✦ EMERGING TECHNOLOGIES · ADVANCED

Digital Twin Technology

Virtual copies of real systems.





40	6	SAM-DGTWIN
HOURS	MODULES	CERTIFICATION

✦ INSIDE THIS BROCHURE

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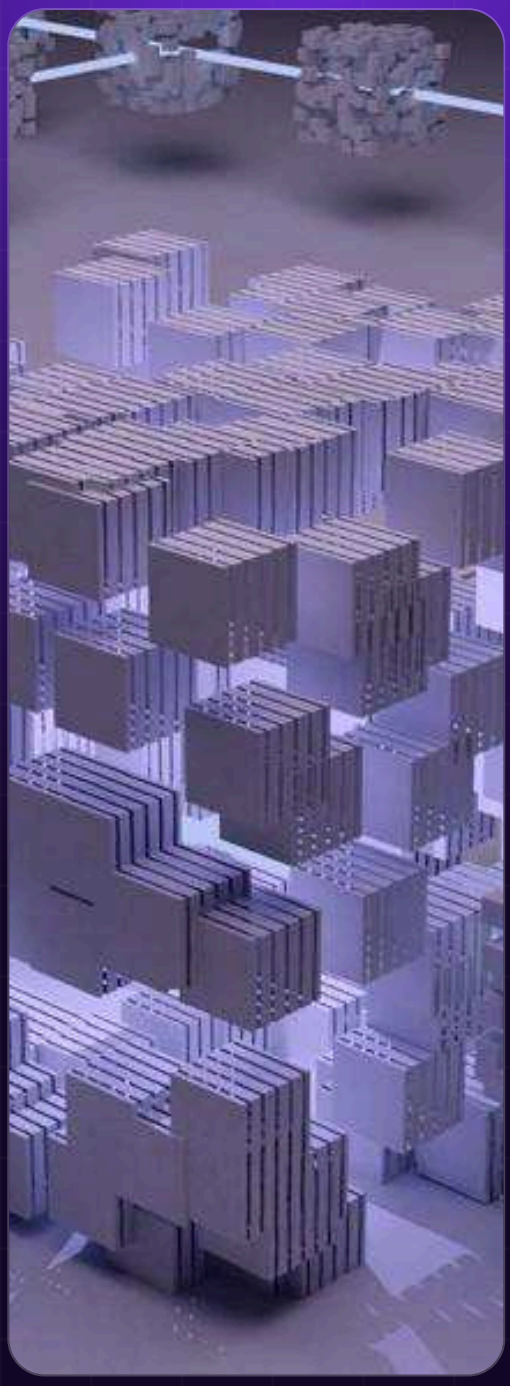
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AT A GLANCE

Level	Advanced
Duration	40 Hours
Modules	6
Certificate	SAM-DGTWIN

✦ PROGRAM OVERVIEW

Virtual copies of real systems.



Build and use digital twins for monitoring, simulation and optimisation.

Digital twins create live virtual models of physical assets, processes and systems, enabling teams to monitor performance, predict failures and test changes before acting in the real world. This advanced program covers digital twin architecture, real-time data integration, simulation, analytics and 3D visualisation, using Python, IoT protocols and Unity. Projects mirror realistic industrial scenarios.

LEVEL	DURATION	CERTIFICATION	DELIVERY
Advanced	40 Hours	SAM-DGTWIN	Instructor-led · Live virtual · Blended



✦ WHAT YOU'LL PRACTISE

Understand digital twin architecture	01
Connect real-time data	02
Simulate and optimise systems	03
Plan digital twin projects	04

✦ WHO IT'S FOR

Built for people ready to grow.

01

Curious professionals

Quantum, blockchain, IoT and AR/VR fundamentals

02

Developers

Solidity, XR development, edge AI / TinyML

03

Security teams

Quantum-safe crypto, IoT and 5G security

04

Innovation teams

Digital twins and emerging-tech strategy

PREREQUISITES

Python programming experience	01
Familiarity with IoT or industrial data concepts	02
Basic understanding of data analytics	03

ROLES YOU CAN TARGET

- Digital Twin Engineer ↗
- Industrial IoT Engineer ↗
- Simulation Engineer ↗
- Smart Manufacturing Analyst ↗
- Solutions Architect (Digital Twin) ↗

✦ LEARNING OUTCOMES

What you'll be able to do.

01 Explain digital twin types, maturity levels and reference architectures

02 Model assets and relationships using standard twin definition approaches

03 Connect real-time sensor data via MQTT and OPC UA

04 Build simulations and predictive models for twin behaviour

05 Visualise twins in 3D dashboards using Unity

06 Plan digital twin projects with clear value and scope

HOURS PER MODULE



✦ PROGRAM RUNWAY

Your journey, module by module.

6
MODULES · 40 HRS

01	**Digital Twin Concepts and Architecture** Digital model, shadow and twin, Twin maturity levels, Reference architectures	6 hrs
02	**Modelling Assets and Systems** Asset hierarchies and relationships, DTDL and Asset Administration Shell, Physics-based vs data-driven models	6 hrs
03	**Real-Time Data Integration** MQTT and OPC UA protocols, Time-series databases like InfluxDB, Streaming data pipelines	8 hrs
04	**Simulation and Analytics** Discrete-event simulation with SimPy, What-if scenario analysis, Predictive maintenance models	8 hrs
05	**3D Visualisation with Unity** Importing CAD and 3D models, Binding live data to 3D objects, Interactive dashboards and alerts	6 hrs
06	**Platforms and Project Delivery** Digital twin platforms overview, NVIDIA Omniverse and OpenUSD, Security and data governance	6 hrs
★	**Capstone · End-to-End Digital Twin** Assessment, capstone review and certification	

✦ DETAILED CURRICULUM

The syllabus.

Modules 01–03

MODULE 01

Digital Twin Concepts and Architecture

6 hours

Hands-on lab
Design a reference architecture for a factory production line twin.

TOPICS COVERED

- Digital model, shadow and twin
- Twin maturity levels
- Reference architectures
- Industry use cases
- ISO 23247 framework overview

MODULE 02

Modelling Assets and Systems

6 hours

Hands-on lab
Model a pump system and its relationships using DTDL.

TOPICS COVERED

- Asset hierarchies and relationships
- DTDL and Asset Administration Shell
- Physics-based vs data-driven models
- Ontology and metadata design
- Twin graph and state management

MODULE 03

Real-Time Data Integration

8 hours

Hands-on lab
Stream simulated sensor data into a twin via MQTT.

TOPICS COVERED

- MQTT and OPC UA protocols
- Time-series databases like InfluxDB
- Streaming data pipelines
- Data quality and synchronisation
- Edge gateways

LEARN BY DOING

6 guided labs, one in every module.



✦ DETAILED CURRICULUM

Syllabus, continued.

Modules 04–06

MODULE 04

Simulation and Analytics

8 hours

Hands-on lab
Simulate production throughput scenarios and identify bottlenecks in Python.

TOPICS COVERED

- Discrete-event simulation with SimPy
- What-if scenario analysis
- Predictive maintenance models
- Anomaly detection on sensor data
- Optimisation techniques

Python

MODULE 05

3D Visualisation with Unity

6 hours

Hands-on lab
Build a Unity scene showing live machine status from data.

TOPICS COVERED

- Importing CAD and 3D models
- Binding live data to 3D objects
- Interactive dashboards and alerts
- AR views of digital twins
- Web-based 3D viewers

MODULE 06

Platforms and Project Delivery

6 hours

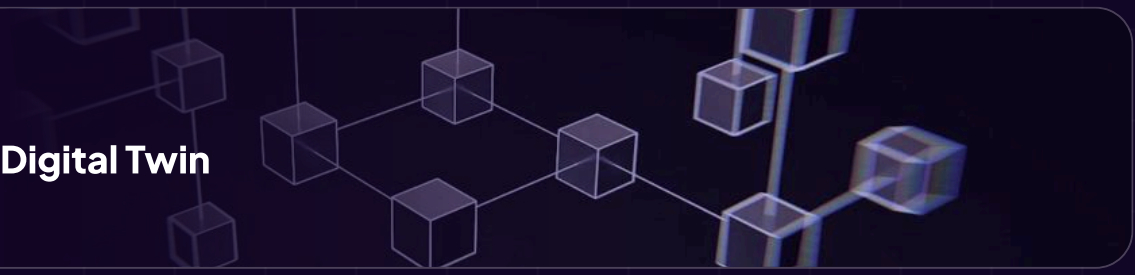
Hands-on lab
Develop a digital twin business case and pilot plan.

TOPICS COVERED

- Digital twin platforms overview
- NVIDIA Omniverse and OpenUSD
- Security and data governance
- Business case and ROI
- Scaling from pilot to enterprise

CAPSTONE

End-to-End Digital Twin



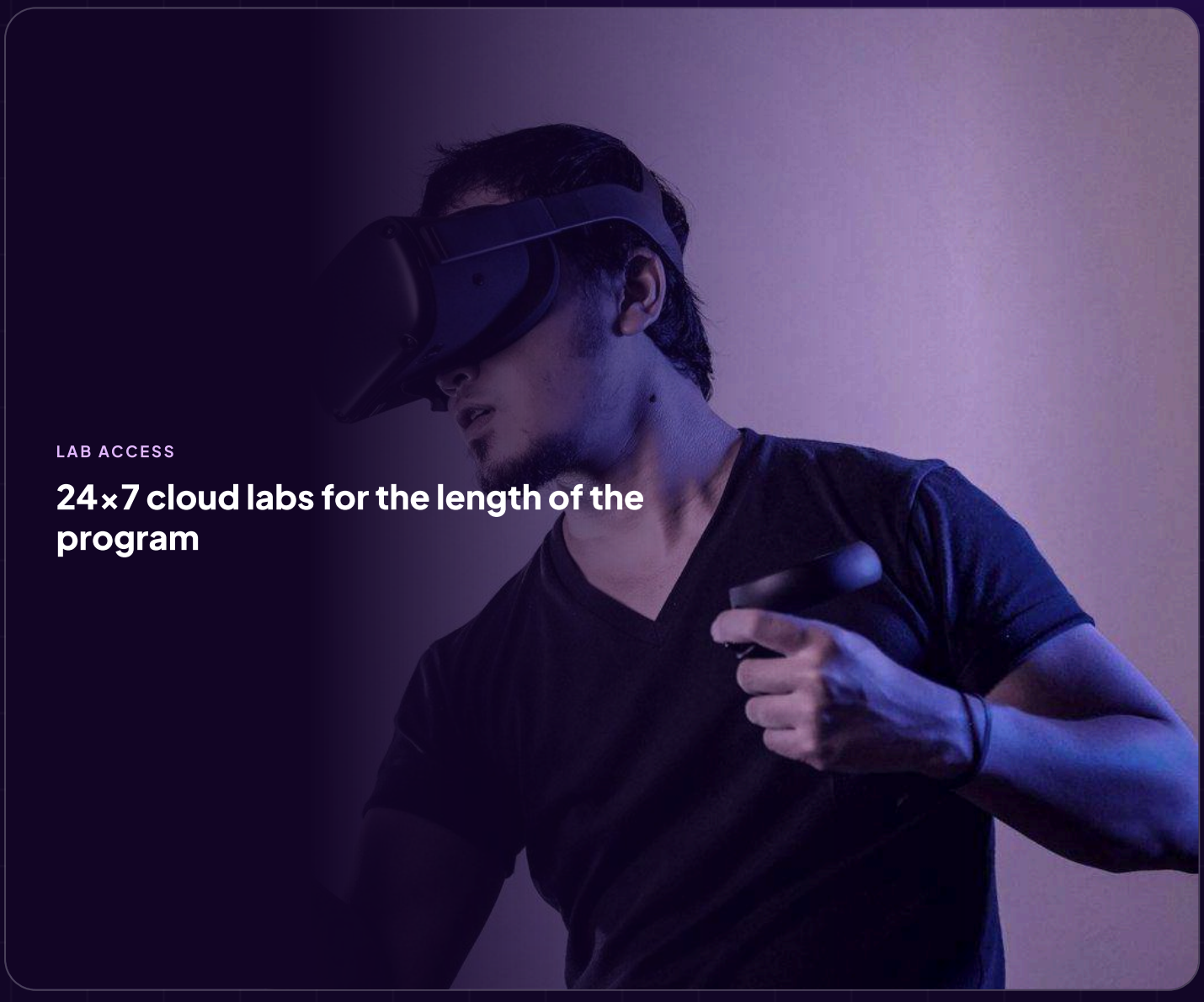
✦ YOUR STACK

Tools you'll build with.

Real platforms and frameworks — the same stack modern teams ship with, practised in cloud-hosted labs.

Python
Automation & scripting

Unity
XR & 3D engine



LAB ACCESS

24×7 cloud labs for the length of the program

✦ HANDS-ON WORK

Projects that prove you can do it.

01

Machine Health Twin

Build a twin of a machine that ingests sensor data, tracks health indicators and raises anomaly alerts.

02

Production Line Simulation

Simulate a production line in Python and evaluate the impact of process changes on throughput.

03

3D Twin Dashboard

Create a Unity visualisation that reflects live asset status and highlights alarms in real time.

CAPSTONE PROJECT

End-to-End Digital Twin

Design and build a digital twin for a chosen physical system, integrating real-time data, a predictive or simulation model and a 3D visualisation, then present architecture, insights generated and a scaling plan.

Real-world scenario | Mentor review | Portfolio ready



CERTIFICATION

SAM-DGTWIN

Awarded on successful completion of the program assessments.

- MCQ assessments
- Practical lab evaluation
- Project & capstone review
- Final presentation



✦ HOW YOU LEARN

The SAM Learning Framework™

PHASE 01

S

Scenario

Real-world attack and use-case scenarios open every module.

PHASE 02

A

Apply

Hands-on lab work, CTF challenges and live projects.

PHASE 03

M

Master

Assessment, peer review and certification prep.

PHASE 04

M

Mentor

Post-program career guidance and support.

DELIVERY MODELS

- Instructor-Led (ILT)
- Virtual Instructor-Led
- Self-Paced Online
- E-Learning Licensing
- Blended Learning
- Corporate Onsite
- Bootcamp Intensive
- Hackathon / CTF
- Mentorship

✦ LEARNING PATH · EMERGING TECHNOLOGIES

Where this program fits.

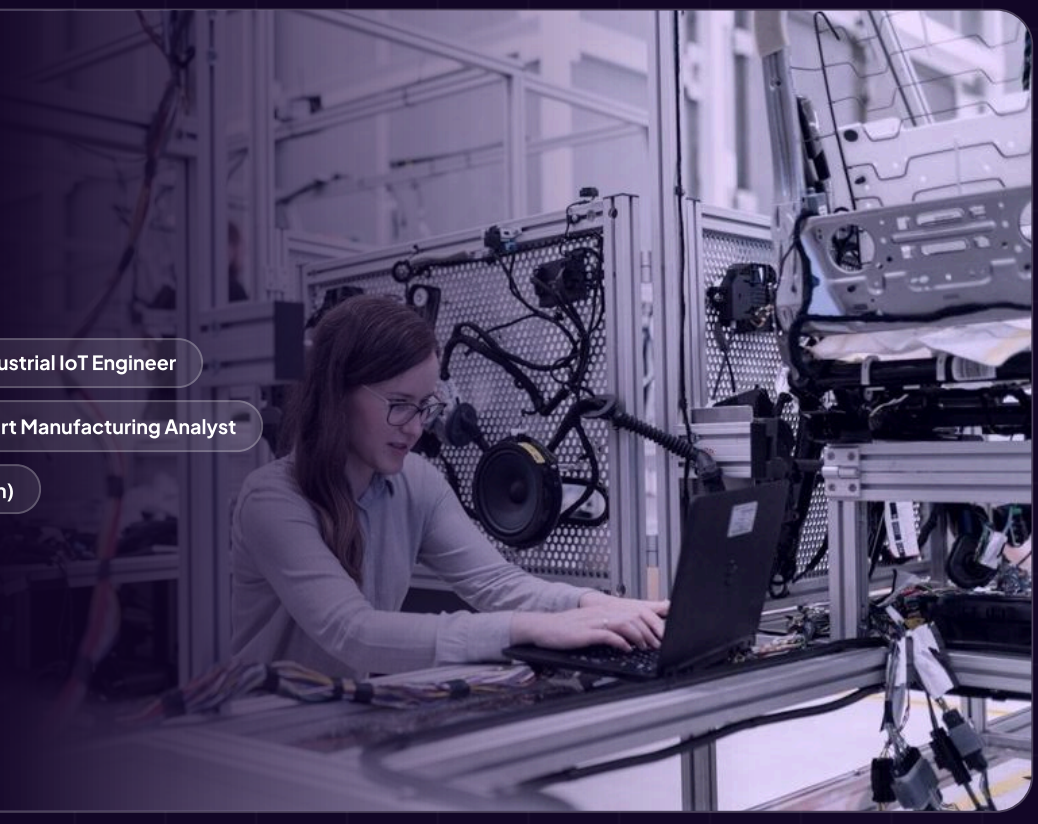
Foundation	Intermediate	Advanced
4 programs	4 programs	You are here

BEFORE THIS

Quantum-Safe Cryptography	48 Hours
Blockchain Development (Solidity/Ethereum)	56 Hours
IoT Security & Architecture	48 Hours
5G Network Security	40 Hours

UP NEXT

The top of this pathway — explore related tracks.



CAREER ROLES

- Digital Twin Engineer
- Industrial IoT Engineer
- Simulation Engineer
- Smart Manufacturing Analyst
- Solutions Architect (Digital Twin)

✦ FAQS

Questions, answered.

Q01

Do I need prior experience to join?

You should be comfortable with Python and have basic data analytics knowledge. Experience with IoT, manufacturing or simulation helps but is not required, as core concepts are introduced before advanced integration work.

Q02

How is the program delivered and scheduled?

The 40 hours program is instructor-led and delivered live virtual or blended, combining concept sessions, demonstrations and guided hands-on work. Batch timings and session frequency are confirmed with the academy team at enrollment.

Q03

Will I receive a certificate?

Yes. Participants who attend the required sessions and pass the program assessments, including practical tasks and a capstone review, receive the Samcommunity Academy SAM-DGTWIN certificate for Digital Twin Technology.

Q04

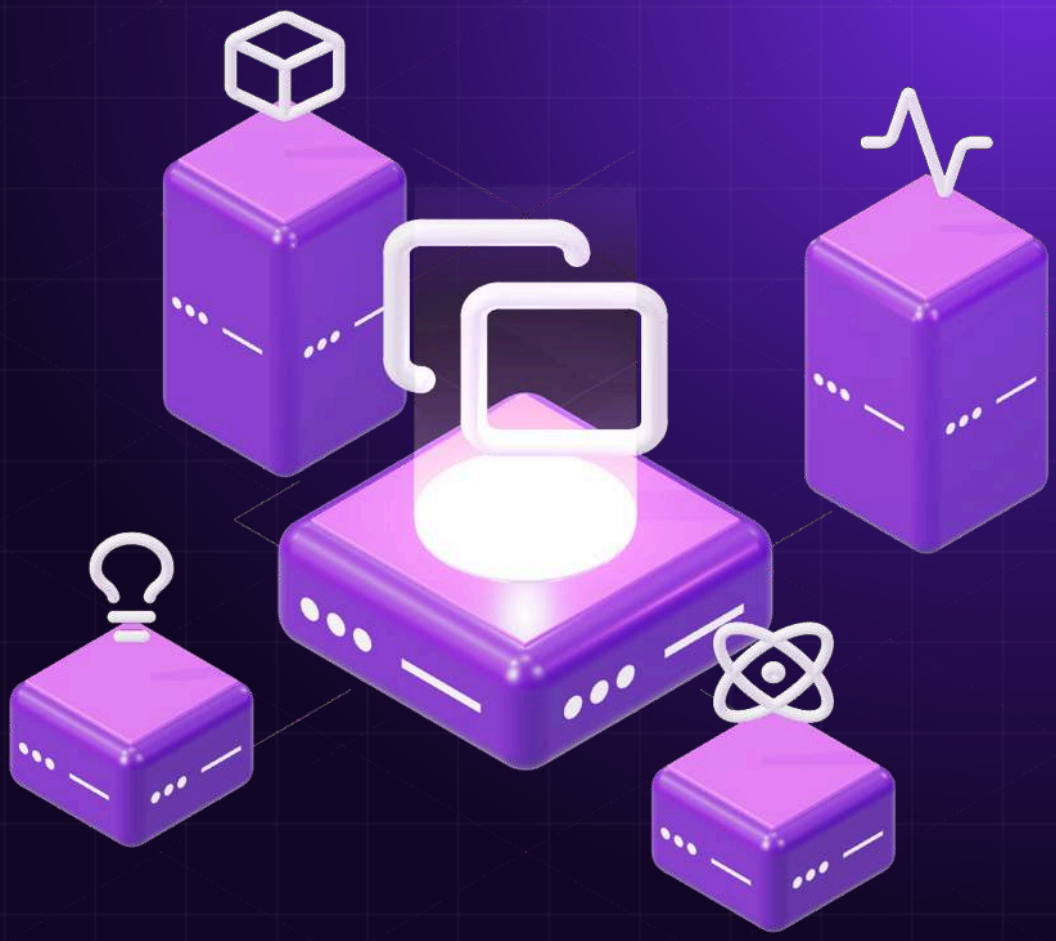
What labs and tools will I have access to?

Labs use Python, SimPy, MQTT, OPC UA simulators, InfluxDB, Grafana and Unity in local or virtual environments. Setup guidance and system requirements are shared before the first hands-on session.

Q05

Is career support provided?

Yes. You receive guidance on building a portfolio from your projects, presenting skills on your resume and preparing for interviews. Career support helps you present yourself well, but job placement, interviews and salaries are not guaranteed.



✦ LET'S TALK

Start Digital Twin Technology with Samcommunity.

INDIVIDUALS

academy@samcommunity.in

Batches, enrolment & career guidance

CORPORATE & INSTITUTIONS

corporate@samcommunity.in

Team batches & custom programs

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