Dept Number	CS 570	Course Title	Topics in Operations Research
Semester Hours	3	Course Coordinator	
Catalog Description	• Netflows. Builds on network and generalized network models for the transportation, transhipment, assignment, shortest path, maximal flow. Prerequisite: 472 or Mathematics 472. • Advanced computer simulation. Review of GPSS. Advanced topics in GPSS. Generation of random variates. Validation, parametric, and nonparametric tests. Design of experiments, optimization, parameter tuning. Analysis of variance, spectral analysis, and variance reduction. Prerequisite: 470 and Mathematics 480 or 483. • Large scale linear programming. Advanced L.P. techniques for sparge matrices and reinversion routines. Prerequisite: 472 or Mathematics 472. • Nonlinear programming. Integer programming with branch and bound and cutting plane methods for solving integer programming problems. Basic dynamic programming with emphasis on the methods and applications. Prerequisite: 472 or Mathematics 472.		

Textbooks

References

Course Learning Outcomes

Assessment of the Contribution to Program Outcomes

Outcome →	1	2	3	4	5	6	7	8	9	10
Assessed →	X		X		X					

Prerequisites by Topic

Major Topics Covered in the Course

570A Netflows:

1. Emphasis placed on building network and generalized network models for the transportation, transhipment, assignment, shortest path, maximal flow and network with gains minimum cost flow problems. {13 classes}
2. The development of computer programs for algorithms which solve the models mentioned. The programs would be based on the theoretical analysis of the algorithms and available flow charts. {13 classes }
3. Applying the programs to developed models; investigating algorithm alterations suggested in recent operations research publications. {14 classes}

570B Advanced Computer Simulation:

1. Review of GPSS; advanced topics in PGSS. {5 classes}
2. Generation of random variates. {2 classes}
3. Validation, parametric and nonparametric tests. {5 classes}
4. Design of experiments, optimation, parameter tuning. {8 classes}
5. Analysis of variance, spectral analysis and variance reduction. {8 classes}
6. Sampling, stopping rules. {5 classes }
7. Continuous simulation, analog and hybrid simulation. {5 classes }
8. Simulation languages. {2 classes}

570C Large Scale Linear Programming:

1. Advanced L. P. techniques for sparse matrices and reinversion routines will be examined. {16 classes}
2. Separable programs and the decomposition techniqe for "stepping stone" models along with their applications in Energy Models. {24 classes}

70D Nonlinear Programming:

1. Integer programming (brouchand bound and cutting plane methods for solving integer programming problems)
2. Basics for dynamic programming with emphasis on the methods and applications