Type/Status : Core

Course Code **: SOST 42414**

Title **: Operational Research II**

Learning Outcomes : On completion of this course unit students should be able to:

- Solve integer Linear Programming and Binary Linear Programming problems.
- Identify Queuing models and solve problems.
- Identify the appropriate Stock Control models based on the situation of the business.
- Solve problems of Decision theory and Game theory

Course Content:

- Integer Linear programing, Fractional cut for Pure Integer Linear programing, Fractional cut for Mixed Integer Liner programing, Branch and Bound algorithm.
- Binary linear programing.
- Queuing theory: the sample queue (M/M/1), M/M/1 system with discourage arrivals, M/M/1 system with responsive server, Multi server queue, M/M/1 with finite waiting room capacity, M/M/1 with finite population.
- Stock control system: the simple stock control model, stock control with discount, stock control when demand rate is variable and lead time is non zero, stock control with Backlogging, stock control with gradual replenishment, and purchasing model with shortage.
- Game theory: two person zero-sum games: mixed strategy solution.

2 X n games, a general method of solution

Two person non zero-sum games: Nash equilibrium and non-cooperative solutions.

- Decision theory: decision making under certainty: complete enumeration, the expected value, the expected opportunity loss, the value of perfect information.

Decision under uncertainty: criteria of choice- Laplace, criterion of pessimism, criterion of optimism, savage's criterion.

Decision trees, application of revised probabilities using Bayer's theorem.

- Simulation modeling.

Methods of teaching and learning: lectures, discussion, tutorials and assignments

Assessment scheme:

Assignment	20%
Semester end examination	80%

Recommended reading:

Wagner H.M. (2004). *Principle of Operational Research with Applications to Managerial Decisions,* Prentice Hall of India Pvt. Ltd.

Murty K.G. (2002). *Operational research Deterministic Optimization Models,* Prentice Hall, Newjersey

Hamdy A.T. (2001), *Operations Research,* 6th Edition, Easton Economy Edition, India.