

STRANDS AND STANDARDS

DATA ANALYTICS



Course Description

This course serves as an introduction to the fundamental principles of data analytics. Students will explore the lifecycle of data, from collection and cleaning to analysis and visualization. Through a blend of theoretical concepts and practical applications, learners will gain proficiency in using various tools and techniques to interpret complex datasets. Emphasis will be placed on understanding how data-driven decisions can be made and the ethical considerations involved in data handling. By the end of the course, students will be equipped with the skills necessary to tackle real-world problems using data analytics methodologies.

Intended Grade Level	9-12
Units of Credit	0.5
Core Code	35.02.00.00.033
Concurrent Enrollment Core Code	35.02.00.13.033
Prerequisite	N/A
Skill Certification Test Number	Coming Soon
Skill Certification Cut Score	N/A
Test Weight	0.5
License Area of Concentration	CTE and/or Secondary Education 6-12
Required Endorsement(s)	
Endorsement 1	Programming & Software Development
Endorsement 2	Web Development

STRAND 1: Foundations of Data Analytics

Students will understand the foundational concept of data analytics.

Standard 1

Understand the role and importance of data in various fields and industries.

Standard 2

Identify and describe the essential skills, knowledge, and abilities needed to be a data practitioner.

Standard 3

Differentiate between types of data

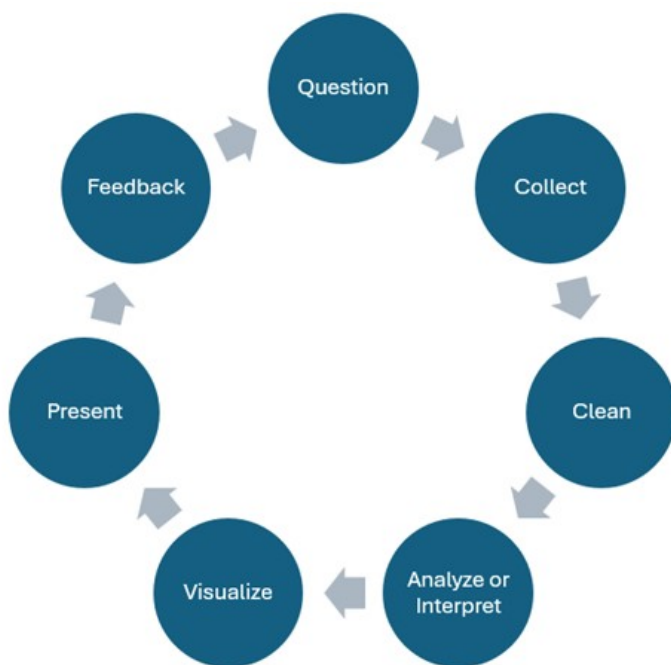
- Quantitative vs. Qualitative
- Structured vs. Unstructured

STRAND 2: The Data Cycle

Students will be able to identify the steps of the Data Cycle and how it applies to analyzing a dataset, including how to use that process to explore data.

Standard 1

Define the Data Cycle and explain each of its stages:



- Including backwards steps (ex: analyze step reveals the need for more cleaning before proceeding)
- Understand that data collection and cleaning is usually 50-70% of the cycle

Standard 2

Examine real-world examples of the Data Cycle in action across various sectors, including business, healthcare, technology, etc.

STRAND 3: Data Handling and Analysis

Students will identify different data types and understand how they're handled in data analysis and visualization processes.

Standard 1

Recognize various types of data. Distinguish between different data types based on their characteristics and understand their representation in datasets.

- Categorical
- Numerical
- Discrete
- Continuous

Standard 2

Comprehend how different data types are handled in data analysis and visualization processes.

Understand the use of the data cycle as a function of exploratory data analysis, ensuring accuracy and reliability in data analysis tasks.

STRAND 4: Data Functions and Statistical Visualization

Students will utilize the data cycle in practicing basic data functions, including how to find and/or use domain, range, independent and dependent variables, and how to represent functions algebraically. Students will also be introduced to the most common statistical charts and basic rules of usage. (This Strand could be taught using a program as simple as a spreadsheet.)

Standard 1

Recognize and use the proper data/spreadsheet functions for a specific task or scenario.

- Syntax
- Anatomy
- Nesting
- Return

Standard 2

Understand basic concepts of a data/spreadsheet function.

- Input/Output
- Domain
- Range
- Independent Variable
- Dependent Variable
- Graphing Functions
- Evaluating Functions

Standard 3

Represent different formats and types of data/spreadsheet functions.

- Algebraic
- Graphical
- Numerical

Standard 4

Understanding how data/spreadsheet functions behave when exploring and analyzing data.

- Operators
- Incremental
- Decremental
- Conditionals
- Skew

Standard 5

Understand how to efficiently create, understand, and use Charts

- Bar Charts
- Histograms
- Line Charts
- Scatter Plots

STRAND 5: Data Ethics and Bias

Students will demonstrate proper ethics when handling data and how ethics impacts each stage within the Data Cycle (i.e. collection, storage, and sharing of data).

Standard 1

Recognize different types of bias that can affect data, including selection bias, confirmation bias, and algorithmic bias. Understand the characteristics and manifestations of easy type of bias and be able to identify them in datasets and analytical processes.

- Privacy
- Confidentiality
- Integrity
- Security
- Government Regulations

Standard 2

How bias can affect data in all areas, but especially in these stages:

- Collection
- Analysis
- Interpretation
- Decision-making

Standard 3

Implications of bias on data-driven outcomes and the importance of mitigating bias in data handling practices.

- Validity
- Reliability
- Fairness
- Bias mitigation

STRAND 6: Data Integration and Query Development

Standard 1

- Master the intricacies of data management by effectively inserting, updating, and deleting data within complex database systems, ensuring data integrity and consistency.

Standard 2

- Students will not only create and execute SQL queries but also optimize them for performance, troubleshoot issues, and understand the implications of different relational database designs and normalization processes.

Standard 3

- Gain advanced proficiency in data analysis tools and software such as Excel, Python, or R, by performing sophisticated data manipulation, visualization, and statistical analysis, thereby transforming raw data into actionable insights.

STRAND 7: Project-Based Learning and Presentation

Standard 1

- Complete a capstone project that involves taking a real-world dataset through the entire Data Cycle.

Standard 2

- Develop and refine skills in data visualization and storytelling to effectively communicate findings.

Standard 3

- Present the completed data project to peers and instructors, demonstrating mastery of the Data Cycle.

Performance Skills:

- Students will be able to gather relevant data from multiple sources, ensuring data quality and accuracy.
- Students will be proficient in identifying and correcting errors, handling missing data, and preparing datasets for analysis.
- Students will be competent in applying statistical methods to extract meaningful insights from data.
- Students will interpret data results within context, identifying trends, and drawing valid conclusions.
- Students will have the ability to create clear and effective visual representations of data using charts, graphs, and dashboards.
- Students will understand and apply ethical considerations in data handling, ensuring responsible and fair use of data.