**SML 320**

**Bayesian Analysis**

**Department Rationale**

A course in Bayesian Analysis will provide students with a versatile understanding of statistical knowledge that is desired by academic research labs and industry opportunities. The Bayesian approach in statistics emphasizes consideration of prior probabilities, calculations of likelihoods, and updates of posterior distributions. The subsequent techniques, with careful consideration of mathematical models, provide interpretable results that can be communicated to colleagues and clients. These easier-to-interpret descriptions of results and model evaluation emphasize effect sizes and prediction intervals instead of p-values or confidence intervals. Bayesian models are easier to apply in situations where it is not feasible to achieve a large sample size. For these reasons, analysts versed in Bayesian techniques are sought in industries such as data science, pharmaceuticals, finance, genomics, engineering design, and sports analytics.

From there, students and practitioners can proceed to ideas such as Bayesian networks, Bayesian optimization, and Gaussian processes. We can equip our undergraduate researchers and engineers with these machine learning skills to prepare them for exciting burgeoning areas such as personalized medicine and artificial intelligence.