

## **Global Energy Management & J.P. Morgan Center for Commodities**

### **Industry Course:**

## **Energy Analytics & Big Data for Managers**

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### **Description**

This on-line course provides a broad-based, but gentle, introduction to the rapidly expanding disciplines of analytics and Big Data as they are being operationalized across today's energy industry. Course sections are devoted to developing foundational understanding of terminology, methods, applications, and tools that are employed across all energy sectors. Instruction includes presentation and discussion of corporate use cases and more formal case studies, particularly from the oil/gas and power sectors, to underscore the analytics value proposition for energy companies. Participants also use Excel and example data sets to complete introductory- to intermediate-level computer exercises designed to build data management and data cleaning skills and to underscore the descriptive, diagnostic, and predictive analytics paradigms. Parts of the course are quantitative in nature, so a fundamental knowledge of business statistics is required, along with a working knowledge of Excel, plus strong file management skills in the Microsoft operating environment. Real-time applications of analytics and Big Data will be covered as well as introductory training sessions on the use of Spotfire, an analytics and visualization software package used widely across the energy industry.

### **Overall Theme:**

The main focus of the course is development of data and quantitative literacy. The content serves to improve, or establish, a working understanding of Big Data and the supporting processes and technologies across the energy complex. Participants are also introduced to the foundational ideas of contemporary analytics, algorithms, and models, but specific training in programming/scripting languages is not included.

### **Who Should Attend?**

The course is appropriate for technical professionals who are relatively new to the concepts of energy analytics and Big Data, as well as supervisory/management personnel alike who want/need to learn more about what Big Data Analytics is, what it encompasses, and how it is being operationalized from a business context throughout the industry.

### **Goals and Educational Objectives**

Participants who complete the course will:

- Have a solid understanding of what analytics and Big Data are all about and be able to use the language/terminology of Big Data and analytics without apprehension
- Be able to comfortably discuss and articulate the issues, impacts, tools, and mechanisms (including models and algorithms) pertaining to energy analytics

- Have a deeper understanding of the supporting constructs of data management and information technology and their relationships to Big Data and analytics
- Better comprehend the scope of influence of Big Data and analytics on the business operations of energy companies and formulate a path forward within their own organizations

### **Course Highlights**

- Introduction to analytics and Big Data ... what are we talking about?
- What is data, where does it come from, and why are we being deluged?
- The link to corporate performance indicators and operational efficiency
- What Big Data analytics entails ... the 3 (or more) Vs and the 4 Ps
- IT and data management as requisite support foundations
- The new language and structure of Big Data management
- Foundational principles of data mining and knowledge discovery
- Overview of contemporary algorithms and data mining methodologies
- Cases/examples from across the energy industry
- Organizational and managerial issues for Big Data initiatives in energy companies

### **Topics**

The course is developed around the following topics, which may be altered or expanded depending on progress and participant interest.

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| • Course introduction   | • Data wrangling   |
| • Getting started with data                                       | • Handling missing values and outlier detection                                    |
| • Data is the new currency  | • KPIs and related issues  |
| • Introduction to Big Data  | • Introduction to data mining  |
| • Three states of data: data in motion, data at rest, data in use | • Prediction and predictive analytics  |
| • Notions and concepts of analytics                               | • Basic linear regression with Excel   |
| • An introductory primer on algorithms, models, and modeling      | • Introduction to forecasting and prediction with multiple regression using Excel  |
| • Models for analytics  | • Classification for predictive analytics  |
| • Data organization, storage and management concepts              | • Descriptive analytics based on clustering  |
| • More about data warehouses and related constructs               | • Becoming a digital energy enterprise   |
| • What is Hadoop and why is it important?                         | • Workflows and their relationship to Big Data and analytics                       |
| • Data standards and formats                                      | • Two important application themes: the digital oilfield and smart grid deployment |
| • Data processing and quality enhancement                         | • Industry case studies  |

### **Instructor Bio**

Dr. Tim Coburn is Professor of Energy and Operations Management in the School of Energy Economics, Policy and Commerce at The University of Tulsa, for which he was the founding director. He is an

instructor for CU Denver's Masters in Global Energy Management. He also holds visiting appointments in the Renewable and Sustainable Energy Institute (RASEI), University of Colorado-Boulder, and the Energy Institute, Colorado State University. Immediately prior to his tenure at The University of Tulsa, Dr. Coburn held the Mesa Petroleum Professorship in Statistics and Management Science at Abilene Christian University. He also previously worked for Phillips Petroleum, Marathon Oil Company, and the National Renewable Energy Laboratory, and served in externship capacities at Sandia National Laboratory, the US Geological Survey, and the Kansas Geological Survey. With parallel streams of research in energy analytics and energy policy/systems/analysis, Dr. Coburn's career intersects various aspects of the energy industry, including oil/gas, renewables, coal, transportation, electricity, infrastructure, and human factors, leading to broad engagement in the scientific, economic, and managerial aspects of energy business. He holds a Ph.D. in statistics from Oklahoma State University, and currently serves on the Energy Statistics Committee of the American Statistical Association, an advisory/consultative group for the US Energy Information Administration. Dr. Coburn is active in various industry professional associations and serves on the editorial boards of *Natural Resources Research* and the *Journal of Energy and Management Studies*.

**For Registration and further information:**

**<https://business.ucdenver.edu/academics/professional-development/not-credit-certificates/energy-analytics-and-big-data-managers>**