

# MASTER OF SCIENCE IN COMPUTATIONAL DECISION SCIENCES AND OPERATIONS RESEARCH

## Collaborative program with the Department of Applied Mathematics

The purpose of this program is to provide students with theoretical skills and knowledge of applications in the areas of optimization, game theory, and machine learning to enable them to contribute towards making business decisions more efficient, or alternatively, to enable them to pursue research in these areas.

## Admission Requirements

Students with bachelor of science degrees in mathematics, computer science, industrial engineering, electrical and computer engineering, mechanical engineering, and business, or related areas, with a minimum cumulative GPA of at least 3.0/4.0, will be considered. Prospective students should have knowledge of linear algebra, discrete mathematics, probability and statistics, and programming.

All applications will be considered on an individual basis and strong applicants without an adequate background might be admitted with a requirement to take additional prerequisite courses. A statement of objectives and a curriculum vitae must be submitted. Two letters of recommendation are required. GRE scores must meet Illinois Institute of Technology institutional requirements.

## Curriculum

Coursework includes 12 credit hours of required core courses and 20 credit hours of elective courses. Up to 12 credit hours of 400-level coursework may be included in the program with adviser approval. A student may, with permission of a thesis adviser, include in his or her program a thesis of up to 5 credit hours consisting of a combination of CS 591 and/or MATH 591. The thesis option requires a written thesis and an oral defense of the thesis. Thesis format and deadlines are set by the Graduate College.

Code	Title	Credit Hours
<b>Core Courses</b>		(12)
CS 430 or CS 535	Introduction to Algorithms Design and Analysis of Algorithms	3
MATH 481 or MATH 564 or MATH 565	Introduction to Stochastic Processes Applied Statistics Monte Carlo Methods in Finance	3
CS 539 or CS 583 or MBA 505 or MATH 522	Game Theory: Algorithms and Applications Probabilistic Graphical Models Contemporary Economic Analysis and Game Theory Mathematical Modeling	3
CS 538 or MATH 535	Combinatorial Optimization Optimization I	3
<b>Computing Sciences Electives</b>		(3)
Select a minimum of one course from the following:		3
CS 422	Data Mining	3
CS 425	Database Organization	3
CS 520	Data Integration, Warehousing, and Provenance	3
CS 522	Advanced Data Mining	3
CS 525	Advanced Database Organization	3
CS 529	Information Retrieval	3
CS 584	Machine Learning	3
CS 595	Topics in Computer Science	3-12
CS 597	Reading and Special Problems	1-20
<b>Applied Math Electives</b>		(3)
Select a minimum of one course from the following:		3
MATH 485	Introduction to Mathematical Finance	3
MATH 522	Mathematical Modeling	3
MATH 553	Discrete Applied Mathematics I	3
MATH 554	Discrete Applied Mathematics II	3

MATH 569	Statistical Learning	3	
MATH 574	Bayesian Computational Statistics	3	
MATH 597	Reading and Special Projects	1-20	
<b>Business and Application Electives</b>			<b>(3)</b>
Select a minimum of one course from the following:			3
BUS 510	Building an Innovative and Sustainable Business	3	
CAE 581	Algorithms in Transportation	3	
MBA 504	Analytics for Decision Making	3	
MBA 513	Operations and Technology Management	3	
MBA 526	Sustainable Supply Chain Management	3	
MSC 511	Economics I	3	
MSC 514	Economics II	3	
<b>Research</b>			<b>(0-5)</b>
Select 0-5 credit hours			0-5
CS 591	Research and Thesis of Masters Degree	1-5	
or MATH 591	Research and Thesis M.S.		
<b>Additional Computational Decision Science and Operations Research Electives</b>			<b>(6-11)</b>
Select 6-11 credit hours <sup>1</sup>			6-11

**Minimum degree credits required: 32**

<sup>1</sup> Courses listed under core courses may be used as an elective if it is not used to fulfill a core requirement. Note: CS 538 and MATH 535 cannot both be taken for credit.  
A maximum of 5 credit hours of CS 597 or MATH 597 may be used towards the elective requirement.