



Analytics Concentration Requirements:

1 x Big Data
1 x Machine Learning
1 x Analytics Systems

Big Data

11-641 Machine Learning for Text and Graph-based Mining
11-663 Applied Machine Learning
11-667 Large Language Models Methods and Applications
11-688 Concepts in Digital Multimedia and Cyber Forensics
11-692 Speech Processing
11-711 Advanced Natural Language Processing
11-737 Multilingual Natural Language Processing
11-751 Speech Recognition and Understanding
11-755 Machine Learning for Signal Processing
11-775 Large Scale Multimedia Analysis
11-777 Multimodal Machine Learning
11-788 Computational Forensics & AI
11-877 Advanced Topics in Multimodal Machine Learning

Machine Learning

10-605 Machine Learning with Large Datasets
10-617 Intermediate Deep Learning
10-701 Introduction to Machine Learning (PhD)
10-703 Deep Reinforcement Learning & Control
10-707 Advanced Deep Learning
10-708 Probabilistic Graphical Models
10-714 Deep Learning Systems: Algorithms and Implementation
10-715 Advanced Introduction to Machine Learning
10-716 Advanced Machine Learning: Theory and Methods
10-718 Machine Learning in Practice
10-725 Convex Optimization
11-641 Machine Learning for Text and Graph-based Mining
11-667 Large Language Models Methods and Applications
11-685 Introduction to Deep Learning
11-767 On-Device Machine Learning
11-777 Multimodal Machine Learning
11-785 Introduction to Deep Learning
36-705 Intermediate Statistics
36-708 Statistical Methods in Machine Learning

Analytics Systems

10-605 Machine Learning with Large Datasets
10-708 Probabilistic Graphical Models
10-714 Deep Learning Systems: Algorithms and Implementation
10-718 Machine Learning in Practice
11-642 Search Engines
11-695 Machine Learning in Production
11-711 Advanced Natural Language Processing
11-737 Multilingual Natural Language Processing
11-751 Speech Recognition and Understanding
11-767 On-Device Machine Learning
11-775 Large Scale Multimedia Analysis
11-797 Question Answering
11-877 Advanced Topics in Multimodal Machine Learning
15-884 Machine Learning Systems
15-857 Performance Modeling

**Human-Centered Data Science
Concentration Requirements:**

1x Research Methods
2x HCI

Research Methods

05-610 User Centered Research & Evaluation
05-816 Applied Research Methods

**Human-
Computer
Interaction**

05-615 Persuasive Design
05-617 Design of Artificial Intelligence Products
05-618 Human AI Interaction
05-891 Designing Human Centered Systems
05-813 Human Factors
05-821 Social Web
05-823 E-Learning Design Principles and Methods
05-840 Tools for Online Learning
05-833 Applied Gadgets, Sensors and Activity Recognition in HCI
05-836 Usable Privacy and Security
05-872 Rapid Prototyping of Computer Systems
05-899 Crowd Programming
05-899 Learning Analytics and Educational Data Science
05-899 AI: Design for the Long Term
05-899 FATE (Fairness, Accountability, Transparency, and Ethics) in Sociotechnical Systems
05-899 Interactive Extended Reality
05-899 Justice through Design
05-899 Transformational Game Design Studio

MCDs CORE

10-601 Machine
Learning

15-619
Cloud
Computing

11-637
Foundations of
Computational
Data Science

05-839
Interactive
Data Science

11-631
Data Science
Seminar

**Systems Concentration
Requirements:**
3 x Systems Project

Systems Projects

15-605 Operating System Design and Implementation
15-618 Parallel Computer Architecture and Programming
15-640 Distributed Systems
15-641 Networking and the Internet
15-645 Database Systems
15-712 Advanced Operating Systems and Distributed Systems
15-719 Advanced Cloud Computing
15-721 Database Systems
15-746 Storage Systems
15-821 Mobile and Pervasive Computing

Capstone Requirements:
Capstone Planning Seminar
Internship
2 x Capstone Courses

Capstone Requirement

11-634 Capstone Planning Seminar
11-630 Internship
11-632 Data Science Capstone
11-635 Capstone Research