

OTM-834 Stochastic Modelling and Optimization

Course description

This course is an advanced operation research course to cover the stochastic and uncertain operational behavior in real life problems. Combinatorial, NP hard, and stochastic programming are more focused with logistic and supply chain applications. In addition to classical optimization this course address the latest trends and issues for complex problem solving using Heuristics such as Genetic Algorithm and Particle swarm algorithm. The dynamic and random process of services systems such as queue management, resource utilization, and cycle time are analyzed using queuing theory, Markov chain, and simulation. In order to optimize the real systems, the concept of simulation-optimization and data driven optimization model with machine learning interface is introduced to addressed the latest challenges of big data analytics.

Course objective

The objective of this course is to improve the student's decision making capability under uncertainty. Uncertainty modeling, variation in decision processes, and their use in optimization models is the core objective of this course. Stochastic operation research model covers the various domains such as operation management, economic, finance, engineering design, logistics, and supply chain management. This course will focus the basic theories, model development, computer coding, and the application of stochastic OR models in logistics and supply chain. This course is recommended for the students with prior knowledge of basic operation research, computer programming statistics, and basic math.

Text and Reference Books

- *Lonard, L, Radrdin. (2015) Optimization in operations research. Pearson*
- *Tijms, H.C. (2003). A First Course in Stochastic Models. Wiley.*
- *King, A.J., Wallace, S.W. (2012). Modeling with Stochastic Programming. Springer.*
- *Powell, W. (2011). Approximate Dynamic Programming. Wiley.*
- *Manuel D. Rossetti (2015), Simulation modeling and Arena. Wiley*