Università degli Studi di Napoli Federico II
Dipartimento di Ingegneria Civile, Edile e Ambientale
Dottorato in Ingegneria dei Sistemi Civili

Visual Programming Language and Generative Design for Infrastructure-Building Information Modeling

Lecturer**:** Eng. **Mattia Intignano**, PhD

Duration: 18 CLOCK HOURS (3 CFU)

Learning Objectives

This course introduces doctoral students and researchers to the use of visual and text-based programming for infrastructure design in BIM. Methodologies and tools for automating processes, managing data, and improving interoperability between software will be explored. Starting with modeling a road infrastructure in Autodesk Civil 3D, integration with Dynamo will proceed, finally expanding the focus to open-source environments, languages such as Python, and open-BIM road project management tools such as Bonsai. Space will be given to reading and writing geospatial data, manipulating infrastructure objects, and producing replicable workflows. The approach will be hands-on, with concrete examples and commented code, to stimulate experimentation and problem solving on real cases. Goal: To train professionals capable of innovating the infrastructure BIM process through programming. Upon successful completion of the course, students will be issued with a certificate of accomplishment for the acquired skills. Attendees will receive a non-commercial student license for participation in this course. Attendees are required to install the software on their own computers.

Topics include:

- BIM for Infrastructure: Fundamentals and Road Modeling in Civil 3D
- VPL for Civil 3D: Dynamo Basics
- VPL for Civil 3D: Automations in C3D workflows
- Data Management: VPL and Python to foster interoperability
- Open BIM and Programming Infrastructure Objects
- Advanced tools for I-BIM workflows

Class Schedule

Lecture 1	Wednesday, January 22nd, 2026 (3-6 PM)
Lecture 2	Wednesday, January 29th, 2026 (3-6 PM)
Lecture 3	Wednesday, February 5th, 2026 (3-6 PM)
Lecture 4	Wednesday, February 12nd, 2026 (3-6 PM)
Lecture 5	Wednesday, February 19th, 2026 (3-6 PM)
Lecture 6	Wednesday, February 26th, 2026 (3-6 PM)