Semester	AUG 2022
Open to semester	5,7,11,13
Course code	**MT3194/DS3124**
Course title	**Statistical Inference**
Credits	4 /
Course Coordinator & participating faculty (if any)	Moumanti Podder
Nature of Course	Lectures
Pre-requisites	The BS-MS curriculum does not seem to suggest any pre-requisite, but I would recommend at least the basic Probability and Statistics course.
Objectives (goals, type of students for whom useful, outcome etc)	The course covers the mathematical development and application of various statistical techniques that are useful in drawing conclusions about a population, based on information obtained from a sample. It is useful for a student wishing to pursue advanced mathematical statistics as well as for a student wishing to analyze commonly collected experimental data in a scientific manner.
Course contents (details of topics /sections with no. of lectures for each)	Reduction of data, sufficient statistics, minimal sufficient statistics, Neyman factorization theorem, complete statistics, exponential families. Ancillary statistics, Basu's theorem. Estimation of real and vector parameters. Method of moments and maximum likelihood, Bayes' estimation. Methods of evaluating estimators, Cramer- Rao Inequality, Fisher Information, Rao-Blackwell theorem, Lehmann?Scheffe theorem. Testing of hypotheses, likelihood Ratio tests, Bayesian tests, error probabilities, P-values, power function, most powerful tests, Neyman-?Pearson lemma, uniformly most powerful tests, monotone likelihood ratio. Confidence intervals, construction of confidence intervals, one-sided confidence intervals and their relation with UMP tests, pivotal quantities, Bayesian intervals. Large sample approximations (without proofs) for: maximum likelihood estimators, log likelihood ratio, confidence intervals, posterior density. One and two way analysis of variance, F-statistics and their null distributions.
Evaluation /assessment	End-Sem Examination-45% Mid-Sem Examination-45%

	Others-Homework assignments (possibly once every two weeks) 10% The above plan may need modifications depending on the size of the class. %
Suggested readings (with full list of authors, publisher, year, edn etc.)	1) Statistical Inference: George Casella, R. L. Berger (2002) Cengage Learning 2) Testing Statistical Hypotheses: E.L. Lehmann (2005) Springer Texts in Statistics 3) For other suggested readings, please refer to the BS-MS curriculum. I might refer to some of them from time to time, but I expect to stick mostly to 1) and 2) above.