

Following are Computational Statistics NPTEL Courses available on NPTEL Repository

- <https://www.udemy.com/course/introduction-to-bayesian-statistics/> (Free Course)
- <https://www.udacity.com/course/intro-to-statistics--st101#> (Free Course)
- <https://nptel.ac.in/courses/111/105/111105090/>
- <https://nptel.ac.in/courses/111/105/111105077/>
- <https://nptel.ac.in/courses/111/106/111106112/>
- <https://nptel.ac.in/courses/110/107/110107114/>

Online Book:

- <http://file.allitebooks.com/20151204/Foundations%20of%20Statistical%20Algorithms.pdf>
- http://onlinestatbook.com/Online_Statistics_Education.pdf
- <https://upload.wikimedia.org/wikipedia/commons/8/82/Statistics.pdf>
- <http://cnx.org/content/col10522/1.38/pdf>
- <http://www.greenteapress.com/thinkstats/thinkstats.pdf>

<p>Unit I Introduction to Statistics What is statistics, Statistical Data- Categorical, Numerical (Continuous), Univariate and Bivariate Analysis, Mean, Median, Mode, Standard Deviation, Harmonic Mean, Data Visualization-Line, Scatter, Box plots, Histogram, Statistical Thinking. #Exemplar/ Case Studies Know about the great statistician- Ronald Fisher</p>	<ul style="list-style-type: none"> ● https://youtu.be/COI0BUmNHT8, https://youtu.be/qj94mSPrrYY ● https://youtu.be/MDoRpJOntLo, https://youtu.be/sjRg6W2awZs ● https://youtu.be/JuTeCVaIKMU, https://youtu.be/knTzw_WOUd8 ● https://youtu.be/yJcmvRS3wu8, https://youtu.be/J34EomPEwBI ● https://youtu.be/9Bd5ViQZWwg, https://youtu.be/LWEWcaeANq4 ● https://youtu.be/m6ng9y03Vfs, https://youtu.be/E6jNADpaY2Q ● https://youtu.be/kVopC1a2-ok, https://youtu.be/HXaW71yJTLU ● https://youtu.be/QN8Zj6HDSKA, https://youtu.be/EyzPaabQapw ● https://youtu.be/fNUbwISpeow, https://youtu.be/a7WA2wPvNQ4 ● https://youtu.be/508DfzWgwel, https://youtu.be/4jNvWTLeho0 ● https://youtu.be/j3AJgU7Npt4, https://youtu.be/8SsY8M7KI-U ● https://youtu.be/4Rz8cpEw66E, https://youtu.be/Phfr2xCVfjQ ● https://youtu.be/rs0P8wLLDEQ, https://youtu.be/8UY7ow62Wqs ● https://youtu.be/fNUbwISpeow ● Exemplar: https://www.adelaide.edu.au/library/special/mss/fisher/
<p>Unit II Distributions Probability Distributions, Characterizing a Distribution, Discrete Distributions, Normal Distributions, Continuous Distributions Derived from the Normal Distribution, Poisson Distribution, Other Continuous distributions- Lognormal, Weighbull, Exponential, Uniform. #Exemplar/ Case Studies Know about the great statistician and father of Indian statistical institute- Praful Chandra Mahalanobis</p>	<ul style="list-style-type: none"> ● https://youtu.be/nISHLzg3BF4, https://youtu.be/qJ15K6-f-NI ● https://youtu.be/oc32DYy-3CA, https://youtu.be/5TlaMUJKUD4 ● https://youtu.be/9qseNRfphIU, https://youtu.be/ykYKgAdeEMM ● https://youtu.be/d0KEQ-Xn0v4, https://youtu.be/kcE96UWkDOc ● https://youtu.be/2DIOHTCG_BM, https://youtu.be/ondcefRepWw ● https://youtu.be/Gs4pCEVzgFY, https://youtu.be/RB4HydD8k0 ● https://youtu.be/53LQwwQ5SEU, https://youtu.be/nRhrmP2HFHo ● https://youtu.be/NJ-MRghiskw ● Exemplar https://www.britannica.com/biography/P-C-Mahalanobis
<p>Unit III Hypothesis Tests and Statistical Tests Typical Analysis procedures, Hypothesis Concept, Errors, p-Value, and Sample Size, Confusion Matrix, Sensitivity and Specificity, ROC-AUC Curve, Test on Numerical Data- Distribution of a Sample Mean, Comparison of Two Groups, Comparison of Multiple Groups</p>	<ul style="list-style-type: none"> ● https://youtu.be/aKohB8IPueg, https://youtu.be/QIM347p0yPO ● https://youtu.be/PIeRQYQzEOU, https://youtu.be/14PQawp_rjk ● https://youtu.be/TDpYY5x2kbE, https://youtu.be/h6F6G4ZZuiA ● https://youtu.be/LawmUqn_NuQ, https://youtu.be/c5f5VK8ur0k ● https://youtu.be/zY1qFxE7fAA, https://youtu.be/a_1991xUAOU ● https://youtu.be/5FmxxvmlOmFA, https://youtu.be/KTFm7E1NBs ● https://youtu.be/prWyZhcktn4, https://youtu.be/eeM7KPRNIs

<p>#Exemplar/ Case Studies Study brief history of Statistics</p>	<ul style="list-style-type: none"> ● https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2636062/ ● https://youtu.be/OAl6eAyP-yo, https://youtu.be/BGwU4sPG9p0 ● https://youtu.be/DUcXZ08ldMo, https://youtu.be/FXZ2O1Lv-KE ● https://youtu.be/NVcov9TIlfy, ● Exemplar https://www.encyclopedia.com/science/encyclopedias-almanacs-transcripts-and-maps/statistics-history-interpretation-and-application
<p>Unit IV Statistical Methods Standard Deviation, Normalization- Feature Scaling, Min-Max scaling, Bias, Variance, Regularization, Ridge Regression, Lasso Regression, Cross Validation Techniques- K-fold, LOOCV, Stratified K-fold, Grid Search CV, CV Error #Exemplar/ Case Studies Euclid’s Elements</p>	<ul style="list-style-type: none"> ● https://youtu.be/18Rrri7Xrlk, https://youtu.be/MRqtXL2WX2M ● https://youtu.be/pXpZoRIQSL4, https://youtu.be/peyFnD33uXc ● https://youtu.be/L8h2CHh5KJ4, https://youtu.be/viV_53s97Nw ● https://youtu.be/VqKq78PVO9g, https://youtu.be/Q81RR3yKn30 ● https://youtu.be/K8iKkzUDw5I, https://youtu.be/9IRv01HDU0s ● https://youtu.be/gJo0uNL-5Qw, https://youtu.be/NhGI3I6AKpM ● https://youtu.be/fKz-SgScM3Q, https://youtu.be/CgmvAMiVKFE ● https://youtu.be/HdIDYng8g9s ● Exemplar: https://mathcs.clarku.edu/~djoyce/java/elements/elements.html
<p>Unit V Statistical Processing Dimensionality Reduction Techniques- Principal Component Analysis, Discriminant Analysis, Feature Selection- Chi2 square method, Variance Threshold, Recursive Feature Elimination, Outliers detection methods, Resampling-Random, under-sampling and over re-sampling #Exemplar/ Case Studies Study about Anomalies</p>	<ul style="list-style-type: none"> ● https://builtin.com/data-science/step-step-explanation-principal-component-analysis ● https://youtu.be/0vcMaeN9_rg, https://youtu.be/dVvF3Z0rwoo ● https://youtu.be/fMIwIKLGke0, https://youtu.be/gDgEjdzEDY ● https://youtu.be/Z141INzivXU, https://youtu.be/pcZ4YlvhSKU ● https://youtu.be/ZKlJmdmmR28, https://youtu.be/AARy8P2RHtg ● https://youtu.be/3MMaF1UttzA, https://youtu.be/vZDDmULsCUU ● Exemplar: https://youtu.be/12Xq90LdQwQ
<p>Unit VI Statistical Modeling Linear Regression models, Correlation coefficient, Rank Correlation, Residual Error, Mean Square Error, RMSE, Multilinear Regression, Polynomial Features, Gradient Descent, Logistic Regression, Bayesian Statistics, Bayes’ Theorem, Monte Carlo Method #Exemplar/ Case Studies Study Biography of Thomas Bayes</p>	<ul style="list-style-type: none"> ● https://youtu.be/kTwRwq60plw, https://youtu.be/NDgPwrATh8w ● https://youtu.be/O3ju5ooKU7s, https://youtu.be/11c9cs6WpJU ● https://youtu.be/T2xtLW58aJl, https://youtu.be/0WejW9MiTGg ● https://youtu.be/9L7k2nIYQhQ, https://youtu.be/c68JLu1Nfkw ● https://youtu.be/Nwdp3wVxEbM, https://youtu.be/sDv4f4s2SB8 ● https://www.analyticsvidhya.com/blog/2021/07/all-you-need-to-know-about-polynomial-regression/ ● https://youtu.be/zAULhNrnUL4, https://youtu.be/LzZ5b3wdZQk ● https://youtu.be/LzZ5b3wdZQk, https://youtu.be/7ESK5SaP-bc ● Exemplar: https://biostat.jhsph.edu/courses/bio621/misc/bayesbiog.pdf