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ITC INNOVATION & TECHNOLOGY CENTRE

Innovation & Technology Center

Summer 2026

Section I: Overview:

COURSE TITLE	Digital Twins for Everyone: Introduction to Intelligent Virtual Models Across Engineering, Business, Health, Cities and Sustainability
INSTRUCTOR	Dr. Shady Adib
CREDITS (Hours)	Total 20 hours- 4 hours/Day
PRE-REQUISITES/CO-REQUISITES	No previous experience in programming, AI, modelling or simulation is required. Basic computer and internet use is sufficient.
LANGUAGE	English
GRADING	Attended/Not Attended
LEARNING ENVIRONMENT	Computer Lab
NUMBER OF PARTICIPANTS	10 - 25
COURSE FEES	2000 EGP/Student

Section II: Background and Rationale:

Digital Twins are becoming one of the key emerging technologies shaping smart cities, engineering, healthcare, business, sustainability and public services. This course provides an accessible introduction to Digital Twins for students from different disciplines. It explains how real-world systems can be connected to digital models using data, dashboards and AI. The course is designed to be practical, low-cost and suitable for students with no technical background. Students will finish the course with a simple Digital Twin concept for a real-world problem.

Section III: Learning Outcomes:

By the end of the course, students will be able to:

- Explain the concept of a Digital Twin in simple and accessible terms.
- Distinguish between physical systems, virtual models, dashboards and Digital Twins.

• Identify Digital Twin applications across engineering, business, healthcare, sustainability, education and smart cities.
• Understand the role of data, dashboards, sensors and artificial intelligence in Digital Twin systems.
• Develop and present a simple conceptual Digital Twin for a real-world problem.

Section IV: Target Audience:

This course is suitable for undergraduate students and early-stage professionals from a wide range of disciplines, including engineering, computer science, artificial intelligence, business, management, architecture, urban planning, healthcare, life sciences, environmental studies, sustainability, education and social sciences. It is also suitable for any student interested in future technologies, smart systems, data-driven decision-making and innovation.

Section V: Content and Structure:

DAY	TITLE	DETAILS
1	What is a Digital Twin?	Introduction to Digital Twins; physical and virtual systems; differences between models, simulations, dashboards and Digital Twins; examples from smart buildings, cities, healthcare, business, transport and infrastructure. Students map a simple real-world system and identify its physical, digital and data components.
2	Data, Monitoring and Dashboards	Introduction to how data feeds Digital Twins; types of data; sensors and manual data; real-time and historical data; dashboards; data quality; missing data and uncertainty. Students create a simple monitoring dashboard using Google Sheets or Excel Online.
3	Artificial Intelligence, Prediction and Smart Decisions	Accessible introduction to how AI enhances Digital Twins through prediction, anomaly detection, optimisation, scenario testing and human-in-the-loop decision-making. Students complete or observe a simple no-code/low-code demonstration using data to detect unusual behaviour or predict future conditions.
4	Digital Twins Across Disciplines	Applications of Digital Twins in engineering, healthcare, business, education, sustainability, climate action, smart cities, manufacturing and public services. Students work in groups to design a Digital Twin concept for a real-world problem from their own discipline or area of interest.
5	Mini Project and Final Presentations	Students finalise and present their Digital Twin concept, including the problem, target users, physical system, digital representation, required data, expected

		benefits, risks, limitations, ethics and future development opportunities. Final group presentations and feedback.