

## **ST4 E05: STATISTICAL DECISION THEORY**

### **UNIT I**

Basic elements of a decision problem, randomized and non-randomized decision rules, loss and risk functions, utility functions, axiomatic development and construction of utility functions.

### **UNIT II**

Bayes approach to inference and decisions, Normal and extensive forms of analysis, loss function. Finite action problems and tests of hypothesis.

### **UNIT III**

Ideas of subjective probability, prior and posterior distributions, determination of prior distributions, natural conjugate priors, prior-posterior analysis for Bernoulli, Poisson and normal processes, improper priors, estimation and testing using improper prior in normal samples.

### **UNIT IV**

Mini max principle, basic elements of game theory, general techniques of solving games, mini-max estimation for normal and Poisson means, admissibility of decision rules, general theorems on admissibility.

#### **Text Books:**

1. James O Berger (1980) Statistical Decision Theory and Bayesian Analysis, Springer Verlag .
2. De Groot M.H (1970) Optimal Statistical Decisions, John Wiley.
3. RaaiFFE H. and Schlaiffer R (2000) Applied Statistical Decision Theory, M.T.Press.

#### **Reference Books:**

1. Zellener (1971) An Introduction to Bayesian Inference in Econometrics, Wiley.
2. Hayes J.G and Winkler R I (1976) Probability, Statistics and Decision, Dower.
3. Wald A (1950) Statistical Decision Functions – Wiley.