CENTRAL UNIVERSITY OF VENEZUELA
Academic Vice-Rectorate
Central Curriculum Commission
Central Coordination of Undergraduate Studies

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	**Architecture**	**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	STRUCTURAL DESIGN 96
CODE	2063
EXECUTIVE UNIT	
CLASSIFICATION	Compulsory
APPROVAL DATE	
UPDATE DATE	
APPROVAL AUTHORITY	
CREDIT UNITS	3 (Three)
HOURS/WEEK	4 (Four)
REGIMEN	Semi-Annual
ACADEMIC PERIODS	Regular
REQUIREMENTS	Construction Materials
PROFESSOR	Carolina Tovar

PURPOSES

1. Provide to the architecture student with necessary tools to perform a preliminary sizing of beam-to- structures.
2. Through real and hypothetical situations stimulate to the architecture student the development of the reasoning and sense of structural design.
3. Stimulate the interest of architecture students for related areas of the structural design.

LEARNING OBJECTIVES

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

1. Identify the resistant elements of a column-beam system in a wood, steel and reinforced concrete structures.
2. Pre-dimensioning of resistant elements of a column-beam system in a wood, steel and reinforced concrete structures.
3. Management of basic concepts of structural configuration and behaviour.

CONTENTS

Part 1. MEMBERS SUBJECTED TO FLEXION

1.1 Shear and moment (Phenomenology, signs convention)

1.2 Shears and moments distribution
(Diagram of shear and moment, shape of the diagrams, relationship between the diagram of moments and the deformed member)

1.3 Relations between acting loads, shears and moments.

1.4 Bending stresses. Shear stress. Deflections. Section module. Eccentricity. Centroid. Shear centre. Dimensioning of cross sections in timber and steel (use of laminated profiles table).

1.5 Timber and steel floors: description of the components (roofs, floor joists, bearers, seismic resistant beams), floor assembly, dimensioning of components. Existing specifications and codes.

Part 2. MEMBERS SUBJECTED TO COMPRESION

2.1. Timber columns:
Short, intermediate and long columns. Euler's formula. Critical stress. Radius of Gyration. Slenderness. Usual formulas to design timber columns. Typical cross sections. Pre-dimensioning.

2.2. Steel columns:
Introduction (usual sections in columns, behaviour). Radius of Gyration. Slenderness: concept and applications. Usual formulas to design steel columns. Composite sections. Moment of inertia of sections with parallel axes. Radius of Gyration: applications. Brief reference of use of diagonals in structures. Pre-dimensioning.

2.3. Reinforcement elements
Dimensioning of reinforcement elements.

Part 3. REINFORCED CONCRETE

2.1. Introduction
Concrete as a structural material. Magnification load factors and reduction resistance factors. Rectangular sections: simply armed, doubly armed, selection criteria. Existing specifications and codes.

2.2. Slabs
Typology according to construction method and according to work method. Selection criteria. Dimensioning.

2.3. Beams and columns
Cross-sections. Calculation criteria. Dimensioning.

2.4. Continuous beams
Method of the envelope of moments. Dimensioning of continuous elements.

INSTRUCTIONAL STRATEGIES

1. Presentation or master class regarding each topic with a presentation in Power Point and slides referred to each topic.
2. Analysis of examples and problem solving in class after the presentation of each topic.
3. Application of cooperative learning through supervised exercises.
4. Use of web tools.

INSTRUCTIONAL MEDIA

1. Classes and digitized slides
2. Web tools
3. Blackboard

EVALUATION

1. One partial exam for each unit (90%)
2. Supervised exercises (5%)
3. Assignments (5%)

CONTINUOUS EVALUATION will be carried out through the following modalities:

- Practical works: a series of exercises will be considered to be solved at home and delivered on the indicated date. Group presentation.

- Directed exercises: a series of exercises will be proposed to be solved in class and delivered that day. Group presentation. The evaluation is linked to the student's attendance and has no recovery.

- On-site evaluation: will be based on attendance, punctuality and student participation in class.

PARTIAL EXAMS are of individual presentation and their application date will be indicated in the class calendar unless in class the teacher decides another date. In case of non-attendance of the student, the evaluation may be recovered if and only if a medical justification is presented

CLASSES ATTENDANCE is compulsory, if the student accumulates a total of 7 non-attendances (25%) automatically lose the course and the right to present final evaluations (sectoral and/or repair as the case may be). The control will be taken once during the class, if the student is not at that moment in the classroom will be registered as non-attendance.

TEXTBOOKS

- Ambrose, J. ANÁLISIS Y DISEÑO DE ESTRUCTURAS. Secondedition. Limusa. 1998.
- Arnal, H. Manual para el proyecto de edificaciones de concreto armado. COVENIN-MINDUR. 1986.
- Beer, F. Johnston, R. MECÁNICA VECTORIAL PARA INGENIEROS. Fifth edition. Mc Graw Hill. 1990.
- Fratelli, M. G. DISEÑO ESTRUCTURAL EN CONCRETO AMADO. 1997.
- Gere, J. Timoshenko, E. MECÁNICA DE MATERIALES. Second edition. Grupo Editorial Iberoaméroca. 1984.
- Moisset de Espanés, Daniel. INTUICIÓN Y RAZONAMIENTO EN EL DISEÑO ESTRUCTURAL. Escala editorial. Colombia. 1992.
- Salvadori, M. Helle, R. ESTRUCTURAS PARA ARQUITECTOS. Third edition. Ed. Cp 67. 1987.

1. Estructuras de acero para Edificaciones: Método de los Estados Límites. COVENIN 1618-98
2. Acciones mínimas sobre el proyecto de edificaciones. COVENIN 2002-88
3. Proyecto y construcción de obras de concreto estructural. COVENIN 1753-2003 (revisión 2006)