Week 1: Introduction to Data Analytics in Health

- Learning Objective:
  1. Understand the role of data analytics in health systems.
  2. Get an overview of health data types and sources.
  3. Learn about the course structure and expectations.
- To do: Write a reflection on how data analytics can improve health outcomes, citing examples from current health systems.

Week 2: Basics of Structured Query Language (SQL)

- Learning Objective:
  1. Introduction to SQL and its importance in data analysis.
  2. Learn basic SQL commands (SELECT, INSERT, UPDATE, DELETE).
  3. Understand how to query health-related databases.
- To do: Perform basic SQL queries on a provided health database to extract specific data points.

Week 3: Advanced SQL Techniques

- Learning Objective:
  1. Master advanced SQL commands (JOINs, subqueries, indexes).
  2. Optimize queries for performance.
  3. Apply advanced SQL techniques to complex health data scenarios.
- To do: Complete a series of advanced SQL exercises involving JOINs and subqueries on a health database.

Week 4: Introduction to Business Intelligence (BI) Tools

- Learning Objective:
  1. Overview of BI tools (Power BI, Tableau).
  2. Understand the interface and functionalities of BI tools.
  3. Import and visualize health data using BI tools.
- To do: Create basic visualizations using Power BI or Tableau with provided health data sets.

Week 5: Advanced BI Techniques

- Learning Objective:
  1. Learn advanced features of Power BI/Tableau (dashboards, calculated fields).
  2. Create interactive and dynamic visualizations.
  3. Analyze health trends using BI tools.
- To do: Develop a comprehensive dashboard in Power BI or Tableau that presents health data insights.

Week 6: Introduction to R/Python for Data Analysis

- Learning Objective:
  1. Get an overview of R and Python for health data analysis.
  2. Set up the development environment (RStudio, Jupyter Notebook).
  3. Write basic scripts for data manipulation.
- To do: Write a script in R or Python to clean and prepare a health data set for analysis.

Week 7: Data Visualization with R/Python

- Learning Objective:
  1. Learn data visualization libraries (ggplot2 for R, Matplotlib/Seaborn for Python).
  2. Create basic plots and charts.
  3. Interpret visualizations to derive insights.
- To do: Create a series of plots and charts to visualize a provided health data set using R or Python.

Week 8: Machine Learning Fundamentals

- Learning Objective:
  1. Introduction to machine learning concepts.
  2. Understand supervised vs. unsupervised learning.
  3. Learn about common algorithms used in health data analysis.
- To do: Write a report summarizing the differences between supervised and unsupervised learning with examples from health data.

Week 9: Implementing Machine Learning Models

- Learning Objective:
  1. Learn to implement machine learning models in R/Python.
  2. Train and test models using health data.
  3. Evaluate model performance.
- To do: Implement a simple machine learning model on a health data set and evaluate its performance.

Week 10: Advanced Machine Learning Techniques

- Learning Objective:
  1. Explore advanced machine learning algorithms (e.g., decision trees, SVM).
  2. Understand hyperparameter tuning.
  3. Apply advanced models to health data.
- To do: Apply an advanced machine learning algorithm to a health data set and optimize its parameters.

Week 11: Introduction to Artificial Intelligence (AI)

- Learning Objective:
  1. Understand the basics of AI and its applications in health.
  2. Learn about AI techniques (e.g., neural networks).
  3. Explore case studies of AI in health.
- To do: Analyze a case study where AI has been applied to improve health outcomes and present findings.

Week 12: AI Applications in Health

- Learning Objective:
  1. Implement basic AI models using R/Python.
  2. Use AI to predict health outcomes.
  3. Understand ethical considerations in AI.
- To do: Develop a simple AI model to predict a health outcome and discuss the ethical implications of its use.

Week 13: Data Mining Techniques

- Learning Objective:
  1. Introduction to data mining concepts.
  2. Learn data mining techniques (e.g., clustering, association).
  3. Apply data mining to discover patterns in health data.
- To do: Perform a data mining exercise on a health data set and report on the patterns discovered.

Week 14: Predictive Modeling for Health Outcomes

- Learning Objective:
  1. Understand predictive modeling concepts.
  2. Learn to build predictive models for health outcomes.
  3. Evaluate the accuracy and reliability of predictive models.
- To do: Build and evaluate a predictive model for a specific health outcome using provided data.

Week 15: Integrating Analytics into Health Strategies

- Learning Objective:
  1. Learn how to integrate data analytics into health strategies.
  2. Understand the impact of analytics on health decision-making.
  3. Explore real-world applications and case studies.
- To do: Propose a data-driven health strategy based on analytics and present a detailed plan.

Week 16: Course Review and Final Project

- Learning Objective:

1. Review key concepts from the course.
2. Work on a final project that integrates multiple course components.
3. Present and critique peer projects.

- To do: Complete a final project that involves analyzing a comprehensive health data set using SQL, BI tools, R/Python, machine learning, and AI. Present the findings and strategy recommendations to the class.