



## 1. General information

**Course:** CONSTRUCTION IV

**Type:** CORE COURSE

**Degree:** 315 - UNDERGRADUATE DEGREE IN BUILDING ENGINEERING

**Center:** 308 - SCHOOL POLYTECHNIC OF CUENCA

**Year:** 3

**Main language:** Spanish

**Use of additional languages:**

**Web site:**

**Code:** 59324

**ECTS credits:** 6

**Academic year:** 2020-21

**Group(s):** 30

**Duration:** First semester

**Second language:** Spanish

**English Friendly:** Y

**Bilingual:** N

**Lecturer:** JESUS ALFARO GONZALEZ - Group(s): 30

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## 2. Pre-Requisites

To take the course, you need basic prior knowledge of other subjects that it is recommended to have; of previous knowledge that is described below. If this is not the case, learning the knowledge and obtaining competences becomes very complex:

### BUILDING:

- Knowledge of the materials of any construction system
- Knowledge of the temporary organization of the work at a basic level.
- Knowledge of the subject of Construction2. The constructive solutions of the structure will be applied in the practices of this course.

### HE DREW:

- Be able to express themselves freely in two and three dimensions by freehand.
- Be able to go from 2D to 3D with ease, both freehand and Technical Drawing.
- Be able to integrate within the representation itself different construction systems.
- Be able to graphically represent the constructed reality.

### CONSTRUCTION MATERIALS:

- Know the characteristics, physical and mechanical properties of all the materials involved in the work and their possibilities of integration in it.

### MATERIAL RESISTANCE:

- Adequate knowledge of structural organization in construction.
- Skill in choosing structural typologies and their constructive arrangement. Already treated under construction 2

### COMPUTING AND BIM METHODOLOGY

- User-level management of the most common Windows programs at the user level.
- Internet management at user level for the selective search of information on the network.
- \* Management of Sketch up, Revit and / or Archicad seen in 1st Representation Systems
- \* Knowledge of CYPECAD and IFC Builder seen in Construction 2 of 1st.

Knowledge of the basic handling of CYPECAD MEP for the export of IFC models from any modeling platform. Basic management of HR and HE modules.

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

### JUSTIFICATION IN THE STUDY PLAN AND WITH THE PROFESSION:

Knowledge of the techniques and processes of execution of architectural constructions are necessary in all phases of the architectural fact, those of design, those of execution, for the documentation and analysis of the architecture already built or for the rehabilitation and reconstruction of the deteriorated or disappeared. Without this subject, the architectural fact as a palpable reality is not possible.

The subject of Construction IV is integrated into the central part of the subjects of Construction after having passed the basic knowledge corresponding to Construction I and II and the part corresponding to the Construction of Construction Structures III Being the central part of said field, and being this field so essential and fundamental within the set of knowledge of the Building Engineer, it seems obvious to say that the importance of this subject gives it the essential character The building engineer must know, the construction techniques, its form work, its constitution, the relationship of some construction systems with others, the disposition of its materials, its execution process, its control and maintenance conditions.

## RELATION TO OTHER SUBJECTS

As it is a subject centered within the rest of Construction, it has a direct sequential relationship with them. It should be understood that the appropriate way to study them will be in their correlative order since the teachings given in some are necessary for the following and so on.

Facilities :: Simultaneous dependence and subsequent discharge. It is considered essential to have completed it simultaneously or later to know the constructive skills to coordinate the construction of the facilities with the rest of the Oba games.

Drawing and Representation Systems: High anterior dependency: Drawing and Representation Systems are a tool that the student must master to understand the applications that will be seen here and to be able to apply knowledge on practical cases with an appropriate tool.

Group of subjects of Construction and Control Materials: High previous dependency regarding the knowledge of the material, its physico-chemical properties in order to proceed with its appropriate choice. With regard to their control and their execution conditions, a later average dependency relationship is detected.

Measurements, Programming and Control group of subjects: There is a previous high dependency relationship, in the logical sequence of the acquisition of competences, it will be necessary to know first what and how it is built and then undertake measurement, programming, control and security

End of Degree Work: It is constituted as a vertebral subject within the interest of the End of Degree Work to be a global and integrative work of knowledge and skills.

Professional activity: BIM methodology is a reality in the world of current construction and student training cannot be removed from this situation. For this reason, an immersion is carried out in the exposition of the content of the construction knowledge areas using software appropriate to the student's needs that covers the contents related to the modeling of construction systems and construction processes (LEAN CONSTRUCTION).

## 4. Degree competences achieved in this course

### Course competences

Code	Description
E15	Ability to identify the elements and construction systems, define their function and compatibility, and their implementation in the construction process. Formulate and resolve constructive details.
E29	Ability to analyze, design and execute solutions that facilitate universal accessibility in buildings and their surroundings.
G01	Ability for analysis and synthesis
G02	Organization and planning ability
G03	Ability to manage information
G04	Problem resolution
G05	Decision making
G06	Critical thinking
G07	Teamwork
G12	Autonomous learning
G15	Sensitivity to environmental issues
G16	Creativity and innovation
G21	Command of Information and Communication Technologies (ICT)
G22	Correct oral and written communication
G23	Ethical commitment and professional ethics

## 5. Objectives or Learning Outcomes

### Course learning outcomes

#### Description

Understanding the behavior of the structures to specify their appropriate construction.

Physical and mechanical characteristics that define the construction systems.

Understanding the way of working of the constructive elements, defining their function and compatibility.

Implementation of the construction elements and systems.

Building Sustainability: Execution and operation.

Manage market information, corresponding to currently constructive systems.

Propose and resolve constructive details appropriate to previous requirements.

### Additional outcomes

Integration of the construction systems of architecture, structure and facilities in a single virtual information model made with BIM methodology software, and the ability to analyze the response of the same to the requirements of the CTE of HE and HR.

## 6. Units / Contents

### Unit 1: INCLINED DECKS

#### Unit 1.1 ROOFS, GENERAL

#### Unit 1.2 LIGHT COVERS

#### Unit 1.3 ROOF TILES

### Unit 2: TRANSLUCENT ROOFS AND ROOFS

#### Unit 2.1 TRANSLUCENT COVERS

#### Unit 2.2 FLAT ROOFS

#### Unit 2.3 PRACTICE 1: ROOFS

### Unit 3: FACADES, ELEMENTS, ENCLOSURES

#### Unit 3.1 GENERAL FACADES

#### Unit 3.2 FACTORY FACADES

#### Unit 3.3 PANEL FACADES AND CURTAIN WALLS

### Unit 4: EXTERNAL WOODWORK

#### Unit 4.1 CARPENTRY

#### Unit 4.2 LOCKSMITH

**Unit 4.3 PRACTICE 2: FACADES AND EXTERNAL CARPENTRY**
**Unit 5: PARTITIONS**
**Unit 5.1 GENERAL PARTITIONS**
**Unit 5.2 INTERIOR PARTITIONS**
**Unit 5.3 INTERIOR CARPENTRY**
**Unit 6: COATINGS**
**Unit 6.1 GENERAL COATINGS**
**Unit 6.2 CONTINUOUS COATINGS**
**Unit 6.3 DISCONTINUOUS COATINGS**
**Unit 6.4 PRACTICE 3: INTERIOR CARPENTRY PARTITIONS AND FINISHES**
**Unit 7: CONSTRUCTION OF THE FACILITIES**
**Unit 7.1 AUDIOVISUAL AND ELECTRICITY INSTALLATIONS**
**Unit 7.2 CONSTRUCTION OF HIDRAULIC FACILITIES**
**Unit 7.3 AIR CONDITIONING FACILITIES**
**Unit 7.4 TRANSPORTING FACILITIES**
**Unit 7.5 PRACTICE 4: CONSTRUCTION OF THE FACILITIES.**
**ADDITIONAL COMMENTS, REMARKS**

The development of the work monitoring practices on the own project of each student, will lead to a modeling of the construction systems of the same to reach the understanding of the integration of the same on the BIM methodology.

The concept of collaborative work is addressed in the BIM methodology environment, and other collaborative work tools are enabled / promoted through which it is possible to collect / filter / use the advances / incidents that, proposed by both the teaching staff and by The students are related to the development of the subject and the work proposed in it.

**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	E15 E29 G01 G06 G15 G16	1.5	37.5	N	-	Theoretical classes taught by the professor of the subject
Study and Exam Preparation [OFF-SITE]	Self-study	E15 E29 G01 G03 G04 G05 G06 G07 G15 G16 G21 G22	1.66	41.5	N	-	Hours of study of the topics exposed in theoretical class
Class Attendance (practical) [ON-SITE]	Practical or hands-on activities	E15 G01 G04 G05 G06 G16 G22	0.5	12.5	Y	N	TEST on the content exposed in class
Study and Exam Preparation [OFF-SITE]	Project/Problem Based Learning (PBL)	E15 E29 G01 G02 G04 G05 G06 G21 G22	0.84	21	Y	N	Study and preparation tasks for the execution of the CLASS PRACTICES
Analysis of articles and reviews [OFF-SITE]	Reading and Analysis of Reviews and Articles	E15 G01 G03 G05 G06 G07 G16 G21	0.55	13.75	Y	N	THEORY WORK. Work in groups oriented to the elaboration of a monographic work on a proposed theme of the subject.
Group tutoring sessions [ON-SITE]	Cooperative / Collaborative Learning	E15 G01 G05 G07 G12 G21 G22	0.05	1.25	N	-	FOLLOW-UP OF WORK: Analysis of the evolution of a real Work, contrasting what has been learned with reality. The work will be developed on the student's own model, proceeding to its modeling in BIM software with contrast capacity to issue CTE HE and HR compliance reports. The EPC enables a workshop for teaching use to channel the preparation of reports, practices, works of the different subjects, with the aim of promoting student work in a collaborative work environment typical of the BIM methodology -to such effects, This workshop is equipped with the hardware and software necessary to carry out the work in said environment, and is also in charge of accentuating the implementation in the use of the tools / software necessary for it.
Practicum and practical activities report writing or preparation [OFF-SITE]	Guided or supervised work	E15 G01 G03 G05 G07 G15 G21 G22	0.55	13.75	Y	N	GUIDELINES for WORK MONITORING. Resolution of doubts raised in the development of work monitoring practices with BIM methodology software.
Group tutoring sessions [ON-SITE]	Group tutoring sessions	E15 G01 G03 G05 G07 G15 G16 G21	0.05	1.25	N	-	ATTENDANCE TO PERIODIC EVIDENCE OF CLASS CASE RESOLUTION.
In-class Debates and forums [ON-SITE]	Case Studies	E15 G01 G03 G05 G06 G22	0.1	2.5	N	-	
		E15 E29 G01 G03 G04 G05					

Final test [ON-SITE]	Assessment tests	G06 G07 G12 G15 G16 G21 G22 G23	0.2	5	Y	Y	THEORETICAL EXAM: 1 HOUR PRACTICAL EXAM: 4 HOURS
Total:			6	150			
Total credits of in-class work: 2.4			Total class time hours: 60				
Total credits of out of class work: 3.6			Total hours of out of class work: 90				

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
Progress Tests	10.00%	0.00%	
Theoretical papers assessment	10.00%	0.00%	
Fieldwork assessment	10.00%	0.00%	
Final test	30.00%	50.00%	
Final test	30.00%	50.00%	
Progress Tests	10.00%	0.00%	
<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:

In the ordinary call all the notes obtained in each of the sections will be computed. That is to say:

- \* CLASS PRACTICES ..... 10%
- \* TESTS CARRIED OUT IN CLASS ..... 10%
- \* THEORY WORK ..... 10%
- \* WORK MONITORING ..... 10%
- \* FINAL EXAM ..... 60%

##### Non-continuous evaluation:

THE NON-CONTINUOUS ASSESSMENT WILL CONSTITUTE A UNIQUE TEST THAT WILL INCLUDE 100% OF THE CONTENTS AND COMPETENCES INCLUDED IN THE SUBJECT.

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

In the extraordinary call, the notes obtained in the fields of CLASS PRACTICES and ASSISTANCE to the resolution of cases in class will be maintained.

For the fields corresponding to THEORY WORK AND WORK MONITORING, new actions may be incorporated to improve the grade. The exam will also count at 60%.

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

THE EVALUATION OF THE SPECIAL CALL FOR COMPLETION WILL CONSTITUTE A UNIQUE TEST THAT WILL INCLUDE 100% OF THE CONTENTS AND COMPETENCES INCLUDED IN THE SUBJECT.

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours
Analysis of articles and reviews [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	13.75
Group tutoring sessions [PRESENCIAL][Cooperative / Collaborative Learning]	1.25
Practicum and practical activities report writing or preparation [AUTÓNOMA][Guided or supervised work]	13.75
Group tutoring sessions [PRESENCIAL][Group tutoring sessions]	1.25
Final test [PRESENCIAL][Assessment tests]	5
Unit 1 (de 7): INCLINED DECKS	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	5.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	6
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	1.75
Study and Exam Preparation [AUTÓNOMA][Project/Problem Based Learning (PBL)]	3
In-class Debates and forums [PRESENCIAL][Case Studies]	.4
Unit 2 (de 7): TRANSLUCENT ROOFS AND ROOFS	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	3.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	4
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	1.75
Study and Exam Preparation [AUTÓNOMA][Project/Problem Based Learning (PBL)]	3
In-class Debates and forums [PRESENCIAL][Case Studies]	.4
Unit 3 (de 7): FACADES, ELEMENTS, ENCLOSURES	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4.75
Study and Exam Preparation [AUTÓNOMA][Self-study]	5.75
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	1.75
Study and Exam Preparation [AUTÓNOMA][Project/Problem Based Learning (PBL)]	3
In-class Debates and forums [PRESENCIAL][Case Studies]	.4

Unit 4 (de 7): EXTERNAL WOODWORK	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	3.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	4
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	1.75
Study and Exam Preparation [AUTÓNOMA][Project/Problem Based Learning (PBL)]	3
In-class Debates and forums [PRESENCIAL][Case Studies]	.4
Unit 5 (de 7): PARTITIONS	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	5.4
Study and Exam Preparation [AUTÓNOMA][Self-study]	6
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	1.75
Study and Exam Preparation [AUTÓNOMA][Project/Problem Based Learning (PBL)]	3
In-class Debates and forums [PRESENCIAL][Case Studies]	.4
Unit 6 (de 7): COATINGS	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	5.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	6
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	1.75
Study and Exam Preparation [AUTÓNOMA][Project/Problem Based Learning (PBL)]	3
In-class Debates and forums [PRESENCIAL][Case Studies]	.3
Unit 7 (de 7): CONSTRUCTION OF THE FACILITIES	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	9.35
Study and Exam Preparation [AUTÓNOMA][Self-study]	9.75
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	2
Study and Exam Preparation [AUTÓNOMA][Project/Problem Based Learning (PBL)]	3
In-class Debates and forums [PRESENCIAL][Case Studies]	.2
Global activity	
Activities	hours
Class Attendance (theory) [PRESENCIAL][Lectures]	37.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	41.5
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	12.5
Study and Exam Preparation [AUTÓNOMA][Project/Problem Based Learning (PBL)]	21
Analysis of articles and reviews [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	13.75
Group tutoring sessions [PRESENCIAL][Cooperative / Collaborative Learning]	1.25
Practicum and practical activities report writing or preparation [AUTÓNOMA][Guided or supervised work]	13.75
Group tutoring sessions [PRESENCIAL][Group tutoring sessions]	1.25
In-class Debates and forums [PRESENCIAL][Case Studies]	2.5
Final test [PRESENCIAL][Assessment tests]	5
Total horas: 150	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Arredondo y Verdú, Francisco	Yesos y cales	Servicio de Publicaciones, E.T.S. Ingenieros de		84-7493-139-8	1991	
Barahona Rodríguez, Celia	Técnicas para revestir fachadas	Munilla-Lería		84-89150-34-6	2000	
Beinhauer, Peter	Atlas de detalles constructivos : con más de 400 ejemplos	Gustavo Gili		978-84-252-2057-9	2006	
España. Dirección General de la Vivienda, la Arquitectura y	Fachadas : diseño,cálculo, construcción, valoración, contro	Ministerio de Fomento, Centro de Publicaciones		84-7433-084-X	2000	
España. Dirección General de la Vivienda, la Arquitectura y	NTE, Normas Tecnológicas de la Edificación, Cubiertas : dise	Ministerio de Fomento, Centro de Publicaciones		84-7433-809-3 (Cubie	2002	
España. Dirección General de la Vivienda, la Arquitectura y	Revestimientos : diseño,cálculo, construcción, valoración,	Ministerio de Fomento, Centro de Publicaciones		84-7433-448-9	2000	
Fernández Ruiz, Enrique	Revestimientos de fachadas : manual práctico	Progenza		84-86505-46-1	1997	
González Martín, Jesús	Revestimientos continuos : tradicionales y modernos	Fundación Escuela de la Edificación		84-86957-97-4	2005	
López Castellanos, Joaquín	Cubiertas y tejados : manual práctico	Promotora General de Estudios		84-86505-63-1	1996	
López Castellanos, Joaquín	Cubiertas y tejados : manual práctico	Promotora General de Estudios		84-86505-63-1	1996	
	Detalles constructivos de la					

McLeod, Virginia	arquitectura doméstica contempo	Gustavo Gili	978-84-252-2124-8	2007	
Monjo Carrió, Juan	El detalle constructivo en arquitectura	Munilla-Lería	978-84-8915-075-1	2007	
Ortega y López de Prado, J. J.	Cubiertas planas e impermeabilización, cubiertas inclinadas	Fundación Escuela de la Edificación Universid	84-86957-23-0	1993	
Paricio Ansuategui, Ignacio	La fachada de ladrillo	Bisagra	84-923125-9-9	2000	
Paricio Ansuategui, Ignacio	Las cubiertas de chapa	Bisagra	84-923125-7-2	1999	
Río Martín, Concha del	Fachadas de ladrillo caravista	La sombra creativa	978-84-613-7196-9	2010	
Sentamans, M.	Carpintería del aluminio : manual práctico	Progenza	84-86505-24-0	1991	
Sánchez-Ostiz Gutiérrez, Ana	Cerramientos de edificios : cubiertas	Cie Dossat 2000	84-96437-55-8	2007	
Villanueva Domínguez, Luis de	Manual del yeso	CIE Inversiones Editoriales, Dossat 2000	84-95312-46-8	2001	
	Detail : revista de arquitectura y detalles constructivos.	Reed Business Information	1578-5769	2001	
	Diseño interior : carpintería de madera = Interior Wood Desi	Daly	84-89738-07-6	1997	
	Façades = Fachadas	Monsa	978-84-96096-96-7	2010	
Peraza Sánchez, José Enrique	Carpintería : puertas, ventanas, escaleras	Asociación de Investigación Técnica de las Indu	84-87381-18-9	2001	
	Roofs = Cubiertas = Coberturas	Monsa	978-84-96096-94-3	2010	
	Tratado de construcción : fachadas y cubiertas	Munilla-Lería	978-84-89150-76-8(v.	2003	
					CÓDIGO TECNICO DE LA EDIFICACIÓN
	<a href="http://www.codigotecnico.org/web/">http://www.codigotecnico.org/web/</a>				CATALOGO DE ELEMENTOS CONSTRUCTIVOS
	<a href="http://www.elementosconstructivos.codigotecnico.org/">http://www.elementosconstructivos.codigotecnico.org/</a>				REVISTA DETAIL
	<a href="http://www.detail.de/thema_arquitectura_74_Es.htm">http://www.detail.de/thema_arquitectura_74_Es.htm</a>				
	<a href="http://www.detallesconstructivos.net/">http://www.detallesconstructivos.net/</a>				REVISTA TECTONICA
	<a href="http://www.tectonica.es/">http://www.tectonica.es/</a>				CATALOGO DE SOLUCIONES CERAMICAS
	<a href="http://www.hispalyt.es/">http://www.hispalyt.es/</a>				NTE EN PDF
	<a href="http://www.geoteknia.com/normas/nte/nte.htm">http://www.geoteknia.com/normas/nte/nte.htm</a>				CENTRO DE ASESORAMIENTO TECNOLÓGICO
	<a href="http://www.cat-coacm.es/">http://www.cat-coacm.es/</a>				