DATA 500 Machine Learning Concepts I
A first course in machine learning, with focus on regression. Simple and multiple linear regression will be covered at the start of the course, after which discussion will progress to classification with logistic regression and discriminant analysis. The course will conclude with coverage of resampling methods and linear model selection. Throughout the course, the R statistical computing language will be utilized.

DATA 510 Data Wrangling
In this course, students will learn to query databases with SQL and the dplyr package for R. Topics include selecting, ordering, filtering, grouping, aggregate functions, and inner joins. In the second half of the course, students will learn web scraping, primarily using tools for R. These include rvest, httr, and RSlelenium. We will also discuss regular expressions in R with the stringr package. If time permits it, web scraping with both Node.js and Python may be explored.

DATA 515 Analytics for Decision-Making
This course introduces the field of data science and analysis through theory and application. The first section of the course will address how data can be transformed into actionable information for a decision-maker. In the second section, students will develop a requirement from a customer, draft a plan of how to answer the information need, the collect data, and apply of various analytic techniques to data and information to derive meaningful conclusions for a decision-maker.

DATA 520 Introduction to Programming
This is an introductory course in programming, and there are no previous programming prerequisites. Python will be the language used, and students will learn about programming fundamentals, such as variables, conditionals, iteration, functions, and lists. In the second half of the course, special attention will be given to data science topics, and coverage will include regular expressions, web scraping, databases, JSON, and API's.

DATA 525 Data Visualization
A hands-on course in data analysis and visualization based on key design principles and techniques for interactively visualizing data based on principles from the fields of statistics, perception, graphic design, cognition, communication, and data mining. Through lecture, case studies, and design studios, students will work individually and collaboratively to visualize complex datasets using software applications to identify patterns, trends, and variation across categories, space, and time. Students will obtain practical experience with the visualization of complex data including multivariate data, geospatial data, textual data, time series, and network data.

DATA 550 Database Technologies
A course in relational and non-relational databases, with MySQL and MongoDB as the tools of choice. Students will study SQL, database administration, database design, the differences between relational and NoSQL databases and their respective advantages, and the particulars of MySQL and MongoDB.

DATA 560 Data Visualization with JavaScript
This course will explore several modern libraries specifically created for data visualization on the web. Students will create interactive, animated, and well-designed graphics that accurately and effectively depict a data set. JavaScript libraries studied are subject to change, but students will learn to create basic charts and graphs, radar charts, trees, word clouds, cartographs, and several other styles of visualization that complement their data.

DATA 570 Data Science Development Tools
An introduction to data-driven web application development with Shiny and JavaScript. Students will learn how to collect JSON data from web APIs, how to scrape data from websites via Node.js, and how to turn this data into interactive web applications via Shiny. Students will also learn how to connect directly to an API with the Shiny server and pass this information on to a local JavaScript file for processing and display. Other technologies covered may include jQuery, Leaflet.js, D3.js, dplyr, ggplot, Git, and Github. Students must have a background in R and in programming.

DATA 580 Data Science App Development
The first part of this course is focused on serving and managing web applications on the backend with Node.js and Express.js. Client-side programming dominates the second half of the course, where React.js is used to create web application components and Redux.js is used to manage application state. With this technology, students will learn how to write highly interactive web applications which consume data from API's and display visualizations of that data.

DATA 590 Machine Learning Concepts II
A continuation of DATA 500, with Python as the primary analysis tool. The course begins with tree-based methods, along with the accuracy improving modifications of bagging, boosting, and random forests. Students will then move on to classification with support vector machines and naive Bayes and conclude the course with a study of unsupervised learning methods, including K-means and hierarchical clustering.

DATA 600 Topics in Data Science
This course focuses on special topics related to the data science discipline. Faculty with special research interests or experience will deal with topics like data science for private security, advanced data visualization, or sports analytics.

DATA 620 Database Technologies
A course in relational and non-relational databases, with MySQL and MongoDB as the tools of choice. Students will study SQL, database administration, database design, the differences between relational and NoSQL databases and their respective advantages, and the particulars of MySQL and MongoDB.

DATA 650 Internship
A period of employment (minimum of 200 hours) as an intelligence analyst with a government, international agency, or corporation during which certain experience objectives must be met.

INTL 501 Research Methods in Intelligence
This course is an introduction to research methods with an emphasis on applying those methods to the field of intelligence. The goal of the course is to facilitate student comprehension and application of methodology in conjunction with sound argumentation. Students will learn a variety of approaches to inquiry, practical methodologies, and tools that will assist them in conducting analytic research as part of their continuing work in the graduate program.

INTL 510 Intelligence Theories and Applications
A survey course that introduces the student to the discipline of intelligence and provides the student with an understanding of how intelligence systems function, how they fit within the policymaking systems of free societies, and how they are managed and controlled. The course will integrate intelligence theory with the methodology and processes that evolved over time to assist the intelligence professional. The course focuses on advanced research and thinking skills fundamental to intelligence analysis.
INTL 520 Advanced Analytical Techniques
This course is designed to provide an opportunity for students to explore techniques emerging from the intelligence community and physical and social sciences and apply those techniques to intelligence problems. Focusing on a variety of techniques from a variety of disciplines, this course will expose an advanced student to new and potentially useful methods for conducting intelligence analysis.

INTL 540 Competitive Intelligence
This course explores the actionable information needs of modern business for competitive intelligence and business analysis. The course objective is to introduce business terminology, analytical models and other resources that organizations utilize in the process of competitive intelligence. Students will be provided with a knowledge base of practical tools and methods to research a business's micro and macro environment; from this base, students will develop competitive overviews and insights to assist corporate decision makers in reducing uncertainty and developing strategy.

INTL 548 Market Research and Primary Intelligence
This course is designed to provide a comprehensive overview of the principles and fundamentals of market research and primary intelligence. The course includes the study of both the qualitative and quantitative methods used in contemporary market research along with the tools and techniques used in the collection, analysis, and measurement of data. The course is organized from a management perspective using an applied, problem analysis format. A real life research project will be used to reinforce the theoretical concepts presented during the term. The course is student-oriented with a focused learning approach. Accordingly, it is taught from an applied perspective to challenge and help students to understand the role, importance, and operational fit of market research in the workplace. The use of technology is emphasized with emphasis on research via the internet, development of an on-line survey and SPSS for statistical evaluation. Students are expected to take an active role and participate in class discussions, interactive assignments, and team/group exercises.

INTL 560 Cyber Threat Analysis
This course explores the relatively new discipline of cyber threat analysis at a basic level, introducing students to the methodology of investigation, the threat environment (cyberspace), some of the online tools used by analysts, and their application in real-world examples. Students will be introduced to the key concepts, tools, and terminologies used by professionals in the field and apply what they learn in lab exercises that model real-world events.

INTL 576 Law Enforcement Intelligence
The course introduces the discipline of law enforcement intelligence across the sub-disciplines of crime and operations/administrative analysis, investigative analysis, and intelligence analysis, in addition to basic definitions and concepts in crime and law enforcement operations. Students will utilize basic analytical methodologies, techniques, and software tools to examine law enforcement operational and investigative problems and issues.

INTL 580 Intelligence Communications
The skill most valued by the intelligence consumer is the ability to communicate, briefly and effectively, the results of detailed analytic work. This course, through repetitive application of a focused set of skills to a body of information of constantly increasing complexity, is designed to prepare intelligence analysts to deliver a variety of intelligence products in both written and oral formats.

INTL 595: Geospatial Intelligence
This course will cover topics related to the collection, exploitation, and analysis of geospatial information and imagery. The focus of the course will be on how to use software and knowledge of geospatial concepts to respond to a variety intelligence requirements that arise from fields that range from military and law enforcement to business, humanitarian issues, and other security issues. The emphasis is on the choice and application of appropriate methods for the analysis of the spatial and imagery data often encountered in the various intelligence disciplines.

INTL 565 Data Analytics for the Private Sector
Data analytics is the process of generating and delivering information that enables and supports an improved and timely decision process. The aim of this course is to provide the student with an understanding of a broad range of decision analysis techniques and facilitate the application of these methodologies to analyze real-world business problems, arrive at a rational solution, and present the solution to decision makers.

INTL 612 Social Media Analysis
This course introduces students to the collection and analysis techniques used in the analysis of social media. Students will be exposed to critical theory with regards to social media including basic techniques in collection and analysis. Open source computer software programs are used to enhance individual analytical products. A threaded discussion of the psycho-socio aspects of intelligence analysis of social media is integrated into course material.

INTL 625 Intelligence and Business Strategy
This course examines the interconnections between competitive intelligence and business strategy. The course provides a detailed overview of the business strategy field, highlighting influential thinkers, key concepts and core analytical frameworks. It describes the evolution of competitive intelligence and strategy in response to current management trends, such as the drive for innovation and the rise of big data. Throughout the course, students have the opportunity to apply both competitive intelligence methods and strategy frameworks to multidisciplinary case studies drawn from a variety of industries and countries.

INTL 626 Financial Intelligence Analysis
This course examines the nature and scope of financial crimes and many of the tools used by law enforcement in the preparation of a financial case. Included in this course is a detailed treatment of the following: laws which serve to aid in the detection and prosecution of these crimes, the types of business records available, types of bank records available, an examination of offshore business and banking operations, and the collection and analysis of this information, with emphasis placed on Net Worth and Expenditure Analysis. In addition, special treatment is given to the detection and prosecution of money laundering, various types of money laundering schemes, and the relationship of money laundering to terrorism.

INTL 638 Social Network Analysis
Social Network Analysis (SNA) is a relevant skill for any analyst in the Intelligence Community, both in the private and public sectors. SNA, however, is much broader than mining the most recent Tweets and creating basic link analysis diagrams. Underpinned by the principles of network theory, sociology, and computational social science, the purpose of this course is to expose students to an array of tools, applications, and techniques across the spectrum of network analytics. Course content will cover both visualization and analysis. The course will culminate with a final project of the student’s choosing using network analysis and other analytic techniques to address an intelligence question in the national security, law enforcement, or competitive intelligence domain.

INTL 655 Managing Strategic Intelligence Analysis
This course is designed to examine the fundamentals of strategy, the strategic estimative process and the management of a “real” strategic intelligence product. In addition to an examination of the theoretical materials, students will apply these materials to “real life” questions posed by senior decision-makers involved in the federal government, business, and/or academia. 3 credits.

INTL 675/695 Internship/Co-op
A period of employment (minimum of 200 hours) as an intelligence analyst with a government or international agency or corporation during which certain experience objectives must be met. Internship unpaid; co-op paid. 3 credits.