorem.

UNIT-IV: Tests of Hypotheses (Large and Small Samples)

Statistical Hypotheses: General Concepts – Testing a Statistical Hypothesis. Single sample: Tests concerning a single mean. Two samples: Tests on two mean (Unknown for equal variance). One sample: Test on a single proportion. Two samples: Tests on two proportions. Small samples: t-test for single and two means, Two-sample tests concerning variances: F-test

UNIT - IV: Complex Differentiation

Differentiation of Complex functions – Analyticity – Cauchy-Riemann equations (without proof) – Harmonic Functions – Finding harmonic conjugate – Milne Thomson method – Elementary analytic functions (exponential, trigonometric, logarithm) and their properties.

UNIT - V: Complex Integration

Line integral – Cauchy's theorem – Cauchy's Integral formula – Zeros of analytic functions – Singularities – Taylor's series – Laurent's series. Residues – Cauchy Residue theorem (All theorems without Proof).

TEXT BOOKS:

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics for Engineers & Scientists, 9th Ed. Pearson Publishers.
2. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications.

REFERENCE BOOKS:

1. T.T. Soong, Fundamentals of Probability and Statistics for Engineers, John Wiley & Sons, Ltd, 2004
2. Sheldon M Ross, Probability and statistics for Engineers and scientists, academic press.

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MA406PC: COMPUTATIONAL MATHEMATICS LAB
(Using Python/MATLAB software)

B.Tech. II Year II Sem.

L	T	P	C
0	0	2	1

Pre-requisites: Matrices, Iterative methods and ordinary differential equations

Course Objectives:

1. Solve problems of Eigen values and Eigen Vectors using Python/MATLAB.
2. Solution of Algebraic and Transcendental Equations using Python/MATLAB
3. Solve problems of Linear system of equations
4. Solve problems of First-Order ODEs Higher order linear differential equations with constant coefficients

Course Outcomes:

1. Develop the code to find the Eigen values and Eigen Vectors using Python/MATLAB.
2. Develop the code find solution of Algebraic and Transcendental Equations and Linear system of equations using Python/MATLAB
3. Write the code to solve problems of First-Order ODEs Higher order linear differential equations with constant coefficients

UNIT - I: Eigen values and Eigenvectors:

Programs:

- Finding real and complex Eigen values.
- Finding Eigen vectors.

UNIT – II: Solution of Algebraic and Transcendental Equations

Bisection method, Newton Raphson Method Programs:

- Root of a given equation using Bisection method.
- Root of a given equation Newton Raphson Method.

UNIT-III: Linear system of equations:

Jacobi's iteration method and Gauss-Seidal iteration method Programs:

- Solution of given system of linear equations using Jacobi's method
- Solution of given system of linear equations using Gauss-Seidal method

UNIT-IV: First-Order ODEs

Exact and non-exact equations, Applications: exponential growth/decay, Newton's law of cooling.

Programs:

- Solving exact and non-exact equations
- Solving exponential growth/decay and Newton's law of cooling problems

UNIT-V: Higher order linear differential equations with constant coefficients

Programs:

- Solving homogeneous ODEs
- Solving non-homogeneous ODEs

TEXT BOOKS:

1. MATLAB and its Applications in Engineering, Rajkumar Basal, Ashok Kumar Geo, Manoj Kumar Sharma, Pearson publication.

2. Kenneth A. Lambert, The fundamentals of Python: First Programs, 2011, Cengage Learnings.
3. Think Python First Edition, by Allen B. Downey, Orielly publishing.
4. Introduction to Python Programming, William Mitchell, Povel Solin, Martin Novak et al., NCLab Public Computing, 2012.
5. Introduction to Python Programming, ©Jacob Fredslund, 2007.

REFERENCE BOOKS:

1. An Introduction to Python, John C. Lusth, The University of Alabama, 2011.
2. Introduction to Python, ©Dave Kuhlman, 2008.