

Major: Data Sciences Option: Applied Data Sciences

Entered Penn State Fall 2019 or before

Total Credits: 125

DS, IST, SRA, and MATH courses have enforced prerequisites.

1 credit of IST 495-IST Internship is required.

| Semester 1 | Credits | Semester 2 | Credits |
|--|---------|--|---------|
| MATH 140 <i>Calculus with Analytical Geometry I (GQ)</i> ETM Course | 4 | MATH 141 <i>Calculus with Analytical Geometry II (GQ)</i> ETM Course | 4 |
| CMPSC 121 <i>Introduction to Programming Techniques</i> , OR CMPSC 131 <i>Programming and Computation I: Fundamentals</i> ETM Course | 3 | CMPSC 122 <i>Intermediate Programming</i> , OR CMPSC 132 <i>Programming and Computation II: Data Structures</i> ETM Course | 3 |
| STAT 200 <i>Elementary Statistics</i> ETM Course | 4 | IST 210 <i>Organization of Data</i> ETM Course | 3 |
| ENGL 15 (GWS) | 3 | General Education Selection | 3 |
| IST 110 | 3 | General Education Selection | 3 |
| Total Credits: | 17 | Total Credits: | 16 |

| Semester 3 | Credits | Semester 4 | Credits |
|--|---------|--|---------|
| DS 200 <i>Introduction to Data Sciences</i> | 3 | DS 220 <i>Data Management for Data Sciences</i> | 3 |
| MATH 220 <i>Matrices</i> | 2 | STAT 318 <i>Elementary Probability</i> | 3 |
| IST 230 <i>Language, Logic, and Discrete Mathematics</i> | 3 | STAT 380 <i>Data Science through Statistical Reasoning and Computation</i> | 3 |
| General Education Selection | 3 | CAS 100 (GWS) | 3 |
| General Education Selection | 3 | General Education Selection | 3 |
| Total Credits: | 14 | Total Credits: | 15 |

| Semester 5 | Credits | Semester 6 | Credits |
|--|---------|--|---------|
| DS 300 <i>Privacy and Security for Data Sciences</i> | 3 | DS 320 <i>Data Integration</i> | 3 |
| DS 310 <i>Machine Learning for Data Analytics</i> | 3 | DS 340W <i>Applied Data Sciences</i> | 3 |
| DS 330 <i>Visual Analytics for Data Sciences</i> | 3 | ENGL 202C (GWS) | 3 |
| SRA 231 <i>Decision Theory and Analysis</i> * IST 442 <i>Information Technology in an International Context</i> , OR SODA 308 <i>Research Design for Social Data Analytics</i> , OR IST 445H <i>Globalization Trends and World Issues</i> | 3 | Option List A Selection (see following page) | 3 |
| General Education Selection | 3 | General Education Selection (GWS) | 3 |
| Total Credits: | 15 | Total Credits: | 15 |

| Semester 7 | Credits | Semester 8 | Credits |
|--|---------|--|---------|
| IST 337 <i>Technologies for Digital Entrepreneurs</i> ** , OR IST 441 <i>Information Retrieval and Organization</i> , OR DS 402 <i>Emerging Trends in the Data Sciences</i> , OR IST 462 <i>Database Modeling and Applications</i> | 3 | DS 440 <i>Data Sciences Capstone Course</i> | 3 |
| DS 410 <i>Programming Models for Big Data</i> | 3 | Option List B Selection (see following page) | 3 |
| Option List A Selection (see following page) | 3 | General Education Selection | 3 |
| Option List B Selection (see following page) | 3 | General Education Selection | 3 |
| General Education Selection | 3 | Elective | 3 |
| Elective | 2 | | |
| Total Credits: | 17 | Total Credits: | 15 |

Major: Data Sciences
Option: Applied Data Sciences

List A and List B Courses***

Entered Penn State Fall 2019 or before

| List A | Credits |
|--|---------|
| MATH 230 <i>Calculus and Vector Analysis</i> | 3 |
| CMPSC/DS 442 <i>Artificial Intelligence</i> OR CMPSC 441* <i>Artificial Intelligence</i> | 3 |
| CMPSC 450** <i>Concurrent Scientific Programming</i> | 3 |
| CMPSC 451 <i>Numerical Computations</i> OR CMPSC 455 <i>Intro to Numerical Analysis</i> | 3 |
| CMPSC 465* <i>Data Structures and Algorithms</i> OR CMPSC 462* <i>Data Structures</i> | 3 |
| STAT 415 <i>Introduction to Mathematical Statistics</i> | 3 |
| STAT 416 <i>Stochastic Modeling</i> | 3 |

| List B | Credits |
|--|---------|
| ASTRO 410 <i>Computational Astrophysics</i> | 3 |
| HD FS 468 <i>Biological Bases of Human Development</i> | 3 |
| HIST 490 <i>Archival Management</i> | 3 |
| IST/COMM 450B <i>Digital Advertising</i> | 3 |
| LER 465 <i>Collective Decision Making</i> | 3 |
| METEO 474 <i>Computer Methods of Meteorological Analysis and Forecasting</i> | 3 |
| PL SC 404 <i>Analysis of Public Policy in the States</i> | 3 |
| PL SC 429 <i>Analysis of Elections</i> | 3 |
| PL SC 447 <i>Analysis of Public Opinion and Political Attitudes</i> | 3 |
| PL SC 476 <i>Empirical Legal Studies</i> | 3 |
| PSYCH 458 <i>Visual Cognition</i> | 3 |
| SOC 423 <i>Social Demography</i> | 3 |
| SOC 429 <i>Social Stratification</i> | 3 |

* Requires CMPSC 360 as a pre-requisite instead of IST 230

** These courses require MATH 230, which is not a prescribed course for the Applied Data Sciences option, so it has been included as an option selection. Both STAT 415 and STAT 416 build on STAT 414

*** Students in the Applied Data Sciences option of the Data Sciences major are allowed to create a four-course custom application focus sequence to substitute for the four courses from List A and List B above. DATSC students pursuing a four-course custom focus must fill out a Custom Application Focus Approval Form and receive approval from the DATSC Program Coordinator or Professor-in-Charge.