

Name of the module (English): Management of Construction Works					
Module code (UP): M14 (provisional)		Name of the module (Portuguese): Gestão de Obras de Construção			
Module code (THM): IMTM (provisional)		Name of the module (German): Bauleitung			
Module code (UC): M14 (provisional)		Name of the module (Spanish): Gerencia de Obras de Construcción			
Credits: 6 ECTS	Module status: Obligatory	Duration: 1 semester	Semester: 2	Year: 1	Frequency: Every year
Type of tuition: Classroom-based		Workload: 180 h	Attendance time: 60 h	Self-study time: 120 h	
Usability: Master (Degree in Sustainable Design, Construction and Management of the Built Environment)			Classification: Engineering / Architecture	Teaching language: English	
Module responsibility: José Manuel Marques Amorim de Araújo Faria (FEUP)		Lecturers: Hipólito José Campos de Sousa (FEUP) Alfredo Augusto Vieira Soeiro (FEUP) João Pedro da Silva Poças Martins (FEUP) Elena Blanco Fernández (UC)			
Description / Observations: The syllabus crosses the full production cycle of buildings, beginning with the coordination and integration of the various components that involve the design stage, by stressing the importance of creating collaborative partnerships in the supply chain. Taking into account that construction is globalised, and that the industry and its main actors must be prepared for that, the topics will be addressed in a national and international perspectives. Under this scope, the processes of budgeting, planning and control of site works will be analyzed, as well as the procedures for site preparation and supply management. Specific software will be used for some of these purposes. Focusing on execution, we will address Lean Construction and the procedures for procurement and the design of the contracts. Risk Analysis will enable the preventive assessment of the level of severity and occurrence of potential failures that might occur in the numerous tasks that take place at all stages of the process.					
Recommended Requirements Basic knowledge about sustainable concepts in design, construction and managements of buildings and infrastructures.					
Basic competences: <ul style="list-style-type: none"> • Possess and understand knowledge that provides a basis or opportunity to be original in the development and/or application of ideas, often in a research context. • Students are able to apply their acquired knowledge and problem-solving skills in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study. • Students are able to integrate knowledge and deal with the complexity of making judgments based on information that is incomplete or limited, including reflections on the social and ethical responsibilities associated with applying their knowledge and judgments. • Students are able to communicate their findings and the ultimate knowledge and reasons behind them to specialist and non-specialist audiences in a clear and unambiguous manner. • Students possess the learning skills to enable them to continue studying in a largely self-directed or autonomous manner. 					

Transverse competences:

Taking into account that the course will be addressed to students having already attained a degree providing professional competence (graduates of 1st cycle or Master), the teaching methodologies seek to balance the more lecturing-focused stages with applications in which the concepts put forward can be tested, and to encourage the offering of personal views from the students, particularly by those who already have some work experience.

On the other hand, and if possible fostered by the different profiles of students, these will be also favourable occasions for the appraisal of the perspectives of engineers and architects, since their diverse academic paths and reasoning models for tackling of the problems which may occur in the construction process gives origin to frequent conflicts.

In this sense, activities will be proposed under the perspective of TBL (Team-Based Learning), in which working groups will have to analyse, propose and advocate solutions to problems put forward by the teachers. This strategy connects strongly to the reality of the CI, inherently collaborative and where several points of view have necessarily to be balanced so as to obtain the best possible result given the existing conditions.

In a second aspect, students will have to perform individual works between classes, with the goal of challenging them and encourage them to focus in the search for specific results and a capacity for synthesis which can be translated by an output of limited scope and size. This is also a frequent situation in the context of CI companies – for consultants as well as construction companies – as working in a production environment with high changeability requires that professionals have to find quick and efficient solutions to cope with last-minute problems.

Specific competences:

Apply methodologies for the effective management of the construction of integrated projects in the built environment.

Learning outcomes:

On successful completion of this module, the students will be able to:

- Understand the endogenous and exogenous conditions that affect a site, its security conditions and risk factors of accident, strategies for workspace efficiency and prevention of accidents.
- Be acquainted with procurement models and evaluation of bids. Internationalization of Project Management in Construction (PMC) and its effects; FIDIC contracts, laws and acculturation.
- Understand, define and apply indicators of assessment of the sustainable performance of strategies for construction work development.
- Understand and know how to identify alternative opportunities with a focus on prefabrication and recycling.
- Be aware of technologies and processes for digital control of works and its integration with BIM.
- Plan activities, allocate resources and follow the progress of the works using a well known software in CI.
- Understand and apply the concepts of Lean in site.
- Understand and apply Risk Analysis to the execution of construction contracts.
- Make use of the competencies of HR in improving PMC; efficient use of subcontractors and self-employed persons.
- Discuss ethical and professional conduct aspects of HR management in CI.

Content:

1. Procurement and hiring processes. Tendering for services and construction works. FIDIC Contracts.
2. Procurement with a focus on Sustainability. Evaluation criteria for tender: Reuse of Building Elements, Lean Operation, Monitoring of Energy and Water Consumption, Recycling, Waste Management and Environmental Pollution Control in the construction stage, Respect for People. Financial incentives related to pre-defined goals.
3. Concepts and tools of Lean Construction. Waste, Pull Production, 5S, PDCA, Last Planner, Kanban. Resource management and balancing.
4. Budgeting and Work Planning. Subcontracting. Technical and economic control of construction works.
5. Digital management of site communications.
6. Site and work preparation. Supply management.
7. Time scheduling with Primavera P6. Activities, relationships, resources, progress following up.
8. Management of safety and accident prevention. Management of HR in the site.
9. Risk Analysis in construction.
10. Decision Theory applied to construction work management.
11. Contract change, closure, claims and disputes.
12. International Projects and Construction Works.

Teaching methodology:

Classes that will join expository parts with audio-visual presentations (slides, videos) to periods of discussion and application in small groups, to be carried out in classes in order to materialize the covered ideas. There will also be case studies specially developed in the module.

Semi-continuous assessment, including group work to be done in a team learning perspective, small individual work to be done in class and focused on various topics, complemented by a final exam (60%+40% relative weights).

Semi-continuous assessment, including group works to be carried out in a perspective of Team-Based Learning, individual works of small size to be carried out between classes and focused on several themes, complemented by a final exam.

Training activities:

	Number of hours	% Attendance
Theory	30	100
Classroom practice	30	100
Tutorials	5	100
Evaluation	5	100
Group work	30	0
Self-directed work	50	0

Assessment method:

	Minimum weighting	Maximum weight
Continuous classroom evaluation	0%	20%
Final written work	0%	20%
Oral presentation	0%	20%
Theoretical exam	0%	75%
Practical exercises	0%	100%

Grading system:

	20	19	18	17	16	15	14	13	12	11	10	9	...	0
U.PORTO														
Portugal	Very Good with distinction			Good with distinction		Good		Sufficient				Fail		
U.CANTABRIA	10.0	9.9	9.0	8.9	...	7.0	6.9	...	5.0	4.9	...	0.0		
Spain	Sobresaliente			Notable			Aprobado				Suspenso			
THM	100	...	88	87	73	72	58	57	...	50	49	...	0	
Germany	Excellent			Good with distinction		Satisfactory		Sufficient				Fail		

Bibliography:

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