



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	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 "CARLOS RAÚL VILLANUEVA"
INSTITUTE	
DEPARTMENT	
OTHERS	

COURSE:

NAME	SYMMETRY I
CODE	1184
EXECUTIVE UNIT	
CLASSIFICATION	ELECTIVE/ THEORETICAL-PRACTICAL
APPROVAL DATE	
UPDATE DATE	
APPROVAL AUTHORITY	
CREDIT UNITS	TWO (2)
HOURS/WEEK	THREE (3)
REGIMEN	SEMI-ANNUAL AND SUMMER SEMSTER
ACADEMIC PERIODS	REGULAR
REQUIREMENTS	FIRST CYCLE COURSES
PROFESSOR	



PURPOSES

The objective of this course is to train the student to be capable to classify and generate forms of the plane through the knowledge of the invariants of the Euclidian space, which are the Symmetries and the Knowledge Structures of the groups that compose it.

LEARNING OBJECTIVES

1. To identify and generate symmetric forms of the plane and derivative shapes of it, to optimize its creative production in its tasks as architecture student.
2. To integrate two types of knowledge that are on one hand the mathematical structure of the theory applied groups to the isometries, and on the other hand the spatial relations, the intuition, the image recognition, patterns and configurations which are the artist's abilities.

CONTENTS

Topic 1: Isometries

Transformations, Isometries, Direct and opposed isometries. The four isometries of the plane: Translation, rotation, reflection and sliding reflection. Properties. Isometries composition. Theorems for the classification of the isometries of the plane.

Topic 2: Symmetries

Symmetries of one shape. Symmetries groups. Order of one group of symmetries. Equivalencies and classes of equivalencies. Identification of Equivalent Shapes. Groups of Symmetries of the plane.

Topic 3: Punctual Groups

Punctual Groups: Cyclical and Dihedrals. Possible symmetries for one punctual group. Typical sector. Symmetries composition of one punctual group. Cayley tables. Punctual subgroups. Subsets generators of groups. Cyclical groups classification, generation of cyclical designs. Dihedrals groups classification, generation methods of dihedrals designs.

Topic 4: Linear Groups

Linear groups. Typical zone, properties. Possible symmetries for one linear group. Symmetries composition in one linear group. Classification of the seven linear groups of



the plane. Subgroups and subsets generators of each one of the seven groups. Generation methods of linear designs.

Topic 5: Planar groups

Planar groups. Typical parallelogram, properties. Possible symmetries for each planar group. Classification of the seventeen planar groups. Symmetries composition for one planar group. Subgroups and subsets generators of each group. Generation methods of planar designs.

INSTRUCTIONAL STRATEGIES

- The professor is aimed to orient the student in the symmetry theory as an enhancer tool for creativity in the generation of shapes, both two-dimensional as three-dimensional.
- It is also proposed to hold workshops that allow the exercising in the process of shapes generation.

INSTRUCTIONAL MEDIA

- Slide projector
- Video Beam
- Models presentation

EVALUATION

- WORKSHOP EVALUATIONS.....30%
- ASSIGNMENTS 20%
- TRIDIMENSIONAL EXERCISE..... 20%
- FINAL WORK..... 30%

TEXTBOOKS (If possible, according to contents)

- PARA, Szusana. Módulo instruccional de simetría.
- ESCHER, M.C. The graphic work of M.C. Escher. Ballantine Books, New York.
- SCHATTNEIDER, Doris. Vision of Symmetry, W.H. Freeman and Company, New York.