Syllabus for Statistics Qualifying Exam (Semester)

The statistics qualifying exam is on following materials covered in STAT 6021-22 and STAT 6031-32:

Mathematical Statistics I and II (STAT 6021, 6022)

Random variables, probability distribution functions, mathematical expectation, inequalities, moment-generating functions, transformation of random variables, joint distribution, marginal and conditional distributions, independence of random variables, discrete random variables (Binomial, Geometric, Negative Binomial, Poisson distribution, etc), continuous random variables (Uniform, exponential, gamma, beta, normal, etc)

Multivariate Normal, t- and F- distributions, sampling distributions, order statistics, distribution of sample mean and sample variance, stochastic convergence (convergence in probability, convergence in distribution, etc), central limit theorem (CLT), confidence intervals, hypothesis testing, chi-square tests, Monte Carlo methods

Maximum likelihood estimator (MLE), unbiased estimator (UE), Likelihood ratio tests (LRT), sufficient statistics, Rao-Blackwell theorem, Lehmann-Scheffe theorem, exponential family, Rao-Cramer bound

Applied Statistics I and (6031, 6032)

Quick review of probability distributions, Inferences (confidence interval, hypothesis testing) about means, variances and proportion of one or two populations

Quick review of linear and matrix algebra, Simple linear regression analysis, Correlation and multiple linear regression analysis, partial F-test, multi-collinearity, diagnostics, variable selections. Projects using SAS packages.

Fixed effect models (one-way, two-way, multi-way ANOVA), multiple comparisons, one-way random, two-way random effect model, mixed model. Factorial designs, Projects using SAS packages.