OPERATIONS RESEARCH (OPRE)

OPRE 207. Statistics for Business and Management Science I. 3 Units.
Organizing and summarizing data. Mean, variance, moments. Elementary probability, conditional probability. Commonly encountered distributions including binomial. Poisson, uniform, exponential, normal distributions. Central limit theorem. Sample quantities, empirical distributions. Reference distributions (chi-square, z-, t-, F-distributions). Point and interval estimation: hypothesis tests. Prereq: MATH 121 or MATH 125.

OPRE 301. Operations Research and Supply Chain Management. 3 Units.
Operations research (OR) or management science, is the discipline of applying advanced quantitative methods to make better decisions. Techniques covered include linear programming, queuing models and simulation. The second part of the course focuses on how OR tools are used in managing various aspects of Supply Chain. Topics covered include demand forecasting, design of distribution systems, capacity planning, and inventory management. Recommended preparation: one semester of statistics or consent of instructor. Prereq: OPRE 207.

OPRE 332A. Spreadsheet and Business Process Simulation - I. 1.5 Unit.
Computer simulation is a process of designing and creating a computer model (vedio game) that mimics an existing or proposed system so as to better understand the behavior of the system. Many studies have shown that in industry, simulation is most frequently used Operations Research tool due to its ability to deal with complex systems. Another reason for the recent popularity of simulation is the availability of specialized software with animation capabilities. This course is designed to give students basic ideas of simulation methodology with the aid of popular simulation software. The emphasis of the course is in simulating business processes, however, the versatility of the technique will be demonstrated with applications from finance, health care, etc. The main focus of the course is on building simulation models using state of the art software (@RISK and ARENA). The grading is based on weekly homework and final exam. Offered as OPRE 332A, OPRE 432A, and SCMG 432A. Prereq: OPRE 301.

OPRE 332B. Spreadsheet and Business Process Simulation - II. 1.5 Unit.
Computer simulation is a process of designing and creating a computer model (video game) that mimics an existing or proposed system so as to better understand the behavior of the system. Many studies have shown that in industry, simulation is most frequently used Operations Research tool due to its ability to deal with complex systems. Another reason for the recent popularity of simulation is the availability of specialized software with animation capabilities. This course is designed to give students basic ideas of simulation methodology with the aid of popular simulation software. The emphasis of the course is in simulating business processes, however, the versatility of the technique will be demonstrated with applications from finance, health care, etc. This course builds on 332A/432A (where the main emphasis was to build simulation model using @RISK and ARENA) and focuses on statistical ideas and tools needed in building, analyzing and experimenting with these models. Offered as OPRE 332B, OPRE 432B, and SCMG 432B Prereq: OPRE 301. Prereq or Coreq: OPRE 332A.

OPRE 427. Convexity and Optimization. 3 Units.
Introduction to the theory of convex sets and functions and to the extremes in problems in areas of mathematics where convexity plays a role. Among the topics discussed are basic properties of convex sets (extreme points, facial structure of polytopes), separation theorems, duality and polars, properties of convex functions, minima and maxima of convex functions over convex set, various optimization problems. Offered as MATH 327, MATH 427, and OPRE 427. Prereq: MATH 223 or consent of instructor.

OPRE 432A. Spreadsheet and Business Process Simulation - I. 1.5 Unit.
Computer simulation is a process of designing and creating a computer model (vedio game) that mimics an existing or proposed system so as to better understand the behavior of the system. Many studies have shown that in industry, simulation is most frequently used Operations Research tool due to its ability to deal with complex systems. Another reason for the recent popularity of simulation is the availability of specialized software with animation capabilities. This course is designed to give students basic ideas of simulation methodology with the aid of popular simulation software. The emphasis of the course is in simulating business processes, however, the versatility of the technique will be demonstrated with applications from finance, health care, etc. The main focus of the course is on building simulation models using state of the art software (@RISK and ARENA). The grading is based on weekly homework and final exam. Offered as OPRE 332A, OPRE 432A, and SCMG 432A. Prereq: MBAP 403 or MBAC 511.

OPRE 432B. Spreadsheet and Business Process Simulation - II. 1.5 Unit.
Computer simulation is a process of designing and creating a computer model (video game) that mimics an existing or proposed system so as to better understand the behavior of the system. Many studies have shown that in industry, simulation is most frequently used Operations Research tool due to its ability to deal with complex systems. Another reason for the recent popularity of simulation is the availability of specialized software with animation capabilities. This course is designed to give students basic ideas of simulation methodology with the aid of popular simulation software. The emphasis of the course is in simulating business processes, however, the versatility of the technique will be demonstrated with applications from finance, health care, etc. This course builds on 332A/432A (where the main emphasis was to build simulation model using @RISK and ARENA) and focuses on statistical ideas and tools needed in building, analyzing and experimenting with these models. Offered as OPRE 332B, OPRE 432B, and SCMG 432B Prereq: MBAP 403 or MBAC 511. Prereq or Coreq: OPRE 432A.

OPRE 433. Statistical Data Analytics for Supply Chain. 3 Units.
Data of many kinds are typically available in practice, but the challenge is to use those data to make effective professional decisions. This software-intensive course begins with useful descriptions of data and the probability theory foundation on which statistics rests. It continues to statistics, including the central limit theorem, which explains why data often appear to be normally distributed, and the Palm-Khintchine theorem which explains why data often appear to have a Poisson distribution. The remainder of the course focuses on regression and forecasting, including detecting and overcoming some of the deadly sins of regression, and the surprising flexibility of regression models. Recommended preparation: One semester of undergraduate calculus or consent of instructor. Offered as OPRE 433 and SCMG 433.

OPRE 454. Analysis of Algorithms. 3 Units.
This course covers fundamental topics in algorithm design and analysis in depth. Amortized analysis, NP-completeness and reductions, dynamic programming, advanced graph algorithms, string algorithms, geometric algorithms, local search heuristics. Offered as CSDS 410 and OPRE 454. Prereq: OPRE 435A and OPRE 435C.

OPRE 490. Independent Study in Operations Research. 1 - 15 Units.
This course is offered, with permission, to students undertaking reading in a field of special interest.

OPRE 501. Special Problems and Topics. 1 - 36 Units.
This course is offered, with permission, to students undertaking reading in a field of special interest.