VGURU TECH ACADEMY

DATA SCIENCE

Course Syllabus

Level: Beginner

Part 1: Course Description

This course introduces young learners to the exciting world of data science. Through interactive, age-appropriate activities, students will learn the basics of data collection, simple analysis, and how to interpret information in a fun and engaging way.

Part 2: Student Learning Outcomes & Objectives

Student Learning Outcomes

- Understand the concept of data and its everyday uses.
- Learn to collect basic data using simple tools.
- Develop basic skills in sorting and categorizing data.
- Introduction to simple charts and graphs.

Course Objectives

- To instill an early interest in data science through playful and engaging activities that simplify complex concepts into child-friendly learning experiences.

Part 3: Topic Outline

Prerequisite/Corequisites

- Familiarity with Basic Computer Operations: The ability to use a mouse or touchscreen to navigate simple interfaces is often a skill children develop through educational games or computer use at home or school.
- Understanding of Simple Patterns and Categories: Basic skills in recognizing patterns and categories, like grouping objects by color or shape, which are foundational concepts in data science.

- ➔ Session 1: Introduction to Data Science
  - ◆ Understanding what data is and how it's used in everyday life.
- ➔ Session 2: Fun with Data
  - ◆ Simple data collection activities using everyday objects.
- ➔ Session 3: Sorting and Organizing
  - ◆ Basic concepts of sorting data by size, color, and type.
- ➔ Session 4: Visualizing Data
  - ◆ Creating basic charts and graphs with simple data sets.
- ➔ Session 5: Data in Nature
  - ◆ Observing and recording natural phenomena like weather or plant growth.
- ➔ Session 6: Data in Games and Sports
  - ◆ Understanding scores, statistics, and simple probability in games.
- ➔ Session 7: Storytelling with Data
  - ◆ Using data to tell a story or describe an event.
- ➔ Session 8: Review and Project
  - ◆ Students create a simple data project based on their interests.

Level: Intermediate

Part 1: Course Description

Building upon the basics, this course delves deeper into data analysis, exploring more advanced methods of data collection and interpretation. Students will learn about statistical concepts and use basic software tools to analyze data.

Part 2: Student Learning Outcomes & Objectives

Student Learning Outcomes

- Understand more complex data types and sources.
- Learn to use basic software for data analysis.
- Develop skills in creating more advanced charts and graphs.
- Introduction to basic statistical concepts.
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Course Objectives

- To expand the knowledge of data science for middle-grade students, integrating more complex concepts and tools, and making them confident in handling and interpreting data.

Part 3: Topic Outline

Prerequisite/Corequisites

- Basic Understanding of Coding Concepts: Familiarity with fundamental coding principles, such as sequences and loops, which can be gained through beginner-level programming platforms like Scratch.
- Introduction to Data Concepts: Basic awareness of data, such as understanding what a chart or graph represents, which can be part of math education at this level.

- Session 1: Deep Dive into Data Types
  - Exploring different types of data and their sources.
- Session 2: Introduction to Data Software
  - Learning to use simple software tools for data analysis.
- Session 3: Advanced Data Visualization
  - Creating more complex charts like line graphs and scatter plots.
- Session 4: Basic Statistics
  - Introduction to mean, median, mode, and range.
- Session 5: Data-Driven Decision Making
  - Using data to make informed decisions in scenarios.
- Session 6: The World of Probability
  - Basic concepts in probability and their real-world applications.
- Session 7: Data Project
  - Students undertake a small-scale data analysis project.
- Session 8: Presentation Skills
  - Presenting data findings effectively.

Level: Advanced

Part 1: Course Description

This advanced course is tailored for teenagers, offering in-depth knowledge of data science concepts. Students will learn about big data, machine learning basics, and complex data analysis techniques using sophisticated software tools.

Part 2: Student Learning Outcomes & Objectives

Student Learning Outcomes

- Understand advanced data science concepts including big data and machine learning.
- Master sophisticated data analysis tools and software.
- Develop complex data visualization skills.
- Conduct in-depth data projects from start to finish.

Course Objectives

To provide a comprehensive understanding of modern data science, equipping students with the skills necessary to undertake complex data projects and preparing them for future academic and career opportunities in the field.

Part 3: Topic Outline

Prerequisite/Corequisites

- Experience with a Programming Language: Basic proficiency in a programming language, preferably one commonly used in data science, like Python. This could be through school courses, online platforms, or self-learning.
- Basic Knowledge of Statistical Concepts: Understanding of fundamental statistical ideas such as mean, median, and mode, often taught in middle and high school math classes.

- Session 1: Exploring Big Data
  - Understanding the concept and applications of big data.
- Session 2: Basics of Machine Learning
  - An introduction to machine learning and its uses in data science.
- Session 3: Advanced Data Analysis Techniques
  - Learning sophisticated methods for analyzing complex data sets.
- Session 4: Complex Data Visualization
  - Techniques for visualizing large and complex data sets.
- Session 5: Data Ethics
  - Discussing the ethical considerations in data science.
- Session 6: Coding for Data Science
  - Introduction to programming languages like Python for data analysis.
- Session 7: Capstone Project Planning
  - Planning and starting a comprehensive data science project.
- Session 8: Capstone Project Presentation
  - Finalizing and presenting the capstone project.