COURSE SYLLABUS

Data Analytics & AI Certificate Program Online

This program prepares students for employment as data analysts, business intelligence analysts, and AI application developers across technology, business, healthcare, finance, and government sectors. Graduates will be able to collect, analyze, visualize, and interpret data using Python, SQL, Tableau, and machine learning tools, and develop AI-powered solutions using Flask and OpenAI frameworks.

Group classes in Live Online and onsite training is available for this course. For more information, email partnerships@vdci.edu or visit: https://vdci.edu/certificates/data-analytics-ai-certificate-online

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Course Outline

This package includes these courses

- Excel for Data Analytics Course Online (18 Hours)
- Data Analytics Foundations Course Online (12 Hours)
- Python for Data Science Course Online (30 Hours)
- SQL Bootcamp Online (18 Hours)
- Python for Automation Course Online (6 Hours)
- Python Data Visualization & Interactive Dashboards Course Online (24 Hours)
- Python Machine Learning Course Online (30 Hours)
- Tableau Bootcamp Online (12 Hours)
- Python Machine Learning Advanced Course Online (30 Hours)
- Python for AI: Create AI Apps with Flask & OpenAI Course Online (30 Hours)
- Data Science Capstone Project (18 Hours)

Attend the AI for Data Analytics course for free as part of this certificate. Choose your date after you register for the program.

AI for Data Analytics Course Online

Excel for Data Analytics Course Online

Get hands-on with Excel's most capable features to streamline data analysis, sharpen reporting accuracy, and pull meaningful insights from large datasets in this practical training.

- Apply Excel functions and formulas for organizing, calculating, and summarizing data with efficiency
- Design and tailor visual charts, including line, column, and pie charts, to present data clearly

- Work with logical statements, database functions, and data validation to manage and filter large datasets
- Construct and adjust Pivot Tables to quickly summarize, sort, and group information
- Discover advanced tools such as named ranges, date calculations, and macro recording for custom reporting
- Use auditing techniques, cell locking, and Excel hot keys to streamline your spreadsheet workflow

Data Analytics Foundations Course Online

Learn the fundamentals of data analytics, including descriptive and inferential statistics, and how various industries and organizations rely on data for forecasting and decision making. Explore statistical analysis and modeling, covering statistical algorithms, theorems, and models.

- Grasp core statistical concepts including measures of central tendency, data dispersion, and the normal curve
- Examine descriptive and inferential statistics, including probability distributions like binomial and Poisson
- Analyze and forecast data using correlation, linear regression, and multiple regression techniques
- Put predictive analytics to work with tools like trendlines, moving averages, and scenario modeling
- Build clear data visualizations using charts, histograms, icon sets, color scales, sparklines, and pivot tables
- Explore prescriptive analytics techniques such as Solver and linear programming to sharpen decision-making

Python for Data Science Course Online

Tap into the power of Python for data-driven decision making as you build a strong command of Python programming fundamentals and move into data analysis. You'll gain the essential skills to clean and manipulate data, create insightful visualizations, and carry out statistical analysis, all through hands-on projects built around real-world datasets.

- Work with different types of data such as integers, floats, and strings
- Direct the flow of your programs with conditional statements, loops, and functions
- Reuse and streamline code through object-oriented programming
- Analyze tabular data with NumPy and Pandas
- Build graphs and visualizations with Matplotlib
- Make predictions with linear regression using scikit-learn

SQL Bootcamp Online

Learn how to extract, filter, and manipulate data efficiently using SQL with a focus on PostgreSQL fundamentals. This course covers database querying, table joins, and advanced techniques for handling large datasets.

- Write SQL queries to retrieve, filter, and sort data with efficiency
- Use joins to combine data from multiple tables and build relationships
- Apply aggregate functions like SUM, COUNT, AVG, and GROUP BY to summarize data
- Work with subqueries, CASE statements, and advanced string functions
- Streamline queries using indexes, data type conversions, and best practices
- Explore views and user-defined functions for smoother database management

Python for Automation Course Online

Learn how to use Python to extract data from websites and write loops to process multiple pages. This course covers essential

topics like HTML/CSS, Python fundamentals, web scraping techniques, data storage, scheduling, and includes real-world examples of scraping valuable data.

- Understand how websites are structured with HTML and CSS to locate and extract specific data
- Build a foundation in Python fundamentals, including variables, data types, conditionals, loops, and working with lists
- Use the Requests and Beautiful Soup libraries to scrape web content and target the information you need
- Write loops to automate data collection across multiple web pages and cut down on repetitive manual work
- Save scraped data in common formats such as text files and CSVs for analysis and reporting
- Schedule Python scripts to run automatically, supporting ongoing data collection and hands-off workflows

Python Data Visualization & Interactive Dashboards Course Online

Learn how to collect, manipulate, and analyze real-world data in this course while gaining hands-on experience with Python's NumPy and Pandas libraries. Strengthen your data visualization skills with tools like Matplotlib, Seaborn, Plotly, and Dash Enterprise, and work on real-life projects you can deploy online.

- Plan and present a data story
- Gather and manipulate data from different sources
- Uncover data stories through exploratory data analysis
- Manipulate data with the NumPy and Pandas libraries
- Use advanced Python visualization libraries like Plotly and Dash
- Build a dashboard
- Apply the rules of effective dashboard design to create professional data science solutions
- Go live with your project and deploy the dashboard on a live server

Python Machine Learning Course Online

Master the basics of machine learning, including regression analysis and classification algorithms, in this hands-on course. You'll build the skills needed to take on real-world challenges using machine learning, with an emphasis on Python programming and key data science libraries.

- How to clean and balance your data using the Pandas library
- Applying machine learning algorithms such as logistic regression and random forests with the scikit-learn library
- Choosing strong features to use as input for your algorithms
- Properly splitting data into training, testing, and cross-validation sets
- Important theoretical concepts like overfitting, variance, and bias
- Evaluating how well your machine learning models perform

Tableau Bootcamp Online

Develop the skills to turn raw data into compelling visual stories with Tableau, the industry-leading data visualization platform. This hands-on bootcamp teaches you to explore, analyze, and publish dashboards that communicate insights clearly and effectively.

- Connect to datasets in a variety of formats, then clean, filter, and structure data for effective visual storytelling
- Build a range of visualizations including bar charts, line charts, treemaps, heat maps, dual-axis charts, and advanced types like spider maps and alluvial diagrams

- Use Tableau's calculation tools to create custom fields, apply aggregates, and dig deeper into your data analysis
- Format charts with labels, tooltips, color, and axis adjustments, and build interactive map visualizations such as choropleths and proportional symbol maps
- Tailor dashboards and stories to different audiences and screen sizes using Tableau's interactivity tools
- Publish work to Tableau Cloud and export dashboards for professional sharing and collaboration

Python Machine Learning Advanced Course Online

Take your machine learning expertise to the next level in this comprehensive, hands-on course built to transform foundational ML knowledge into practical, real-world applications. Move beyond standard Jupyter notebooks and discover how professional ML engineers build and deploy machine learning systems across a wide range of domains.

- Build a complete NLP pipeline, including cleaning with RegEx, removing stopwords, lemmatizing, and vectorizing text.
- Train and evaluate a Naive Bayes machine learning model to classify movie reviews as positive or negative.
- Compare and apply pre-trained sentiment scoring systems such as TextBlob and Vader.
- Develop a recommendation engine that suggests similar products through NLP techniques.
- Learn Flask fundamentals by building search apps, integrating APIs, and serving ML models in the browser.
- Complete a capstone project by creating a Flask-powered Movie Recommender App that brings together NLP, machine learning, and web development.

Python for AI: Create AI Apps with Flask & OpenAI Course Online

Learn how to build AI-powered web applications using Flask and the OpenAI API. This course covers web development fundamentals, API integration, and AI-driven features for interactive applications.

- Set up Flask projects and create routes for handling web requests and rendering templates
- Design and style web applications with HTML, CSS, and Flask's templating system
- Integrate the OpenAI API to add AI-powered features like sentiment analysis
- Handle user input through dynamic forms and process data for real-time interactions
- Apply error handling and debugging techniques to keep your application running smoothly
- Deploy and test Flask applications for real-world use and AI-enhanced functionality

Data Science Capstone Project

Throughout this program, you will complete three capstone projects to showcase in your portfolio:

Machine Learning & AI Capstone

- Choose, clean, and engineer features from a structured dataset to train machine learning models (e.g., logistic regression, random forest), evaluate performance, and visualize results clearly.
- Deliver a professional presentation detailing your data processing workflow, modeling techniques, and insights discovered using Python libraries like pandas, scikit-learn, and Matplotlib.

Python for AI Capstone *(choose One of Two)*

- AI Chat Assistant: Build an interactive chat assistant embedded on a webpage, using Flask and JavaScript to integrate with OpenAI's API for context-aware user interactions.
- Collectibles Identification App: Develop a Flask-based web app allowing image uploads of collectible items, leveraging OpenAI to identify items, generate descriptive metadata, and dynamically display logged session history.

Python Data Visualization Capstone

- Clean, analyze, and visualize global CO_2 emissions alongside GDP and population data, highlighting trends and correlations through insightful visualizations with Matplotlib, seaborn, and plotly.
- Build a responsive Dash dashboard enabling interactive exploration of emissions data, clearly communicating insights such as regional trends, GDP-emission correlations, and emission anomalies.

You will work on your capstone projects both in and outside of class, using scheduled mentoring sessions to review your progress, ask questions, and get personalized feedback from your instructor.

See examples of data science capstone projects from students.