PVP SIDDHARTHA INSTITUTE OF TECHNOLOGY, Kanuru

2/4 B.Tech. THIRD SEMESTER

CE3T1   MATHEMATICAL METHODS   Credits: 3

Lecture: 3 periods/week   Internal assessment: 30
marks Tutorial: 1 period /week   Semester end examination: 70 marks

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Course Objectives:

- To introduce the fundamental concepts in Mathematics.

- To solve logic, set theory, counting methods, probability and statistics.

Course Outcomes:

At the end of the course student will be able to
1. Determine approximate root of algebraic and transcendental equations
2. Apply different interpolating methods to calculate value of interpolating polynomial at given point. Evaluate integrals making use quadrature formulae, obtain derivative at given point of the interpolating polynomial .
3. Solve ordinary differential equations with given initial condition by Taylor's , picard's, Euler's methods
4. Demonstrate basic principles of probability, and sample spaces, Baye's theorem, random variables and their distributions.
5. Comprehend the concept of population and sampling and able to determine mean, variance of sampling distribution of means. Also calculate point and interval estimations of means, proportions.
6. Analyze null hypothesis of parameters corresponding to mean, proportion for large and small samples.

UNIT – I SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS:
Introduction – The Bisection Method – The Method of False Position – The Iteration Method – NewtonRaphson Method.

UNIT-II INTERPOLATION: Introduction- Errors in Polynomial Interpolation – Finite differences Forward Differences- Backward differences –Central differences –Symbolic relations and separation of symbols-Differences of a polynomial-Newton's formulae for interpolation – Interpolation with unevenly spaced points - Lagrange's Interpolation formula.

UNIT – III NUMERICAL DIFFERENTIATION AND INTEGRATION:
Differentiation using finite differences - Trapezoidal rule – Simpson's 1/3 Rule – Simpson's 3/8 Rule.

UNIT – IV NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method-RungeKutta Methods –Predictor-Corrector Methods-Milne's Method.

UNIT-V PROBABILITY: Sample space and events – Probability – The axioms of probability – Some Elementary theorems - Conditional probability – Baye's theorem. Random variables – Discrete and continuous distributions - Distribution function.

UNIT-VI Binomial, Poisson, normal distribution – related properties.,

UNIT-VII POPULATION AND SAMPLES: Sampling distribution of mean (with known and unknown variance), proportion, variances. - Sampling distribution of sums and differences. Point and interval estimators for means, variances, proportions.

UNIT-VIII STATISTICAL HYPOTHESIS: Errors of Type I and Type II errors and calculation. One tail, two-tail tests. Testing hypothesis concerning means, proportions and their differences using z-test, t-test.

Learning resources

Text books:

1. Textbook on Mathematical Methods by Ravindranath, V. and Vijayalaxmi, P.A., Himalaya Publishing House, 2010.

2. Higher Engineering Mathematics, (42ndedition) by Grewal, B.S., Khanna Publishers, 2012.

3. Probability & Statistics for Engineers, (7th edition) by Johnson Richard, Miller and Freunds, Prentice Hall of India, 2005. 4. Probability & Statistics by Murugeson, D.K. and Guru Swamy. P., Anuradha Publishers, 2012.

Reference books:

1. Mathematical Methods by Iyengar, T.K.V., S. Chand Limited, 2007.

2. Numerical Methods by Chand, S. and Armugam, S., SCITECH Publications, 2011.

3. Probability and Statistics by Chand, S. and Armugam, S., Ridge Publications, 2012.