



Semester number: 5	Intelligent Facade Systems: Design and Fabrication	ECTS credits: ECTS ●
Level of study: Engineering degree		Academic year: 2026/2027

Department: Department of Visual Arts

Instructor: MSc Arch. Kacper Radziszewski

Short description of the course:

The facade is no longer a static envelope but an active, responsive interface of the building. This seminar introduces students to the design of smart, intelligent and futuristic facade systems: from case study research and environmental simulation, through electronics and sensors, to digital fabrication and a jointly built facade panel prototype.

Couse Objective:

The goal of the course is to provide knowledge and skills necessary for designing, simulating and fabricating intelligent facade systems, taking into account life cycle assessment (LCA), visual aspects and the realisation of the process.

Course content and class schedule:

Theoretical module:

- Contemporary facade systems: smart, intelligent, responsive, futuristic.
- Case study selection: building type and geographic location, climate and context analysis.
- Life cycle assessment (LCA) of facade materials and systems.

Simulation module:

- Short tutorial on 3D modelling of facade geometry in Rhino.
- Autodesk Forma: introduction to simulations at urban and architectural scale (sun, wind, daylight, microclimate).

Prototyping module:

- Introduction to microprocessors and sensors in Autodesk Tinkercad.
- Responsive facade logic: sensing, control, movement and reaction to environmental conditions.

Project module:

- Introduction to digital fabrication: CNC laser cutting.
- Small group project: a futuristic facade system for the selected case study.
- Joint 1:1 facade panel prototype, with documentation and final presentation