

## Course #: Netflix Applied Data Science Boot Camp

Section 01, Spring 2021 – 3 credits

Course Information:	Instructor Information:	Office Hours:
Schedule	Name	Schedule
Room	Phone number	Schedule
3 Credits	email	

### COURSE DESCRIPTION, PREREQUISITES

Discussion and application of industry-standard data analytics tools and techniques to collect, analyze, summarize and report data.

**Pre-requisites:** CS or EE or MATH majors & master's degree candidates (or alumni standing); prior completion of CSC 170 or technical assessment

### COURSE RATIONALE

This course provides students the key skills required to collect, analyze, summarize and report data using industry-standard data analytic tools and techniques.

The course is split into three modules. In the first module students will learn how to perform exploratory data analysis using Python tools such as Pandas, Matplotlib and Plotly. In the second module, they will also learn about designing and querying databases using SQL and Spark. In the last module, students will learn how to model, optimize and evaluate queried data using Scipy, scikit-learn and TensorFlow. Throughout the course, students will learn to solve real-world data analysis problems through critical thinking and computer programming.

By the end of this course, students will complete a series of projects and scenario-based assignments to supplement their professional portfolios. The course is recommended for students seeking employment in technical roles such as a data or business analyst, or entry-level roles in the fields of data science or data engineering.

### COURSE GOALS AND LEARNING OUTCOMES

#### **Course Goals**

The major goals to be achieved in this course are to:

- Develop fluency in programmatic, statistical, and visual analysis using Python.
- Implement database design, query data with SQL and work with big data at scale.
- Implement statistical modeling, test and train machine learning algorithms, and apply optimization techniques.

#### **Program Educational Outcomes**

Students taking this course will have opportunities to develop knowledge and skills related to selected NSU Engineering Department Program Educational Outcomes:

- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics;
- The impact of engineering solutions in global, economic, environmental, and societal contexts.

### COURSE MATERIALS

Materials, scenario data, and examples will be provided.

### **Required Tools**

- Anaconda for Python 3.8
- SQL and SparkSQL

### **PRIMARY METHOD(S) OF INSTRUCTION**

Lecture, discussion, demonstrations, and hands-on practice activities.

### **COURSE OUTLINE**

This section contains a high-level description of the modules in the course:

Module	Description	Objectives
I. Exploratory Data Analysis	This module covers the foundations of exploratory data analysis including common data analytic workflows, Python data libraries and statistical concepts. The material covers both qualitative analysis using visualization libraries and summary statistics as well as quantitative analysis using statistical tests and confidence intervals.	<ul style="list-style-type: none"><li>● Import and manipulate tabular data using Pandas.</li><li>● Design compelling data visualizations using Matplotlib and Plotly.</li><li>● Calculate summary statistics on numerical data.</li><li>● Design and implement hypothesis-driven statistical tests.</li></ul>
II. Data Engineering	This module covers data engineering fundamentals including database structures, building and querying SQL databases, and querying from big data sources. The material will cover SQL database concepts using PostgreSQL and big data concepts using Spark.	<ul style="list-style-type: none"><li>● Implement a SQL database to encapsulate data from multiple sources.</li><li>● Perform common SQL actions such as creating, reading, updating and deleting data from a database.</li><li>● Design and optimize big data queries using Spark framework.</li></ul>

III. Data Modelling and Optimization	This module covers the basics of data modelling and optimization using supervised and unsupervised model designs. The material will apply statistical concepts from previous modules to design predictive models as well as establish a model building workflow that students can apply to their own preferred data model.	<ul style="list-style-type: none"> <li>● Apply statistical and machine learning models to multi-factor datasets.</li> <li>● Evaluate model performance using accuracy, bias and runtime.</li> <li>● Optimize input data and model performance through feature selection and hyperparameter tuning.</li> </ul>
--------------------------------------	--	---

*The above outline is subject to change at the discretion of the instructor or depending upon the progress of the class.*

### **EVALUATION / ASSESSMENT METHODS**

In-class activities, homework assignments, and projects will be used to determine course grades:

- Attendance/Participation - 10%
- Take Home Assignments and Assessments - 30%
- Projects (3) - 60%

### **ATTENDANCE**

A student will be permitted one “unexcused” absence per semester hour of credit. Please review **the NSU 2019-2020 University Catalog, Page 44.**

### **LATE SUBMISSION POLICY**

Homework is due on the specified due date. Please notify the instructor in advance if your timely submission is problematic. Late submissions will be penalized. Products more than 1 week late will not be accepted.

### **MAKE-UP EXAM/ASSIGNMENT POLICY**

Make-up assignments will not be given unless an approved medical or other absence is confirmed with the instructor. The approval should be sought prior to the exam date. Failing assignment scores may be resubmitted at instructor's discretion.

**Special Student Services:** In accordance with section 504 of the Rehabilitation Act of 1973, and the Americans with Disabilities Act (ADA) of 1990, students with disabilities should notify the the Office of Accessibility Services/International Student Services (O.A.S.I.S.), Mrs. Doral Jackson, Suite 121, James Bowser Building, 757-823-2009. Please also see a university description of OASIS in the **NSU 2019-2020 University Catalog, Page 17.**

### **ACADEMIC HONESTY:**

As emerging scholars in science and engineering fields, it is expected that you will possess intellectual integrity. A discussion of academic honesty may be found in the **NSU 2019-2020 University Catalog, Page 44.**