Utah System of Higher Education

The Gateway, Salt Lake City, UT 84101

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Data Analytics	**Course Description**

Catalog Year: 2025, Required Hours: 450, Credits: 15

Foundational Courses (Required Hours: 450, Credits: 15)

Aligned (Required Hours: 330, Credits: 11)	Credits	Hours

TEDA 1010	**Introduction to Spreadsheet Analytics**	**1.00**	**30.00**

Students will learn the basics of statistics functions and concepts within a spreadsheet framework. Students will learn how to look at data and the basics of describing data. Focus will be on thinking critically about data. Students will build understanding of correlation vs. causation and basic ethics when handling data. Students will practice calculating significant values such as outliers, interquartile ranges, and the differences between types of data.

Objectives:
• Describe the basic concepts of a function.
• Calculate mean, median, mode, standard deviation, interquartile range, linear regression, correlation, and outliers.
• Identify different data types and how they are handled.
• Recognize different types of bias and how it affects data handling.
• Demonstrate proper ethics when handling data.
• Analyze correlation and causation and when they are and are not related.

TEDA 1020	**SQL Fundamentals**	**1.00**	**30.00**

The SQL Fundamentals course familiarizes students with concepts of relational databases and how to access this data using SQL queries. A series of database application projects will teach students to pull, filter, aggregate, and join data. Students will also learn how to restore a database and save queried data to a database. They also learn basic navigation within the database. Students will build working knowledge and hands-on familiarity with SQL using industry software.

Objectives:
• Connect to a SQL server.
• Restore a database from a backup file.
• Source data from a SQL server.
• Insert data into a SQL server.
• Save queried data to a database.
• Demonstrate proficiency with basic queries, filters, and aggregates to pull relevant data.

TEDA 1030	**Python Programming**	**3.00**	**90.00**

The Python Programming course introduces the Python programming language. Topics include basic Python syntax, procedural programming concepts, data types, decision and control structures, working with data analytics-related Python libraries, and creating and running functions. Students use both command prompt and industry standard integrated development environments (IDEs) to create and run their Python code. Students completing this course are able to perform basic tasks in Python related to the work of the entry-level data practitioner.

Objectives:
• Demonstrate competency using an interactive development environment to write Python code.
• Write basic Python code to structure, clean, and analyze data.
• Demonstrate competency with conditionals for decision and control structures and data modifications.
• Demonstrate proficiency with for loop and while loop coding.
• Demonstrate proficiency with data types and functions for analysis and use of data.

TEDA 1040	**Advanced Python for Data Analytics**	**2.00**	**60.00**

The Advanced Python for Data Analytics course builds upon the principles learned in Python Programming. In this course, students learn to access remote databases using Python. Students then use the data they have pulled to create, manipulate, and filter data using multiple industry standard libraries essential for data analytics. Students also learn to create ad hoc visualizations with Python ok, code. Students who complete this course are able to use a variety of Python libraries in the data analytics industry to collect, clean, analyze, and present data.

Objectives:
• Create data visualizations using Python code.
• Demonstrate competency with using filters and aggregations to understand data.
• Use critical thinking to perceive data analytics problems and find their solutions.
• Demonstrate proficiency with data types and functions for analysis and use of data.

TEDA 1050	Data Visualization Fundamentals	2.00	60.00

The Data Visualization Fundamentals course teaches key principles in analyzing data using visualizations and best practices in presenting data to stakeholders through a project-based curriculum. Students learn foundational principles of data visualization and how to tell a story using data as well as how visualizations fit into the data cycle. The students learn to use Tableau and Microsoft Power BI to produce multiple visualizations as well as best practices for clear and accurate visuals. Students who complete this course are able to apply data visualization principles using various software.

Objectives:
• Install standard data visualization software.
• Demonstrate competency regarding when to use different graph types.
• Create and apply common graphics to data.
• Demonstrate competency in interpreting the output of a graphic and its applications to business.
• Demonstrate competency in understanding statistics concepts through visualizations.

TEDA 2050	Capstone Project I	2.00	60.00

In the Capstone Project I course, students find and use their own dataset and go through the complete data cycle. They collect, clean, transform, analyze, and visualize data using the tools and techniques learned throughout the program. Students use technology and programming skills learned in the program to clean and manipulate data in a professional manner. Programs and processes learned throughout the program are used to move step-by-step through analysis processes and procedures with a focus on industry accepted best practices. They then present their findings using a visualization tool of their choice. Students who complete this course are able to complete a basic data based project from the proposal stage all the way to presenting their findings.

Objectives:
• Submit a formal proposal for a project of the student's choice.
• Set and meet project deadlines.
• Apply techniques learned throughout the program to collect, clean, transform, analyze, and visualize real world data.
• Create a written report of the findings of the project.
• Present findings using a visualization tool.

Supplemental Courses Varies by Institution (Required Hours: 120, Credits: 4)

Non-Aligned (Electives) (Required Hours: 120, Credits: 4)		Credits	Hours
TEDA 1035	**Machine Learning (Python)**	2.00	60.00

The Machine Learning course teaches the basics of machine learning and how to use industry standard Python libraries. Students will learn to pre-process data, identify the differences between various algorithms, and practice validating models. The differences between supervised, unsupervised, and reinforcement algorithms will be detailed, as well as the appropriate uses of each. The course also introduces students to complications that arise when interpreting the output of a machine learning model. Students who complete this course are able to find solutions to a range of challenges faced in predictive data analysis using machine learning.

Objectives:
• Demonstrate knowledge of the differences between major machine learning algorithms.
• Demonstrate proficiency with Python to pre-process data to prepare for use in machine learning.
• Use Python to pre-process data in preparation for use in machine learning.
• Train multiple machine learning models using real-world data.
• Demonstrate accepted methods of model validation.
• Utilize machine learning algorithms to process data for pattern and problem detection.

TEDA 1065	Manufacturing Analytics	2.00	60.00

The Manufacturing Analytics course provides students with experience working as a data practitioner in the field of manufacturing. Utilizing real-world situations, they gain experience with the types of tasks which are required of data practitioners working in manufacturing. Students go through the data cycle with multiple sets of data and different situations that can arise in manufacturing situations. Students optimize manufacturing data and practice predictive maintenance. They access a Programmable Logic Controller (PLC)-driven manufacturing system to a database and process that data as though in a live working environment utilizing data analysis programs and techniques. Students who complete this course are able to work with manufacturing data.

Objectives:
• Apply techniques learned throughout the program on datasets from the field of manufacturing.
• Analyze data from multiple real-world scenarios.
• Present findings using a visualization tool.
• Setup data transfer from a PLC-driven manufacturing system to a database using Kepware.
• Analyze data in a manufacturing optimization scenario.
• Analyze data in a manufacturing predictive maintenance scenario.

TEDA 1070	R for Data Analytics	2.00	60.00

The R for Data Analytics course teaches basic statistical analysis and visualization techniques using R. Students learn R syntax and how it differs from Python and other languages in data analysis. Students learn file input and output, data manipulation, and a variety of visualization techniques using R throughout the data cycle. They take a dataset through the data cycle using R and analyze the value of R against their prior experience with Python and SQL. Student installs multiple R packages and utilizes them within the scope of the course to experience and analyze how these additional packages affect the process of data analysis in R. Students who complete this course are able to use R to perform basic statistical analyses and visualization techniques.

Objectives:
• Identify the basics of coding in R.
• Import data into R.
• Install the package collection tidyverse and demonstrate basic use.
• Manipulate data using dplyr.
• Visualize data in ggplot2.
• Analyze data using R.

TEDA 1080	Advanced Spreadsheets Analytics	2.00	60.00

This course will teach students how to use spreadsheets for data analysis. Students will learn how to pull data from the web into a spreadsheet and what to do with that data afterward. This will include how to find and filter information and how to use basic data-related tools used in industry for data analytics.. Students will learn how to create visualizations and dashboards in spreadsheets. We will also go over custom functions and macros to automate repeated tasks.

Objectives:
• Source data from the web into a spreadsheet.
• Prepare a raw dataset for analysis using spreadsheets.
• Employ tools for data searching, merging, splitting, and indexing.
• Use spreadsheet functions to answer questions about a dataset.
• Use PivotTables to identify important data points.
• Create dashboards and visualizations to describe data.
• Use spreadsheets to create statistical calculations.
• Create custom tools and workflows with scripting and macros.

TEDA 2055	Capstone Project II	2.00	60.00

In the Capstone Project II course, students expand on their project completed in Capstone Project I by further refining stage(s) in the data cycle such as: data collection, data cleaning, data transformation, data visualization, and/or data storytelling. They analyze strengths and weaknesses in the project and assess changes that would improve the quality and clarity of the work. They will decide how best to expand and/or refine their data project and then present to their peers that analysis. They show their analysis of the project and describe how they expanded upon their data project from Capstone I. Students who complete this course are able to complete an advanced data based project from the proposal stage all the way to presenting their findings.

Objectives:
• Apply techniques learned throughout the program to collect, clean, transform, and analyze real world data.
• Present findings using a visualization tool.
• Demonstrate industry best-practices and ethics throughout.
• Report on the differences between both capstone projects and the reasons those changes were made.
• Explain key decisions made and significant findings.

TEDA 2901	Special Applications	4.00	120.00

The Special Applications course gives students the opportunity to expand their knowledge in a specific industry or skill. The student participates in defining how this information applies to data analytics and demonstrates how the skills learned within the Data Analytics program relate to this knowledge or skill. Student will also provide context and industry relevance to provide value to the experience. Student will compile a report on the data analysis opportunities observed throughout the course and how their data analytics knowledge affects their understanding of the situation. Students who complete this course are able to expand their knowledge in a specific industry or skill related to data analytics.

Objectives:
• Illustrate context of industry-relevance and data analysis opportunities.
• Define data analysis opportunities within a specific industry or skill.
• Report on observed data analysis opportunities.
• Identify the data analysis tool(s) best used within the scope of the course.
• Complete all other objectives in the course as defined by the instructor.

TEDA 2999	Externship	3.00	135.00

The Data Analytics Externship course gives students real-world experience in a work-based environment. Entry-level data practitioner skills such as data collection, data cleaning, data transformation, data visualization, and/or data storytelling are utilized in a non-simulated work environment. Students coordinate with faculty and business partners to define or analyze key goals and scope of the externship as well as stakeholder needs. At the end of their externship, students present an example of what they have completed within the time frame of the externship. Work-based activities will be provided by cooperating business. Students who complete this course have real world experience applying what they have learned throughout their time in the program.

Objectives:
• Apply techniques learned throughout the program to collect, clean, transform, and analyze real world data.
• Present findings using a visualization tool.
• Utilize the data cycle in a live work-based environment.
• Use company defined programs and data to complete job duties within the scope of data analytics-related work.
• Demonstrate ability to follow reasonable employer directions and/or mandates.