

## B. TECH.SECONDYEAR(3<sup>rd</sup> semester)- Data Science/AI/AIML

<b>Course code</b>		
<b>Course title</b>	<b>Statistics and Probability</b>	
<b>Course objective:</b> The objective of this course is to familiarize the engineers with concept of Statistical techniques, probability distribution, hypothesis testing and ANOVA and numerical aptitude. It aims to show case the students with standard concepts and tools from B. Tech to deal with advanced level of mathematics and applications that would be essential for their disciplines.		
<b>Pre-requisites:</b> Knowledge of Mathematics I and II of B. Tech or equivalent		
<b>Course Contents / Syllabus</b>		
<b>UNIT-I</b>	<b>Descriptive measures</b>	<b>10</b>
Measures of central tendency – mean, median, mode, measures of dispersion – mean deviation, standard deviation, quartile deviation, variance, Moment, Skewness and kurtosis, least squares principles of curve fitting, Covariance ,Correlation and Regression analysis, Correlation coefficient: Karl Pearson coefficient, rank correlation coefficient, uni-variate and multivariate linear regression, application of regression analysis, Logistic Regression, time series analysis- Trend analysis (Least square method).		
<b>UNIT-II</b>	<b>Probability and Random variable</b>	<b>8</b>
Probability Definition, The Law of Addition, Multiplication and Conditional Probability, Bayes' Theorem, Random variables: discrete and continuous, probability mass function, density function, distribution function, Mathematical expectation, mean, variance. Moment generating function, characteristic function, Two dimensional random variables: probability mass function, density function,		
<b>UNIT-III</b>	<b>Probability distribution</b>	<b>8</b>
Probability Distribution (Continuous and discrete- Normal, Exponential, Binomial, Poisson distribution), Central Limit theorem		
<b>UNIT-IV</b>	<b>Test of Hypothesis &amp; Statistical Inference</b>	<b>8</b>
Sampling and population, uni-variate and bi-variate sampling, re-sampling, errors in sampling, Sampling distributions, Hypothesis testing- p value, z test, t test (For mean), Confidence intervals, F test; Chi-square test, ANOVA: One way ANOVA, Statistical Inference, Parameter estimation, Least square estimation method, Maximum Likelihood estimation.		
<b>UNIT-V</b>	<b>Aptitude-III</b>	<b>8</b>
Time & Work, Pipe & Cistern, Time, Speed & Distance, Boat & Stream, Sitting Arrangement, Clock & Calendar.		
<b>Course outcome:</b>		
CO 1	Understand the concept of moments, skewness, kurtosis, correlation, curve fitting and regression analysis.	K <sub>1</sub> , K <sub>3</sub>
CO 2	Understand the concept of Probability and Random variables.	K <sub>1</sub> , K <sub>3</sub>

CO 3	Remember the concept of probability to evaluate probability distributions	K <sub>3</sub> , K <sub>4</sub>
CO 4	Apply the concept of hypothesis testing and estimation of parameter.	K <sub>2</sub>
CO 5	Solve the problems of Time & Work, Pipe & Cistern, Time, Speed & Distance, Boat & Stream, Sitting Arrangement, Clock & Calendar.	K <sub>3</sub>

### Text books

- (1) P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003(Reprint)
- (2) S. Ross: A First Course in Probability, 6th Ed., Pearson Education India, 2002
- (3) W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968.

### Reference Books

- (1) B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
- (2) T.Veerarajan : Engineering Mathematics (for semester III), Tata McGraw-Hill, New Delhi
- (3) R.K. Jain and S.R.K. Iyenger: Advance Engineering Mathematics; Narosa Publishing House, New Delhi.
- (4) J.N. Kapur: Mathematical Statistics; S. Chand & Sons Company Limited, New Delhi.
- (5) D.N.Elhance, V. Elhance & B.M. Aggarwal: Fundamentals of Statistics; KitabMahal Distributers, New Delhi.

### Link:

<b>Unit 1</b>	<a href="https://youtu.be/wWenULjri40">https://youtu.be/wWenULjri40</a> <a href="https://youtu.be/mL9-WX7wLAo">https://youtu.be/mL9-WX7wLAo</a> <a href="https://youtu.be/nPsfqz9EljY">https://youtu.be/nPsfqz9EljY</a> <a href="https://youtu.be/nqPS29IvnHk">https://youtu.be/nqPS29IvnHk</a> <a href="https://youtu.be/aaQXMbpbNKw">https://youtu.be/aaQXMbpbNKw</a> <a href="https://youtu.be/wDXMYRPup0Y">https://youtu.be/wDXMYRPup0Y</a> <a href="https://youtu.be/m9a6rg0tNSM">https://youtu.be/m9a6rg0tNSM</a> <a href="https://youtu.be/Qy1YAKZDA7k">https://youtu.be/Qy1YAKZDA7k</a> <a href="https://youtu.be/Qy1YAKZDA7k">https://youtu.be/Qy1YAKZDA7k</a> <a href="https://youtu.be/s94k4H6AE54">https://youtu.be/s94k4H6AE54</a> <a href="https://youtu.be/lBB4stn3exM">https://youtu.be/lBB4stn3exM</a> <a href="https://youtu.be/0WejW9MiTGg">https://youtu.be/0WejW9MiTGg</a> <a href="https://youtu.be/QAEZOHE13Wg">https://youtu.be/QAEZOHE13Wg</a> <a href="https://youtu.be/ddYNq1TtM0">https://youtu.be/ddYNq1TtM0</a> <a href="https://youtu.be/YciBHHeswBM">https://youtu.be/YciBHHeswBM</a> <a href="https://youtu.be/VCJdg7YBbAQ">https://youtu.be/VCJdg7YBbAQ</a> <a href="https://youtu.be/VCJdg7YBbAQ">https://youtu.be/VCJdg7YBbAQ</a> <a href="https://youtu.be/yhzJxftDgms">https://youtu.be/yhzJxftDgms</a>
<b>Unit 2</b>	<a href="https://youtu.be/bhp4nVqA9o">https://youtu.be/bhp4nVqA9o</a> <a href="https://youtu.be/8sJ9dFj_ydg">https://youtu.be/8sJ9dFj_ydg</a> <a href="https://youtu.be/u_x8zQvWWLk">https://youtu.be/u_x8zQvWWLk</a> <a href="https://youtu.be/3rYYPWN_QS0">https://youtu.be/3rYYPWN_QS0</a> <a href="https://youtu.be/HZGCoVF3YvM">https://youtu.be/HZGCoVF3YvM</a> <a href="https://youtu.be/z4e4E9igjIE">https://youtu.be/z4e4E9igjIE</a> <a href="https://youtu.be/dOr0NKyD31Q">https://youtu.be/dOr0NKyD31Q</a> <a href="https://youtu.be/YXLVjCKVP7U">https://youtu.be/YXLVjCKVP7U</a> <a href="https://youtu.be/l0ecMiNUZu8">https://youtu.be/l0ecMiNUZu8</a> <a href="https://youtu.be/L0zWnBrjhng">https://youtu.be/L0zWnBrjhng</a> <a href="https://youtu.be/cbmFYoePHPk">https://youtu.be/cbmFYoePHPk</a> <a href="https://youtu.be/_DWnI-gk0ys">https://youtu.be/_DWnI-gk0ys</a> <a href="https://youtu.be/d_9KT2abCAY">https://youtu.be/d_9KT2abCAY</a> <a href="https://youtu.be/sSUCwLvmCLg">https://youtu.be/sSUCwLvmCLg</a>

	<a href="https://youtu.be/H2Ji-Q4MfqU">https://youtu.be/H2Ji-Q4MfqU</a> <a href="https://youtu.be/TwN79BuiMM">https://youtu.be/TwN79BuiMM</a> <a href="https://youtu.be/yXsvMlqoiK4">https://youtu.be/yXsvMlqoiK4</a>
<b>Unit 3</b>	<a href="https://youtu.be/gT26Y_VJmOM">https://youtu.be/gT26Y_VJmOM</a> <a href="https://youtu.be/onFv73Btdno">https://youtu.be/onFv73Btdno</a> <a href="https://youtu.be/mYFygtQrDxc">https://youtu.be/mYFygtQrDxc</a> <a href="https://youtu.be/S8YrED3mf5s">https://youtu.be/S8YrED3mf5s</a> <a href="https://youtu.be/z5gongqrMv8">https://youtu.be/z5gongqrMv8</a> <a href="https://youtu.be/4vsGyghhxVg">https://youtu.be/4vsGyghhxVg</a> <a href="https://youtu.be/CW-3qjcw-GA">https://youtu.be/CW-3qjcw-GA</a> <a href="https://youtu.be/RqiqhrZE6Uk">https://youtu.be/RqiqhrZE6Uk</a>
<b>Unit 4</b>	<a href="https://youtu.be/L3wQw0wva3g">https://youtu.be/L3wQw0wva3g</a> <a href="https://youtu.be/n9qpktdFfLU">https://youtu.be/n9qpktdFfLU</a> <a href="https://youtu.be/_Qlxt0HmuOo">https://youtu.be/_Qlxt0HmuOo</a> <a href="https://youtu.be/YSwmpAmLV2s">https://youtu.be/YSwmpAmLV2s</a> <a href="https://youtu.be/KLnGOL_AUgA">https://youtu.be/KLnGOL_AUgA</a> <a href="https://youtu.be/cQp_bJdxjWw">https://youtu.be/cQp_bJdxjWw</a> <a href="https://youtu.be/geB0A7CPGaQ">https://youtu.be/geB0A7CPGaQ</a> <a href="https://youtu.be/zmyh7nCjmsg">https://youtu.be/zmyh7nCjmsg</a> <a href="https://youtu.be/ohquDY3fZqk">https://youtu.be/ohquDY3fZqk</a> <a href="https://youtu.be/izGZLnB-mEo">https://youtu.be/izGZLnB-mEo</a> <a href="https://youtu.be/q48uKU_KWas">https://youtu.be/q48uKU_KWas</a> <a href="https://youtu.be/lZFmFuZGQTK">https://youtu.be/lZFmFuZGQTK</a> <a href="https://youtu.be/iin6vthyzsQ">https://youtu.be/iin6vthyzsQ</a> <a href="https://youtu.be/ysjkkBspbYY">https://youtu.be/ysjkkBspbYY</a> <a href="https://youtu.be/pXjaMY29k1g">https://youtu.be/pXjaMY29k1g</a> <a href="https://youtu.be/pvvoK4rlzqQ">https://youtu.be/pvvoK4rlzqQ</a>
<b>Unit 5</b>	<a href="https://www.youtube.com/playlist?list=PLFqNfk5W2ZuzjUsRqDp1Zj3S8n9yfdmN9">https://www.youtube.com/playlist?list=PLFqNfk5W2ZuzjUsRqDp1Zj3S8n9yfdmN9</a> <a href="https://youtu.be/x3SEYdBUGaA">https://youtu.be/x3SEYdBUGaA</a> <a href="https://youtu.be/B7sMHZj_p18">https://youtu.be/B7sMHZj_p18</a> <a href="https://youtu.be/4HRLswVPOG8">https://youtu.be/4HRLswVPOG8</a> <a href="https://youtu.be/aHEWcn_bPYc">https://youtu.be/aHEWcn_bPYc</a> <a href="https://youtu.be/ePQiVq8WtL8">https://youtu.be/ePQiVq8WtL8</a>