



Date:		REGISTRATION OF COURSES		RESPONSIBLE OF REGISTRATION:	
AREA OF KNOWLEDGE	SUB-AREA	UNDERGRADUATE	POSTGRADUATE		
BASIC SCIENCES					
ECONOMICS AND SOCIAL SCIENCES					
HEALTH SCIENCES					
ENGINEERING, ARCHITECTURE AND TECHNOLOGY		X			
EDUCATION SCIENCES					
HUMANITIES AND ARTS					
AGRICULTURAL AND SEA SCIENCES					
MILITARY ARTS AND SCIENCES					
SAFETY AND CIVIL PROTECTION					
INTERDISCIPLINARY					
OTHERS					
ADSCRIPTION OR BRANCH (ES):					
FACULTY	ARCHITECTURE AND URBANISM				
SCHOOL	ARCHITECTURE				
INSTITUTE					
DEPARTMENT	TECHNOLOGY SECTOR				
OTHERS					
COURSE:					
NAME	CONSTRUCTION 98				
CODE	2065				
EXECUTIVE UNIT					
CLASSIFICATION	COMPULSORY / THEORETICAL - PRACTICAL				
APPROVAL DATE					
UPDATE DATE					
APPROVAL AUTHORITY					
CREDIT UNITS	THREE (3)				
HOURS/WEEK	4 (FOUR)				
REGIMEN	SEMI-ANNUAL				
ACADEMIC PERIODS					
REQUIREMENTS	BUILDING SERVICES 97				
PROFESSOR	JUAN CÁMARA				



PURPOSES

Raise awareness in the student, through the construction process knowledge, its stages and character; of the value that the construction fact possess as determinant within the building design process. The knowledge is aimed in terms of comprehension of the constructive process as an articulated technological procedure and closely related to the feasibility and viability concepts of the architectural object.

LEARNING OBJECTIVES

At the end of the course the student will be able to:

1. **Define, describe and evaluate** the different stages and operations which compose the buildings constructive process of conventional technology.
2. **Establish** the importance of the construction process as design determinant within the viable buildings development from the constructive, technological and economic perspective.
3. **Evaluate** the character of “**systemic and productive process**” that possess the construction.
4. **Incorporate and handle** the constructive/technological aspects within the integral conception process of the building.



CONTENTS

TOPIC #1:

Construction as a “systemic” process: The architecture project and its constructive implications.

Processes and systems: Conceptualization. Construction as a systematized process. **The project and its importance as guarantee of technical/constructive viability of buildings:** Concept, objectives, stages and scopes. **Contract:** Concept and objectives, legal importance, examples. **Interdisciplinarity:** Concept, the role of the architect within project teams. Coordination and managerial aspects. Competencies and professional responsibilities. **Project file:** Concept, constructive importance and components. Permit paperwork: Concepts, scopes, competent authorities, paperwork and requirements, legal value. **Construction monitoring:** Concept, importance, modalities, scopes and responsibilities. Construction planning.

TOPIC #2:

Soil and soil testing.

Soils: “Constructive” concept of soil, classification, general behaviour, advantages and limitations, vocation. **Soil test:** Concept and objectives, stages and scopes, execution. Technical report and recommendations, importance as design determinant, interpreting results.

TOPIC #3:

Preliminary works: Its importance.

Preliminary works: Concept, objectives, classification and scope. Planning and importance. **Lot clearing:** Concept, operations, transport, importance. **Provisional structures and suppliers:** Concept, scope, importance, planning, types. **Morphological transformations to the lot:** Concept and scope. **Set-out surveys:** Concept, general methodology, importance. **Earthworks:** Concept, relation with the project and soil type. Common operations: Excavations, cuts, fills, levelling, compacting, etc. General recommendations and design aspects. Construction process (Applicable to all the latter points)

TOPIC #4:

Substructure: Terrain protection and load transferring to soil.

Substructure: Concept, definition, importance and scopes. Classification and components. **Retaining systems:** Concept, objective and importance, relation with the project, soil type, set-out surveys and earthworks. Common typologies and characteristics. *“Passive” or inertial systems:* Concept and common typologies, advantages and limitations, common uses. Particularities of their construction process. *Active systems:* Concept, classification, advantages and limitations, uses. Construction process and particularities. **Foundations:** Concept and objectives, constructive/structural importance, relation with the load-bearing system, building scale and soil type. Common classifications. *Direct or superficial foundations:* Concept and typologies, advantages, limitations and uses. Construction process and their particularities. Indirect or deep foundations: Concept and typologies, advantages, limitations and uses. Construction process and their particularities. **Transitioning and anchorage elements:** Concept, objective and typologies (Strap beams, pedestals, footings, etc.). Construction process and its particularities.



TOPIC#5:

Superstructure: The building load-bearing system.

Superstructure: Concept, function, importance, typologies, materials. **The resistant skeleton and other systems:** Concept, typologies, components, variations according employed materials, importance at design level, selection criteria and technological integration.

Construction processes with reinforced concrete: workforce, formwork, reinforcement rebars, concrete preparation and dosages, pouring, vibrating, execution control and tests.

Common construction problems. **Construction processes with steel:** Design differences regarding reinforced concrete structures. Construction particularities, joints and its types, assemblies, workforce and equipment. Advantages and limitations in our environment.

Common construction problems. **Industrialized and precast construction:** Concept, scopes differences with traditional construction. Applications in our environment, potential advantages, real limitations. Design implications. Workforce, specialization and mechanization.

TOPIC #6:

Mezzanines and roofs.

Slabs: Concept, resistant particularities, typological classifications. Advantages and limitations of the most used types. Selection criteria and uses. **Construction processes with reinforced concrete:** workforce, formwork and shores, reinforcement rebars, concrete preparation and dosages, pieces colocation (when existing) and pouring, vibrating, execution control and tests.

Common construction problems. **Construction processes with steel:** Design differences regarding the types in reinforced concrete structures. Construction particularities, joints and its types, assemblies, workforce and equipment. Advantages and limitations in our environment. Common construction problems. **Precast slabs:** Concept and characteristics. Uses.

Manipulation and construction particularities. **Floors:** Concept and objective. Drainage slopes. Preparation of poor concrete. Execution sequence, levelling and slopes verification. Common construction mistakes.

Concept, scopes differences with traditional construction. Applications in our environment, potential advantages, real limitations. Design implications. Workforce, specialization and mechanization.

TOPIC #7:

Building services as a constructive problematic.

Generalities: Relation with other construction elements. Design integration and solving potential conflicts during the project. **Building services and substructure:** Interrelation with structural elements. Execution of underground water tanks, small man-holes, elevator wells and their potential impact on foundations. Waterproofing of water storages and filtering prevention. Pipes placement, ditches and channels protection. Common construction mistakes. **Building services and superstructure:** Interrelation with the load-bearing skeleton and mezzanines.

Vertical pipelines and horizontal networks: Canalization and pipes placement according to the diameter. Embedded-pipe networks vs. hanging-pipe networks. Joints: execution and inspection. Common problems. *Placement of mechanical ventilation and air condition ducts:*

Constructive particularities. Devices: Elevators, air units management, condensers, cooling towers, etc. Relation with the structure and construction particularities. Common mistakes.



Design and constructive differences between the services network in reinforced concrete structures and steel structures.

TOPIC #8:

Partition walls and external enclosures:

Partition walls: Concept and objectives, types, uses. Construction processes: Set-out, common materials, coordination with services networks. Execution (Verticality and levelling, joints, etc.), construction control and common mistakes (example of different types). **Movable partition walls and other elements:** Precast partition walls, rails and displacement systems. Placement. Doors. Construction aspects and common mistakes. External enclosures: Concept, common types, materials, durability and climatic adaptation. Selection criteria. Construction processes particularities and frequent mistakes of the most common types. Maintenance. **Windows:** Concept and uses. Typologies. Climatic adaptation. Dimensional coordination and placement processes. Protection against passage of humidity. Common construction mistakes. **Curtain-walls:** Set-out and placement. Anchoring and levelling. Construction placement and frequent mistakes. Protection against passage of humidity.

TOPIC #9:

Coverings and finishes.

Coverings: Concept, mortars types and uses. Preparation and application on construction. Retraction and curing. Construction control and frequent mistakes. **Finishes:** Concept, types and application surfaces (indoors and outdoors). Common materials. Adherents and durability. Placement processes on the most common ceilings, walls and floors. Frequent mistakes. Quality and maintenance. **Waterproofing:** Concept and objective. Common types and application surfaces. Advantages and limitations. Protection of vertical, horizontal and inclined surfaces. Silicones for joints sealing and superficial applications. Bitumen and its types. Application forms. Asphalt roll roofing. Uses, advantages and limitations. Laying process. Common mistakes. Maintenance and durability.

TOPIC #10:

Final construction cleaning and verification.

Concept and objective. The most common operations. Final control of quality. Final inspection report. Habitability permit.



INSTRUCTIONAL STRATEGIES

Contents are given through a combination of master classes combined with audio-visual resources (transparencies and illustrative slides of constructive processes) and, when the size of the course group allows it, construction sites visits.

INSTRUCTIONAL MEDIA

EVALUATION

1. During the course development three evaluations are held, break down as following: 2 exams and a practical application work (not documental) of knowledge taught in this course. For this work the necessary corrections are planned.
2. The exams are structured in two clearly differenced types of questions. One first part of conceptual type, in which the student must answer questions related to general aspects of the constructions stages, including the corresponding topics (definitions, processes descriptions, components characteristics, etc.); and other in which the student must give responses to hypothetical project situations (problems of the suitable structural/constructive alternatives selection) using as references the taught content and the implicit constructive determinants.

TEXTBOOKS (If possible, according to contents)