



# SWARNANDHRA

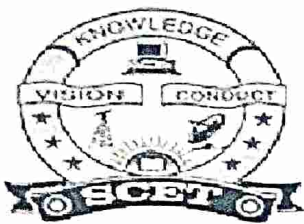
## COLLEGE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

Accredited by National Board of Accreditation, AICTE, New Delhi, Accredited by NAAC with "A" Grade – 3.32 CGPA, Recognized under 2(f) & 12(B) of UGC Act 1956, Approved by AICTE, New Delhi, Permanent Affiliation to JNTUK, Kakinada Seetharampuram, W.G.DT., Narsapur-534280, (Andhra Pradesh)

### DEPARTMENT OF S&H

| Course Code                                                                    | Course Title                                                                                                             | Semester                                                   | Branches                                        | Contact Periods /Week          | Academic Year | Date of commencement of Semester                |
|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|-------------------------------------------------|--------------------------------|---------------|-------------------------------------------------|
| 23BS4T04                                                                       | Probability and Statistics                                                                                               | IV                                                         | CSE,AI ML,IT,CSE-(BS)                           | 60/6                           | 2025-26       | 10 -12-2025                                     |
| <b>COURSE OUTCOMES:</b> At the end of this course, the student will be able to |                                                                                                                          |                                                            |                                                 |                                |               |                                                 |
| CO1                                                                            | Classify the concepts of data science and its importance (K2)                                                            |                                                            |                                                 |                                |               |                                                 |
| CO2                                                                            | Apply discrete and continuous probability distributions (K3)                                                             |                                                            |                                                 |                                |               |                                                 |
| CO3                                                                            | Apply Sampling Distribution and estimate the population parameters. (K3)                                                 |                                                            |                                                 |                                |               |                                                 |
| CO4                                                                            | Examine the statistical inferential methods based on small and large sampling tests (K3)                                 |                                                            |                                                 |                                |               |                                                 |
| CO5                                                                            | Use correlation methods and principle of least squares, regression lines (K3)                                            |                                                            |                                                 |                                |               |                                                 |
| UNIT                                                                           | Out Comes / Bloom's Level                                                                                                | Topic No.                                                  | Topics/Activity                                 | Text Book/ Reference           | Contact Hour  | Delivery Method                                 |
| I                                                                              | CO1: At the end of this course, the student will be able to classify the concepts of data science and its importance(K2) | <b>Descriptive statistics and methods for data science</b> |                                                 |                                |               |                                                 |
|                                                                                |                                                                                                                          | 1.1                                                        | Introduction – Data Science - Statistics        | T <sub>1</sub> &T <sub>2</sub> | 1             | Chalk & Talk, Active learning ,PPT and Tutorial |
|                                                                                |                                                                                                                          | 1.2                                                        | Population vs Sample                            | T <sub>1</sub> &T <sub>2</sub> | 1             |                                                 |
|                                                                                |                                                                                                                          | 1.3                                                        | Collection of data (primary and secondary data) | T <sub>1</sub> &T <sub>2</sub> | 1             |                                                 |
|                                                                                |                                                                                                                          |                                                            |                                                 |                                | 1             |                                                 |
|                                                                                |                                                                                                                          | 1.4                                                        | Types of variable: dependent and independent    | T <sub>1</sub> &T <sub>2</sub> | 1             |                                                 |
|                                                                                |                                                                                                                          | 1.5                                                        | Continuous variables                            | T <sub>1</sub> &T <sub>2</sub> | 1             |                                                 |
|                                                                                |                                                                                                                          | 1.6                                                        | Data visualization                              | T <sub>1</sub> &T <sub>2</sub> | 1             |                                                 |
|                                                                                |                                                                                                                          |                                                            |                                                 |                                | 1             |                                                 |
|                                                                                |                                                                                                                          | 1.7                                                        | Measures of Central tendency                    | T <sub>1</sub> &T <sub>2</sub> | 1             |                                                 |
|                                                                                |                                                                                                                          | 1.8                                                        | Measures of Variability                         | T <sub>1</sub> &T <sub>2</sub> | 1             |                                                 |
|                                                                                |                                                                                                                          | 1.9                                                        | Skewness                                        | T <sub>1</sub> &T <sub>2</sub> | 1             |                                                 |
|                                                                                |                                                                                                                          | 1.10                                                       | Kurtosis                                        | T <sub>1</sub> &T <sub>2</sub> | 1             |                                                 |
|                                                                                |                                                                                                                          |                                                            |                                                 |                                | 14            |                                                 |



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|      |                                                                                                                                      |                                |                                                                                               |                                |   |                                                 |
|------|--------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-----------------------------------------------------------------------------------------------|--------------------------------|---|-------------------------------------------------|
|      |                                                                                                                                      |                                |                                                                                               |                                |   |                                                 |
| II   | CO2: At the end of this course, the student will be able to apply discrete and continuous probability distributions (K3)             | Probability and Distributions  |                                                                                               |                                |   | Chalk & Talk, Active learning ,PPT and Tutorial |
|      |                                                                                                                                      | 2.1                            | Introduction - Probability                                                                    | T <sub>1</sub> &T <sub>2</sub> | 1 |                                                 |
|      |                                                                                                                                      | 2.2                            | Conditional probability                                                                       | T <sub>1</sub> &T <sub>2</sub> | 1 |                                                 |
|      |                                                                                                                                      | 2.3                            | Baye's theorem                                                                                | T <sub>1</sub> &T <sub>2</sub> | 1 |                                                 |
|      |                                                                                                                                      |                                |                                                                                               |                                | 1 |                                                 |
|      |                                                                                                                                      | 2.4                            | Random variables – Discrete random variables                                                  | T <sub>1</sub> &T <sub>2</sub> | 1 |                                                 |
|      |                                                                                                                                      | 2.5                            | Continuous random variables                                                                   | T <sub>1</sub> &T <sub>2</sub> | 1 |                                                 |
|      |                                                                                                                                      | 2.6                            | Probability mass function, Probability density function and Cumulative distribution functions | T <sub>1</sub> &T <sub>2</sub> | 1 |                                                 |
|      |                                                                                                                                      | 2.7                            | Mathematical Expectation and Variance                                                         | T <sub>1</sub> &T <sub>2</sub> | 1 |                                                 |
|      |                                                                                                                                      | 2.8                            | Binomial distributions                                                                        | T <sub>1</sub> &T <sub>2</sub> | 1 |                                                 |
|      |                                                                                                                                      |                                |                                                                                               |                                | 1 |                                                 |
|      |                                                                                                                                      | 2.9                            | Poisson distributions                                                                         | T <sub>1</sub> &T <sub>2</sub> | 1 |                                                 |
| 1    |                                                                                                                                      |                                |                                                                                               |                                |   |                                                 |
| 2.10 | Uniform distributions                                                                                                                | T <sub>1</sub> &T <sub>2</sub> | 1                                                                                             |                                |   |                                                 |
| 2.11 | Normal distributions                                                                                                                 | T <sub>1</sub> &T <sub>2</sub> | 1                                                                                             |                                |   |                                                 |
|      |                                                                                                                                      | T <sub>1</sub> &T <sub>2</sub> | 1                                                                                             |                                |   |                                                 |
|      |                                                                                                                                      |                                |                                                                                               | 15                             |   |                                                 |
| III  | CO3: At the end of this course, the student will be able to apply Sampling Distribution and estimate the population parameters. (K3) | Sampling Theory                |                                                                                               |                                |   |                                                 |
|      |                                                                                                                                      | 3.1                            | Introduction–Population and Samples                                                           | T <sub>1</sub> &T <sub>2</sub> | 1 |                                                 |
|      |                                                                                                                                      | 3.2                            | Sampling distribution of Means and Variance (definition only)                                 | T <sub>1</sub> &T <sub>2</sub> | 1 |                                                 |
|      |                                                                                                                                      |                                |                                                                                               | T <sub>1</sub> &T <sub>2</sub> | 1 |                                                 |
|      |                                                                                                                                      | 3.3                            | Point and Interval estimations                                                                | T <sub>1</sub> &T <sub>2</sub> | 1 |                                                 |
|      |                                                                                                                                      | 3.4                            | Maximum error of estimate                                                                     | T <sub>1</sub> &T <sub>2</sub> | 1 |                                                 |
|      |                                                                                                                                      | 3.5                            | Central Limit theorem (without proof)                                                         | T <sub>1</sub> &T <sub>2</sub> | 1 |                                                 |



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|    |                                                                                                                                                      |                                   |                                                                   |               |           |                                                 |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------------------------------------------------------------|---------------|-----------|-------------------------------------------------|
|    |                                                                                                                                                      | 3.6                               | Estimation using $t$ , and F- distributions                       | $T_1$ & $T_2$ | 1         | Chalk & Talk, Active learning ,PPT and Tutorial |
|    |                                                                                                                                                      |                                   |                                                                   |               | 7         |                                                 |
|    |                                                                                                                                                      | <b>Tests of Hypothesis</b>        |                                                                   |               |           |                                                 |
| IV | CO4: At the end of this course, the student will be able to examine the statistical inferential methods based on small and large sampling tests (K3) | 4.1                               | Introduction–Hypothesis– Null and Alternative Hypothesis          | $T_1$ & $T_2$ | 1         | Chalk & Talk, Active learning ,PPT and Tutorial |
|    |                                                                                                                                                      | 4.2                               | Type I and Type II errors– Level of significance                  | $T_1$ & $T_2$ | 1         |                                                 |
|    |                                                                                                                                                      | 4.3                               | Test of significance for large samples- Single mean               | $T_1$ & $T_2$ | 1         |                                                 |
|    |                                                                                                                                                      |                                   |                                                                   | $T_1$ & $T_2$ | 1         |                                                 |
|    |                                                                                                                                                      | 4.4                               | Test of significance for large samples- difference of means       | $T_1$ & $T_2$ | 1         |                                                 |
|    |                                                                                                                                                      |                                   |                                                                   | $T_1$ & $T_2$ | 1         |                                                 |
|    |                                                                                                                                                      | 4.5                               | Test of significance for large samples- Single proportion         | $T_1$ & $T_2$ | 1         |                                                 |
|    |                                                                                                                                                      |                                   |                                                                   | $T_1$ & $T_2$ | 1         |                                                 |
|    |                                                                                                                                                      | 4.6                               | Test of significance for large samples- difference of proportions | $T_1$ & $T_2$ | 1         |                                                 |
|    |                                                                                                                                                      | 4.7                               | Test of significance for small samples- Student's t- test         | $T_1$ & $T_2$ | 1         |                                                 |
|    |                                                                                                                                                      | 4.8                               | Test of significance for small samples- F-test                    | $T_1$ & $T_2$ | 1         |                                                 |
|    |                                                                                                                                                      | 4.9                               | Test of significance for small samples- $\chi^2$ - test           | $T_1$ & $T_2$ | 1         |                                                 |
|    |                                                                                                                                                      | <b>Total</b>                      |                                                                   |               | <b>12</b> |                                                 |
|    |                                                                                                                                                      | <b>Correlation and Regression</b> |                                                                   |               |           |                                                 |
| V  | CO5: At the end of this course, the student will be able to Use correlation methods and principle of least squares, regression lines (K3)            | 5.1                               | Correlation – Correlation coefficient                             | $T_1$ & $T_2$ | 1         |                                                 |
|    |                                                                                                                                                      |                                   |                                                                   | $T_1$ & $T_2$ | 1         |                                                 |
|    |                                                                                                                                                      | 5.2                               | Rank correlation.                                                 | $T_1$ & $T_2$ | 1         |                                                 |
|    |                                                                                                                                                      |                                   |                                                                   | $T_1$ & $T_2$ | 1         |                                                 |
|    |                                                                                                                                                      | 5.3                               | Linear Regression: Straight line                                  | $T_1$ & $T_2$ | 1         |                                                 |
|    |                                                                                                                                                      | 5.4                               | Multiple Linear Regression                                        | $T_1$ & $T_2$ | 1         |                                                 |
|    |                                                                                                                                                      |                                   |                                                                   | $T_1$ & $T_2$ | 1         |                                                 |



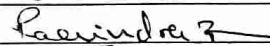
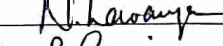
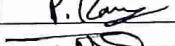
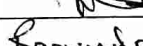
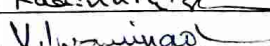
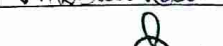
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|                             |                                                                                                                                          |     |                                        |                                |    |                                                 |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-----|----------------------------------------|--------------------------------|----|-------------------------------------------------|
|                             |                                                                                                                                          | 5.6 | Regression coefficients and properties | T <sub>1</sub> &T <sub>2</sub> | 1  | Chalk & Talk, Active learning ,PPT and Tutorial |
|                             |                                                                                                                                          | 5.7 | Curvilinear Regression: Parabola       | T <sub>1</sub> &T <sub>2</sub> | 1  |                                                 |
|                             |                                                                                                                                          | 5.8 | Exponential                            | T <sub>1</sub> &T <sub>2</sub> | 1  |                                                 |
|                             |                                                                                                                                          | 5.9 | Power curves                           | T <sub>1</sub> &T <sub>2</sub> | 1  |                                                 |
|                             |                                                                                                                                          |     |                                        | T <sub>1</sub> &T <sub>2</sub> | 1  |                                                 |
|                             |                                                                                                                                          |     |                                        | Total                          | 12 |                                                 |
| Cumulative Proposed Periods |                                                                                                                                          |     |                                        |                                | 60 |                                                 |
| Text Books:                 |                                                                                                                                          |     |                                        |                                |    |                                                 |
| S.No.                       | AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION                                                                             |     |                                        |                                |    |                                                 |
| T1                          | Miller and Freund's, Probability and Statistics for Engineers,7/e,Pearson,2008.                                                          |     |                                        |                                |    |                                                 |
| T2                          | S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics,11/e, Sultan Chand & Sons Publications, 2012                         |     |                                        |                                |    |                                                 |
| Reference Books:            |                                                                                                                                          |     |                                        |                                |    |                                                 |
| S.No.                       | AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION                                                                             |     |                                        |                                |    |                                                 |
| R1                          | Shron L. Myers, KeyingYe, Ronald E Walpole, Probability and Statistics Engineers and the Scientists,8 <sup>th</sup> Edition,Pearson2007. |     |                                        |                                |    |                                                 |
| Web Details                 |                                                                                                                                          |     |                                        |                                |    |                                                 |
| 1                           | <a href="https://youtu.be/RJLqVy8qdSM">https://youtu.be/RJLqVy8qdSM</a>                                                                  |     |                                        |                                |    |                                                 |
| 2                           | <a href="https://youtu.be/mBCiKUzwdMs">https://youtu.be/mBCiKUzwdMs</a>                                                                  |     |                                        |                                |    |                                                 |
| 3                           | <a href="https://youtu.be/WkDxhfxLf-M">https://youtu.be/WkDxhfxLf-M</a>                                                                  |     |                                        |                                |    |                                                 |
| 4                           | <a href="https://youtu.be/Ig3pCE_B12E">https://youtu.be/Ig3pCE_B12E</a>                                                                  |     |                                        |                                |    |                                                 |

|       |                       | Name                  | Signature with Date                                                                   |
|-------|-----------------------|-----------------------|---------------------------------------------------------------------------------------|
| i.    | Faculty               | Mr. M. Ravindhra Babu |  |
| ii.   | Faculty               | Mr T.V.Lakshmana Rao  |  |
| iii.  | Faculty               | Mrs. R. V. Lakshmi    |  |
| iv.   | Faculty               | Ms. N. Lavanya        |  |
| v.    | Faculty               | Ms.P.Esther Rani      |  |
| vi.   | Course Coordinator    | Mr T.V.Lakshmana Rao  |  |
| vii.  | Module Coordinator    | Mr. M. Ravindhra Babu |  |
| viii. | Programme Coordinator | Dr. V. Swaminadham    |  |

  
Principal