

## **STAT-805 Bayesian Inference (3 Credit Hours)**

### **1. Objectives**

This course aims to introduce students to the Bayesian statistical hypothesis testing procedures and methods.

### **2. Course Contents**

Prior Information and Prior distribution; Posterior distribution; Summaries of the univariate, bivariate & multivariate posterior distributions & applications. Posterior distributions using conjugate prior. Elicitation of hyperparameters of information priors. Methods for the derivation of non-information priors (reference priors). Predictive distribution; Predictive inference. Bayesian hypothesis testing; Bayes factor for testing the sharp (point) hypothesis; The highest density region. Bayesian computation, e.g. Gibbs sampling.

### **3. Recommended Books**

- i. Bolstad, W. M., Introduction to Bayesian Statistics Second Edition, John Wiley & Sons, New York (2007).
- ii. Hoff, P. D. A., First Course in Bayesian Statistical Methods, Springer, (2009).
- iii. Damien, P., Dellaportas, P., Nicholas G., Polson, N. G., and Stephens, D.A. Bayesian Theory and Applications. Oxford University Press. (2013).
- iv. Congdon, P., Bayesian Statistical Modeling, 2nd Edition. John Wiley (2006).
- v. Savchuk, V. and Tsokos C.P., Bayesian Theory and Methods with Applications. Springer Sciences and Business Media. (2011).

### **4. Outcomes**

On successful completion of this course, students will be able to fit the posterior distribution, to conduct Bayesian estimation, Bayesian inference, Bayesian model fitting and computation.