TECHNICAL
EDUCATION
ACADEMY

School of Computer Science

COURSE PROGRAMME

000616

ITSP007 – Fundamentals of Machine Learning and Data Science for the Oil and Gas Industry

The advent of the digital age and the exponential growth of data has sparked the transformation of numerous industries, with the Oil and Gas sector being no exception.



Learn from the Best in the Business!

Course overview

Foundation level

Why take this course

The advent of the digital age and the exponential growth of data has sparked the transformation of numerous industries, with the Oil and Gas sector being no exception. Our comprehensive training program, "Fundamentals of Machine Learning and Data Science for the Oil and Gas Industry," is designed to equip professionals with the tools and skills needed to navigate and leverage this data-centric landscape.

The program is organised into six modules, beginning with foundational data science skills. Here, participants will explore Python and R, two powerful programming languages essential to modern data science. The first module also introduces participants to the world of Excel for basic data manipulation—a crucial, often overlooked, aspect of data science.

The second module delves into data visualization and analysis, utilizing advanced features of Excel and the dynamic capabilities of Power BI. In today's data-driven decision-making processes, the ability to present data in a meaningful, visually appealing manner is of paramount importance. With Power BI, participants will learn to create interactive visualizations and dashboards, thereby enhancing their ability to communicate complex data insights effectively.

From there, the program transitions to the practical applications of machine learning, with separate modules dedicated to regression and classification techniques. Participants will learn to predict the mass of oil, carry out facies classification, and handle imbalanced data scenarios, which are common in the Oil and Gas industry.

In the fifth module, the program explores the increasingly important field of Natural Language Processing (NLP), teaching participants how to analyse textual data and classify injury reports—a key aspect of Health, Safety, and Environment (HSE) management in the Oil and Gas sector.

The final module introduces participants to the cutting-edge field of Deep Learning, using TensorFlow to apply techniques such as image segmentation for identifying salt deposits in seismic sessions.

By the end of this training course, participants will have gained a broad yet detailed skill set. They will be equipped to apply Python and R for data science tasks, perform data manipulation and analysis using Excel, and create dynamic visualizations with Power BI. In addition, they will have a firm grasp of applying various machine learning algorithms, conducting NLP for textual data, and implementing deep learning techniques for image analysis.

This training program is ideal for a wide range of professionals, from engineers and data scientists to researchers and managers. Even those transitioning their careers or starting their journey in data science will find the course beneficial. Ultimately, this program aims to cultivate a data-driven mindset, enabling professionals to leverage machine learning and data science to drive innovation and efficiency in the Oil and Gas industry.

Course overview — continued

Who it is for and how it helps

This course is designed for a variety of professionals who are interested in leveraging data science and machine learning within the Oil and Gas industry. This includes but is not limited to:

- Oil and Gas Professionals: Engineers, geoscientists, and other technical professionals in the Oil and Gas industry who wish to integrate data science into their work to make better-informed decisions and improve operational efficiency.

- Data Analysts/Scientists: Professionals in the field of data analysis or data science who are looking to specialize or gain expertise in the Oil and Gas industry.

- IT Professionals: IT professionals working in or aiming to work in Oil and Gas companies who want to upskill in machine learning and data science to contribute more effectively to their organizations.

- Researchers and Academics: Those involved in research related to the Oil and Gas industry who are interested in incorporating machine learning techniques into their research methodologies.

- Management Professionals: Professionals in managerial or decision-making roles in the Oil and Gas industry who want to understand the potential of machine learning and data science to improve business strategies and outcomes.

What you will learn

- Utilize programming languages: Develop a strong foundation in Python and R, enabling them to write code, manipulate data, and implement machine learning algorithms
- Employ data analysis techniques: Analyze and interpret complex data sets using a variety of statistical techniques, and visualize this data for clearer comprehension and presentation
- Handle data effectively in Excel: Execute basic and advanced data manipulation tasks using Excel, a widely-used tool in the industry
- Create insightful visualizations with Power BI: Build interactive data visualizations and dashboards to convey data-driven insights using Power BI
- Apply machine learning algorithms: Build, validate, and interpret machine learning models including regression, classification, and deep learning algorithms using popular libraries like Scikit-Learn and TensorFlow
- Conduct Natural Language Processing (NLP): Analyze textual data, implement TF-IDF techniques, and apply NLP for practical use-cases like injury report classification
- Implement deep learning for image analysis: Use TensorFlow to apply deep learning techniques for image segmentation in seismic sessions
- Solve real-world problems in the Oil and Gas industry: Apply data science and machine learning techniques to solve specific problems in the Oil and Gas industry such as predicting oil yield, facies classification, and injury report analysis
- Make informed decisions: Choose the appropriate data science or machine learning tool or technique for various scenarios, and interpret the results to make data-driven decisions

Curriculum

Modules 01–06

01 Foundation of Data Science

- Introduction to Python for Data Science
- Introduction to R for Data Science
- Basic Data Manipulation with Excel

02 Data Visualization and Analysis with Excel and Power BI

- Advanced Data Analysis with Excel
- Introduction to Data Visualization in Power BI
- Advanced Data Visualization Techniques in Power BI

03 Predictive Modeling - Regression Approach

- Understanding Data and Its Nature
- Data Cleaning Techniques
- Introduction to Linear Regression
- Advanced Regression with Gradient Boosting
- Model Interpretation and Evaluation

04 Classification Techniques for Facies Analysis

- Data Imputation Techniques
- Effective Feature Engineering
- Logistic Regression and Handling Imbalanced Data
- Advanced Classification with Gradient Boosting

05 Natural Language Processing for HSE

- Introduction to Natural Language Processing
- Text Analysis using TF-IDF
- Classification of Injury Reports

06 Deep Learning Applications

- Introduction to Tensorflow
- Image Segmentation in Seismic Sessions

Participation and contacts

Joining the programme

Contact the Academy and quote course code 000616 to confirm dates, delivery format, prices and enrolment terms.

Training for your team

Tell us your business goals, the roles and number of participants, and your preferred dates and location. This will help us discuss the right training option.

Preparing for the programme

The published programme does not specify any prerequisites. Contact us before enrolling to confirm how to prepare.

Discuss your training needs

mail@tecedu.org
www.tecedu.academy

Learn from the Best in the Business!