# SERVICE API
# DESIGN & MANAGEMENT

## Training & Certification Guide

Arcitura®
TRAINING
Service API Design &
Management

Arcitura®
CERTIFIED
Service API
Specialist

itcc

PCC PROFESSIONAL
CERTIFICATION
COALITION

Pearson | VUE

OnVUE

Acclaim

Credly
by Pearson

Arcitura®
DIGITAL

# About the Service Technology School

The Service Technology School from Arcitura provides formal education and accreditation programs dedicated to the fields of Microservices, Service APIs and SOA, including analysis, modeling, design, architecture, security and governance.

The Service Technology School curriculum is comprised of 20 course modules and 9 certification tracks. 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 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

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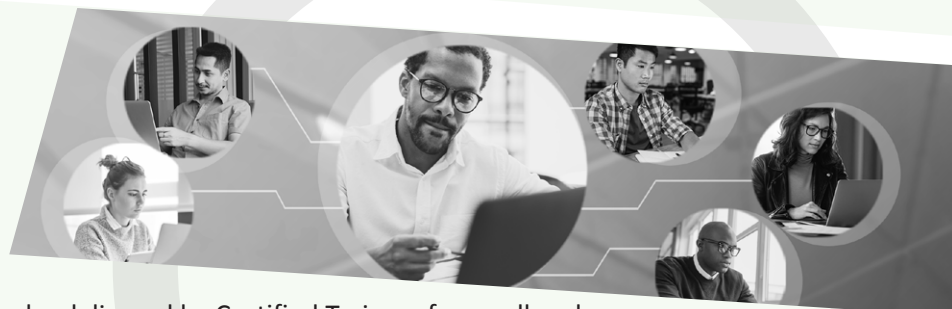
*Several additional learning and exam preparation products and services are available, including coaching, exam prep kits and digital downloads. See the Training and Exam Preparation Resources page for details.*
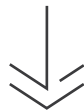
## HOW TO GET STARTED

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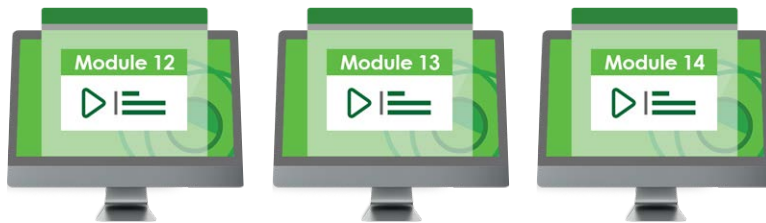
Additional resources are available to assist you with completing this course, including downloadable digital course files, printed course materials, coaching hours and instructor-led training services (as explained on the *Training and Exam Preparation Resources* page.)

## PREREQUISITE

The prerequisite for this course is the completion of the Fundamental Microservices & Service Technology course. It is recommended that you complete the Fundamental Microservices & Service Technology course prior to starting the Service API Design & Management course.

Module 12

Module 13

Module 14

**Arcitura**®
**Certificate of Completion**

**Jane Smith**
has successfully completed the course
*Service API Design & Management*

www.arcitura.com

**Arcitura**®
**TRAINING**
Service API Design & Management

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

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**Arcitura**
**CERTIFIED**
*Service API Specialist*

*A Certified Service API Specialist has in-depth knowledge of service API design and coupling techniques, and REST and web-capable RPC protocols, as well as associated management practices, including monetization and versioning.*



# HOW TO GET CERTIFIED

You can become a Certified Service API Specialist! This course can prepare you for the official Service API Specialist 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 Service API Specialist 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.)
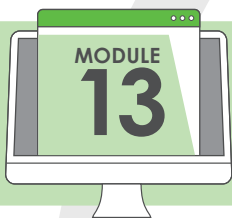
*The Service API Design & Management course provides comprehensive coverage of API design techniques, coupling and granularity considerations, and API management practices including API versioning. Also covered are serialization protocols, as well as topics pertaining to REST and RPC protocols.*
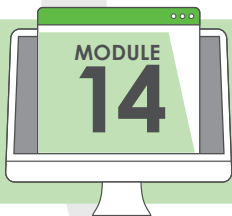
# COURSE MODULE OUTLINES

The Service API Design & Management course is comprised of the following course modules. Outlines for these course modules are provided on the subsequent pages.
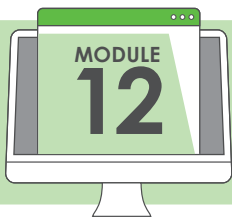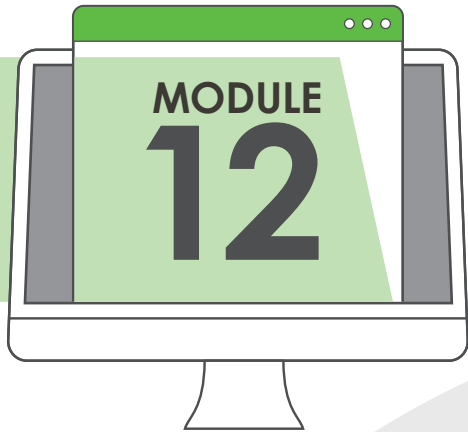
**MODULE 12** — Fundamental Service API Design & Management



**MODULE 13** — Advanced Service API Design & Management



**MODULE 14** — Service API Design & Management Lab

# Fundamental Service API Design & Management

This course module covers essential topics pertaining to modern-day service API design and management, including API roles, the API lifecycle and fundamental API patterns and coupling types. Also covered are established and alternative data serialization technologies, API gateways and a comprehensive tutorial of REST and related patterns.

The following primary topics are covered:

- Introduction to APIs and API Roles
- Pubic, Private and Partner API Models
- The Service API Lifecycle
- Decoupled Contracts and Service Façades
- Contract Centralization and Service Agents
- Positive and Negative Service Coupling Types
- Text-based Data Serialization Formats (XML, JSON)
- Binary Data Serialization Protocols (Apache Avro, Thrift, Google Protocol Buffer)
- REST APIs and REST Properties
- Endpoint Redirection, Entity Linking and Idempotent Capabilities
- Lightweight Endpoints and Uniform Contracts
- API Gateways and Service Brokers
- Data Model and Format Transformation, Protocol Bridging
- Intermediate Routing, Brokered Authentication and Multi-Channel Endpoints

# Advanced Service API Design & Management
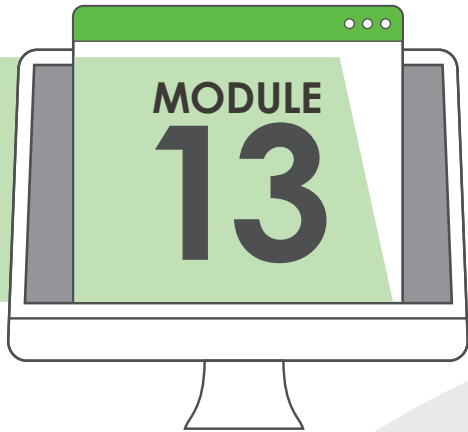
**MODULE**
**13**

This course module delves into established and alternative service API protocols to explore how each functions and to provide a comparison that helps determine when one service protocol may be more suitable than others. A series of service API design and management patterns are covered, along with an exploration of the service mesh model and how it compares with API gateways.

The following primary topics are covered:

- Understanding gRPC for (.proto and XML)
- Unary RPC, Client/Server Streaming RCP and Bidirectional RPC
- Understanding GraphQL, Data Requests and Fetches, Caching
- Understanding Falcor, Falcor vs. GraphQL, Request Batching
- Understanding Thrift (Processor, Protocol and Transport Layers)
- Concurrent Contracts, Contract Denormalization and Canonical Schema
- Schema Centralization, Policy Centralization and Canonical Protocol
- Dual Protocols and Legacy Wrappers
- Messaging Metadata and State Messaging
- Service Mesh Model, Library, Proxy and Sidecar
- Service Mesh vs. API Gateway
- Service API Management
- Decomposed Capability, Distributed Capability and Proxy Capability
- Validation Abstraction and Partial Validation

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# Microservice Architecture & Containerization Lab
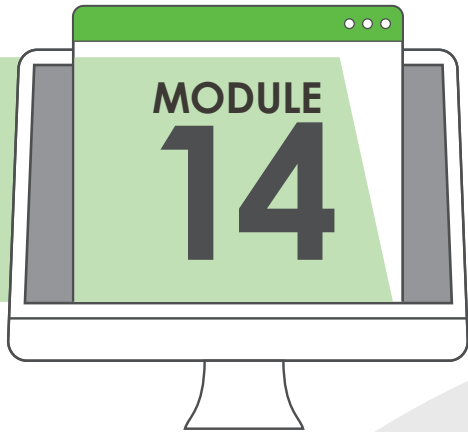
**MODULE**
**14**

As a continuation of course modules 12 and 13, this hands-on workshop allows attendees to apply the technologies, concepts, techniques and patterns previously covered in order to complete a set of lab exercises.

Participants are required to study case study backgrounds and carry out a series of exercises to solve a number of inter-related problems, with the ultimate goal of applying technologies and design patterns to design their own service API solutions.

The following exercises are provided:

- Reading Exercise 14.1: Case Study Background: Handy
- Lab Exercise 14.2: Define Lines of Communication
- Lab Exercise 14.3: Define Service API View
- Lab Exercise 14.4: Define Communication Support in Processing Logic
- Lab Exercise 14.5: Identify Coupling Types
- Lab Exercise 14.6: Identify Hidden Coupling Issues
- Lab Exercise 14.7: Solve Coupling Problems
- Reading Exercise 14.8: Order Processing Service APIs
- Lab Exercise 14.9: Optimize Service API for Performance
- Lab Exercise 14.10: Deal Service Extension
- Lab Exercise 14.11: Design Product Service Lab Exercise 14.12: Enhance Product Service Architecture

# 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.
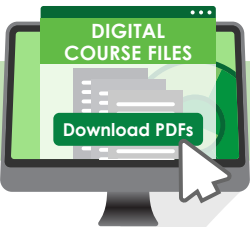
### Digital Course Files

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.

# DIGITAL TRANSFORMATION PROFESSIONAL ACADEMY

| | | Digital Transformation / Digital Transformation Specialist | Digital Transformation: Fundamental Technology / Digital Transformation Technology Professional | Digital Transformation: Advanced Technology & Architecture / Digital Transformation Technology Architect | Digital Transformation: Fundamental Data Science / Digital Transformation Data Science Professional | Digital Transformation: Advanced Data Science / Digital Transformation Data Scientist | Digital Transformation: Fundamental Security / Digital Transformation Security Professional | Digital Transformation: Advanced Security / Digital Transformation Security Specialist | Digital Transformation: Fundamental Intelligent Automation / Digital Transformation Intelligent Automation Professional | Digital Transformation: Advanced Intelligent Automation / 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.*

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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 | | | | | | | | ● |

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# NEXT-GEN DATA SCIENCE ACADEMY

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| COURSES / CERTIFICATIONS | Big Data Analytics & Fundamental Data Science / Big Data Science Professional | Big Data Analysis & Advanced Data Science / Big Data Scientist | Data Science Professional Consulting / Data Science Consultant | Machine Learning / Machine Learning Specialist | Artificial Intelligence / Artificial Intelligence Specialist | Big Data Engineering / Big Data Engineer | Big Data Architecture / Big Data Architect | Data Science Governance / Data Science Governance Specialist | AI Decisioning / 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.*

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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 | | | | | | | ● |

*Gray circles indicate prerequisite modules.*

Pearson | VUE    OnVUE    Acclaim    Credly by Pearson

# SERVICE TECHNOLOGY SCHOOL

| 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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