

E content-Blow up Plan

Course code: **PCL 108** Name of the Course name: **Statistical Methods & Algorithms**

Name of the instructor: **Amrik Sen**

Lecture no.	Contents covered*	Link of the lectures**
1	Introduction to Statistical Methods & Algorithms: syllabus, CLOs, course website.	https://www.youtube.com/watch?v=hkWVbx-TpjAI&feature=youtu.be
2	Axioms of probability, concept of probability distributions for continuous and discrete case, random variable, introduction to conditional probability, Bayes' theorem, laws of total probability and expectation, examples and practical application of conditional probability.	https://www.youtube.com/watch?v=uEO2NGAdykk&list=PLO-6jspot8ALyrofp0fWp0f-Ob19NcFS4V&index=26&t=272s
3	Axioms of probability, concept of probability distributions for continuous and discrete case, random variable, introduction to conditional probability, Bayes' theorem, laws of total probability and expectation, examples and practical application of conditional probability.	https://www.youtube.com/watch?v=uEO2NGAdykk&list=PLO-6jspot8ALyrofp0fWp0f-Ob19NcFS4V&index=26&t=272s
4	Axioms of probability, concept of probability distributions for continuous and discrete case, random variable, introduction to conditional probability, Bayes' theorem, laws of total probability and expectation, examples and practical application of conditional probability.	https://www.youtube.com/watch?v=uEO2NGAdykk&list=PLO-6jspot8ALyrofp0fWp0f-Ob19NcFS4V&index=26&t=272s
5	Examples of discrete probability distributions.	https://www.youtube.com/watch?v=uCXSDT4PdDE&list=PLO-6jspot8ALyrofp0fWp0f-Ob19NcFS4V&index=25&t=0s
6	Examples of discrete probability distributions.	https://www.youtube.com/watch?v=uCXSDT4PdDE&list=PLO-6jspot8ALyrofp0fWp0f-Ob19NcFS4V&index=25&t=0s https://www.youtube.com/watch?v=m5u4h0t4ico&list=PLO-6jspot8ALyrofp0fWp0f-Ob19NcFS4V&index=22&t=0s

7	Examples of continuous probability distributions, joint and marginal distributions.	https://www.youtube.com/watch?v=c4Slalt_QK0&list=PLO-6jspot8ALyrofp0fWp0fOb19NcFS4V&index=24&t=0s
8	Examples of continuous probability distributions, joint and marginal distributions.	https://www.youtube.com/watch?v=c4Slalt_QK0&list=PLO-6jspot8ALyrofp0fWp0fOb19NcFS4V&index=24&t=0s https://www.youtube.com/watch?v=vegK36Z-hvs&list=PLO-6jspot8ALyrofp0fWp0fOb19NcFS4V&index=23&t=5s
9	Probability using CDF and pdf	https://www.youtube.com/watch?v=vegK36Z-hvs&list=PLO-6jspot8ALyrofp0fWp0fOb19NcFS4V&index=23&t=5s
10	Introduction to discrete time Markov chains, Multi- step transition probabilities, examples.	https://www.youtube.com/watch?v=vegK36Z-hvs&list=PLO-6jspot8ALyrofp0fWp0fOb19NcFS4V&index=23&t=5s
11	Introduction to discrete time Markov chains, Multi- step transition probabilities, examples.	https://www.youtube.com/watch?v=vegK36Z-hvs&list=PLO-6jspot8ALyrofp0fWp0fOb19NcFS4V&index=23&t=5s
12	Multi- step transition probabilities, examples.	https://www.youtube.com/watch?v=arxmRnAdLy4&list=PLO-6jspot8ALyrofp0fWp0f-Ob19NcFS4V&index=5&t=0s
13	Multi- step transition probabilities, more examples.	https://www.youtube.com/watch?v=arxmRnAdLy4&list=PLO-6jspot8ALyrofp0fWp0f-Ob19NcFS4V&index=5&t=0s https://www.youtube.com/watch?v=4s_FiYYnF4U&list=PLO-6jspot8ALyrofp0fWp0fOb19NcFS4V&index=4&t=0s
14	Multi- step transition probabilities, more examples.	https://www.youtube.com/watch?v=4s_FiYYnF4U&list=PLO-6jspot8ALyrofp0fWp0fOb19NcFS4V&index=4&t=0s

15	Multi- step transition probabilities, more examples.	https://www.youtube.com/watch?v=XgoClgSEN4c&list=PLO-6jspot8ALyrofp0fWp0fOb19NcFS4V&index=3&t=15s
16	Chapman Kolmogorov equation, long time distribution of states in Markov processes, Stationary distributions, Detailed Balance, examples	https://www.youtube.com/watch?v=zVCB49HYIxM&list=PLO-6jspot8ALyrofp0fWp0f-Ob19NcFS4V&index=2&t=0s
17	Stationary distributions, Detailed Balance, examples	https://www.youtube.com/watch?v=zVCB49HYIxM&list=PLO-6jspot8ALyrofp0fWp0f-Ob19NcFS4V&index=2&t=0s
18	Advanced concepts of Markov Chains: Hitting probabilities and return/exit times	https://youtu.be/zyKUubTLHEE
19	Introduction to sampling distributions, chi-square, t and F distributions	https://www.youtube.com/watch?v=CdI4ahGJG58&list=PLO-6jspot8ALyrofp0fWp0f-Ob19NcFS4V&index=21&t=0s
20	Introduction to sampling distributions, chi-square, t and F distributions	https://www.youtube.com/watch?v=CdI4ahGJG58&list=PLO-6jspot8ALyrofp0fWp0f-Ob19NcFS4V&index=21&t=0s
21	introduction to hypothesis testing, level of significance, p-value and power of tests	https://www.youtube.com/watch?v=W5RWqqAV_iY&list=PLO-6jspot8ALyrofp0fWp0f-Ob19NcFS4V&index=19&t=0s
22	introduction to hypothesis testing, level of significance, p-value and power of tests	https://www.youtube.com/watch?v=W5RWqqAV_iY&list=PLO-6jspot8ALyrofp0fWp0f-Ob19NcFS4V&index=19&t=0s
23	introduction to hypothesis testing, level of significance, p-value and power of tests	https://www.youtube.com/watch?v=W5RWqqAV_iY&list=PLO-6jspot8ALyrofp0fWp0f-Ob19NcFS4V&index=19&t=0s

24	two sample tests for means using t- distributions	https://www.youtube.com/watch?v=Js60WOk5w9E&list=PLO-6jspot8ALyrofp0fWp0f-Ob19NcFS4V&index=18&t=0s
25	two sample tests for means using t- distributions	https://www.youtube.com/watch?v=Js60WOk5w9E&list=PLO-6jspot8ALyrofp0fWp0f-Ob19NcFS4V&index=18&t=0s
26	Examples of hypothesis testing: student's t-test	https://www.youtube.com/watch?v=TPtKnB1qlhc&list=PLO-6jspot8ALyrofp0fWp0fOb19NcFS4V&index=16&t=0s
27	More examples on hypothesis tests	https://www.youtube.com/watch?v=h1z6p-Z7EpM&list=PLO-6jspot8ALyrofp0fWp0fOb19NcFS4V&index=17&t=0s
28	Introduction to ANOVA	https://www.youtube.com/watch?v=vXdXQvoMics&list=PLO-6jspot8ALyrofp0fWp0f-Ob19NcFS4V&index=15&t=0s
29	One-way ANOVA: theory and examples	https://www.youtube.com/watch?v=lbTaljdvnOw&list=PLO-6jspot8ALyrofp0fWp0fOb19NcFS4V&index=14&t=0s
30	Two-way ANOVA	https://www.youtube.com/watch?v=dCBrCfDbK4Y&list=PLO-6jspot8ALyrofp0fWp0f-Ob19NcFS4V&index=13&t=0s

31	Examples of 2-way ANOVA	https://www.youtube.com/watch?v=B_AofmjweY8&list=PLO-6jspot8ALyrofp0fWp0f-Ob19NcFS4V&index=12&t=0s https://www.youtube.com/watch?v=QL_hUu47_og&list=PLO-6jspot8ALyrofp0fWp0f-Ob19NcFS4V&index=11&t=0s
32	Introduction to Time Series	https://www.youtube.com/watch?v=7sM1k7ffXEU&list=PLO-6jspot8ALyrofp0fWp0fOb19NcFS4V&index=10&t=0s
33	Introduction to Time Series	https://youtu.be/GEtRVYBHnmQ
34	Examples of time series: Non linear trend	https://www.youtube.com/watch?v=okCTHubNT1U&list=PLO-6jspot8ALyrofp0fWp0f-Ob19NcFS4V&index=8&t=0s
35	Examples on Time series	https://www.youtube.com/watch?v=RMdLDXmKKyA&list=PLO-6jspot8ALyrofp0fWp0f-Ob19NcFS4V&index=7&t=0s
36	Moving Average model	https://youtu.be/MfguUPMqeQM
37	Auto-Regressive model	https://youtu.be/H1UEFw9tTPA

38	Principal Component Analysis	Part 1: https://youtu.be/QUOh5689LbA Part 2: https://youtu.be/U_XNz98zTzc
39	Principal Component Analysis	Part 1: https://youtu.be/QUOh5689LbA Part 2: https://youtu.be/U_XNz98zTzc
40	Method of Least squares estimates	https://www.youtube.com/watch?v=3N9UtlqvmF4&list=PLO-6jspot8ALyrofp0fWp0f-Ob19NcFS4V&index=9&t=0s
41	Method of Least squares estimates	https://www.youtube.com/watch?v=3N9UtlqvmF4&list=PLO-6jspot8ALyrofp0fWp0f-Ob19NcFS4V&index=9&t=0s
42	Method of Least squares estimates	https://www.youtube.com/watch?v=3N9UtlqvmF4&list=PLO-6jspot8ALyrofp0fWp0f-Ob19NcFS4V&index=9&t=0s