

DIGITAL TRANSFORMATION: FUNDAMENTAL DATA SCIENCE

Training & Certification Guide



Arcitura[®]
DIGITAL

About the Digital Transformation Professional Academy

The Digital Transformation Professional Academy from Arcitura provides formal education and accreditation programs dedicated to industry-standard Digital Transformation. This extensive program encompasses a number of specialized tracks for IT professionals, each of which addresses a specific skillset for a common profession associated with Digital Transformation projects. Fields of practice covered by the Digital Transformation Professional Academy curriculum include Digital Transformation technology, architecture, data science, security and intelligent automation.

The Digital Transformation Professional Academy curriculum is comprised of 20 course modules and 9 certification tracks. Several of the certification tracks leverage courses in other Arcitura programs. Exams are available worldwide via Pearson VUE testing centers, as well as via Pearson VUE OnVue online proctoring and on-site delivery by Certified Trainers. Achieving a passing grade on 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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HOW TO TAKE THIS COURSE



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.

To learn more, visit: www.arcitura.com/elearning

To enroll, visit: digital.arcitura.com/courses



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 Digital eLearning course materials. Each workshop agenda, format and schedule can be tailored to client requirements.

To learn more, visit: www.arcitura.com/workshops



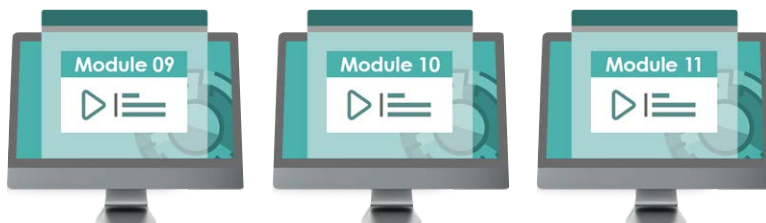
VIRTUAL WORKSHOPS

Private virtual workshops can be delivered by Certified Trainers for small and large groups, as well as individual participants. Workshop participants receive access to the course materials via the Arcitura Digital eLearning platform. Virtual workshop agendas can be tailored with greater flexibility to accommodate more distributed and fragmented training schedules.

To learn more, visit: www.arcitura.com/workshops



Several additional learning and exam preparation products and services are available, including coaching, exam prep kits and digital downloads. See the Training and Exam Preparation Resources page for details.



HOW TO GET STARTED

Welcome to the Digital Transformation: Fundamental Data Science course! This course is comprised of a set of modules. Each module has a set of lessons and is further supplemented with exercises to help reinforce your understanding of key topics. Upon completing the course, you can optionally proceed to prepare yourself for the certification exam (as explained on the *How to get Certified* page).

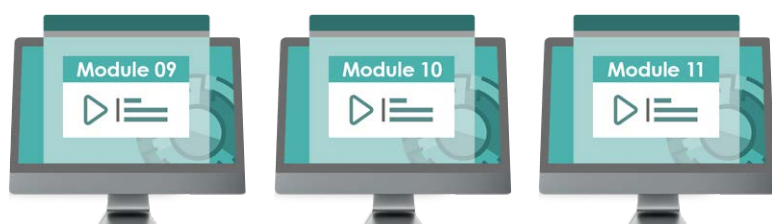
Additional resources are available to assist you with completing this course, including downloadable digital course files, printed course materials, coaching hours and instructor-led training services (as explained on the *Training and Exam Preparation Resources* page.)

PREREQUISITE

The prerequisite for this course is the completion of the Digital Transformation course. It is recommended that you complete the Digital Transformation course prior to starting the Digital Transformation: Fundamental Data Science course.

MORE INFO

To enroll in this course, visit:
digital.arcitura.com/courses



HOW TO GET CERTIFIED

You can become a Certified Digital Transformation Data Science Professional! This course can prepare you for the official Digital Transformation Data Science Professional Certification exam, which can be taken worldwide at Pearson VUE testing centers, via Pearson VUE online proctoring and/or Arcitura direct proctoring.

Upon attaining a passing grade on the certification exam (and fulfilling any other prerequisite exam requirements) you will achieve the Digital Transformation Data Science Professional Certification, after which you will automatically receive an official digital Accreditation Certificate and a digital Certification Badge from Acclaim/Credly with an account that supports the online verification of your certification status. Digital accreditation certificates and badges are free of charge.

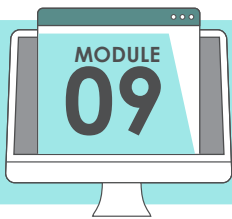
Additional resources are available to assist you with preparing for the certification exam, including practice exam questions, downloadable digital course files, printed course materials, coaching hours and instructor-led training services (as explained on the *Training and Exam Preparation Resources* page.)

MORE INFO

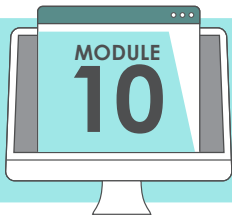
To learn more about this certification and exam, visit:
www.arcitura.com/certifications

COURSE MODULE OUTLINES

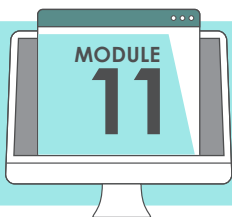
The Digital Transformation: Fundamental Data Science course is comprised of the following course modules. Outlines for these course modules are provided on the subsequent pages.



Fundamental Big Data Analysis & Analytics



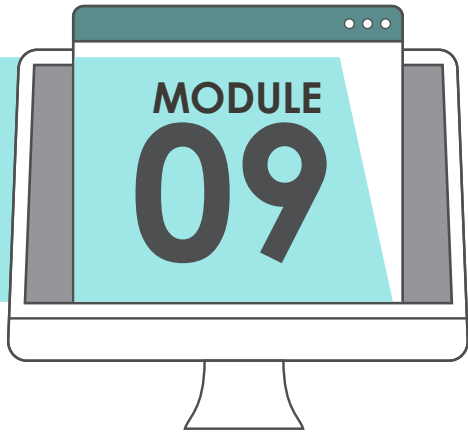
Fundamental Machine Learning



Fundamental AI



Fundamental Big Data Analysis & Analytics

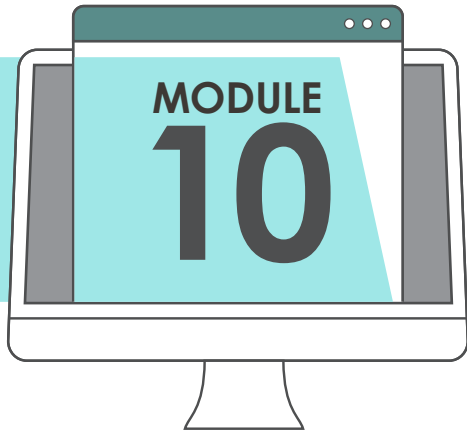


This foundational course module provides an overview of essential big data science topics and explores a range of the most relevant contemporary analysis practices, technologies and tools for big data environments. Topics include common analysis functions and features offered by big data solutions, as well as an exploration of the big data analysis lifecycle.

The following primary topics are covered:

- Understanding Big Data
- Fundamental Terminology & Concepts
- Big Data Business & Technology Drivers
- Characteristics of Data in Big Data Environments
- Dataset Types in Big Data Environments
- Fundamental Analysis and Analytics
- Business Intelligence & Big Data
- Data Visualization & Big Data
- The Big Data Analysis Lifecycle
- A/B Testing, Correlation, Regression
- Time Series Analysis, Heat Maps
- Network Analysis, Spatial Data Analysis
- Classification, Clustering
- Filtering (including collaborative filtering & content-based filtering)
- Sentiment Analysis, Text Analytics

Fundamental Machine Learning

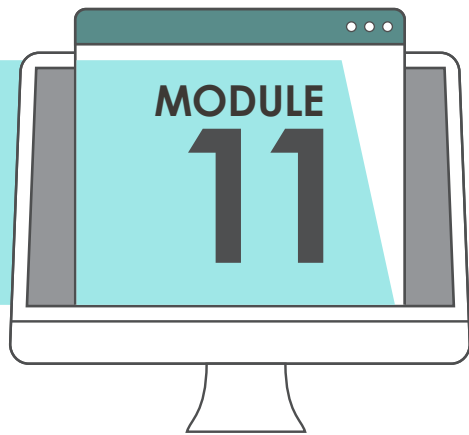


This course module provides an easy-to-understand overview of machine learning for anyone interested in how it works, what it can and cannot do and how it is commonly utilized in support of business goals. The course covers common algorithm types and further explains how machine learning systems work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

The following primary topics are covered:

- 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)

Fundamental AI



This course module provides essential coverage of artificial intelligence and neural networks in easy-to-understand, plain English. The course 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 course 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 course 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, nvolution, Pool, Output, Match Input, etc.)
- Fundamental and Specialized Neural Network Architectures
- Perceptron, Feedforward, Deep Feedforward, AutoEncoder, Recurrent, Long/Short Term Memory
- 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)



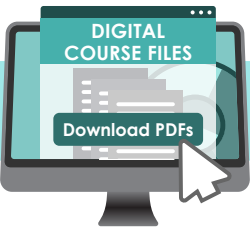
TRAINING AND EXAM PREPARATION RESOURCES

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.



Digital Course Files

For each course you can order a set of downloadable digital course materials comprised of printable, watermarked workbook and poster PDF files.



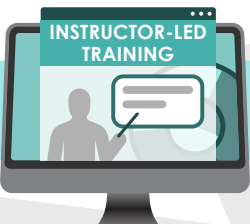
Printed Course Materials

The printed workbooks and posters for each course can be ordered in B&W and full-color, and can be shipped worldwide.



One-on-One Coaching

Certified Trainers are available to provide online coaching on an hourly basis and in all time zones.



Instructor-Led Training

Certified Trainers are available to provide virtual and onsite training workshops for this and other Arcitura courses.

COURSES		Digital Transformation	Digital Transformation: Fundamental Technology	Digital Transformation: Advanced Technology & Architecture	Digital Transformation: Fundamental Data Science	Digital Transformation: Advanced Data Science	Digital Transformation: Fundamental Security	Digital Transformation: Advanced Security	Digital Transformation: Fundamental Intelligent Automation	Digital Transformation: Advanced Intelligent Automation
CERTIFICATIONS		Digital Transformation Specialist	Digital Transformation Technology Professional	Digital Transformation Technology Architect	Digital Transformation Data Science Professional	Digital Transformation Data Scientist	Digital Transformation Security Professional	Digital Transformation Security Specialist	Digital Transformation Intelligent Automation Professional	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									●
MODULE 19	Fundamental AI Decisioning								●	●
MODULE 20	Advanced AI Decisioning									●

Gray circles indicate prerequisite modules.

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								●

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									●

Gray circles indicate prerequisite modules.

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							●

Gray circles indicate prerequisite modules.

COURSES		Fundamental Microservices & Service Technology	Fundamental SOA Design with Services & Microservices	SOA Analysis & Modeling with Services & Microservices	SOA Design & Architecture with Services & Microservices	Microservice Design & Architecture	Microservice Professional Consulting	Service API Design & Management	Service Governance & Project Delivery	Security for Microservices & SOA
CERTIFICATIONS		Microservice Professional	SOA Professional	SOA Analyst	SOA Architect	Microservice Architect	Microservice Consultant	Service API Specialist	Service Governance Specialist	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									●

Gray circles indicate prerequisite modules.



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