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<th>Dept Number</th>
<th>CS 570</th>
<th>Course Title</th>
<th>Topics in Operations Research</th>
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<td>Semester Hours</td>
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<td>Course Coordinator</td>
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**Catalog Description**

- Netflows. Builds on network and generalized network models for the transportation, transhipment, assignment, shortest path, maximal flow. Prerequisite: 472 or Mathematics 472.
- Large scale linear programming. Advanced L.P. techniques for sparse 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**

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<th>Outcome</th>
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**Prerequisites by Topic**
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, optimization, 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 technique for "stepping stone" models along with their applications in Energy Models. {24 classes}

70D Nonlinear Programming:
1. Integer programming (branch-and-bound and cutting plane methods for solving integer programming problems)
2. Basics for dynamic programming with emphasis on the methods and applications