Arcitura®
the IT education company

NEXT-GEN
DATA SCIENCE ACADEMY

NEXT-GEN
DATA SCIENCE ACADEMY

The Next-Gen Data Science Academy from Arcitura
provides formal education and accreditation programs
dedicated to the fields of Artificial Intelligence, Machine
Learning, Big Data and general Data Science, including
analytics and analysis, decisioning, architecture,
engineering and governance.

For more information, visit the Next-Gen Data Science
Academy home page: www.arcitura.com/ds

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SELF-STUDY

ARCITURA **eLEARNING OPTIONS**
To give you the most flexibility to achieve your learning goals and accommodate your preferences, this course is made available via two Arcitura eLearning solutions: An interactive environment with graded exercises and a graded self-test, as well as a study kit account that supports online/offline access and custom annotations.

ONLINE **COACHING**
Arcitura Certified Trainers are available to provide online coaching services that can be scheduled on an hourly basis. Scheduling is available in all time zones and is based on your preferences and trainer availability.

ENHANCED SELF-STUDY WITH **ADD-ONs**
Arcitura eLearning courses can be supplemented with downloadable course files, printed course materials and other add-on resources.

EXAM PREPARATION & **TAKING EXAMS**
Each Arcitura eLearning course includes practice questions that can help with certification exam preparation. Certification exams can be taken worldwide at Pearson VUE testing centers, via Pearson VUE OnVUE online proctoring and/or via direct online proctoring.
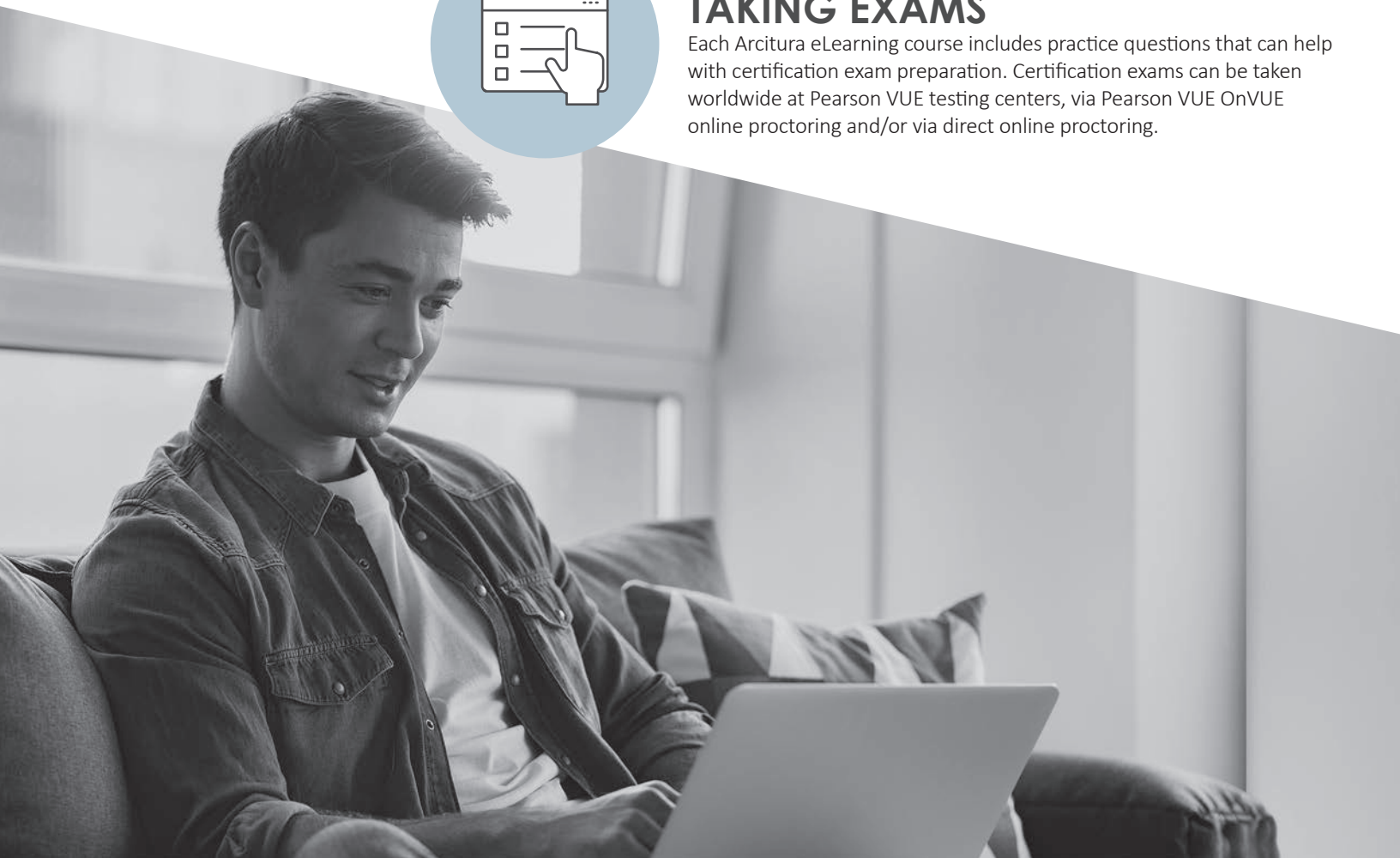
Onsite Classroom

Virtual Classroom

ONSITE **WORKSHOPS**

Private onsite workshops can be delivered by Certified Trainers from Arcitura and authorized training partners for both small and large groups. Each workshop participant can receive access to the full Arcitura eLearning course materials. Each workshop agenda, format and schedule can be tailored to client requirements. Onsite workshops allow for the option to deliver onsite paper-based exams.

VIRTUAL **WORKSHOPS**

Private virtual workshops can be delivered by Certified Trainers from Arcitura and authorized training partners for small and large groups, as well as individual participants. Each workshop participant can receive access to the full Arcitura eLearning course materials. Each workshop agenda, virtual delivery platform and schedule can be tailored to client requirements. In addition to a typical delivery schedule based on consecutive workshop days, virtual workshops allow for a delivery schedule to be distributed as shorter sessions across weeks or months.

ONLINE **COACHING**

Arcitura Certified Trainers are available to provide online coaching services that can be scheduled on an hourly basis. Scheduling is available in all time zones and is based on your preferences and trainer availability. For workshop participants, coaching sessions can be scheduled during or after a given workshop, for groups or individuals.

EXAM PREPARATION & **TAKING EXAMS**

Onsite and virtual workshop participants can receive complimentary practice exam questions as part of their eLearning course accounts. Certified Trainers can supervise and provide guidance for participants completing the self-tests and the Exam Prep Kit practice questions provided in the eLearning accounts. Certification exams can be taken worldwide at Pearson VUE testing centers, via Pearson VUE OnVUE online proctoring and/or via direct online proctoring.

The Next-Gen Data Science Academy from Arcitura provides formal education and accreditation programs dedicated to the fields of Artificial Intelligence, Machine Learning, Big Data, including analytics and analysis, data science, architecture, engineering and governance.

The Next-Gen Data Science Academy curriculum is comprised of 24 course modules and 9 certification tracks. Exams are available worldwide via online proctoring and on-site delivery by Certified Trainers. Achieving a passing grade on the required exam(s) achieves a certification for which a digital accreditation certificate is automatically issued by Arcitura and a digital certification badge is issued by Acclaim/Credly.

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QUESTIONS?
Contact us at: info@arcitura.com

itcc   PCC | PROFESSIONAL CERTIFICATION COALITION   P Pearson | VUE   OnVUE   Acclaim   Credly by Pearson

Arcitura CERTIFIED — *Big Data Science Professional*

A Certified Big Data Science Professional has knowledge of fundamental data science and Big Data concepts and models, as well as an understanding of Big Data analysis, analytics and mechanisms.

Big Data Analytics & Fundamental Data Science
COURSE 01 02 03

Arcitura CERTIFIED — *Big Data Scientist*

A Certified Big Data Scientist has knowledge of a range of analysis and analytics techniques, as well as the processes required for processing large volumes of complex data to drive decision-making.

Big Data Analysis & Advanced Data Science
COURSE 04 05 06

Arcitura CERTIFIED — *Data Science Consultant*

A Certified Data Science Consultant has knowledge of a cross-section of contemporary data science-related fields of practice, including big data analytics, machine learning and artificial intelligence so as to provide guidance and advisory services.

Data Science Professional Consulting
COURSE 07 10

Arcitura CERTIFIED — *Machine Learning Specialist*

A Certified Machine Learning Specialist understands how and where machine learning techniques are best utilized to produce business value, and has knowledge of associated algorithms and system designs, as well as advanced model learning approaches and analysis practices.

Machine Learning
COURSE 07 08 09

Arcitura CERTIFIED — *Artificial Intelligence Specialist*

A Certified Artificial Intelligence Specialist understands how AI practices can be utilized to perform data analysis and autonomous data processing and has knowledge of AI learning approaches and functional designs, as well as knowledge of neural networks.

Artificial Intelligence
COURSE 10 11 12

Arcitura CERTIFIED — *Big Data Engineer*

A Certified Big Data Engineer has knowledge of designing and integrating Big Data platforms and solutions, with an emphasis on the mechanisms used to enable data processing, data storage and the utilization of Big Data pipelines.

Big Data Engineering
COURSE 13 14 15

Arcitura CERTIFIED — *Big Data Architect*

A Certified Big Data Architect has knowledge of Big Data platform technology architecture and Big Data application architecture within IT enterprise and cloud-based environments.

Big Data Architecture
COURSE 16 17 18

Arcitura CERTIFIED — *Data Science Governance Specialist*

A Certified Data Science Governance Specialist has an understanding of governance frameworks and controls to standardize and regulate the lifecycles, pipelines and platforms pertaining to data analysis and processing practices used in machine learning, AI and big data.

Data Science Governance
COURSE 19 20 21

**Arcitura CERTIFIED** — *AI Decisioning Specialist*

A Certified AI Decisioning Specialist has an understanding of artificial intelligence concepts, models and practices that pertain to enabling and maintaining AI systems with autonomous decision-making capabilities.

AI Decisioning
COURSE 22 23 24

Big Data Analytics & Fundamental Data Science

Develops skills in Big Data analytics and analysis, as well as data science fundamentals.
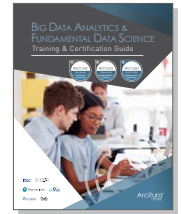
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MODULE 01 | Fundamental Big Data Science & Analytics

This foundational module establishes a basic understanding of fundamental data science, and explains Big Data from business and technology perspectives, including common concepts, models, benefits, challenges and adoption issues.

MODULE 02 | Big Data Analysis & Technology Concepts

Explores contemporary data analysis practices, technologies and tools for Big Data environments at a conceptual level, focusing on common analysis approaches, functions and features of Big Data solutions. Also covered is the Big Data Analysis Lifecycle.

MODULE 03 | Big Data Analysis & Technology Lab

Provides a series of real-world exercises for assessing and establishing Big Data environments, and for solving problems using common Big Data analysis techniques.

Arcitura **TRAINING** Fundamental Data Science

Arcitura **TRAINING** Big Data Analytics & Analysis

Arcitura **CERTIFIED** Big Data Science Professional

Big Data Analysis & Advanced Data Science

Provides comprehensive coverage of contemporary Big Data analysis and analytics practices and advanced data science techniques and processes.

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MODULE 04 | Big Data Analysis & Science

Provides comprehensive coverage of Big Data analysis algorithms, analytics, data mining and statistical techniques, as well as exploratory data analysis, confirmatory data analysis, visualization and predictions.

MODULE 05 | Advanced Big Data Analysis & Science

Covers the application of a range of essential and advanced analysis techniques, including modeling and model evaluation, data reduction, classification, pattern identification, time series analysis, text analytics and outlier detection.

MODULE 06 | Big Data Analysis & Science Lab

Provides a series of real-world exercises for applying Big Data analysis and analytics techniques to fulfill business requirements and solve complex problems.

Machine Learning

Develops skills in Machine Learning practices, models and algorithms, as well as Machine Learning systems that can perform a range of data analysis processing tasks.

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MODULE 07 | Fundamental Machine Learning

Provides an easy-to-understand overview of Machine Learning that explains how it works, what it can and cannot do and how it is commonly utilized in support of business goals. The module covers common algorithm types and further explains how Machine Learning systems work behind the scenes.

MODULE 08 | Advanced Machine Learning

Delves into the many algorithms, methods and models of contemporary Machine Learning practices to explore how a range of different business problems can be solved by utilizing and combining proven Machine Learning techniques.
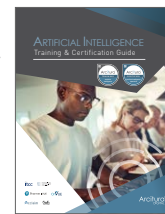
MODULE 09 | Machine Learning Lab

Provides a series of exercises for applying Machine Learning systems and techniques, as they are applied and combined to solve real-world problems.

Artificial Intelligence (AI)

Develops skills in AI practices and learning approaches, as well as Neural Network architectures, cell types and activation functions.

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MODULE 10 | Fundamental Artificial Intelligence

Provides essential coverage of Artificial Intelligence and neural networks in easy-to-understand, plain English. The course module provides concrete coverage of the primary parts of AI, including learning approaches, functional areas that AI systems are used for and a thorough introduction to neural networks, how they exist, how they work and how they can be used to process information. The module further establishes a step-by-step process for assembling an AI system.

MODULE 11 | Advanced Artificial Intelligence

Covers a series of practices for preparing and working with data for training and running contemporary AI systems and neural networks. It further provides techniques for designing and optimizing neural networks, including approaches for measuring and tuning neural network model performance.

MODULE 12 | Artificial Intelligence Lab

Provides a series of exercises for applying AI systems and neural network architectures, as they are applied and combined to solve real-world problems.

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CERTIFIED

Next-Gen Data Science courses are available via online study, as well as in-person or virtual instructor-led training and coaching.

Data Science Professional Consulting

Provides comprehensive coverage of contemporary Big Data analysis and analytics practices and advanced data science techniques and processes.

DATA SCIENCE
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Training & Certification Guide

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MODULE 07 | Fundamental Machine Learning

Provides an easy-to-understand overview of Machine Learning that explains how it works, what it can and cannot do and how it is commonly utilized in support of business goals. The module covers common algorithm types and further explains how Machine Learning systems work behind the scenes.

MODULE 10 | Fundamental Artificial Intelligence

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Big Data Engineering

Covers essential practices for designing, configuring and utilizing Big Data solutions, including Big Data storage environments, pipelines and data processing.

BIG DATA ENGINEERING
Training & Certification Guide
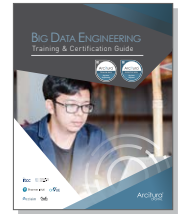
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MODULE 13 | Fundamental Big Data Engineering

Explores on the usage and application of the Hadoop and MapReduce frameworks, as well as a range of Big Data engineering techniques and technologies. Coverage includes Big Data storage models, NoSQL and NewSQL, as well as Big Data processing engines.

MODULE 14 | Advanced Big Data Engineering

Delves into advanced engineering topics pertaining primarily to the storage and processing of Big Data datasets. The module covers advanced Big Data engineering mechanisms, in-memory data storage and realtime data processing, as well as MapReduce algorithms, bulk synchronous parallel processing and graph data processing.

MODULE 15 | Big Data Engineering Lab

Provides a series of real-world exercises for designing Big Data algorithms, Big Data processing and Big Data storage environments.

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Big Data
Engineering

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Big Data
Engineer

Big Data Architecture

Provides comprehensive coverage of design techniques, technology architecture models and patterns associated with building and integrating Big Data solutions within enterprise environments.

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MODULE 16 | Fundamental Big Data Architecture

Provides coverage of the Hadoop stack, data pipelines and Big Data technology architecture layers, mechanisms and components, as well as associated design patterns for building and integrating Big Data solutions.

MODULE 17 | Advanced Big Data Architecture

Provides a drill-down of Big Data solution environments, architectural models and layers, and additional advanced design patterns. Also covered are cloud-based implementations and enterprise integration considerations, as well as topics pertaining to storage, processing and security.
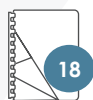
MODULE 18 | Big Data Architecture Lab

Provides a series of real-world exercises for building and integrating Big Data solutions within IT enterprises and cloud-based environments.

Arcitura **TRAINING** Big Data Architecture

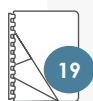Arcitura **CERTIFIED** Big Data Architect

Data Science Governance

Develops knowledge and skills of Data Science Governance precepts, processes and roles that pertain to machine learning, artificial intelligence (AI) and big data solutions and processing environments.

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MODULE 19 | Fundamental Data Science Governance for Big Data, Machine Learning & AI

Describes data science governance concepts and basics and identifies common risks and challenges, as well as key roles for those involved in governance projects. The course module further explores the analytics pipeline governance lifecycle and establishes over 70 data science governance precepts and processes. The module maps how precepts and processes relate to each other and how they relate to governance stages.

MODULE 20 | Advanced Data Science Governance for Big Data, Machine Learning & AI

In this course module, over 80 additional data science governance precepts and processes are described in relation to analytics platform governance and machine learning and AI pipeline governance stages. Relevant roles are also mapped to individual governance stages.

MODULE 21 | Data Science Governance Lab for Big Data, Machine Learning & AI

Provides a series of real-world exercises for fostering a comprehensive understanding of how different data science governance precepts and processes can be applied to address common governance concerns.

Arcitura **TRAINING** Data Science Governance

Arcitura **CERTIFIED** Data Science Governance Specialist

AI Decisioning

Provides coverage of essential AI topics and explores the technologies, techniques and data processing models distinct to enabling autonomous decision-making within AI systems.

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MODULE 22 | Fundamental AI Decisioning

Covers essential topics pertaining to AI systems, neural networks and data processing, with an emphasis on autonomous decision-making capability-enablement. Topics include risk assessment, reinforcement learning, decision-result evaluation, ethics and behavior control.

MODULE 23 | Advanced AI Decisioning

Covers advanced topics, such as knowledge representation, rules of inference, probabilistic reasoning and First-Order Logic (FOL) and documents a series of AI practices as applied to autonomous decision-making, including reasoning, data wrangling, reinforcement learning and model evaluation and optimization.
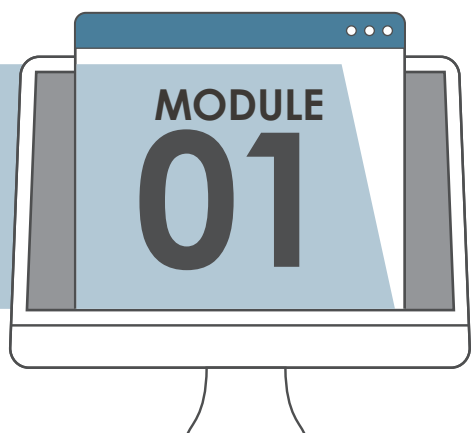
MODULE 24 | AI Decisioning Lab

Provides a series of real-world exercises for utilizing AI practices and techniques to assemble AI-driven, autonomous decisioning solutions for common usage scenarios.

Arcitura **TRAINING** AI Decisioning

Arcitura **CERTIFIED** AI Decisioning Specialist

Fundamental Big Data Science & Analytics
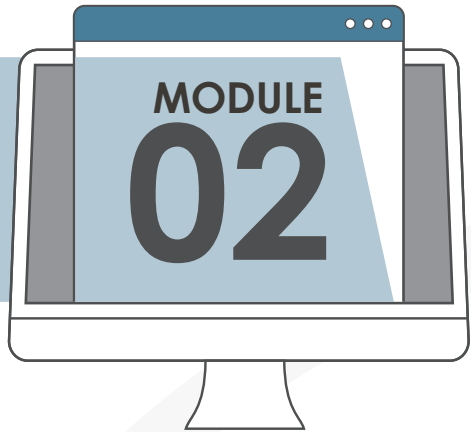
MODULE
01

This foundational course module provides a high-level overview of essential Big Data topic areas. A basic understanding of Big Data from business and technology perspectives is provided, along with an overview of common benefits, challenges, and adoption issues.

The module content is divided into a series of modular sections, each of which is accompanied by one or more hands-on exercises.

The following primary topics are covered:

- Understanding Big Data
- Fundamental Big Data Terminology and Concepts
- Big Data Business Drivers and Technology Drivers
- Traditional Enterprise Technologies Related to Big Data
- OLTP, OLAP, ETL and Data Warehouses in relation to Big Data
- Characteristics of Data in Big Data Environments
- Dataset Types in Big Data Environments
- Structured, Unstructured and Semi-Structured Data
- Metadata and Data Veracity
- Fundamental Analysis and Analytics
- Quantitative and Qualitative Analysis
- Machine Learning Types
- Descriptive and Diagnostic Analytics
- Predictive and Prescriptive Analytics
- Business Intelligence and Big Data
- Data Visualization and Big Data
- Big Data Adoption and Planning Considerations

# Big Data Analysis & Technology Concepts

MODULE 02

This course module explores a range of the most relevant topics that pertain to contemporary analysis practices, technologies and tools for Big Data environments. The module content intentionally keeps coverage at a conceptual level, focusing on topics that enable participants to develop a comprehensive understanding of the common analysis functions and features offered by Big Data solutions, as well as a high-level understanding of the back-end components that enable these functions.

The following primary topics are covered:

- Big Data Analysis Lifecycle (from Business Case Evaluation to Data Analysis and Visualization)
- A/B Testing and Correlation
- Regression and Heat Maps
- Time Series Analysis
- Network Analysis and Spatial Data Analysis
- Classification and Clustering
- Filtering, including Collaborative Filtering and Content-based Filtering
- Sentiment Analysis and Text Analytics
- Clusters and Processing Batch and Transactional Workloads
- How Cloud Computing relates to Big Data
- Foundational Big Data Technology Mechanisms
- Big Data Storage Devices and Processing Engines
- Resource Managers, Data Transfer Engines and Query Engines
- Analytics Engines, Workflow Engines and Coordinate Engines

Big Data Analysis & Technology Lab
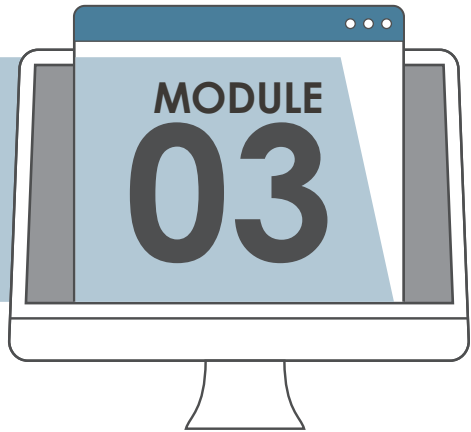
MODULE 03

This course module presents participants with a series of exercises and problems that are designed to test their ability to apply their knowledge of topics covered in previous modules. Completing this lab will help highlight areas that require further attention and will help prove proficiency in big data analysis and technology and practices as they are applied and combined to solve real-world problems.

The following exercises are provided:

- Reading Exercise 3.1: Case Study Background PLGM
- Lab Exercise 3.2: Plan the Big Data BI Environment
- Lab Exercise 3.3: Analyze Customer Loyalty Data
- Lab Exercise 3.4: Alleviate Customer Dissatisfaction
- Lab Exercise 3.5: Improve PLGM's On-Line Sales
- Reading Exercise 3.6: Case Study Background LHL
- Lab Exercise 3.7: Plan the Data Integration and Reporting Environment
- Lab Exercise 3.8: Develop a Treatment Personalization Capability
- Lab Exercise 3.9: Enhance LHL's Research Capability
- Reading Exercise 3.10: Case Study Background SWP
- Lab Exercise 3.11: Smart Meter Data Analysis
- Lab Exercise 3.12: Enhance Electricity Demand Prediction Capability
- Lab Exercise 3.13: Asset Management and Risk Identification Capability

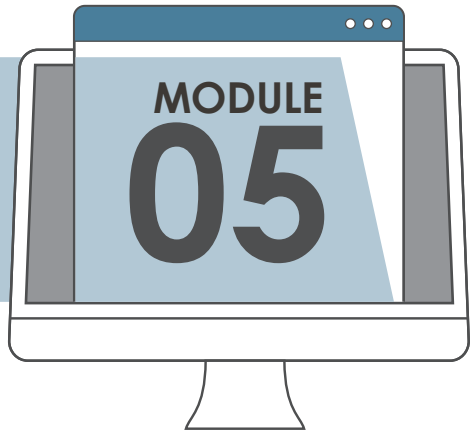# Big Data Analysis & Science
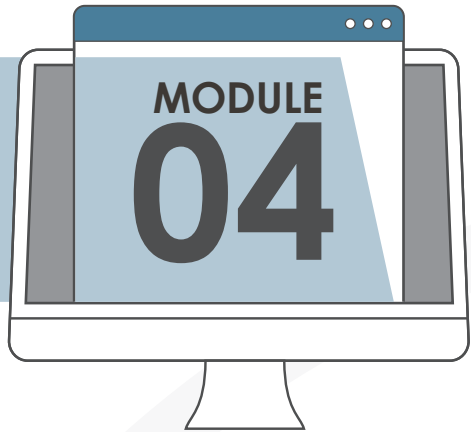
MODULE
04

This course module provides an in-depth overview of essential topic areas pertaining to data science and analysis techniques relevant and unique to big data with an emphasis on how analysis and analytics need to be carried out individually and collectively in support of the distinct characteristics, requirements and challenges associated with big data datasets.

The following primary topics are covered:

- Data Science, Data Mining & Data Modeling
- Big Data Dataset Categories
- High-Volume, High-Velocity, High-Variety, High-Veracity, High-Value Datasets
- Exploratory Data Analysis (EDA)
- EDA Numerical Summaries, Rules and Data Reduction
- EDA analysis types, including Univariate, Bivariate and Multivariate
- Essential Statistics, including Variable Categories and Relevant Mathematics
- Statistics Analysis, including Descriptive, Inferential, Covariance, Hypothesis Testing, etc.
- Measures of Variation or Dispersion, Interquartile Range & Outliers, Z-Score, etc.
- Probability, Frequency, Statistical Estimators, Confidence Interval, etc.
- Data Munging and Machine Learning
- Variables and Basic Mathematical Notations
- Statistical Measures and Statistical Inference
- Confirmatory Data Analysis (CDA)
- CDA Hypothesis Testing, Null Hypothesis, Alternative Hypothesis, Statistical Significance, etc.
- Distributions and Data Processing Techniques
- Data Discretization, Binning and Clustering
- Visualization Techniques, including Bar Graph, Line Graph, Histogram, Frequency Polygons, etc.
- Prediction Linear Regression, Mean Squared Error and Coefficient of Determination R2, etc.
- Clustering k-means, Cluster Distortion, Missing Feature Values, etc.
- Numerical Summaries

Advanced Big Data Analysis & Science
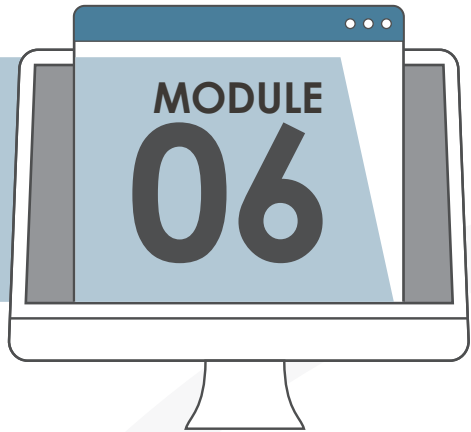
MODULE 05

This course module delves into a range of advanced data analysis practices and analysis techniques that are explored within the context of big data. The module content focuses on topics that enable participants to develop a thorough understanding of statistical, modeling, and analysis techniques for data patterns, clusters and text analytics, as well as the identification of outliers and errors that affect the significance and accuracy of predictions made on big data datasets.

The following primary topics are covered:

- Modeling, Model Evaluation, Model Fitting and Model Overfitting
- Statistical Models, Model Evaluation Measures
- Cross-Validation, Bias-Variance, Confusion Matrix and F-Score
- Machine Learning Algorithms and Pattern Identification
- Association Rules and Apriori Algorithm
- Data Reduction, Dimensionality Feature Selection
- Feature Extraction, Data Discretization (Binning and Clustering)
- Advanced Statistical Techniques
- Parametric vs. Non-Parametric, Clustering vs. Non-Clustering
- Distance-Based, Supervised vs. Semi-Supervised
- Linear Regression and Logistic Regression for Big Data
- Classification Rules for Big Data
- Logistics Regression, Naïve Bayes, Laplace Smoothing, etc.
- Decision Trees for Big Data
- Tree Pruning, Feature Splitting, One Rule (1R) Algorithm
- Pattern Identification, Association Rules, Apriori Algorithm
- Time Series Analysis, Trend, Seasonality
- K Nearest Neighbor (kNN), K-means
- Text Analytics for Big Data
- Bag of Words, Term Frequency, Inverse Document Frequency, Cosine Distance, etc.
- Outlier Detection for Big Data
- Statistical, Distance-Based, Supervised and Semi-Supervised Techniques

Big Data Analysis & Science Lab
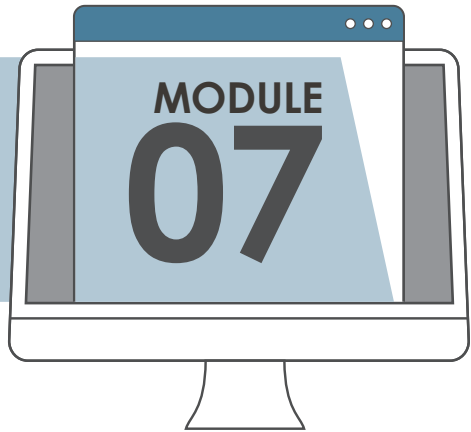
MODULE
06

This course module covers a series of exercises and problems designed to test the participant's ability to apply knowledge of topics covered previously in module modules 4 and 5. Completing this lab will help highlight areas that require further attention, and will further prove proficiency in big data analysis and science practices as they are applied and combined to solve real-world problems.

The following exercises are provided:

- Reading Exercise 6.1: TMC Case Study Background
- Lab Exercise 6.2: Analysis for Enhancing Product Quality
- Lab Exercise 6.3: Analysis for Lowering Total Cost of Ownership
- Reading Exercise 6.4: PLGM Case Study Background
- Lab Exercise 6.5: Analysis for High-Yield Marketing Plan
- Lab Exercise 6.6: Analyze Items Layout and Credit Card Data
- Reading Exercise 6.7: LHL Case Study Background
- Lab Exercise 6.8: Enhance Patient Diagnosis Capability
- Reading Exercise 6.9: SWP Case Study Background
- Lab Exercise 6.10: Enhance Risk Management and Understand Demand Patterns

Fundamental Machine Learning

MODULE
07

This course module provides an easy-to-understand overview of machine learning for anyone interested in how it works, what it can and cannot do and how it is commonly utilized in support of business goals. The module covers common algorithm types and further explains how machine learning systems work behind the scenes. The base module materials are accompanied with an informational supplement covering a range of common algorithms and practices.

The primary topics covered by this module are:

- Machine Learning Business and Technology Drivers
- Machine Learning Benefits and Challenges
- Machine Learning Usage Scenarios
- Datasets, Structured, Unstructured and Semi-Structured Data
- Models, Algorithms, Model Training and Learning
- How Machine Learning Works
- Collecting and Pre-Processing Training Data
- Algorithm and Model Selection
- Training Models and Deploy Trained Models
- Machine Learning Algorithms and Practices
- Supervised Learning, Classification, Decision Tree
- Regression, Ensemble Methods, Dimension Reduction
- Unsupervised Learning and Clustering
- Semi-Supervised and Reinforcement Learning
- Machine Learning Best Practices
- How Machine Learning Systems Work
- Common Machine Learning Mechanisms
- How Mechanisms Are Used in Model Training
- Machine Learning and Deep Learning, Artificial Intelligence (AI)

Advanced Machine Learning
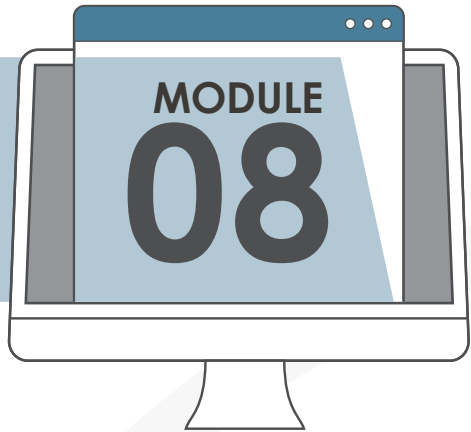
MODULE 08

This course module delves into the many algorithms, methods and models of contemporary machine learning practices to explore how a range of different business problems can be solved by utilizing and combining proven machine learning techniques.

The following primary topics are covered:

- Data Exploration Patterns
- Central Tendency Computation, Variability Computation
- Associativity Computation, Graphical Summary Computation
- Data Reduction Patterns
- Feature Selection, Feature Extraction
- Data Wrangling Patterns
- Feature Imputation, Feature Encoding
- Feature Discretization, Feature Standardization
- Supervised Learning Patterns
- Numerical Prediction, Category Prediction
- Unsupervised Learning Patterns
- Category Discovery, Pattern Discovery
- Model Evaluation Patterns, Baseline Modeling
- Training Performance Evaluation, Prediction Performance Evaluation
- Model Optimization Patterns
- Ensemble Learning, Frequent Model Retraining
- Lightweight Model Implementation, Incremental Model Learning

Machine Learning Lab
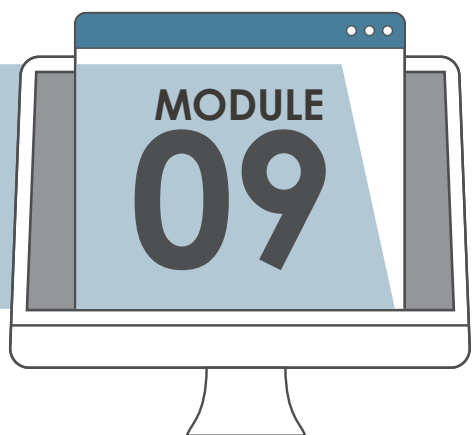
MODULE

09

This course module presents participants with a series of exercises and problems that are designed to test their ability to apply their knowledge of topics covered in previous modules. Completing this lab will help highlight areas that require further attention and will help prove proficiency in machine learning systems and techniques, as they are applied and combined to solve real-world problems.

The following exercises are provided:

- Reading Exercise 9.1: Mini Case Study: RHE R&D Company
- Lab Exercise 9.2: Retrieving the Training Data
- Lab Exercise 9.3: Selecting the Correct Algorithm
- Lab Exercise 9.4: Modeling Features and Representation
- Lab Exercise 9.5: Measuring and Optimizing the Trained Model
- Lab Exercise 9.6: Correcting Inconsistent Features
- Reading Exercise 9.7: Mini Case Study: GTO Financial Institution
- Lab Exercise 9.8: Identifying Customer Transaction Data
- Lab Exercise 9.9: Assessing Customer Risk
- Lab Exercise 9.10: Identifying Alarming Spending Patterns

# Fundamental Predictive & Generative Artificial Intelligence
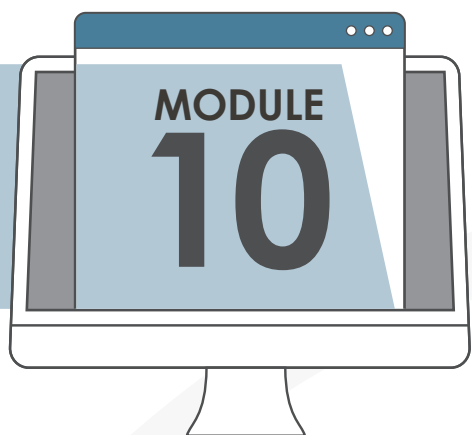
MODULE 10

This course module provides essential coverage of artificial intelligence and neural networks in easy-to-understand, plain English. The module provides concrete coverage of the primary parts of AI, including learning approaches, functional areas that AI systems are used for and a thorough introduction to neural networks, how they exist, how they work and how they can be used to process information.

The module establishes the five primary business requirements AI systems and neural networks are used for, and then maps individual practices, learning approaches, functionalities and neural network types to these business categories and to each other, so that there is a clear understanding of the purpose and role of each topic covered. The module further establishes a step-by-step process for assembling an AI system, thereby illustrating how and when different practices and components of AI systems with neural networks need to be defined and applied. Finally, the module provides a set of key principles and best practices for AI projects.

The following primary topics are covered:

- AI Business and Technology Drivers, AI Benefits and Challenges
- Business Problem Categories Addressed by AI, AI Types (Narrow, General, Symbolic, Non-Symbolic, etc.)
- Common AI Learning Approaches and Algorithms
- Supervised Learning, Unsupervised Learning, Continuous Learning
- Heuristic Learning, Semi-Supervised Learning, Reinforcement Learning
- Common AI Functional Designs, Computer Vision, Pattern Recognition
- Robotics, Natural Language Processing (NLP)
- Speech Recognition, Natural Language Understanding (NLU)
- Frictionless Integration, Fault Tolerance Model Integration
- Neural Networks, Neurons, Layers, Links, Weights
- Understanding AI Models and Training Models and Neural Networks
- Understanding how Models and Neural Networks Exist

- Loss, Hyperparameters, Learning Rate, Bias, Epoch
- Activation Functions (Sigmoid, Tanh, ReLU, Leaky RelU, Softmax, Softplus)
- Neuron Cell Types (Input, Backfed, Noisy, Hidden, Probabilistic, Spiking, Recurrent, Memory, Kernel, Convolution, Pool, Output, Match Input, etc.)
- Fundamental and Specialized Neural Network Architectures
- Perceptron, Feedforward, Deep Feedforward, AutoEncoder, Recurrent, Long/Short Term Memory,
- Boltzmann Machine, Restricted Boltzmann Machine, Deep Belief Network
- Deep Convolutional Network, Extreme Learning Machine, Deep Residual Network
- Support Vector Machine, Kohonen Network, Hopfield Network
- Generative Adversarial Network, Liquid State Machine, How to Build an AI System (Step-by-Step)
- Common AI System Design Principles and Common AI Project Best Practices

Fundamental Big Data Engineering
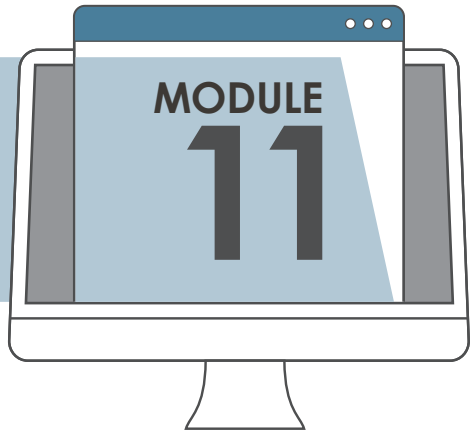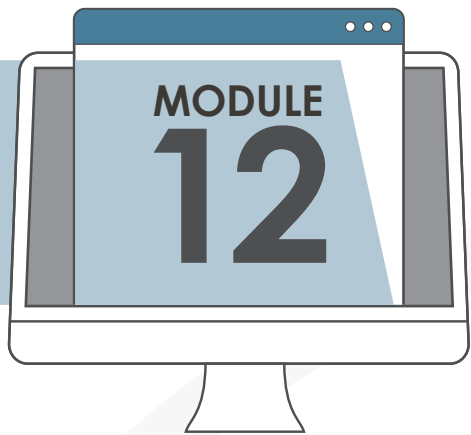
MODULE 11

This course module covers engineering-related concepts, techniques and technologies for the processing and storage of big data datasets. It highlights the unique challenges faced when processing and storing large, volatile and disparate sets of data. NoSQL is covered and the MapReduce data processing engine is explained in detail as a base framework for high-volume batch data processing.

The following primary topics are covered:

- Big Data Engineering Techniques and Challenges
- Big Data Storage, including Sharding, Replication, CAP Theorem, ACID and BASE
- Master-Slave, Peer-to-Peer Replication, Combining Replication with Sharding
- Big Data Storage Requirements, Scalability, Redundancy and Availability
- Fast Access, Long-term Storage, Schema-less Storage and Inexpensive Storage
- On-Disk Storage, including Distributed File System and Databases
- Introduction to NoSQL and NewSQL
- NoSQL Rationale and Characteristics
- NoSQL Database Types, including Key-Value, Document, Column-Family and Graph Databases
- Big Data Processing Engines
- Distributed/Parallel Data Processing, Schema-less Data Processing
- Multi-Workload Support, Linear Scalability and Fault-Tolerance
- Big Data Processing Requirements, including Batch, Cluster and Realtime Modes
- MapReduce for Big Data Processing, including Map, Combine, Partition, Shuffle and Sort and Reduce
- MapReduce Algorithm Design
- Task Parallism, Data Parallism

Advanced Big Data Engineering

MODULE
12

This course module builds upon Module 13 by exploring advanced engineering topics pertaining primarily to the storage and processing of big data datasets. Specifically, it covers advanced big data engineering mechanisms, in-memory data storage and realtime data processing.

The module presents further considerations for building MapReduce algorithms and also introduces the Bulk Synchronous Parallel (BSP) processing engine, along with a discussion of graph data processing. The big data mechanisms required for developing big data pipelines, its stages and the design process involved in building big data processing solutions are also explored.

The following primary topics are covered:

- Advanced Big Data Engineering Mechanisms
- Serialization and Compression Engines
- In-Memory Storage Devices
- In-Memory Data Grids and In-Memory Databases
- Read-Through, Read-Ahead, Write-Through and Write-Behind Integration Approaches
- Polyglot Persistence
- Explanation, Issues and Recommendations
- Realtime Big Data Processing
- Speed Consistency Volume (SCV)
- Event Stream Processing (ESP)
- Complex Event Processing (CEP)
- The SCV Principle
- General Realtime Big Data Processing and MapReduce
- Advanced MapReduce Algorithm Designs
- Bulk Synchronous Parallel (BSP) Processing Engine
- BSP vs. MapReduce
- BSP Synchronous Parallel
- Graph Data and Graph Data Processing using BSP (Supersteps)
- Big Data Pipelines, including Definition and Stages
- Big Data with Extract-Load-Transform (ELT)
- Big Data Solution Characteristics, Design Considerations and Design Process

Big Data Engineering Lab
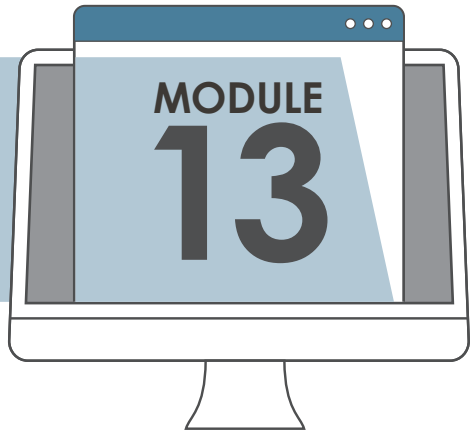
MODULE

13

This course module presents participants with a series of exercises and problems that are designed to test their ability to apply their knowledge of topics covered in previous modules. Completing this lab will help highlight areas that require further attention and will help prove proficiency in big data engineering practices as they are applied and combined to solve real-world problems.

The following exercises are provided:

- Reading Exercise 9.1: CFU Case Study Background
- Lab Exercise 9.2: Big Data Solution for Achieving Regulatory Compliance
- Lab Exercise 9.3: Enhancing Risk Analysis Capability
- Lab Exercise 9.4: Develop Innovative Data Analytics Service
- Reading Exercise 9.5: TCT Case Study Background
- Lab Exercise 9.6: Solution for Alleviating Service Delays
- Lab Exercise 9.7: Solution for Reducing Operational Costs
- Reading Exercise 9.8: TOB Case Study Background
- Lab Exercise 9.9: Solution for Handling Increased Website Traffic
- Lab Exercise 9.10: Analyze Marketing Ad Campaign Data

Fundamental Big Data Architecture
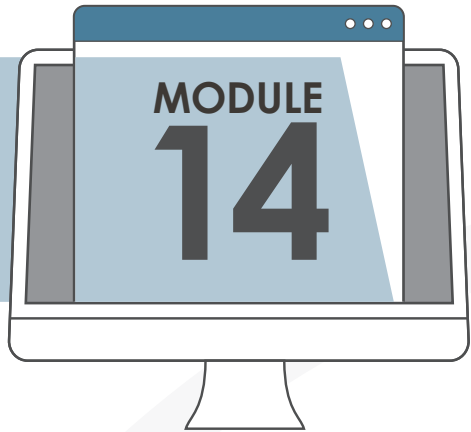
MODULE 14

This course module provides an overview of essential topic areas pertaining to big data solution platform architecture, covering a range of architectural models, approaches and considerations. big data mechanisms are explained for the creation of big data solutions, as well as architectural options for assembling data processing platforms.

The module further introduces the enterprise data warehouse and discusses various options for its integration with big data environments. Common scenarios are also presented to provide a basic understanding of how big data solutions are generally utilized. Finally, the use of cloud environments for the big data olutions is explored in the context of cloud computing delivery and deployment models.

The following primary topics are covered:

- Security Engines, Cluster Managers and Data Governance Managers
- Visualization Engines and Productivity Portals
- Machine-Level Data Processing Architectural Models
- Shared-Everything and Shared-Nothing Architectures
- Big Data Analytics Logical Architecture
- Data Sources and Data Acquisition Layers
- Storage, Processing and Batch Layers
- Realtime Processing, including Event Stream and Complex Event Processing
- Enterprise Data Warehouse and Big Data Integration Approaches (including Series and Parallel)
- Poly Source, including Relational, Streaming and File-based Sources
- Poly Storage, including Automatic Data Replication and Data Size Reduction
- Random Access Storage, including High Volume Binary, Tabular, Linked, Hierarchical and Data Sharding
- Streaming Access Storage, including Streaming Storage and Dataset Decomposition
- Large-Scale Batch Processing, Complex Decomposition and Processing Abstraction
- Poly Sink, including Relational Sink, File-based Sink and Automated Dataset Execution
- Big Data Appliance and Data Virtualization
- Architectural Environments, including ETL
- Analytics Engines and Application Enrichment
- Cloud Computing and Big Data Architectural Considerations
- Cloud Delivery and Deployment Models for Hosting Big Data Solutions

Advanced Big Data Architecture
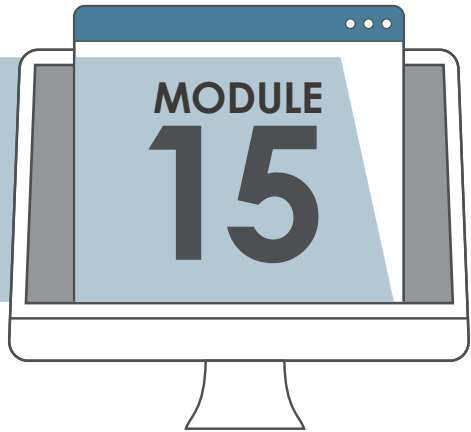
This course module builds upon Module 10 by exploring advanced topics pertaining to Big Data solution platform architecture. In particular, different architectural layers that make up the Big Data solution platform are introduced and discussed, including those pertaining to storage, processing and security. Also covered are a number of design patterns and compound patterns generally employed when building enterprise big data solutions.

The following primary topics are covered:

- Enterprise Data Warehouses and Big Data
- Operational Data Store, Data Marts and Analytical Databases
- Big Data Solution Architectural Layers
- Big Data Architecture, Maintenance and Governance
- Big Data Security Architecture
- Series, Parallel, Appliance and Virtualization Approaches
- Big Data and Cloud-based Storage and Data Processing
- Canonical Data and Large-Scale Graph Processing
- Realtime Access Storage and Direct Data Access
- Analytical Sandbox and Confidential Data Storage
- Batch Data Processing and Dataset Denormalization
- Online Data Repository and Big Data Warehouse Architecture
- Operational Data Store and Indirect Data Access
- Integrated Access and Centralized Dataset Governance
- Event Stream Processing and Complex Event Processing
- Fan-in Ingress, Fan-out Ingress and High Velocity Realtime Processing
- Data Egress, Data Visualization and Data Utilization
- Data Wrangling, Data Processing and Data Analysis Processing
- Big Data Solution Design Patterns and Architectural Compound Patterns
- Lambda Architecture, Layers, Characteristics and Benefits

Big Data Architecture Lab
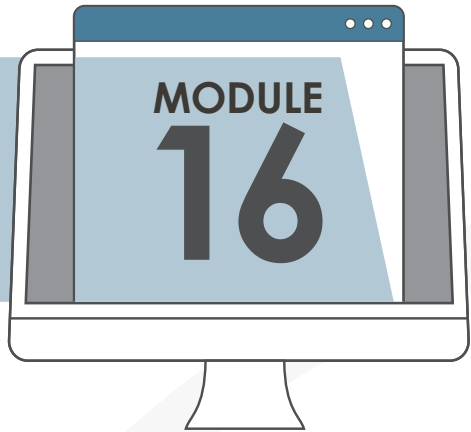
MODULE
16

This course module presents participants with a series of exercises and problems that are designed to test their ability to apply their knowledge of topics covered in previous modules. Completing this lab will help highlight areas that require further attention and will help prove proficiency in big data architecture practices as they are applied and combined to solve real-world problems.

The following exercises are provided:

- Reading Exercise 18.1: SFI Case Study Background
- Lab Exercise 18.2: Design Big Data Pipeline for SLA Compliance
- Lab Exercise 18.3: Alleviate Customer Dissatisfaction
- Lab Exercise 18.4: Reduce Data Storage Cost
- Reading Exercise 18.5: LOC Case Study Background
- Lab Exercise 18.6: Solution for Intelligent Oil Exploration
- Lab Exercise 18.7: Enhance Oil Well Production
- Lab Exercise 18.8: Reduce Maintenance Costs and Achieve Regulatory Compliance
- Reading Exercise 18.9: TXC Case Study Background
- Lab Exercise 18.10: Identify Fraud and Eliminate Waste
- Lab Exercise 18.11: Prioritize Resource Allocation and Enable Open Data Access

Fundamental Data Science Governance for Big Data, Machine Learning & AI
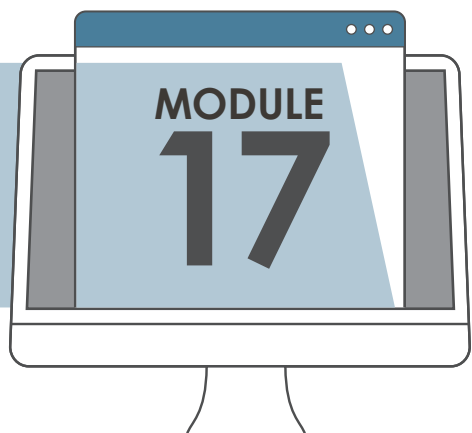
MODULE 17

This course module explores introductory topics pertaining to the field of developing data processing solutions–data engineering–in the context of Big Data environments. Specifically it covers concepts, techniques and technologies related to the processing and storage of Big Data datasets including MapReduce and NoSQL. It highlights the unique challenges faced when processing and storing Big Data datasets. The MapReduce data processing engine, which is the de facto framework for batch processing of large amounts of data, is also explained in detail.

The following primary topics are covered:

- Big Data Engineering – Big Data Engineering Challenges
- Big Data Storage Terminologies (including sharding, replication, CAP theorem, ACID, BASE)
- Big Data Storage Requirements
- On-Disk Storage (including distributed file system – databases)
- Introduction to NoSQL – NewSQL
- NoSQL Rationale – Characteristics
- NoSQL Database Types (including key-value, document, column-family and graph databases)
- Big Data Processing Requirements
- Big Data Processing (including batch mode and realtime mode)
- Introduction to MapReduce for Big Data Processing (batch mode)
- MapReduce Explained (including map, combine, partition, shuffle and sort, and reduce)

Advanced Data Science Governance for Big Data, Machine Learning & AI
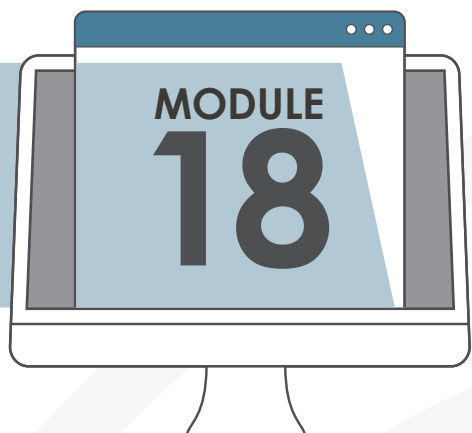
MODULE 18

This course module builds upon Module 7 by exploring advanced topics pertaining to the storage and processing of Big Data datasets. Specifically it covers advanced Big Data engineering mechanisms, in-memory data storage and realtime data processing. It presents further considerations for developing MapReduce algorithms and also introduces the Bulk Synchronous Parallel (BSP) processing engine, along with a discussion of graph data processing. The Big Data mechanisms required for developing Big Data pipelines, its stages and the design process involved in developing Big Data processing solutions are also explored.

The following primary topics are covered:

- Advanced Big Data Engineering Mechanisms (including serialization & compression engines)
- In-Memory Storage Devices, In-Memory Data Grids & In-Memory Databases
- Read-Through, Read-Ahead, Write-Through & Write-Behind Integration Approaches
- Polyglot Persistence (including Explanation, Issues & Recommendations)
- Realtime Big Data Processing Concepts (including Speed Consistency Volume (SCV), Event Stream Processing (ESP) & Complex Event Processing (CEP))
- General Realtime Big Data Processing & Realtime Big Data Processing & MapReduce
- Advanced MapReduce Algorithm Design
- Bulk Synchronous Parallel (BSP) Processing Engine & BSP vs. MapReduce
- Graph Data & Graph Data Processing using BSP
- Big Data Pipelines (including Definition and Stages)
- Big Data with Extract-Load-Transform (ELT)
- Big Data Solutions (including Characteristics, Design Considerations & Design Process)

Data Science Governance Lab for Big Data, Machine Learning & AI
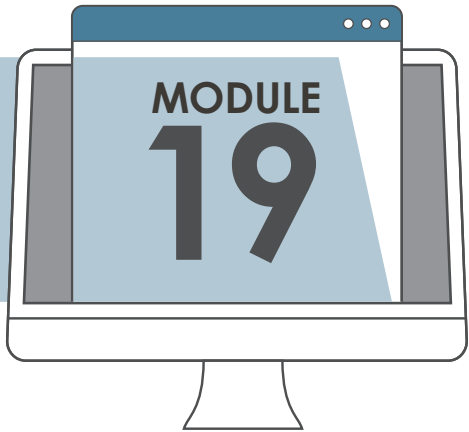
MODULE
19

This course module covers a series of exercises and problems designed to test the participant's ability to apply knowledge of topics covered previously in course modules 19 and 20. Completing this lab will help highlight areas that require further attention, and will further prove hands-on proficiency in Big Data engineering practices as they are applied and combined to solve real-world problems.

As a hands-on lab, this module incorporates a set of detailed exercises that require participants to solve various inter-related problems, with the goal of fostering a comprehensive understanding of how different data engineering technologies, mechanisms and techniques can be applied to solve problems in Big Data environments.

For instructor-led delivery of this lab module, the Certified Trainer works closely with participants to ensure that all exercises are carried out completely and accurately. Attendees can voluntarily have exercises reviewed and graded as part of the class completion. For individual completion of this course as part of the Module 9 Study Kit, a number of supplements are provided to help participants carry out exercises with guidance and numerous resource references.

TRAINING AND EXAM PREPARATION RESOURCES

You can supplement this course with a number of available resources to assist with both learning and exam preparation. Contact info@arcitura.com with any questions.

Certification Exam Prep Kit

A set of additional practice questions is available to support exam preparation.
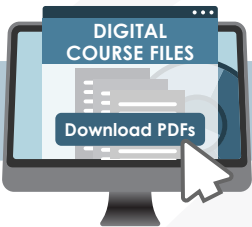
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INSTRUCTOR-LED WORKSHOP

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- Predictive AI Specialist Certification Exam
- Generative AI Specialist Certification Exam
- AI Engineer Certification Exam
- AI Architect Certification Exam
- AI Consultant Certification Exam
- AI Chatbot Specialist Certification Exam
- NLP Engineer Certification Exam
- Cloud AI Professional Certification Exam
- Cloud AI Architect Certification Exam

Digital Transformation Professional Academy

- Digital Transformation Specialist Certification Exam
- Digital Transformation Technology Professional Certification Exam
- Digital Transformation Technology Architect Certification Exam
- Digital Transformation Data Science Professional Certification Exam
- Digital Transformation Data Scientist Certification Exam
- Digital Transformation Security Professional Certification Exam
- Digital Transformation Security Specialist Certification Exam
- Digital Transformation IA Professional Certification Exam
- Digital Transformation IA Specialist Certification Exam

Next-Gen IT Academy

- DevOps Specialist Certification Exam
- Blockchain Architect Certification Exam
- IoT Architect Certification Exam
- Cybersecurity Specialist Certification Exam
- RPA Specialist Certification Exam
- Digital Business Technology Professional Certification Exam
- Containerization Architect Certification Exam
- Quantum Computing Specialist Certification Exam

Next-Gen Data Science Academy

- Big Data Science Professional Certification Exam
- Big Data Scientist Certification Exam
- Machine Learning Specialist Certification Exam
- Artificial Intelligence Specialist Certification Exam
- Data Science Consultant Certification Exam
- Big Data Engineer Certification Exam
- Big Data Architect Certification Exam
- Data Science Governance Specialist Certification Exam
- AI Decisioning Specialist Certifiation Exam

Cloud Computing School

- Cloud Technology Professional Certification Exam
- Cloud Computing Consultant Certification Exam
- Cloud Architect Certification Exam
- Cloud Security Specialist Certification Exam
- Cloud Governance Specialist Certification Exam
- Cloud Storage Specialist Certification Exam
- Cloud Virtualization Specialist Certification Exam

Service Technology School

- Microservice Professional Certification Exam
- SOA Professional Certification Exam
- SOA Analyst Certification Exam
- SOA Architect Certification Exam
- Microservice Architect Certification Exam
- Service API Specialist Certification Exam
- Service Governance Specialist Certification Exam
- Service Security Specialist Certification Exam
- Microservice Consultant Certification Exam

MORE INFO

For more information regarding these exams contact: info@arcitura.com

COURSES	Predictive AI	Generative AI	AI Engineering	AI Architecture & Design	AI Professional Consulting	AI Chatbot Concepts & Design	NLP Engineering	Cloud AI Technology & Automation	Cloud AI Architecture & Design
CERTIFICATIONS	Predictive AI Specialist	Generative AI Specialist	AI Engineer	AI Architect	AI Consultant	AI Chatbot Specialist	NLP Engineer	Cloud AI Professional	Cloud AI Architect
MODULE 01 Fundamental Predictive AI	●		●	●	●				
MODULE 02 Advanced Predictive AI	●								
MODULE 03 Predictive AI Lab	●								
MODULE 04 Fundamental Generative AI		●	●	●	●				
MODULE 05 Advanced Generative AI		●							
MODULE 06 Generative AI Lab		●							
MODULE 07 Fundamental AI Engineering			●		●				
MODULE 08 Advanced AI Engineering			●						
MODULE 09 AI Engineering Lab			●						
MODULE 10 Fundamental AI Architecture				●	●				
MODULE 11 Advanced AI Architecture				●					
MODULE 12 AI Architecture Lab				●					
MODULE 13 Fundamental AI Chatbot Concepts & Design						●			
MODULE 14 Advanced AI Chatbot Concepts & Design						●			
MODULE 15 AI Chatbot Concepts & Design Lab						●			
MODULE 16 Fundamental NLP Engineering							●		
MODULE 17 Advanced NLP Engineering							●		
MODULE 18 NLP Engineering Lab							●		
MODULE 19 Fundamental Cloud AI Technology & Automation								●	●
MODULE 20 Advanced Cloud AI Technology & Automation								●	●
MODULE 21 Fundamental Cloud AI Architecture & Design									●
MODULE 22 Advanced Cloud AI Architecture & Design									●
MODULE 23 Cloud AI Architecture & Design Lab									●

AI & Cloud AI Professional Academy

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COURSES / CERTIFICATIONS	Digital Transformation / Digital Transformation Specialist	Fundamental Digital Technology / Digital Technology Professional	Digital Technology & Architecture / Digital Technology Architect	Fundamental AI & Data Science for Digital Transformation / Digital Data Science Professional	AI & Data Science for Digital Transformation / Digital Data Scientist	Fundamental Security for Digital Transformation / Digital Security Professional	Security for Digital Transformation / Digital Security Specialist	Fundamental Intelligent Automation for Digital Transformation / Intelligent Automation Professional	Intelligent Automation for Digital Transformation / Intelligent Automation Specialist
MODULE 01 — Fundamental Digital Transformation	●	●	●	●	●	●	●	●	●
MODULE 02 — Digital Transformation in Practice	●	●	●	●	●	●	●	●	●
MODULE 03 — Fundamental Cloud Computing		●	●						
MODULE 04 — Fundamental Blockchain		●	●			●	●		
MODULE 05 — Fundamental IoT		●	●						
MODULE 06 — Cloud Architecture			●						
MODULE 07 — Blockchain Architecture			●				●		
MODULE 08 — IoT Architecture			●						
MODULE 09 — Fundamental Big Data Analysis & Analytics				●	●				
MODULE 10 — Fundamental Machine Learning				●	●				
MODULE 11 — Fundamental AI				●	●			●	●
MODULE 12 — Advanced Big Data Analysis & Analytics					●				
MODULE 13 — Advanced Machine Learning					●				
MODULE 14 — Advanced AI					●				●
MODULE 15 — Fundamental Cybersecurity						●	●		
MODULE 16 — Advanced Cybersecurity							●		
MODULE 17 — Fundamental RPA								●	●
MODULE 18 — Advanced RPA & Intelligent Automation									●

Attaining a certification that encompasses all of the course modules also associated with another certification results in the other certification also being automatically awarded.

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COURSES	DevOps	Blockchain Architecture	IoT Architecture	Cybersecurity	Robotic Process Automation	Digital Business Technology	Containerization Architecture	Quantum Computing
CERTIFICATIONS	DevOps Specialist	Blockchain Architect	IoT Architect	Cybersecurity Specialist	RPA Specialist	Digital Business Technology Professional	Containerization Architect	Quantum Computing Specialist
DevOps MODULE 01 Fundamental DevOps	●							
MODULE 02 DevOps in Practice	●							
MODULE 03 DevOps Lab	●							
Blockchain MODULE 01 Fundamental Blockchain		●						
MODULE 02 Blockchain Technology & Architecture		●						
MODULE 03 Blockchain Technology & Architecture Lab		●						
Internet of Things MODULE 01 Fundamental IoT			●					
MODULE 02 IoT Technology & Architecture			●					
MODULE 03 IoT Technology & Architecture Lab			●					
Cybersecurity MODULE 01 Fundamental Cybersecurity				●				
MODULE 02 Advanced Cybersecurity				●				
MODULE 03 Cybersecurity Lab				●				
Robotic Process Automation MODULE 01 Fundamental RPA					●			
MODULE 02 Advanced RPA & Intelligent Automation					●			
MODULE 03 RPA Lab					●			
Digital Business Technology MODULE 01 Business Automation Technology Overview						●		
MODULE 02 Data Science Technology Overview						●		
MODULE 03 Digital & Security Technology Overview						●		
Containerization MODULE 01 Fundamental Containerization							●	
MODULE 02 Containerization Technology & Architecture							●	
MODULE 03 Containerization Technology & Architecture Lab							●	
Quantum Computing MODULE 01 Fundamental Quantum Computing								●
MODULE 02 Advanced Quantum Computing								●
MODULE 03 Quantum Computing Lab								●

Next-Gen Data Science Academy

COURSES	Big Data Analytics & Fundamental Data Science	Big Data Analysis & Advanced Data Science	Data Science Professional Consulting	Machine Learning	Artificial Intelligence	Big Data Engineering	Big Data Architecture	Data Science Governance	AI Decisioning
CERTIFICATIONS	Big Data Science Professional	Big Data Scientist	Data Science Consultant	Machine Learning Specialist	Artificial Intelligence Specialist	Big Data Engineer	Big Data Architect	Data Science Governance Specialist	AI Decisioning Specialist
MODULE 01 Fundamental Big Data Science & Analytics	●	●	●			●	●	●	●
MODULE 02 Big Data Analysis & Technology Concepts	●	●	●			●	●	●	●
MODULE 03 Big Data Analysis & Technology Lab	●		●						
MODULE 04 Big Data Analysis & Science		●							
MODULE 05 Advanced Big Data Analysis & Science		●							
MODULE 06 Big Data Analysis & Science Lab		●							
MODULE 07 Fundamental Machine Learning			●	●					
MODULE 08 Advanced Machine Learning				●					
MODULE 09 Machine Learning Lab				●					
MODULE 10 Fundamental Artificial Intelligence			●		●				
MODULE 11 Advanced Artificial Intelligence					●				
MODULE 12 Artificial Intelligence Lab					●				
MODULE 13 Fundamental Big Data Engineering						●			
MODULE 14 Advanced Big Data Engineering						●			
MODULE 15 Big Data Engineering Lab						●			
MODULE 16 Fundamental Big Data Architecture							●		
MODULE 17 Advanced Big Data Architecture							●		
MODULE 18 Big Data Architecture Lab							●		
MODULE 19 Fundamental Data Science Governance for Big Data, Machine Learning & AI								●	
MODULE 20 Advanced Data Science Governance for Big Data, Machine Learning & AI								●	
MODULE 21 Data Science Governance Lab for Big Data, Machine Learning & AI								●	
MODULE 22 Fundamental AI Decisioning									●
MODULE 23 Advanced AI Decisioning									●
MODULE 24 AI Decisioning Lab									●

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COURSES	Cloud Computing	Cloud Computing Professional Consulting	Cloud Architecture	Cloud Security	Cloud Governance	Cloud Storage	Cloud Virtualization
CERTIFICATIONS	Cloud Technology Professional	Cloud Computing Consultant	Cloud Architect	Cloud Security Specialist	Cloud Governance Specialist	Cloud Storage Specialist	Cloud Virtualization Specialist
MODULE 01 Fundamental Cloud Computing	●	●	●	●	●	●	●
MODULE 02 Cloud Technology Concepts	●	●	●	●	●	●	●
MODULE 03 Cloud Technology Lab	●	●					
MODULE 04 Fundamental Cloud Architecture		●	●				
MODULE 05 Advanced Cloud Architecture			●				
MODULE 06 Cloud Architecture Lab			●				
MODULE 07 Fundamental Cloud Security		●		●			
MODULE 08 Advanced Cloud Security				●			
MODULE 09 Cloud Security Lab				●			
MODULE 10 Fundamental Cloud Governance					●		
MODULE 11 Advanced Cloud Governance					●		
MODULE 12 Cloud Governance Lab					●		
MODULE 13 Fundamental Cloud Storage						●	
MODULE 14 Advanced Cloud Storage						●	
MODULE 15 Cloud Storage Lab						●	
MODULE 16 Fundamental Cloud Virtualization							●
MODULE 17 Advanced Cloud Virtualization							●
MODULE 18 Cloud Virtualization Lab							●

COURSES / CERTIFICATIONS	Fundamental Microservices & Service Technology / Microservice Professional	Fundamental SOA Design with Services & Microservices / SOA Professional	SOA Analysis & Modeling with Services & Microservices / SOA Analyst	SOA Design & Architecture with Services & Microservices / SOA Architect	Microservice Design & Architecture / Microservice Architect	Microservice Professional Consulting / Microservice Consultant	Service API Design & Management / Service API Specialist	Service Governance & Project Delivery / Service Governance Specialist	Security for Microservices & SOA / Service Security Specialist
MODULE 01 — Fundamental SOA, Services & Microservices	●	●	●	●	●	●	●	●	●
MODULE 02 — Microservice Technology Concepts	●			●	●	●	●		●
MODULE 03 — Design & Architecture with SOA, Services & Microservices		●	●	●				●	
MODULE 04 — Fundamental SOA Analysis & Modeling with Services & Microservices			●						
MODULE 05 — Advanced SOA Analysis & Modeling with Services & Microservices			●						
MODULE 06 — SOA Analysis & Modeling Lab with Services & Microservices			●						
MODULE 07 — Advanced SOA Design & Architecture with Services & Microservices				●					
MODULE 08 — SOA Design & Architecture Lab with Services & Microservices				●					
MODULE 09 — Fundamental Microservice Architecture & Containerization					●	●			
MODULE 10 — Advanced Microservice Architecture & Containerization					●				
MODULE 11 — Microservice Architecture & Containerization Lab					●				
MODULE 12 — Fundamental Service API Design & Management						●	●		
MODULE 13 — Advanced Service API Design & Management							●		
MODULE 14 — Service API Design & Management Lab							●		
MODULE 15 — Fundamental Service Governance & Project Delivery								●	
MODULE 16 — Advanced Service Governance & Project Delivery								●	
MODULE 17 — Service Governance & Project Delivery Lab								●	
MODULE 18 — Fundamental Security for Services, Microservices & SOA						●			●
MODULE 19 — Advanced Security for Services, Microservices & SOA									●
MODULE 20 — Security Lab for Services, Microservices & SOA									●

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