# DS Elective Requirements

1. Choose either Methodology track or In-the-Field track

2. Complete ONE course from EACH of its subjects

3. Complete EXTRA course from ANY of its subjects

## Methodology

### Advanced Data Science Methods
- **CAS CS 507**: Optimization in Computing and Machine Learning
- **CAS CS 530**: Advanced Algorithms
- **CAS CS 531**: Advanced Optimization Algorithms
- **CAS CS 565**: Algorithmic Data Mining
- **ENG EC 524**: Optimization Theory and Methods
- **ENG EC 533**: Advanced Discrete Mathematics
- **CAS MA 416**: Analysis of Variance
- **CAS MA 539**: Methods of Scientific Computing
- **CAS MA 584**: Multivariate Statistical Analysis
- **CAS MA 589**: Computational Statistics

### Scalable and Trustworthy DS & AI
- **CDS DS 563**: Algorithmic techniques for Taming Big Data
- **CAS CS 528**: Cloud Computing
- **CAS CS 561**: Data Systems Architectures
- **CAS CS 562**: Advanced Database Applications
- **ENG EC 521**: Cybersecurity
- **ENG EC 528**: Cloud Computing

### Applied and Use-Inspired DS & AI
- **CAS CS 440**: Intro. to Artificial Intelligence
- **CAS CS 505**: Intro. to Natural Language Processing
- **ENG EC 523**: Deep Learning
- **CAS MA 415**: Data Science in R

## In-the-Field

### Analytics in the Field
- **CDS DS 549**: Machine Learning X-Lab Practicum
- **CAS EC 508**: Econometrics
- **CAS EE 375**: Intro. to Quantitative Environmental Modeling
- **CAS EE 516**: Multivariate Analysis for Geographers
- **CAS MA 415**: Data Science in R
- **QST QM 222**: Modeling Business Decisions and Market Outcomes
- **CAS MA 539**: Methods of Scientific Computing
- **QST FE 459**: Computational Techniques for Finance

### Algorithmics in the Field
- **CDS DS 519**: Software Engineering X-Lab Practicum
- **CAS CS 506**: Computational Tools for Data Science
- **CAS MA 569**: Optimization Methods of Operational Research
- **ENG EC 527**: High Performance Programming w/ Multicore and GPUs
- **ENG BE 562**: Computational Biology: Genomes, Networks, Evolution
- **HUB XC 475**: Fellowship
- **QST BA 476**: Machine Learning for Business Analytics
- **QST BA 472**: Business Experiments and Causal Methods

### Data Science in the Field
- **CDS DS 537**: Data Science for Conservation Decisions
- **CDS DS 539**: Data Science Practicum
- **CAS BI 577**: Quantitative Approaches in Molecular Biology
- **CAS EC 507**: Statistics for Econometrics
- **CAS PO 399**: OR **CAS PO 599**: Data Science for Politics
- **QST BA 305**: Business Decision-Modeling with Data

**Minimum Courses Required: 4**

**Note:** Maximum of two courses may be used toward major and minor requirements.