Data Science I
Course

Course Description:

Long before the century turned over, this age was identified as the information age, a time where information is the universal concept of social being and growth, much like industry was the universal concept of the previous age. The ability to access and process data and turn it into useful information is the skill that determines the success or failure of companies large and small. This skill set is now so prevalent that all students need to develop a familiarity with it to function efficiently in society. The foundation tools and techniques that encompass this skill set are the subject of this course. This course sits at the nexus of mathematical and computational thinking. It relies heavily on the mathematical and statistical reasoning that is developed during primary education and contextualizes those concepts with computational solutions. This course is a foundation and has no prerequisites save a cursory understanding of algebraic and statistical concepts (such as functions, graphs, and measures of central tendency). No computing knowledge is assumed. Data Science is a field where mathematical principles are applied using technology and computing skills to solve real world problems.

Course Competency 1
DS1-1 Demonstrate how Data Science can be used to impact school, work, and leisure time
1.1: Demonstrate how data science impacts their lives.
1.2: Identify and differentiate between different data governance standards.
1.3: Identify ethical issues in data science.
1.4: Give examples of how Data Science is used in the real world
1.5: Identify and compare potential bias issues in data science

Course Competency 2
DS1-2 Explore, research, and present findings on data science careers
2.1: Research post-secondary options for data science careers, including industry certifications, college options and organizational training.
2.2: Identify and distinguish different skills sets used in data science
2.3: Identify different job opportunities within the data science field and how such job types are interrelated

Course Competency 3
DS1-3 Formulate Questions to Clarify the problem at hand and formulate 1 or more questions that can be answered with data analysis
3.1: Identify the objectives of data and information management
3.2: Determine whether a problem involves categorical or quantitative data
3.3: Frame a statistical question of interest in terms of measurable data.

Course Competency 4
DS1-4 Design and implement a plan to collect appropriate data to answer a research question
4.1: Define "spreadsheet" and "database" and describe ways they may be used.
4.2: Describe the factors that must be considered in distributing data effectively and how a simple model can be used to obtain at least a first-cut distribution.

Course Competency 5
DS1-5 Analyze data by selecting appropriate graphical and numerical methods
5.1: Implement spreadsheet functions (i.e., preset formulas), formulas, conditional formatting, cell referencing, and pivot tables.
5.2: Create data tables and graphical representations of data including two-way tables, scatterplots, bar graphs, histograms, stem plots and dot plots from a spreadsheet software.
5.3: Describe the characteristics of data tables and how they benefit end user experiences

Course Competency 6
DS1-6 Identify the general concepts of databases/data tools and how to utilize design thinking to produce solutions that are clean and thoughtful.
6.1: Identify and distinguish between variations of techniques (Artificial Intelligence, Machine Learning, etc.)
6.2: Provide definitions of key terms and concepts that describe the database environment
6.3: Describe and build the major components of the database environment and explain how these components interact with each other
6.4: Assess end user data and information requirements and develop a logical model to fit those requirements

Course Competency 7
DS1-7 Build a database based on designed model, identify implementation policies and procedures, and establish plans for testing/debugging a data science solution.
7.1: Describe a Database Management System Language (DMBS) like SQL and summarize its basic operators.
7.2: Formulate single table DMBS (SQL) queries.
7.3: Formulate DMBS (SQL) queries that use functions.
7.4: Use of the group by and order by clauses in DMBS (SQL) queries.

Course Competency 8
DS1-8 Deploy a data science solution in a production environment, follow implementation procedures, and develop a plan for long term maintenance.
8.1: Describe the differences between the process of deployment and implementation of a solution.
8.2: Understand the components and key steps to a successful deployment.

Course Competency 9
DS1-9 Analyze results by interpreting the information provided by the data analysis and how its interpretation supports possible answers to the question or problem being investigated.
9.1: Utilize visual reporting and statistic tools to perform 1 and 2 sample t-tests and linear regression testing using technology (not by hand)
9.2: Summarize results.
9.3: Identify and express areas for further study or investigation based on the analysis of data
9.4: Create a simple dashboard with appropriate tables and charts to show the data that is being analyzed.