Master of Science in Operations Research and Industrial Engineering

Concentration in Data Analytics

The Data Analytics M.S. Concentration is designed to provide the necessary coursework and training for students who wish to develop their expertise in data science, and to prepare them for a successful career in the field. Students obtain an MS in ORIE, but focus their coursework on topics that are relevant to data and decision analytics. **Students must satisfy all ORIE degree requirements.** Students successfully completing the Concentration may list it on their resume and Prof. Hanasusanto or Hasenbein will confirm if requested.

M.S. Concentration Requirements

- 30 semester hours, 27 of which must be at graduate level, 18 hours must be in ORIE
- Grade of B+ or better in Data Science for Engineers
- Students may replace one ORIE course with a 3-hour individual project or 6-hours of thesis supervised (or co-supervised) by either Prof. Hanasusanto or Hasenbein
- No required course may be taken credit/no-credit
- Students must **apply** for admission to the Concentration in Data Analytics program after completing their first course in data analytics. Not all students will be accepted.

MS Required Courses (21 hours)

Linear Programming (ORI 391Q.5, Fall)
Data Science for Engineers (ME 379M, Spring) – Counts as an ORI course
Statistical Modeling I (SDS 383C, Fall) – Counts as an ORI course
Decision Analysis Theory (ORI 390R.17, Spring)
Applied Projects in ORIE (ORI 397, Spring)
ORIE Elective (Any ORI course)
Statistics or EE course (SDS 383D, 384.2, 384.4, or EE 380L.10) – Counts as an ORIE course

Note: The timing of the courses listed above is notional. Students must check course schedules via the Registrar's website. Some courses are not offered every year.

Required Master's Report (3 hours) or Thesis (6 hours)

Master's Report (ORI 398R, 3 hours, Fall/Spring) *or*
MS Thesis (ORI 698A/698B, 6 hours, Fall/Spring)

Master's Report or Thesis must be supervised or co-supervised by either Prof. Hanasusanto or Hasenbein. The report may detail work completed during a summer internship. The thesis must be of sufficient quality and depth that it supports the submission of one journal publication.

Elective Courses (6 to 9 hours)

Choose any courses you are interested in from the list of Approved Electives for the Concentration in Data Analytics.

Example Degree Plans to Obtain M.S. Concentration in Data Analytics

Example Course Sequence with Master's Report

Semester	Course 1	Course 2	Course 3
Fall, First Year	ORI 391Q.5: Linear Programming	SDS 383C: Statistical Modeling I	ORIE Elective
Spring, First Year	ME 379M: Data Science for Engineers	EE 380L.10: Data Mining	Elective
Fall, Second Year	SDS 384.4: Regression Analysis	Elective	Elective
Spring, Second Year	ORI 390R.17: Decision Analysis Theory	ORI 397: Applied Projects ORIE	ORI 398R: Master's Report

Example Course Sequence with Master's Thesis

Semester	Course 1	Course 2	Course 3
Fall, First Year	ORI 391Q.5: Linear Programming	SDS 383C: Statistical Modeling I	ORIE Elective
Spring, First Year	ME 379M: Data Science for Engineers	EE 380L.10: Data Mining	Elective
Fall, Second Year	SDS 384.4: Regression Analysis	Elective	ORI 698A: Master's Thesis
Spring, Second Year	ORI 390R.17: Decision Analysis Theory	ORI 397: Applied Projects ORIE	ORI 698B: Master's Thesis

Courses are required. Courses are electives and are only examples. Courses are research.

Please note that two years in residence is an estimate for the total amount of time needed to complete an MS in ORIE with a concentration in Data Analytics. The actual time required may differ and depends upon the availability of funding and student progress. Some students complete the program in fewer than two years.

How to Apply

Students may apply upon completion of their first data analytics course. To apply, email Profs. Hanasusanto and Hasenbein the following:

-- Transcript
-- Proposed degree plan
-- Statement detailing your proposed research topic and your career goals

Contact: Prof. Grani A. Hanasusanto, Graduate Program in Operations Research & Industrial Engineering, grani.hanasusanto@utexas.edu, http://grani.hanasusanto.com
Prof. John Hasenbein, Graduate Program in Operations Research & Industrial Engineering, has@me.utexas.edu, http://sites.utexas.edu/hasenbein

Concentration in Data Analytics: Approved Electives

The courses listed below are pre-approved electives for the Concentration in Data Analytics. Electives not listed will be considered by Profs. Hanasusanto and Hasenbein.

Some of the courses listed below may require instructor approval.

Operations Research & Industrial Engineering
Algorithms for Mixed Integer Programming (ORI 391Q.6)
Applied Stochastic Processes (ORI 390R.5)
Decision Analysis II (ORI 390R.xx)
Integer Programming (ORI 391Q.4)
Logistic Analytics (ORI397)
Markov Decision Processes (ORI 390R.16)
Nonlinear Programming (ORI 391Q.1)
Optimization Under Uncertainty (ORI 397)
Production and Inventory Control (ORI 390Q.2)
Statistical Methods in Manufacturing (ORI 390R.18)
Systems Modeling (ORI 397)
System Simulation (ORI 390R.9)
Time Series Modelling, Analysis & Control (ORI 390R.3)

Business
Business Analytics and Decision Modeling (STA 287)
Data Mining in Business Intelligence (MIS 382N.9)
Decision-Support Modeling (MIS 383N)
Financial Modeling and Optimization (RM 392)
Pricing and Revenue Optimization (OM 386_
Supply Chain Analytics (OM 386)

Economics
Econometrics I (ECO 392M.2)
Economics and Control Theory (ECO 392M.10)
Introduction to Game Theory (ECO 387L.27)
Mathematical Economics (ECO 387L.24)
Resource Systems Modeling (ECO 392M.11)

Engineering
Data Analytics in Power System (EE394V)

Data Mining (EE 380L.10)
Decision and Risk Analysis (CE 395R.3)
Decision, Risk and Reliability (CE 387T)
Elements of Modern Control Theory (ChE 391)
Information Theory (EE 381K.7)
Introduction to System Theory (EE 380K)
Large Scale and Convex Optimization (EE 381K)
Large Scale and Convex Optimization II (EE 381V)
Linear Systems Analysis (ASE 381P.1)
Optimal Control Theory (ASE 381P.3)
Optimization in Engineering Systems (EE 380N.11)
Stochastic Control Theory (EE 380N.5)

Statistics
Any advanced graduate SDS class