UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH

Course guide
210297 - IAT - Innovations in Architecture and Technology

Last modified: 29/06/2023

Unit in charge: Barcelona School of Architecture
Teaching unit: 753 - TA - Department of Architectural Technology.

Degree: DEGREE IN ARCHITECTURE STUDIES (Syllabus 2014). (Optional subject).

Academic year: 2023 **ECTS Credits:** 3.0 **Languages:** Catalan

LECTURER

Coordinating lecturer: Oriol Pons Valladares

Others:

PRIOR SKILLS

Capable of understanding general blueprints and detailed drawings of architecture designs. Drawing in two and three dimensions freehand or with software tools. To develop a research project.

REQUIREMENTS

Have successfully passed the first degree course in architecture studies at the ETSAB or equivalent.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
EP19. Translation from Spanish slope
ET16. Translation from Spanish slope

Transversal:
CT1. Translation from Spanish slope
CT2. Translation from Spanish slope
CT4. Translation from Spanish slope
CT5. Translation from Spanish slope
CT6. Translation from Spanish slope

TEACHING METHODOLOGY

Active methodologies. Personalized learning, discussions, gamification, learning with real material, project-based learning and visits.

LEARNING OBJECTIVES OF THE SUBJECT

That students:
- Get to know in a generic way the most recent and relevant innovations in architecture, as well as real and practical cases of these novelties.
- Analyze and evaluate in detail the impact on the architecture of some real case/s of these innovations.
- Propose a future innovation or evolution of a current novelty in the coming years within the field of architecture and its technologies.

STUDY LOAD

Type	Hours	Percentage
Self study	42,0	56.00
Hours large group	33,0	44.00

Total learning time: 75 h

CONTENTS

General contents

Description:
This subject is organized into 10 sessions: 1) introduction to the subject and the syllabus; 2) innovative design and project strategies, from BIM to participatory design; 3) new prototyping systems, from the CNC to virtual mock-ups; 4) innovative test systems as laboratory as it is on site; 5) new materials, high-tech and low-tech; 6) Innovative on-site construction systems with robotization; 7) new off-site construction technologies such as 3D printing; 8) innovative restoration and rehabilitation systems such as the use of scanning and / or drones; 9) New environmental assessment systems such as life cycle tools combined with BIM; and 10) innovative sustainability assessment systems also combined with BIM and with sensitivity and uncertainty analysis. These tòpics will work on real cases and applications - such as the construction of the Sagrada Familia in Barcelona and competitive research projects - which will be updated over the years.

Full-or-part-time: 33h
Practical classes: 33h

GRADING SYSTEM

Continuous assessment
Continuous assessment will be based on the work carried out by the student during the academic year, through the submission of assignments or the performance of written and/or oral tests, according to the criteria and timetable established, with an arithmetic average of the deliveries.
Final assessment
If the continuous assessment is not positive, a second assessment may be carried out, which will consist of a final overall test in the established methodology according to the criteria of the lecturer in charge (written or oral test and/or submission of assignments).
Telematic continuous assessment
In online teaching situations, continuous assessment will be carried out synchronously and asynchronously, by the methods established by the University and the School, with a periodic record of academic activity by submitting assignments, forums, questionnaires or any other means provided by the Atenea platform, or the alternative tools provided to the teaching staff.
In situations in which this telematic teaching takes place when faceâ□□toâ□□face teaching has already begun, or for nonâ□□academic reasons, any alterations to the weightings or regular teaching control systems will be communicated in detail to all students on the Atenea platform for every subject.
Final telematic assessment
If the continuous telematic assessment is not positive, a second assessment may be carried out consisting of a final overall test in telematic format to be established in accordance with the criteria of the lecturers in charge and the ICT resources and tools provided by the University or the School.
The measures for adapting to distance teaching will be implemented in accordance with ICT security and personal data protection criteria to ensure compliance as regards Personal Data Protection legislation (RGPD and LOPDGDD).

BIBLIOGRAPHY

Basic:
- Eco-efficient construction and building materials : life cycle assessment (lca), eco-labelling and case studies. Philadelphia, PA: Woodhead Pub, 2014.
- Hebel, Dirk. Building from Waste: Recovered Materials in Architecture and Construction. Boston: Basel: Birkhauser, 2014. ISBN 3038215848.
- Pan, M. "A framework of indicators for assessing construction automation and robotics in the sustainability context". Journal of Cleaner Production [on line]. 2018, vol. 182, p. 82-95 [Consultation: 16/07/2021]. Available on: https://doi.org/10.1016/j.jclepro.2018.02.053.- Smith, Ryan E.. Prefab architecture: a guide to modular design and construction [on line]. Hoboken, N.J: Wiley, 2010 [Consultation: 16/07/2021]. Available on: https://ebookcentral.proquest.com/lib/upcatalunya-ebooks/detail.action?docID=698719. ISBN 9780470275610.
- Escorsa, Pere; Valls, Jaume. Tecnología e innovación en la empresa [on line]. [2ª ed. ampl.]. Barcelona: Edicions UPC, 2003 [Consultation: 16/07/2021]. Available on: http://hdl.handle.net/2099.3/36718. ISBN 8483017067.
- Awoyera, P. O., & Adesina, A.. "Plastic wastes to construction products: Status, limitations and future perspective.". Case Studies in Construction Materials [on line]. 2020, vol. 12 [Consultation: 10/03/2022]. Available on: https://www-sciencedirect-com.recursos.biblioteca.upc.edu/journal/case-studies-in-construction-materials.- Staib, Gerald.. Components and systems: modular construction, design, structure, new technologies [on line]. Basel; Boston: Birkhäuser, cop. 2008 [Consultation: 16/07/2021]. Available on: https://doi.org/10.11129/detail.9783034615662. ISBN 9783764386566.
- Watts, Andrew. Modern Construction Handbook [on line]. 4th ed. rev. Basel: Birkhäuser, 2016 [Consultation: 16/07/2021]. Available on: https://doi.org/10.1515/9783035617085. ISBN 3035609594.
- Sebestyén, Gyul. New architecture and technology. Oxford: Architectural Press, 2003. ISBN 0750651644.
- Sagrada Familia : Gaudí's unifinished [sic] masterpiece : geometry, construction and site. Shenzhen: Oscar Riera Ojeda, 2014. ISBN 9789881225245.
- Burry, Mark. Prototyping for architects. London: Thames & Hudson Ltd, 2016. ISBN 9780500343050.

Complementary:
- New perspective in industrialisation in construction: a state-of-the-art report. Zurich: ETH, 2009. ISBN 9783906800172.

RESOURCES

Other resources:
The materials and documents of the subject may be written indistinctly in any languages of instruction.