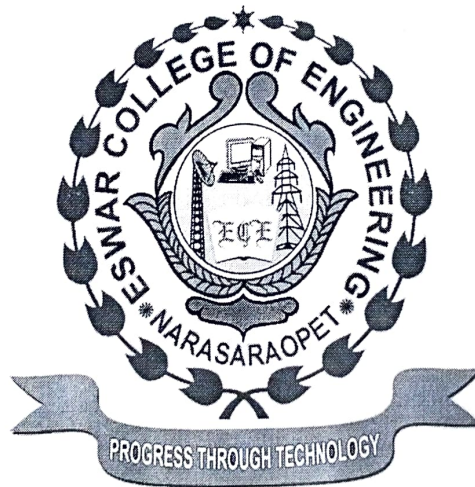


DEPARTMENT OF MATHEMATICS

**Resolutions of the 1st Board of Studies Meeting
Department of Mathematics**

A Y. 2025-26



Date :24-FEB-2026

Time :2:45PM

Mode : Hybrid



DEPARTMENT OF MATHEMATICS

AGENDA – FIRST BOARD OF STUDIES MEETING

- 1. Welcome of Members and Invitees**
Formal welcome to all internal and external members, university nominees, and invitees.
- 2. Ratification of Mathematics Syllabi for I Year UG and PG Programmes**
Discussion and approval of the mathematics syllabi for I Year UG and PG programmes for A.Y. 2025-26.
- 3. Review of Credits, Contact Hours, and Course Structure**
Examination and approval of allocation of credits, contact hours, and overall course organization.
- 4. Approval of Internal and External Assessment Pattern**
Discussion and approval of the internal assessment and end-semester examination pattern as per university regulations.
- 5. Any Other Matter with Permission of the Chair**
Academic recommendations for enhancement of teaching-learning process and future syllabus considerations discussed.
- 6. Vote of Thanks**
Formal vote of thanks acknowledging the contributions and academic insights of all members.



DEPARTMENT OF MATHEMATICS

Ref: ESWR/MATHS/BoS-MoM/2025-26/01

25-FEB-2026

Resolutions of the 1st BoS Meeting, Department of Mathematics, Eswar College of Engineering (Autonomous), Kesanupalli, 24.02.2026 (Hybrid Mode).

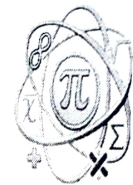
<https://us04web.zoom.us/j/79868063314?pwd=BRyObVy82k55vPY5MhDlrCYbt3TPKh.1>

BoS MEMBERS

S.No	Name of the Member	Designation/Occupation	Category
1	Mr.G.Karunakar Babu	Head of the Department	Chairman
2	Prof. B. Satyanarayana	Professor, Department of Mathematics ,Acharya Nagarjuna University. Mail id:drbsn63@yahoo.co.in Contact no:9440843956	Nominated by Hon'ble VC, JNTUK
3	Prof. E. Keshava Reddy	Professor Department of Mathematics, JNTUACEA, Anantapuramu. Mobile: 9440228484 Email: keshava.maths@jntua.ac.in	Subject experts outside parent university
4	Prof. Vasudeva Reddy P	Department of Mathematics, Andhra University, Email:vasucrypto@andhrauniversity.edu.in Mobile no:9885000274	Subject experts outside parent university
5	Dr.V.Rukmini Bala Suseela	Asst.Professor	Internal Faculty Members
6	Mr.D.Koteswara Rao	Asst.Professor	
7	Mr.P. Bala Joseph	Asst.Professor	
8	Mrs. K.Aruna	Asst.Professor	
9	Ch.Mohan	Technical Manager, ORACLE CORP. Bangalore	Industry
10	SaradhiJerripothu	Sr. Corporate Trainer, Conscience Technologies, Hyderabad	Alumni

Members Absent: Nil

With the quorum present, the Chairperson called the meeting to order.



DEPARTMENT OF MATHEMATICS

MINUTES OF THE 1ST BOS MEETING

Agenda

Agenda 1: Introduction of Members of the Board of Studies

The Chairperson convened the First Board of Studies Meeting in hybrid mode, welcomed the members, introduced the honourable external members and internal faculty, and placed the agenda before the Board for consideration.

Resolution 1: The Chair introduced the members, and the constitution of the Board of Studies for A.Y. 2025–26 was placed on record.

Agenda 2: Ratification of Mathematics Syllabi for I Year UG and PG Programmes for the Academic Year 2025–26

Resolution 2: The Board reviewed and ratified the mathematics syllabi for I Year UG and PG programmes for the Academic Year 2025–26, approving continuation without modification as per JNTUK Regulations R23 (UG), R24 (MBA), and R25 (M. Tech).

Agenda 3: Review of Credits, Contact Hours, and Course Structure

Resolution 3: The Board examined the allocation of credits, contact hours, and overall course organization and approved the structure as proposed.

Agenda 4: Approval of Internal and External Assessment Pattern

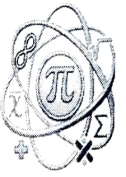
Resolution 4: The internal assessment and end-semester examination pattern were reviewed and approved for continuation as per university regulations

Agenda 5: Any Other Matter with the Permission of the Chair. The honourable members provided academic recommendations for enhancement of teaching learning process.

Prof. B. Satyanarayana, University Nominee from Acharya Nagarjuna University, suggested that the M. Tech Mathematics syllabus may be considered in future academic regulations from the student perspective and recommended continuation of the existing I Year UG and PG syllabus without change for the current semester.

Prof. E. Kesava Reddy, Subject Expert from JNTUA, stated that the present M.Tech Mathematics syllabus may be revisited in forthcoming regulatory revisions and supported continuation of the current I Year UG and PG syllabus for the ongoing semester.

Dr. P. Vasudeva Reddy, Subject Expert from Andhra University, indicated that the syllabus may be reviewed in future academic revisions considering student learning needs and agreed that no modification is required at present, with the existing I Year UG and PG syllabus continuing as prescribed.



DEPARTMENT OF MATHEMATICS

Resolution 5:

The Department shall implement the suggestions offered by the honourable members in a phased manner while continuing the existing JNTUK regulations for the current academic year.

Conclusion

The meeting concluded with a formal vote of thanks proposed by Mr. G. Karunakar Babu, acknowledging the contributions and academic insights of all members. The proceedings ended at 3:30 PM with the approval of the Chair.



DEPARTMENT OF MATHEMATICS

BoS Committee

S.No	Name of the Member	Designation/Occupation	Category	Signature
1	Mr.G.Karunakar Babu	Head of the Department	Chairman	
2	Prof. B. Satyanarayana	Professor, Department of Mathematics ,Acharya Nagarjuna University. Mail id:drbsn63@yahoo.co.in Contact no:9440843956	Nominated by Hon'ble VC, JNTUK	Approved through mail
3	Prof. E. Keshava Reddy	Professor Department of Mathematics, JNTUACEA, Anantapuramu. Mobile: 9440228484 EMail: keshava.maths@jntua.ac.in	Subject experts outside parent university	Approved through mail
4	Prof. Vasudeva Reddy P	Department of Mathematics, Andhra University, Email:vasucrypto@andhrauniversity.e du.in Mobile no:9885000274	Subject experts outside parent university	Approved through mail
5	Dr.V.Rukmini Bala Suseela	Asst.Professor	Internal Faculty Members	
6	Mr.D.Koteswara Rao	Asst.Professor		
7	Mr.P. Bala Joseph	Asst.Professor		
8	Mrs. K.Aruna	Asst.Professor		
9	Ch.Mohan	Technical Manager, ORACLE CORP. Bangalore	Industry	
10	Saradhijerripothu	Sr. Corporate Trainer, Conscience Technologies, Hyderabad	Alumni	

28/02/2026, 13:00

Gmail - Fwd: BoS Proceedings Submitted for Ratification – First Year UG (A.Y. 2025–26)



V V <vlsunitha1@gmail.com>

Fwd: BoS Proceedings Submitted for Ratification – First Year UG (A.Y. 2025–26)

1 message

karunakara babu gavini <karun4gavini@gmail.com>
To: vlsunitha1@gmail.com

Sat, Feb 28, 2026 at 12:53 PM

----- Forwarded message -----

From: Yahoo Mail <drbsn63@yahoo.co.in>

Date: Fri, 27 Feb, 2026, 1:40 pm

Subject: Re: BoS Proceedings Submitted for Ratification – First Year UG (A.Y. 2025–26)

To: karunakara babu gavini <karun4gavini@gmail.com>

Dear Sir,

The Minutes of the First Board of Studies (BoS) Meeting in Mathematics held on 24 February 2026 is Ratified my side.

Thank you

On Thursday, 26 February 2026 at 12:49:10 pm IST, karunakara babu gavini <karun4gavini@gmail.com> wrote:

Respected Sir,

I am forwarding the Minutes of the First Board of Studies (BoS) Meeting in Mathematics held on 24 February 2026 for ratification, pertaining to the First Year B.Tech programme for the A.Y. 2025–26.

The Minutes of the Meeting are enclosed for ratification and approval.

Thank you.

Yours Sincerely,

G. Karunakar Babu
HOD-Dept of Mathematics
Eswar College of Engineering

28/02/2026, 13:00

Gmail - Fwd: BoS Proceedings Submitted for Ratification – First Year UG (A.Y. 2025–26)



V V <vlsunitha1@gmail.com>

Fwd: BoS Proceedings Submitted for Ratification – First Year UG (A.Y. 2025–26)

1 message

karunakara babu gavini <karun4gavini@gmail.com>
To: vlsunitha1@gmail.com

Sat, Feb 28, 2026 at 12:53 PM

----- Forwarded message -----

From: keshava maths <keshava.maths@jntua.ac.in>

Date: Thu, 26 Feb, 2026, 4:12 pm

Subject: Re: BoS Proceedings Submitted for Ratification – First Year UG (A.Y. 2025–26)

To: karunakara babu gavini <karun4gavini@gmail.com>

Ratified from my side.

Sr. Prof. E.Keshava Reddy
Department of Mathematics,
JNTUA College of Engineering,
Ananthapuramu-515002
A.P,India

On Thu, Feb 26, 2026 at 12:51 PM karunakara babu gavini <karun4gavini@gmail.com> wrote:

Respected Sir,

I am forwarding the Minutes of the First Board of Studies (BoS) Meeting in Mathematics held on 24 February 2026 for ratification, pertaining to the First Year B.Tech programme for the A.Y. 2025–26.

The Minutes of the Meeting are enclosed for ratification and approval.

Thank you.

Yours Sincerely,

G. Karunakar Babu
HOD-Dept of Mathematics
Eswar College of Engineering

28/02/2026, 13:01

Gmail - Fwd: BoS Proceedings Submitted for Ratification – First Year UG (A.Y. 2025–26)



V V <vlsunitha1@gmail.com>

Fwd: BoS Proceedings Submitted for Ratification – First Year UG (A.Y. 2025–26)

1 message

karunakara babu gavini <karun4gavini@gmail.com>
To: vlsunitha1@gmail.com

Sat, Feb 28, 2026 at 12:52 PM

----- Forwarded message -----

From: **Prof. P Vasudeva Reddy** <vasucrypto@andhrauniversity.edu.in>
Date: Sat, 28 Feb, 2026, 10:27 am
Subject: Re: BoS Proceedings Submitted for Ratification – First Year UG (A.Y. 2025–26)
To: karunakara babu gavini <karun4gavini@gmail.com>

Dear sir..

Thank you for your mail. Received minutes copy.

I am herewith conveying my approval for the minutes of the meeting, which is conducted on 24 th Feb. 2024.

Thanking you

Prof. P. VASUDEVA REDDY

Dept of Engg. Mathematics

Andhra University

Visakhapatnam.

On Thu, Feb 26, 2026, 12:52 PM karunakara babu gavini <karun4gavini@gmail.com> wrote:

Respected Sir,

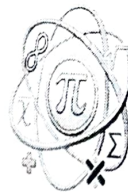
I am forwarding the Minutes of the First Board of Studies (BoS) Meeting in Mathematics held on 24 February 2026 for ratification, pertaining to the First Year B.Tech programme for the A.Y. 2025–26.

The minutes of the meeting are enclosed for ratification and approval.

Thank you.

Yours Sincerely,

G. Karunakar Babu
HOD-Dept of Mathematics
Eswar College of Engineering

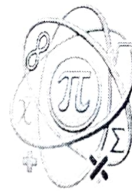


DEPARTMENT OF MATHEMATICS
UG-Course Structure

S.No.	Sub Code	Title	L/D	T	P	Credits
1	R231105	LINEAR ALGEBRA& CALCULUS (Common for all branches of Engineering)	3	0	0	3
2	R231202	DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS (Common for all branches of Engineering)	3	0	0	3

PG-Course Structure

S.No	Sub Code	Title	L/D	T	P	Credits
1	MB2414	Quantitative Analysis for Business Decisions[MBA]	4	0	0	4
M.TECH						
2	DS15803	Mathematical Foundations & Computer Science[CSE]	3	1	0	4
3	DS13801	Mathematical Foundation for Communication Engineering[ECE]	3	1	0	4



DEPARTMENT OF MATHEMATICS

SUB CODE:R231105	I YEAR - I SEMESTER	L	T	P	C
Linear Algebra& Calculus (Common for all branches of Engineering)		3	0	0	3

Course Objectives: To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real-world problems and their applications.

Course Outcomes: At the end of the course, the student will be able to

CO1: Develop and use of matrix algebra techniques that are needed by engineers for practical applications.

CO2: Utilize mean value theorems to real life problems.

CO3: Familiarize with functions of several variables which is useful in Optimization.

CO4: Learn important tools of calculus in higher dimensions.

CO5: Familiarize with double and triple integrals of functions of several variables in two dimensions using Cartesian and polar coordinates and in three dimensions using cylindrical and spherical coordinates.

UNIT - I Matrices

Rank of a matrix by echelon form, normal form. Cauchy–Binet formulae (without proof). Inverse of non-singular matrices by Gauss-Jordan method, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method, Jacobi and Gauss Seidel Iteration Methods.

UNIT - II Eigen values, Eigen vectors and Orthogonal Transformation

Eigen values, Eigenvectors 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 forms by Orthogonal Transformation.

UNIT - III Calculus

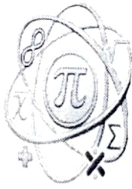
Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem with their geometrical interpretation, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof), Problems and applications on the above theorems.

UNIT - IV Partial differentiation and Applications (Multi variable calculus)

Functions of several variables: Continuity and Differentiability, Partial derivatives, total derivatives, chain rule, Directional derivative, Taylor's and Maclaurin's series expansion of functions of two variables. Jacobians, Functional dependence, maxima and minima of functions of two variables, method of Lagrange multipliers.

UNIT - V Multiple Integrals (Multi variable Calculus)

Double integrals, triple integrals, change of order of integration, change of variables to polar, cylindrical and spherical coordinates. Finding areas (by double integrals) and volumes (by double integrals and triple integrals).



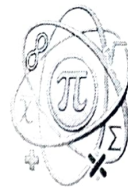
DEPARTMENT OF MATHEMATICS

Textbooks:

1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, 2017, 44th Edition
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10th Edition.

Reference Books:

1. Thomas Calculus, George B. Thomas, Maurice D. Weir and Joel Hass, Pearson Publishers, 2018, 14th Edition.
2. Advanced Engineering Mathematics, R. K. Jain and S. R.K.Iyengar, Alpha Science International Ltd., 2021 5th Edition (9th reprint).
3. Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5th Edition.
4. Advanced Engineering Mathematics, Micheael Greenberg, , Pearson publishers, 9th edition 5. Higher Engineering Mathematics, H. K Das, Er. Rajnish Verma, S. Chand Publications, 2014, Third Edition (Reprint 2021)



DEPARTMENT OF MATHEMATICS

SUB CODE:R231202	I YEAR – II SEMESTER	L	T	P	C
DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS (Common for all branches of Engineering)		3	0	0	3

Course Objectives:

1. To enlighten the learners in the concept of differential equations and multivariable calculus.
2. To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real-world applications

Course Outcomes: At the end of the course, the student will be able to CO1: Solve the differential equations related to various engineering fields.

CO2: Identify solution methods for partial differential equations that model physical processes.

CO3: Interpret the physical meaning of different operators such as gradient, curl and divergence. CO4: Estimate the work done against a field, circulation and flux using vector calculus.

UNIT - I Differential equations of first order and first degree

Linear differential equations - Bernoulli's equations- Exact equations and equations reducible to exact form. Applications: Newton's Law of cooling – Law of natural growth and decay- Electrical circuits.

UNIT - II Linear differential equations of higher order (Constant Coefficients)

Definitions, homogenous and non-homogenous, complimentary function, general solution, particular integral, Wronskian, Method of variation of parameters. Simultaneous linear equations, Applications to L-C-R Circuit problems and Simple Harmonic motion.

UNIT - III Partial Differential Equations

Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order linear equations using Lagrange's method. Homogeneous Linear Partial differential equations with constant coefficients.

UNIT - IV Vector differentiation

Scalar and vector point functions, vector operator Del, Del applies to scalar point functions-Gradient, Directional derivative, del applied to vector point functions- Divergence and Curl, vector identities.

UNIT - V Vector integration

Without integral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and related problems.

Textbooks:

1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, 2017, 44th Edition

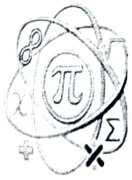


DEPARTMENT OF MATHEMATICS

2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10th Edition.

Reference Books:

1. Thomas Calculus, George B. Thomas, Maurice D. Weir and Joel Hass, Pearson Publishers, 2018, 14th Edition.
2. Advanced Engineering Mathematics, Dennis G. Zill and Warren S. Wright, Jones and Bartlett, 2018.
3. Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5th Edition.
4. Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Alpha Science International Ltd., 2021 5th Edition (9th reprint).
5. Higher Engineering Mathematics, B. V. Ramana, , McGraw Hill Education, 2017



DEPARTMENT OF MATHEMATICS

SUB CODE:MB2414	MBA I YEAR - I SEMESTER	L	T	P	C
QUANTITATIVE ANALYSIS FOR BUSINESS DECISIONS		4	0	0	4

Course Objectives:

- To develop a deeper understanding of meaning and importance of quantitative technique and its applications in managerial decisions.
- Statistical tools like measures of central tendency & measures of variations and apply these tools to real life situations.
- Students have more knowledge about the decision-making concept, process of decision making and different environments like risk, uncertainty and certainty.
- To have knowledge about Sampling and Sampling Distributions-Estimation-Point and Interval Estimates, Concepts of Testing Hypothesis.
- Students would able to understand the concept of ANOVA, Chi-square Test of Independence and Goodness of fitness.

Course Outcomes:

At the end of the course students will be able to:

1. Basic importance and applications of quantitative techniques.
2. Study the various measures and applicability of probability related to the statistics.
3. Justify the several decisions in decision theory.
4. Use and understand the different sampling distribution techniques.
5. Test the hypothesis for choosing best conclusion and inference.

UNIT-I:

Quantitative Techniques: Introduction - Meaning and Definition – Classification of QT - QT and other disciplines – Application of QT in business – Limitations.

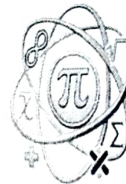
UNIT -II:

Measure of Central Tendency and Dispersions- Arithmetic Mean; Geometric Mean; Harmonic Mean; Median: Mode, Standard Deviation. Simple correlation- Karl Pearson's Coefficient of correlation, Rank correlation. Simple Regression Analysis – Concept of Probability Rules-Joint and Marginal probability-Bayes' Theorem-Probability Distributions - Binominal, Poisson, Normal & Exponential Probability Distributions.

UNIT- III:

Introduction of Decision Theory: Steps involved in decision making, different Environments in which decisions are made, Criteria for decision making, Decision making under uncertainty, Decision making under conditions of Risk-Utility and decision criterion, Decision trees, Graphic displays of the decision-making process, Decision making with an active opponent.

UNIT- IV:



DEPARTMENT OF MATHEMATICS

Concept of Estimation and Sampling: Inferential Analysis-Point Estimates and Interval Estimates of Averages and Proportions of small and large samples. Sampling –Meaning, Steps in Sampling Process-Sample Size- Probability and non- probability sampling techniques, Errors in sampling. Tests of significance- Types- Hypothesis Types- Hypothesis testing and Confidence Intervals. Parametric Tests for means, Proportions, Variance and Paired Observations.

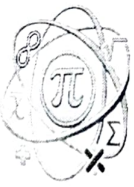
UNIT- V:

Analysis of Variance (ANOVA): One-way and Two Way ANOVA, Non-Parametric tests- Chi-Square- Test of Independence, Test of Goodness of Fit.

Relevant cases have to be in each unit and in examination case is compulsory for every unit

References:

1. N.D. Vohra "Quantitative Techniques in Management", TataMcGraw Hill Private Limited, New Delhi, 2011.
2. Gupta S.P "Statistical Methods", S. Chand and Sons, New Delhi.
3. Anand Sharma "Quantitative Techniques for Business decision Making Himalaya Publishers, New Delhi, 2012.
4. D.P. Apte "Operation Research and Quantitative Techniques", Excel Publications, New Delhi, 2013.
5. Hamdy, A. Taha "Operation Research. An Introduction", Prentice Hall of India, New Delhi, 2003.
6. Anderson "Quantitative Methods for Business", Cengage Learning, New Delhi, 2013.



DEPARTMENT OF MATHEMATICS

SUB CODE:DS15803	M. Tech I YEAR - I SEMESTER(CSE)	L	T	P	C
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE		3	1	0	4

Course Outcomes: At the end of the course, student will be able to

CO1 To apply the basic rules and theorems of probability theory such as Baye's Theorem, to determine probabilities that help to solve engineering problems and to determine the expectation and variance of a random variable from its distribution

CO2 Able to perform and analyze of sampling, means, proportions, variances and estimates the maximum likelihood based on population parameters

CO3 To learn how to formulate and test hypotheses about sample means, variances and proportions and to draw conclusions based on the results of statistical tests

UNIT - 1 Basic Probability and Random Variables:

Random Experiments, Sample Spaces Events, the Concept of Probability the Axioms of Probability, Some Important Theorems on Probability Assignment of Probabilities, Conditional Probability Theorems on Conditional Probability, Independent Events, Bayes Theorem or Rule. Random Variables, Discrete Probability Distributions, Distribution Functions for Random Variables, Distribution Functions for Discrete Random Variables, Continuous Random Variables

UNIT - 2 Sampling and Estimation Theory:

Population and Sample, Statistical Inference Sampling with and Without Replacement Random Samples, Random Numbers Population Parameters Sample Statistics Sampling Distributions, Frequency Distributions, Relative Frequency Distributions, Computation of Mean, Variance, and Moments for Grouped Data. Unbiased Estimates and Efficient Estimates Point Estimates and Interval Estimates. Reliability Confidence Interval Estimates of Population Parameters, Maximum Likelihood Estimates

UNIT - 3 Tests of Hypothesis and Significance:

Statistical Decisions Statistical Hypotheses. Null Hypotheses Tests of Hypotheses and Significance Type I and Type II Errors Level of Significance Tests Involving the Normal Distribution One-Tailed and Two- Tailed Tests P Value Special Tests of Significance for Large Samples Special Tests of Significance for Small Samples Relationship between Estimation Theory and Hypothesis Testing Operating Characteristic Curves. Power of a Test Quality Control Charts Fitting Theoretical Distributions to Sample Frequency Distributions, The Chi-Square Test for Goodness of Fit Contingency Tables Yates' Correction for Continuity Coefficient of Contingency.)

UNIT - 4 Algebraic Structures and Number Theory:

Algebraic Systems, Examples, General Properties, Semi Groups and Monoids, Homomorphism of Semi Groups and Monoids, Group, Subgroup, Abelian Group, Homomorphism, Properties of Integers. Division Theorem, The Greatest



DEPARTMENT OF MATHEMATICS

Common Divisor, Euclidean Algorithm, Least Common Multiple, Testing for Prime Numbers, The Fundamental Theorem of Arithmetic, Modular Arithmetic (Fermat's Theorem and Euler's Theorem)

UNIT - 5 Graph Theory:

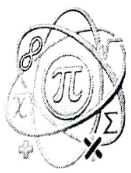
Basic Concepts of Graphs, Sub graphs, Matrix Representation of Graphs: Adjacency Matrices, Incidence Matrices, Isomorphic Graphs, Paths and Circuits, Eulerian and Hamiltonian Graphs, Multigraph's, Planar Graphs, Euler's Formula, Graph Colouring and Covering, Chromatic Number, Spanning Trees, Algorithms for Spanning Trees (Problems Only and Theorems without Proofs).

Text Books:

1. Foundation Mathematics for Computer Science, 1st edition, John Vince, Springer, 2015
2. Probability & Statistics, 3rd Edition, Murray R. Spiegel, John J. Schiller and R. Alu Srinivasan, Schaum's Outline Series, Tata McGraw-Hill Publishers, 2018
3. Probability and Statistics with Reliability, 2nd edition, K. Trivedi, Wiley, 2011
4. Discrete Mathematics and its Applications with Combinatorics and Graph Theory, 7th Edition, H. Rosen, Tata McGraw Hill, 2003

Reference Books:

1. Probability and Computing: Randomized Algorithms and Probabilistic Analysis, 1st edition, M. Mitzenmacher and E. Upfal, 2005
2. Applied Combinatorics, 6th edition, Alan Tucker, Wiley, 2012



DEPARTMENT OF MATHEMATICS

SUB CODE:D2513801	M. Tech I YEAR - I SEMESTER(ECE)	L	T	P	C
MATHEMATICAL FOUNDATIONS FOR COMMUNICATION ENGINEERING		3	1	0	4

COURSE OBJECTIVES:

1. Understand foundational concepts of probability, sampling distributions, estimation, and hypothesis testing for statistical data analysis.
2. Develop analytical skills to handle random processes and Markov chains essential in stochastic modelling and simulation.
3. Acquire computational techniques for solving numerical problems involving interpolation, root finding, ODEs, and eigenvalue problems.
4. Explore mathematical optimization through multivariable calculus, constrained optimization techniques, and numerical methods.
5. Introduce wavelet transform concepts and their application to multi-resolution analysis in data and signal processing.

COURSE OUTCOMES

By the end of this course, students will be able to:

Apply statistical methods including point estimation, confidence intervals, and hypothesis testing to real-world data scenarios.

1. Model and analyze stochastic systems using random processes, random walks, and Markov chains.
2. Solve engineering and scientific problems using numerical techniques such as Newton- Raphson, interpolation methods, and Runge-Kutta for differential equations.
3. Perform optimization tasks with or without constraints using gradient-based techniques and understand the role of Lagrange multipliers.
4. Use wavelet transforms to analyze signals and data with applications in compression and resolution enhancement.

UNIT- I: Probability and Statistics:

Sampling distributions, Estimation of parameters (point estimation – unbiasedness & minimum variance, basics of interval estimation – confidence interval for mean), Testing of hypotheses (one and two sample tests for mean), Linear regression, Introduction to non-linear regression.

UNIT - II: Stochastic process:

Random processes, Random Walk, Markov process with special emphasis on Markov chain

UNIT-III: Numerical Analysis:



DEPARTMENT OF MATHEMATICS

Introduction to Interpolation formulae [Bessel's & Sterling's], Roots of transcendental equations [Bisection, Regula-Falsi & Newton-Raphson] Solutions of simultaneous non-linear equations [Newton's method], Numerical solution of Ordinary Differential equation [Modified Euler's method, fourth order Runge-Kutta method], Matrix Eigen value and Eigen vector problems.

UNIT- IV: Optimization Technique:

Calculus of several variables, Implicit function theorem, Nature of singular points, Necessary and sufficient conditions for optimization, Constrained Optimization, Lagrange multipliers, Gradient method – steepest descent method.

UNIT- V: Wave let Transform:

Resolution problems, Multi-resolution analysis, Continuous & discrete wavelet transform

TEXT BOOKS:

1. A. Papoulis and S. Unnikrishnan Pillai, "Probability, Random Variables and Stochastic Processes," Fourth Edition, McGraw Hill. (Indian Edition is available).
2. Gilbert Strang, "Linear Algebra and its applications", Thomson Learning Inc, 4th Edition.

REFERENCE BOOKS:

1. H.Stark and J. Woods, 'Probability and Random Processes with Applications to Signal Processing,' Third Edition, Pearson Education. (Indian Edition is available).
2. Steven M. Kay, "Intuitive Probability and Random Process using MATLAB", Springer Publications.
3. Todd K Moon, Wynn C. Stirling "Mathematical Methods and Algorithms for Signal Processing, Prentice Hall.