

**1. General information****Course:** APPLIED SUSTAINABILITY IN CONSTRUCTION**Type:** ELECTIVE**Degree:** 378 - UNDERGRADUATE DEGREE PROGRAMME IN ARCHITECTURE**Center:** 606 - SCHOOL OF ARCHITECTURE OF TOLEDO**Year:** Sin asignar**Main language:** Spanish**Use of additional languages:****Web site:****Code:** 11335**ECTS credits:** 4.5**Academic year:** 2021-22**Group(s):** 40**Duration:** C2**Second language:****English Friendly:** Y**Bilingual:** N**Lecturer:** CLEMENTE GALLARDO ANDRES - Group(s): 40

Building/Office	Department	Phone number	Email	Office hours
Sabatini 0.19	CIENCIAS AMBIENTALES	926 05 14 53	clemente.gallardo@uclm.es	Monday and Wednesday from 11 a.m. to 2 p.m. By appointment by email.

**2. Pre-Requisites**

They have not been established.

**3. Justification in the curriculum, relation to other subjects and to the profession**

The foundation of the so-called Sustainable Architecture consists of the optimal use of natural resources to minimize the environmental impact of buildings, considering both the characteristics of the construction materials and the climatic conditions of the environment, with the aim of achieving the lowest energy consumption global in building and, in general, the least environmental impact. In this subject, the main aspects that should be considered in the architectural and urban design of bioclimatic type are analyzed, in order to be able to incorporate those elements that are more suitable to achieve an acceptable level of habitability and climate comfort of the urban and interior space through natural and passive procedures, reducing the use of active energy consuming systems.

The use of renewable energy sources both in the design of a building and in the planning of a city is also a crucial aspect in the performance of current and future Architecture and Urbanism. Where the passive techniques of Bioclimatic Architecture can not reach in the conditioning of the inhabited places, the active techniques used to reach the adequate comfort should work, increasingly to a greater extent, with clean energies.

The concepts and competences that are acquired when taking this subject are related to some of the most current technical concerns in Architecture and Urbanism. Therefore, for a student of this degree it is interesting to familiarize oneself with the notions that are discussed here, since they could be important in their future professional development.

**4. Degree competences achieved in this course****Course competences**

Code	Description
E28	Applied knowledge of ecology, sustainability and the principles of conservation of energy and environmental resources
E38	Ability to solve passive environmental conditioning
E39	Ability to solve thermal and acoustic conditioning, climate control
E40	Ability to solve energy efficiency and natural lighting problems
E52	Applied knowledge of the basics of vernacular architecture
E55	Applied knowledge of ecology, sustainability and the principles of conservation of energy and environmental resources
E71	Ability to solve passive environmental conditioning
E72	Ability to solve thermal and acoustic conditioning, climate control
E73	Ability to solve energy efficiency and natural lighting problems
G02	Organizational and planning skills
G03	Information management capacity
G15	Sensitivity to environmental issues
G23	Correct oral or written communication

**5. Objectives or Learning Outcomes****Course learning outcomes****Description**

To provide the student with a spatial capacity to face the technological challenges (in terms of the new techniques used for installations, structures and construction), the challenges of sustainability (in terms of the active and passive aspects of materials, energy and space design) and the challenges of intervening on the landscape.

**6. Units / Contents****Unit 1: Introduction to Sustainable and Bioclimatic Architecture****Unit 2: Elements and factors of climate****Unit 3: Basics on temperature, humidity and air movements**

Unit 4: Human comfort  
Unit 5: Natural climate controls in interior spaces of buildings  
Unit 6: Vernacular architectures and climate  
Unit 7: Bioclimatic architecture: architectural elements  
Unit 8: Urbanism and climate  
Unit 9: Guides of architectural and urban design in various types of climate  
Unit 10: Use of energies and other renewable resources in building and urban planning

#### 7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures	E28 E38 E39 E40 E52 E55 E71 E72 E73 G02 G03 G15	0.84	21	Y	N	The basic principles of sustainable and bioclimatic architecture will be exposed. The use of the classes during them will be evaluated. Students who cannot regularly attend theory classes may alternatively take an exam in which the acquisition of knowledge and skills related to these classes are evaluated in both the ordinary and extraordinary sessions.
Group tutoring sessions [ON-SITE]	Guided or supervised work	E28 E38 E39 E40 E52 E55 E71 E72 E73 G02 G03 G15 G23	0.76	19	N	-	These tutorials will be dedicated to monitoring the work that must be presented at the end of the course.
Study and Exam Preparation [OFF-SITE]	Self-study	E28 E38 E39 E40 E52 E55 E71 E72 E73 G02 G03 G15	2.7	67.5	N	-	
Project or Topic Presentations [ON-SITE]	Individual presentation of projects and reports	E28 E38 E39 E40 E52 E55 E71 E72 E73 G02 G03 G15 G23	0.2	5	Y	N	A simple work will be presented in which some of the ideas developed in the course are reflected in the form of architectural or urban design or improvement. It is not intended that a project be designed or modified to be ideally sustainable, but rather that one or a few of the learned techniques be used to increase the sustainability of the building or space. The work and the presentation are recoverable in the extraordinary call.
<b>Total:</b>			<b>4.5</b>	<b>112.5</b>			
<b>Total credits of in-class work: 1.8</b>			<b>Total class time hours: 45</b>				
<b>Total credits of out of class work: 2.7</b>			<b>Total hours of out of class work: 67.5</b>				

As: Assessable training activity

Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

#### 8. Evaluation criteria and Grading System

Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Assessment of active participation	50.00%	0.00%	The use of classes will be valued
Theoretical papers assessment	50.00%	50.00%	The work carried out, as well as its presentation, will be valued.
Theoretical exam	0.00%	50.00%	Only for students who cannot regularly attend theory classes.
<b>Total:</b>	<b>100.00%</b>	<b>100.00%</b>	

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject, an ordinary and an extraordinary one (evaluating 100% of the competences).

#### Evaluation criteria for the final exam:

##### Continuous assessment:

It will be evaluated participation with use in class of the student and the preparation and presentation of a work.

Students of exchange programs will be evaluated by an alternative procedure determined by the teacher according to the circumstances of each case.

##### Non-continuous evaluation:

Students who cannot regularly attend theory classes may alternatively take an exam that evaluates the acquisition of knowledge and skills related to these classes. The weight of that exam in the final mark for the course will be 50%. The rest of the mark will be assigned through the evaluation of a work and its presentation.

#### Specifications for the resit/retake exam:

The marks of the ordinary call will be saved for evaluation in conjunction with the activities passed in the extraordinary call. Students who have not been able to regularly attend theory classes and have not passed the alternative exam in the ordinary call may take another exam.

Students of exchange programs will be evaluated by an alternative procedure determined by the teacher according to the circumstances of each case.

#### Specifications for the second resit / retake exam:

Given the special characteristics of this call, appropriate evaluation mechanisms will be established to cover the same aspects than in the other types of call.

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
<b>Hours</b>	<b>hours</b>
Group tutoring sessions [PRESENCIAL][Guided or supervised work]	19
Project or Topic Presentations [PRESENCIAL][Individual presentation of projects and reports]	5
Unit 1 (de 10): Introduction to Sustainable and Bioclimatic Architecture	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	1.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	7
Unit 2 (de 10): Elements and factors of climate	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Study and Exam Preparation [AUTÓNOMA][Self-study]	7
Unit 3 (de 10): Basics on temperature, humidity and air movements	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	1.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	6
Unit 4 (de 10): Human comfort	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	1.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	7
Unit 5 (de 10): Natural climate controls in interior spaces of buildings	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Study and Exam Preparation [AUTÓNOMA][Self-study]	7
Unit 6 (de 10): Vernacular architectures and climate	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	1.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	7
Unit 7 (de 10): Bioclimatic architecture: architectural elements	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Study and Exam Preparation [AUTÓNOMA][Self-study]	7
Unit 8 (de 10): Urbanism and climate	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	1.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	7
Unit 9 (de 10): Guides of architectural and urban design in various types of climate	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	1.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	7
Unit 10 (de 10): Use of energies and other renewable resources in building and urban planning	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Study and Exam Preparation [AUTÓNOMA][Self-study]	5.5
Global activity	
<b>Activities</b>	<b>hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	21
Group tutoring sessions [PRESENCIAL][Guided or supervised work]	19
Project or Topic Presentations [PRESENCIAL][Individual presentation of projects and reports]	5
Study and Exam Preparation [AUTÓNOMA][Self-study]	67.5
<b>Total horas: 112.5</b>	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
B. Givoni	Climate considerations in building and urban design	J. Wiley&Sons		9780471291770	1998	
Mareike Krautheim, Ralf Pasel, Sven Pfeiffer y Joachim Schultz-Granberg	City and Wind. Climate as an Architectural Instrument	DOM Publishers	Berlin	978-3-86922-310-0	2014	
Steven V. Szokolay	Introduction to architectural science, the basis of sustainable design	Architectural Press USA		9780750687041	2010	
Torben Dahl	Climate and Architecture	Routledge Ed.		9780415563086	2010	