

AI ENGINEER

Training & Certification Guide



Arcitura[®]
DIGITAL

AI & Cloud AI Professional Academy

The AI & Cloud AI Professional Academy from Arcitura provides formal education and accreditation programs dedicated to contemporary AI technology and practices, including predictive AI, generative AI and cloud-based AI, as well as AI engineering and architecture.

The AI & Cloud AI Professional Academy curriculum is comprised of 23 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.

TABLE OF CONTENTS

03

How to Take This Course

04

How to Get Started

05

How to Get Certified

06

Course Module Outlines

11

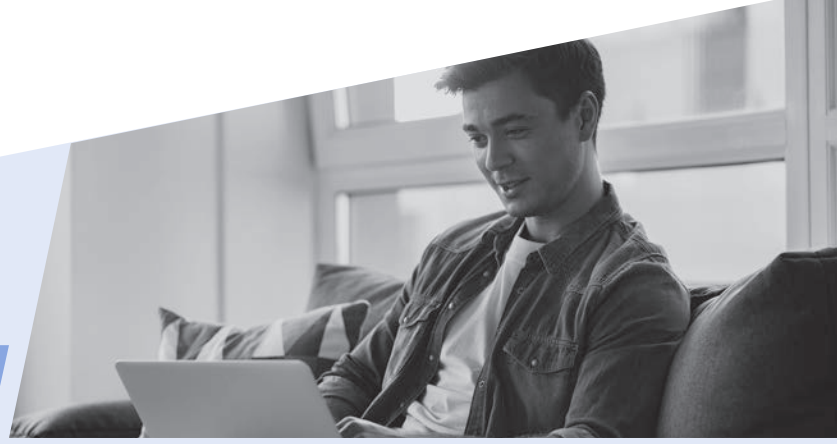
Training and Exam Preparation Resources

12

Arcitura Certification Programs



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



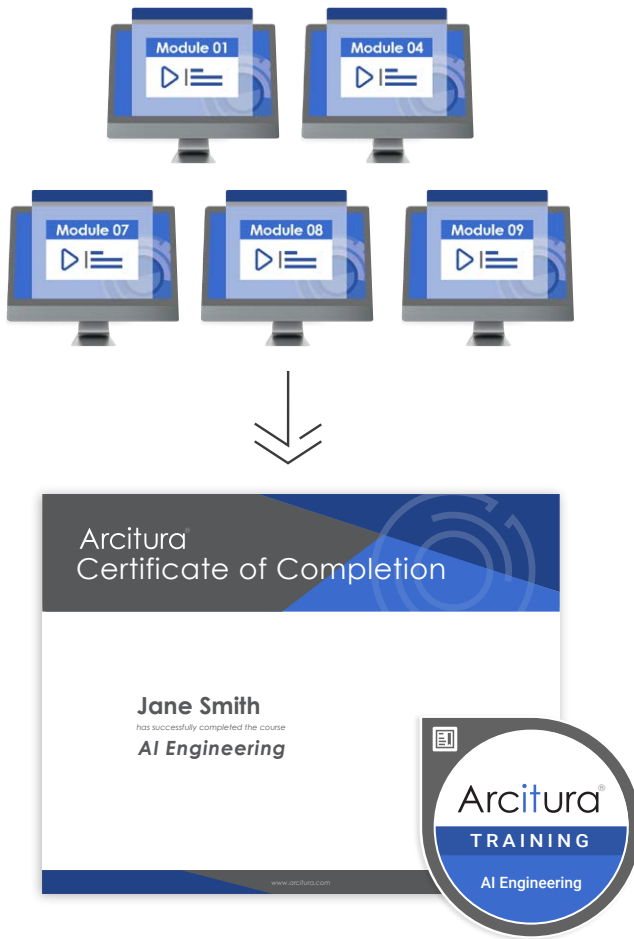
VIRTUAL WORKSHOPS

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

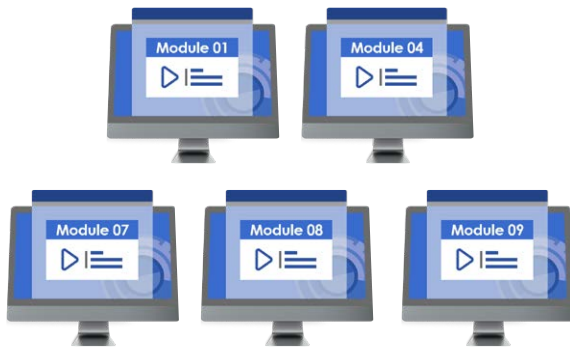
Welcome to the AI Engineering course! This course is comprised of a set of modules. Each module has a set of lessons and is further supplemented with exercises to help reinforce your understanding of key topics. Upon completing the course, you can optionally proceed to prepare yourself for the certification 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.)

MORE INFO

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

A Certified AI Engineer has proven knowledge of AI systems design, neural network engineering and engineering practices associated with a broad range of predictive AI and generative AI models and networks.



HOW TO GET CERTIFIED

You can become a Certified AI Engineer! This course can prepare you for the official AI Engineer Certification exam, which can be taken worldwide.

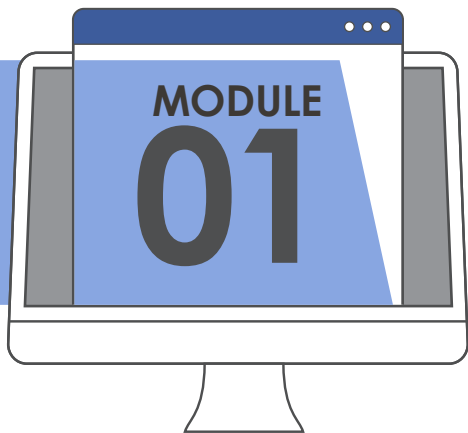
Upon attaining a passing grade on the certification exam, you will achieve the AI Engineer Certification, after which you will automatically receive an official digital Accreditation Certificate and a digital Certification Badge from Acclaim/Credly with an account that supports the online verification 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

Fundamental Predictive AI

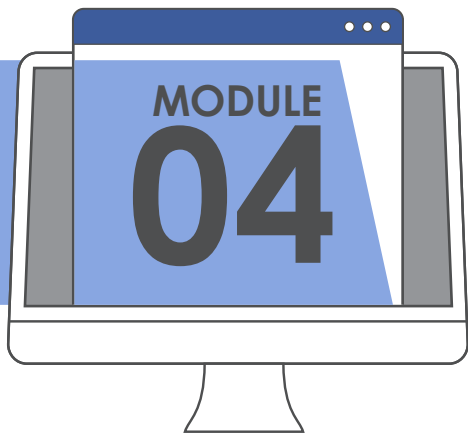


This course module illustrates how predictive AI can be used and applied in a range of business applications, as well as essential coverage of predictive AI practices and systems. The module explores the most common learning approaches and functional areas that AI systems are used for. All of the content is authored in easy-to-understand, plain English.

The following primary topics are covered:

- Predictive AI Business and Technology Drivers
- Predictive AI Benefits
- Common Risks and Challenges of Using Predictive AI
- Business Problem Categories Addressed by AI
- Types of Predictive AI
- Common Predictive AI Learning Approaches
- Understanding Predictive AI Learning and Model Training
- Step-by-Step Training Loop Process
- Supervised Learning, Unsupervised Learning, Continuous Learning
- Heuristic Learning, Semi-Supervised Learning, Reinforcement Learning
- Common Predictive AI Functional Designs, Computer Vision, Pattern Recognition
- Robotics, Natural Language Processing (NLP)
- Speech Recognition, Natural Language Understanding (NLU)
- Understanding AI Models and Neural Networks

Fundamental Generative AI

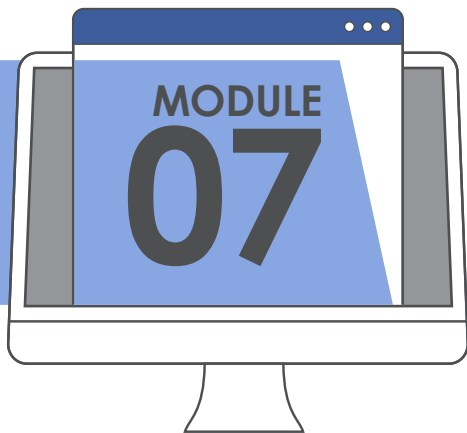


This course module explores the application of generative AI within a range of business scenarios and provides fundamental coverage of generative AI concepts, models, best practices and neural networks, including Generative Adversarial Networks (GANs), Variational Encoders (VAEs) and Transformer models. All of the content is authored in easy-to-understand, plain English.

The following primary topics are covered:

- Generative AI Business and Technology Drivers
- Generative AI Benefits
- Common Risks and Challenges of Using Generative AI
- Business Problem Categories Addressed by Generative AI
- Understanding Models, Algorithms and Neural Networks
- Types of Generative AI
- Training Generative Models and Understanding the Training Loop
- Understanding Generative Adversarial Networks (GANs)
- Understanding Variational Encoders (VAE)
- Understanding Transformers
- Steps to Building AI Systems
- Generative AI Best Practices

Fundamental AI Engineering

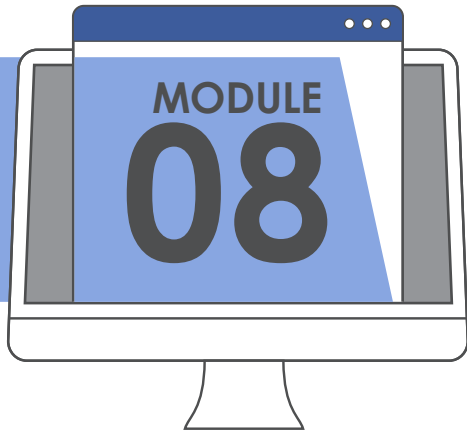


This course module delves into a range of AI engineering practices and techniques, and further provides a detailed introduction of neural network architecture components. The course module establishes a step-by-step process for assembling an AI system, thereby illustrating how and when different practices 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:

- Model Evaluation and Validation Techniques
- Data Preprocessing Techniques, Overfitting and Regularization
- Practical AI Ethics and Bias Mitigation
- Optimization Techniques and Advanced Learning Algorithms
- Imbalanced Datasets Handling Techniques
- Natural Language Processing (NLP) with Deep Learning
- Advanced Feature Engineering, Data Augmentation Techniques
- Fine-Tuning Strategies, Reinforcement Learning
- Frictionless Integration, Fault Tolerance Model Integration
- Model Explainability and Interpretability
- Model Deployment, Monitoring and Maintenance
- Understanding Neural Networks and Models
- Neural Network Types, Neurons, Layers, Links, Weights
- 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.)
- Neural Network Architectures for Predictive AI and Generative AI
- How to Build an AI System (Step-by-Step)
- Common AI System Design Principles and AI Project Best Practices

Advanced AI Engineering

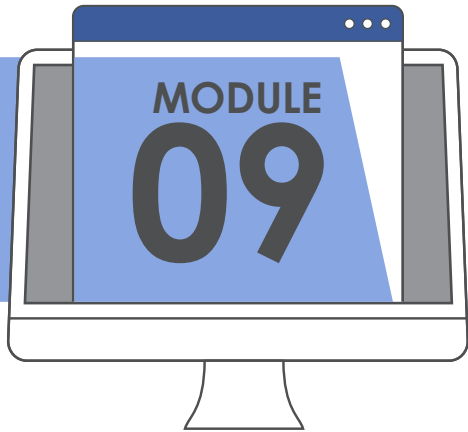


This course module covers a series of practices for preparing and working with data for training and running contemporary AI systems and neural networks. It further provides techniques for designing and optimizing neural networks, including approaches for measuring and tuning neural network model performance. The practices and techniques can be applied individually or in different combinations to address a range of common AI system problems and requirements.

The following primary topics are covered:

- Data Wrangling for Preparing Data for Neural Network Input
- Feature Encoding for Converting Categorical Features
- Feature Imputation for Inferring Feature Values
- Feature Scaling for Training Datasets with Broad Features
- Text Representation for Converting Data while Preserving Semantic and Syntactic Properties
- Dimensionality Reduction to Reduce Feature Space for Neural Network Input
- Supervised Learning for Training Neural Network Models
- Supervised Network Configuration for Establishing the Number of Neurons in Network Layers
- Image Identification for Using a Convolutional Neural Network
- Sequence Identification for Using a Long Short Term Memory Neural Network
- Unsupervised Learning Patterns for Training Neural Network Models
- Pattern Identification for Visually Identifying Patterns via a Self Organizing Map
- Content Filtering for Generating Recommendations
- Model Evaluation Patterns for Measuring Neural Network Performance
- Training Performance Evaluation for Assessing Neural Network Performance
- Prediction Performance Evaluation for Predicting Neural Network Performance in Production
- Baseline Modeling for Assessing and Comparing Complex Neural Networks
- Model Optimization Patterns for Refining and Adapting Neural Networks
- Overfitting Avoidance for Tuning a Neural Network
- Frequent Model Retraining for Keeping a Neural Network in Synch with Current Data
- Transfer Learning for Accelerating Neural Network Training

AI Engineering Lab



This course module provides a series of case-study driven, lab-style exercises and problems that are designed to test your ability to apply your knowledge of topics covered in previous modules. Completing this lab helps reinforce understanding of preceding topics and further demonstrates how different practices and technologies can be applied together as part of greater solutions.





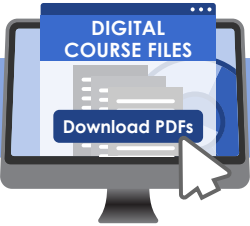
TRAINING AND EXAM PREPARATION RESOURCES

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		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									●

COURSES		Digital Transformation	Fundamental Digital Technology	Digital Technology & Architecture	Fundamental AI & Data Science for Digital Transformation	AI & Data Science for Digital Transformation	Fundamental Security for Digital Transformation	Security for Digital Transformation	Fundamental Intelligent Automation for Digital Transformation	Intelligent Automation for Digital Transformation
CERTIFICATIONS		Digital Transformation Specialist	Digital Technology Professional	Digital Technology Architect	Digital Data Science Professional	Digital Data Scientist	Digital Security Professional	Digital Security Specialist	Intelligent Automation Professional	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.

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	Big Data Consulting	Data Science Professional Consulting	Machine Learning	Big Data Engineering	Big Data Architecture	Data Science Governance
CERTIFICATIONS		Big Data Science Professional	Big Data Scientist	Big Data Consultant	Data Science Consultant	Machine Learning Specialist	Big Data Engineer	Big Data Architect	Data Science Governance 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 Predictive & Generative Artificial Intelligence				●				
MODULE 11	Fundamental Big Data Engineering						●		
MODULE 12	Advanced Big Data Engineering						●		
MODULE 13	Big Data Engineering Lab			●			●		
MODULE 14	Fundamental Big Data Architecture							●	
MODULE 15	Advanced Big Data Architecture							●	
MODULE 16	Big Data Architecture Lab							●	
MODULE 17	Fundamental Data Science Governance for Big Data, Machine Learning & AI								●
MODULE 18	Advanced Data Science Governance for Big Data, Machine Learning & AI								●
MODULE 19	Data Science Governance Lab for Big Data, Machine Learning & AI								●

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
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.



Arcitura®

Copyright © Arcitura Education Inc.
www.arcitura.com • info@arcitura.com