

The DIGITWIN4CIUE project

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- Co-Funded by



Co-funded by
the European Union

- 4 years Project
- Starting from Nov 2022
- 7.0 M€ Budget (1.2M€ subsidy for students)
- 50% co funding
- Promoted by European universities and disruptive and innovative SMEs
- Support from industry and administration



To prepare and deliver an executive master targeting civil engineers to cover a major need of lack of digital training

Objectives



To establish a sustainable Centre of Excellence of digital twins



To facilitate and accelerate the digital transformation of the built environment ecosystem

The DIGITWIN4CIUE consortium



POLITÉCNICA

UNIVERSIDAD
POLITÉCNICA
DE MADRID



École des Ponts
ParisTech



Civil Engineering & Architecture Schools



AI and CS research
center



tyris.ai
Predictive Analytics

MainRail 
ALTA METRIS

Innovation SMEs

European University



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Executive Master in Digital Twins for Infrastructures and Cities

The Executive Master



UNIVERSIDAD
POLITÉCNICA
DE MADRID



- One year 60 ECTS program in English
- Online evening sessions
- 3 onsite events
- Series of public conferences

**Basic skills
courses**

20 ECTS

**Applied skills
courses**

20 ECTS

Capstone project

20 ECTS

The Executive Master Program

Part I (20 ECTS)

Basic Skills

Computer Science and BIM/GIS to acquire the basic digital skills needed to manage digital twins

COURSE TITLE	ECTS	TYPE	PERIOD	COORDINATOR
Programming & Software development	4	Core	Oct/Nov	UPM
Cloud Computing and Cybersecurity	4	Core	Oct/Nov	UPM
Principles of BIM and GIS	4	Core	Oct/Nov	UPM
Internet of Things (IoT) implementations in Digital Twin (DT) Systems	4	Core	Dec/Feb	UPB
Machine learning and data analysis	4	Core	Dec/Feb	UPB
Big Data	4	Core	Dec/Feb	ITU
Finite-element analysis and model calibration	2	Elective	Oct/Nov	UPM
MATLAB programming	2	Elective	Oct/Nov	BME
Relational database and SQL	2	Elective	Oct/Nov	ITU
Introduction to numerical methods and optimization	2	Elective	Oct/Nov	BME
Transport modelling	2	Elective	Dec/Feb	BME
Python programming	2	Elective	Dec/Feb	ITU

The Executive Master Program

Part II (20 ECTS)

Applied Digital Twins

Core courses (12 ECTS) in generic Digital Twins concepts and Elective Courses (8 ECTS) in applied technologies

COURSE TITLE	ECTS	TYPE	PERIOD	COORDINATOR
Design and deployment of digital twins	3	Core	Feb/Apr	UPM
Innovation & Industry 5.0	3	Core	Feb/Apr	ENPC
Asset and Facility management in DGT for Infrastructures	3	Core	Feb/Apr	ITU
Digital Twins: validation and usage	3	Core	Apr/Jun	ENPC
Knowledge representation and semantic interoperability	3	Core	Apr/Jun	UPM
Advanced BIM for Transports	2	Elective	Feb/Apr	UPM
Mobility Data Analysis	2	Elective	Feb/Apr	Nommon
Intelligent Transportation Systems	2	Elective	Apr/Jun	BME
Road and Rail Track Management systems	2	Elective	Apr/Jun	BME
Advanced BIM for Construction	2	Elective	Feb/Apr	ENPC
Smart buildings	2	Elective	Feb/Apr	ENPC
Smart cities and territory: policy and planning	2	Elective	Apr/Jun	UPM
Structural Health Monitoring	2	Elective	Apr/Jun	UPM
GIS in Digital Twin City	2	Elective	Apr/Jun	ITU

The Executive Master Program



Public conference cycle

A cycle of 20 bi-weekly lectures of 60 min by leading experts of the industry, research and academia



Capstone projects

Real-world cases of applied digital twins, proposed and mentored by industrial partners, and coordinated by faculty of the Master.

Developed in groups of students, with 2 onsite workshops and a final presentation at the closing ceremony

Current status

- 19 students
 - 7 different nationalities, based in 6 different countries
- 22 PhD candidates from SIE and VTT in several courses
 - Mainly in Python, Machine Learning, Big Data, IoT and “Smart” technologies
- 6 Capstone Projects
 - Dam, port, railway, mobility, power line, wind turbine
 - Academic mentoring (ex. Nicolas Audebert for the railway case)
- A dozen of conferences yet
 - Bridges, maintenance, port, railway, dam, ...
 - Lack in renewable energies

Center of Excellence in Digital Twins for Infrastructures and Cities

The Centre of Excellence



Neutral connections

Academia
Research entities
Construction companies
Engineering consultants
SMEs
European Union

- Executive Master
- Digital Technologies short programs
- Online MOOCs for members

Training

- Watch team
- Research & innovation
- Technological support
- Standards & definitions

Technology transfer

- International + national incubators
- Research and innovation calls (cf. Digital Europe)
- Facilitator

Entrepreneurship hub





**DIGITAL
TWINS**

infrastructures & cities

Thank you!

<https://www.digitwin4ciue.eu>

