



Date:	REGISTRATION OF COURSES	RESPONSIBLE OF REGISTRATION:
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AREA OF KNOWLEDGE	SUB-AREA	UNDERGRADUATE	POSTGRADUATE
BASIC SCIENCES			
ECONOMICS AND SOCIAL SCIENCES			
HEALTH SCIENCES			
ENGINEERING, ARCHITECTURE AND TECHNOLOGY	X	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	TECHNOLOGY AND ARCHITECTURE
CODE	2061
EXECUTIVE UNIT	
CLASSIFICATION	Compulsory Theoretical
APPROVAL DATE	
UPDATE DATE	
APPROVAL AUTHORITY	
CREDIT UNITS	3 (THREE)
HOURS/WEEK	4 (FOUR)
REGIMEN	Semi-Annual
ACADEMIC PERIODS	Regular
REQUIREMENTS	
PROFESSOR	Carolina Tovar



PURPOSES

Raise awareness to the first semester student of the Architecture career about the relation and importance of knowledge and technology areas in this discipline.

LEARNING OBJECTIVES

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

1. Handle preliminary concepts about technology and relate them to Architecture.
2. Identify the technological systems of the building.
3. Handle the concepts of rigidity, resistance, stability and balance of a structure.
4. Calculate reactions in isostatic structures.
5. Handle the internal efforts and stress states.
6. Recognize the diverse existing structural systems, their components and their basic behaviour.
7. Handle preliminary concepts about structural design.



CONTENTS

Subject #1 Technology as a media and resource for building production.

- 1.1. Definition of technology, influence on the development of the building.
- 1.2. Technical building systems: structural system, means and construction processes. Building Installation systems (Mechanical, electrical and plumbing).
- 1.3. Brief historical evolution of the use of technology as a mean of building production.

Subject # 2 Resistant needs and their physical aspects

- 2.1. Forces: concept, concurrent forces, coplanar, parallels. Laws that rule the behaviour of the forces (Newton, Universal gravitation). Static balance. Resulting force. Resulting of a system of concurrent forces (parallelogram law, sine theorem, cosine theorem, decomposition of forces). Principle of transmissibility.
- 2.2. Moment concept. Links and members of a structure. Isostatic structures, hyperstatic, partial and improperly linked. Determination of reactions on isostatic structures. Point and distributed loads.
- 2.3. Structural requirements: Balance, stability, rigidity and resistance. Concepts and physical examples.
- 2.4. Building loads: origin, classification and definition. Live, dead, static, dynamic and others loads. Relation with the use of the building. Existing regulation.
- 2.5. Stress states: traction, compression, flexion, flexo-compression, shear, torsion. Definition and examples. Relation between the way the load is applied and the resulting stress state. Internal forces in the structures (beams, trusses, cables, frames, etc). Deformations and their relation with stress states.
- 2.6. The materials and their resistance to stress states: graphs of stress-strain relationship of structural materials. Basic properties: resistance, ductility, plasticity, elasticity. Work efforts, admissible efforts, and safety factors. Industrialized components available in the market (profiles, sections, etc.)
- 2.7. Introduction to structural elements pre-dimensioning: elements subjected to traction, compression, bending. Basic principles. Properties of flat sections and their relation with the structure: centroid, static moment, moment of inertia.

Subject #3 Structural requirements and their relation with architectonic aspects.

- 3.1. Structural elements. Relation material/ structural shape.
- 3.2. Scale, the form, the geometry and their relation with the structure.
- 3.3. The materials and its knowledge as theoretical framework.

Subject #4 Loadbearing systems evolution

- 4.1. First structural types: megalithism, pillar and lintel, architrave.
- 4.2. Classification of structural systems according to Engel: Active form, active vector, active section, active surface and active height. Characteristics. Design variables. Resistant mechanism. Materials.



INSTRUCTIONAL STRATEGIES

Relate structural concepts of the existing Architecture.
Relate structural concepts with images and examples.
Practical problems solution.
Analysis of existing buildings from a structural point of view.

INSTRUCTIONAL MEDIA

Image presentation on slides and transparencies.
Solution of problems on the blackboard.
Presentation of schemes in images and on the blackboard.



EVALUATION

Two partial exams and a final evaluation*

*Final evaluation may be an exam or a theoretical-practical work about the analysis from a structural point of view of existing architectonic buildings.

TEXTBOOKS (If possible, according to contents)

1. Ambrose, James. Análisis y Diseño de estructuras. Second edition. Limusa Editorial. México, 1998. (For all the subjects)
2. Beer, F. y Johnston, R. Vector Mechanics for Engineers: Statics and Dynamics. (Subject #2: topics 2.1 and 2.2)
3. Engel, Heino. Structure Systems.
4. Moisset de Espanés, Daniel. Intuición y razonamiento en el diseño estructural. Escala Editorial. Colombia 1991. (Topic #2: 2.3, 2.5 and 2.7)
5. Rodríguez Juan Manuel. La razón estructural. FAU Library Editions. (Subject # 2 and Subject #3)
6. Salvadori Mario and Heller Robert. Structure in Architecture (For all the subjects)