

<b>Degree course</b>	Architecture
LM4_Architettura quinquennale c.u.	1001886
<b>Course code</b>	Dott. Stefano Cascone
<b>Lecturer</b>	
<b>Course name</b>	Rating Systems for Sustainability in Construction sector
<b>Disciplinary area</b>	Building Production
<b>Disciplinary field of science</b>	Icar 11
ICAR	6
<b>University credits – ECTS</b>	
<b>Teaching hours</b>	60
<b>Course year</b>	V
<b>Semester</b>	II

### Synthetic description and specific course objectives

The course "Assessment Protocols for Sustainability in Construction" provides the skills necessary to understand the different aspects and parameters related to the integration of Building Information Modeling (BIM) with the sustainability certification process of a building with application of the LEED protocol. The discipline aims to become characterizing for any degree thesis courses (Laboratories and / or Thesis Atelier), within an in-depth trajectory between teaching and research and design experimentation.

#### Qualifying training objectives

As the teaching is delivered in the fifth year of the single-cycle master's degree course in Architecture, this is part of the second cycle of the training course, macro-area "Architecture and Construction". The qualifying educational objective of the teaching is to provide the student with the complete preparation to integrate the process of assessing the sustainability of the built environment with digital technologies by:

- information modeling of the project in a BIM (Building Information Modeling) environment
- computational modeling with export of models from BIM
- application of the LEED certification protocol (Leadership in Energy and Environmental Design)
- coordination and control of the initial design process (pre-design phase) for the construction of sustainable buildings

The acquired knowledge allows to take the international exam for accreditation in LEED GA (Green Associate) which demonstrates the knowledge of sustainable construction, according to the accreditation scheme managed by Green Business Certification Inc. in compliance with UNI CEI EN ISO / IEC 17024: 2004.

The aforementioned knowledge will be immediately applicable for the performance of the following activities habitually exercised with the professional title of architect, making them highly characterizing "the profession":

- LEED expert (LEED Green Associate, LEED AP)
- BIM expert (BIM Specialist, BIM Coordinator, BIM Manager)
- consultant for companies in the public sector
- consultant for private individuals and investment groups

### Specific training objectives

The qualifying educational objectives defined above allow for the identification of the specific educational objectives of the teaching within the more general ones relating to the Degree Course. In particular, among the latter, the teaching aims to ensure the achievement of an adequate knowledge of the industries, organizations, regulations and procedures necessary to carry out building projects and a knowledge of the methods of investigation and preparation of the construction project. In fact, the scientific-disciplinary contents of the teaching, through the knowledge and application of BIM and LEED protocols for the environmental certification of buildings, relate to the analysis of the relationship between design and construction, within the integrated concept of the process. construction and its sustainability.

## Course entry requirements

The only prerequisite is knowledge of the Autodesk Revit Architecture 2023 BIM modelling software which will be the subject of a specific cycle of seminars by the teacher as part of the training activities provided for by the Degree Course (Credits F).

## Course programme

The course program takes place in the first semester, with 12 weeks of activities that include lectures, seminars, exercises and exam simulations. The course is divided into 15 modules for a total of 60 hours, from February to May 2023.

Module 1: The LEED certification system + Revit Architecture Modeling (1st week)

Module 2: Site Sustainability + Revit Architecture Modeling (2nd week)

Module 3: Water Management + Revit Architecture Modeling (3rd week)

Module 4: Energy and Atmosphere + Revit Architecture Modeling (4th week)

Module 5: Materials and Resources + Indoor Environmental Quality (5th week)

Module 6: Innovation in Design + Regional Priority (6th week)

Module 7: Autodesk Green Building Studio (7th week)

Module 8: Autodesk Green Building Studio (8th week)

Module 9: Autodesk Green Building Studio (9th week)

Module 10: LEED Protocol (10th week)

Module 11: LEED Protocol (11th week)

Module 12: LEED Protocol (12th week)

A cycle of seminars closely related to the transfer of research to teaching will be organized within the course, which involves the participation of:

- Architecture studies (Open project, Lombardini22)
- University research laboratories (ABITALab Parametric modeling for LEED)
- University professors experts in BIM and sustainability (University of Turin)

## Expected results

The expected results are defined below through the system adopted at European level of five interrelated descriptors (Dublin Descriptors).

- Knowledge and understanding in recognizing successful strategies and measures to achieve the objectives required by the protocol;
- Knowledge and understanding applied to case studies that represent best practices and the ability to interpret the different construction markets;

- Autonomy of judgment in identifying and explaining the synergies between BIM and the sustainability assessment protocols;
- Communication skills in describing the structure of the LEED rating system and the certification process and the key concepts of sustainable building and the objectives associated with LEED;
- Ability to learn the central role of integrated design.

### Course structure and teaching

Lessons (hours / year in the classroom): 30 h  
 Exercises (hours / year in the classroom): 15 h  
 Practical activities (hours / year in the classroom): 15 h

The exercises and practical activities will be aimed at the BIM modeling of an architectural project carried out in previous courses and its assessment of sustainability through the use of environmental certification protocols.

The course is held in Italian but the teaching material is in English (the international accreditation exams in LEED are exclusively in English).

At the end of the training activities, the teacher is available for some remedial appointments.

### Student's independent work

The student will have to support the cognitive path by dedicating hours of study in learning the tools to be applied (Autodesk Revit Architecture, Autodesk Green Building Studio and LEED Protocol), to carry out the guided exercises, with reference to the bibliography and the materials indicated.

In particular:

- Deepening / study on bibliography (theoretical part): 20 h
- Preparation of verifications (experimentation): 35 h
- Exam preparation: 35 h

### Testing and exams

There will be an oral interview on the group exercise carried out and an exposition and discussion of the descriptive report of the process adopted and of the graphic tables. Conducting the exercise is a prerequisite for accessing the final exam and concur with the interview to determine the student's assessment. There are no other intermediate checks during the semester.

### Suggested reading materials

A T Koralturk (2021), LEED AP BD+C V4 Exam Complete Study Guide (Building Design & Construction), LDCT Pub

A T Koralturk (2021), LEED Green Associate V4 Exam Complete Study Guide (Second Edition), LDCT Pub

Pozzoli S, Bonazza M (2022), Autodesk Revit 2023 per l'architettura, Tecniche Nuove, Milano

Fantozzi F, Scatizzi G, Venturelli F (2021). La certificazione energetica e ambientale LEED. Guida ai principi, Hoepli, Milano

Dall'O' G (2016). Leadership in Green Building. I progetti certificati LEED in Italia, Edizioni Ambiente, Milano

Cascone S (Under review). Ecological Transition for the Built Environment: Natural Insulating Materials in Green Building Rating Systems