COMPUTATIONAL METHODS CONCENTRATION, DATA SCIENCE (MS)

Course Requirements

Introductory Courses

Course	Title	Quarter Hours
IT 403	STATISTICS AND DATA ANALYSIS	4
CSC 412	TOOLS AND TECHNIQUES FOR COMPUTATIONAL ANALYSIS	4
CSC 401	INTRODUCTION TO PROGRAMMING	4

Foundation Courses

Course	Title	Quarter Hours
DSC 450	DATABASE PROCESSING FOR LARGE-SCALE ANALYTICS	4
DSC 423	DATA ANALYSIS AND REGRESSION	4
DSC 430	PYTHON PROGRAMMING	4
DSC 441	FUNDAMENTALS OF DATA SCIENCE	4
Select one of the following applied analytics courses:		4
DSC 424	ADVANCED DATA ANALYSIS	
DSC 465	DATA VISUALIZATION	

Advanced Courses

Course	Title	Quarter Hours
DSC 478	PROGRAMMING MACHINE LEARNING APPLICATIONS	4
CSC 555	MINING BIG DATA	4
DSC 540	ADVANCED MACHINE LEARNING	4
Select one of the following:		4
CSC 521	MONTE CARLO ALGORITHMS	
CSC 575	INTELLIGENT INFORMATION RETRIEVAL	
CSC 578	NEURAL NETWORKS AND DEEP LEARNING	

Elective Courses

Students must select eight (8) Credit Hours of graduate-level elective courses in the areas of statistical modeling, data mining or database technologies. Students must choose electives from the following list of courses:

Course	Title	Quarter Hours
Select eight (8) credit hours from the following:		8
CMNS 549	SPECIAL TOPICS IN ORGANIZATIONAL COMMUNICATION	
CSC 452	DATABASE PROGRAMMING	
CSC 468	PROGRAMMING INTERACTIVE DATA VISUALIZATION FOR THE WEB	
CSC 481	INTRODUCTION TO IMAGE PROCESSING	
CSC 482	APPLIED IMAGE ANALYSIS	
CSC 484	ETHICS IN ARTIFICIAL INTELLIGENCE	
CSC 521	MONTE CARLO ALGORITHMS	
CSC 528	COMPUTER VISION	
CSC 543	SPATIAL DATABASES & GEOGRAPHIC INFORMATION SYSTEMS	
CSC 555	MINING BIG DATA	
CSC 575	INTELLIGENT INFORMATION RETRIEVAL	
CSC 576	COMPUTATIONAL ADVERTISING	
CSC 577	RECOMMENDER SYSTEMS	
CSC 578	NEURAL NETWORKS AND DEEP LEARNING	
CSC 580	ARTIFICIAL INTELLIGENCE II	
CSC 583	NATURAL LANGUAGE PROCESSING	
CSC 594	TOPICS IN ARTIFICIAL INTELLIGENCE	
CSC 598	TOPICS IN DATA ANALYSIS	
DSC 425	TIME SERIES ANALYSIS AND FORECASTING	
DSC 433	SCRIPTING FOR DATA ANALYSIS	
DSC 465	DATA VISUALIZATION	
DSC 478	PROGRAMMING MACHINE LEARNING APPLICATIONS	
DSC 480	SOCIAL NETWORK ANALYSIS	
DSC 484	WEB DATA MINING	
DSC 510	HEALTH DATA SCIENCE	
DSC 540	ADVANCED MACHINE LEARNING	
GEO 441	GEOGRAPHIC INFORMATION SYSTEMS (GIS) FOR COMMUNITY DEVELOPMENT	
GEO 442	GEOGRAPHICAL INFORMATION SYSTEMS (GIS) FOR SUSTAINABLE URBAN DEVELOPMENT	
GPH 565	DESIGNING FOR VISUALIZATION	
HCI 512	INFORMATION VISUALIZATION AND INFOGRAPHICS	
IPD 451	BIG DATA AND NOSQL PROGRAM	
IS 478	INFORMATION TECHNOLOGY CONSULTING	
IS 549	DATA WAREHOUSING	
IS 550	ENTERPRISE DATA MANAGEMENT	
IS 574	BUSINESS INTELLIGENCE AND ANALYTICS SYSTEMS	
MGT 559	HEALTH SECTOR MANAGEMENT	
MGT 798	SPECIAL TOPICS (Managerial & Marketing Epidemiology)	
MKT 555	MARKETING MANAGEMENT	
MKT 530	CUSTOMER RELATIONSHIP MANAGEMENT	
MKT 534	ANALYTICAL TOOLS FOR MARKETERS	
MKT 595	DIGITAL MARKETING ANALYTICS & PLANNING	
MKT 798	SPECIAL TOPICS (Health Care Data Analysis)	

Capstone Options

Four (4) credit hours are required for the capstone requirement. Students have the option of completing a real world Data Analytics Project, or completing the Data Science Capstone course, or participating in a

Data Analytics Internship or completing a Master's Thesis to fulfill their Capstone requirement.

- Data Analytics Project
  - The real data analytics project is for students who are interested in working in a small team on a research project under the supervision of a CDM faculty. A list of available projects is published on the dampa center website (http://dampa.cdm.depaul.edu). Students who are interested in proposing their own data analytics project are encouraged to contact a CDM faculty member teaching analytics courses as soon as possible. Students must enroll in CSC 695 for a total of 4 credit hours taken in two consecutive quarters (2 credit hours for 2 quarters) to satisfy the capstone requirement. The faculty who supervises the project will initiate enrollment in the CSC 695 course.
- Predictive Analytics Capstone course
  - DSC 672 course offers the opportunity of working on an analytics project in a more structured class format. Students enrolled in the courses will be working in teams on a data analytics project under the supervision of the course instructor.
- Analytics Internship
  - An internship offers students the opportunity to integrate their academic experience with on-the-job training in an analytics related field. Students must enroll in CSC 697 for 4 credit hours to satisfy the practicum requirement. These are the steps:
    i. Secure an internship with focus in analytics.
    ii. International Students must obtain the appropriate practical training form and meet with an advisor in the CDM Academic Center for approval. (http://oiss.depaul.edu/Requests/Forms/index.asp (http://oiss.depaul.edu/Requests/Forms/))
    iii. Login to MyCDM and click the "MyInternships" link on the left to start the course enrollment process.
- Master's Thesis
  - A student who has made an original contribution to the area (typically, through work done by CSC 695 may choose to complete a Master's Thesis. The student and the student's research advisor should form a Master's Thesis Committee of 3 faculty. The student will need to submit to the committee a thesis detailing the results of the research project. After a public defense, the committee will decide whether to accept the thesis. In that case, the student will be allowed to register for the 0 credit hour course CSC 698 and the transcript will show the thesis title as the course topic.