



# 2024-2025 Core & Concentrations

[Stellic Degree Planner](#)

[Schedule of Classes](#)

**MCDS Graduation Requirements:**  
MCDS Core Courses  
Capstone Requirement  
One Set of Concentration Courses  
One Elective (any 600+ level SCS course)

**Analytics Concentration Requirements:**  
1 x Big Data  
1 x Machine Learning  
1 x Analytics Systems

**Human-Centered Data Science Concentration Requirements:**  
1x Research Methods  
2x HCI

- Big Data**
- 11-641 Machine Learning with Graphs
  - 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 for Conversational AI
  - 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
  - 11-891 Neural Code Generation

- Analytics Systems**
- 10-605 Machine Learning with Large Datasets
  - 10-708 Probabilistic Graphical Models
  - 10-714 Deep Learning Systems: Algorithms and Implementation
  - 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
  - 11-868 Large Language Model Systems
  - 15-884 Machine Learning Systems
  - 15-857 Performance Modeling

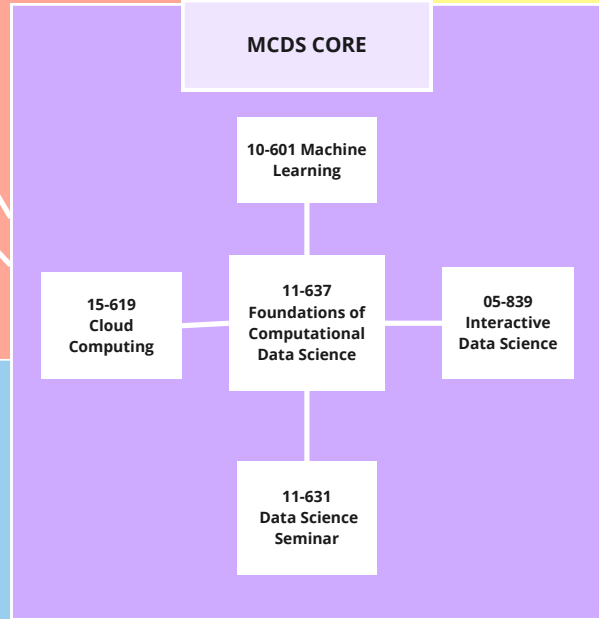
- Machine Learning**
- 10-605 Machine Learning with Large Datasets
  - 10-617 Intermediate Deep Learning
  - 10-701 Introduction to Machine Learning (PhD)
  - 10-703 Deep Reinforcement Learning & Control
  - 10-707 Advanced Deep Learning
  - 10-708 Probabilistic Graphical Models
  - 10-714 Deep Learning Systems: Algorithms and Implementation
  - 10-725 Convex Optimization
  - 11-641 Machine Learning for Graphs
  - 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
  - 11-891 Neural Code Generation

**Research Methods**

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

- 05-615 Persuasive Design
- 05-617 Design of Artificial Intelligence Products
- 05-618 Human AI Interaction
- 05-660 Interaction Design Fundamentals
- 05-813 Human Factors
- 05-818 Design of Educational Games
- 05-823 E-Learning Design Principles and Methods
- 05-833 Applied Gadgets, Sensors and Activity Recognition in HCI
- 05-836 Usable Privacy and Security
- 05-840 Tools for Online Learning
- 05-872 Rapid Prototyping of Computer Systems
- 05-891 Designing Human Centered 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

**Human-Computer Interaction**



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

**Capstone Requirements:**  
Capstone Planning Seminar  
Internship  
2 x Capstone Courses

- 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
  - 15-642 Machine Learning Systems
  - 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 Requirement**

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