



**NATIONAL UNIVERSITY OF ENGINEERING
COLLEGE OF MECHANICAL ENGINEERING
MECHANICAL ENGINEERING PROGRAM**

COURSE: MACHINE PROJECTS

I. GENERAL INFORMATION

CODE	:	MC546
SEMESTER	:	10
CREDITS	:	3
HOURS PER WEEK	:	5 (2 Theory – 3 Practice)
REQUIREMENTS	:	MC586 – MC612
CONDITION	:	Mandatory

II. COURSE INTRODUCTION

The course prepares the student in the topics of rationale of design methods, Analysis of information and existing solutions. The Generalized Method is used, basing the technical systems to establish the basic provisions. The method requires Generation of Alternatives for it is used the morphological matrix that allows the determination of the concept of design and based on Design Strategies is proposed The Preliminary Project and this allows to develop the Definitive Project to finally be evaluated and determined the Sensitivity and Impact of the Selected Alternative.

III. COURSES OUTCOMES

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

1. Integrates knowledge of design methods and Analyzes existing information and solutions in technology using the generalized method to base technical systems that allows you to set the basic design provisions.
2. It understands that it must work effectively in equipment for the development of the generalized method with the use of the generation of alternatives and applies the morphological matrix to determine the concept of the design with which it arrives to determine the optimal concept of the design.
3. He understands that he must communicate effectively both verbally and in writing for the need of feasibility analysis by planning the generalized method and developing design strategies to develop the project.
4. Understand the responsibility and the impact of the designer on the clients to develop the preliminary project as well as the final project and analyze and evaluate the impact of the chosen alternative.

IV. LEARNING UNITS

1. FUNDAMENTALS OF DESIGN AND GENERALIZED METHOD / 20 HOURS.

Rationale of design methods / Analysis of information and existing solutions / Precision of the problem to be designed / Generalized method / Fundamentals of technical systems / Abstraction /

2. GENERALIZED METHOD WITH DESIGN STRATEGIES / 15 HOURS

Elaboration of the approximate form / Morphological matrix / Evaluation of design alternatives / Optimum concept of design / Technological policies and restrictions / Design strategies / Design strategies /

3. PROJECT DEVELOPMENT AND ENVIRONMENTAL IMPACT / 20 HOURS.

Planning of solution actions / Considerations or design factors / The preliminary project / Determine the optimal preliminary project / Present the preliminary project plan (drawings) / The Definitive Project / Restrictions in the design / Design properties / Define the material and making processes / Analyzing the environmental impact of the project / Conducting the sensitivity analysis.

4. EVALUATION AND DETERMINATION OF PROJECT COSTS / 15 HOURS

Engineering of value / Use of technical standards / Evaluate and define the horizon of evaluation / Design of the minimum cost / Methods for the Estimation of Costs / Estimation of costs considering the materials / structures of costs.

V. THEMES OF QUIZZES

QUIZ 1: In this practice the student is asked about the topics developed in Learning Units 1 and 2, the maximum grade is 10 (Ten). In addition, students present group work related to the conventional methods developed in class, the maximum grade is 10 (Ten), which added both grades could reach a grade of 20.

QUIZ 2: In this practice the student is asked about the topics developed in Learning Units 2 and 3, the maximum grade is 10 (Ten). In addition, students present group work related to the learning units 2 and 3 developed in class, the maximum grade is 10 (Ten), which added both grades could reach a grade of 20.

QUIZ 3: In this practice the student is asked about the topics developed in Learning Units 3 and 4, the maximum grade is 20 (twenty).

VI. METHODOLOGY

As it is a CAPSTONE course it is developed in sessions of theories and workshops in the classroom. In the theory sessions, the teacher presents the definitions, machine project concepts with theoretical applications and real cases. In the workshop sessions, other real cases are raised and the monograph is formulated that is of real application. At the end of the course students must present and present the monographic work (Machinery Project) in groups of 4 or 6 members, where they demonstrate THE EFFECTIVENESS of teamwork and can communicate effectively. In all the sessions, the active participation of the student is promoted.

VII. EVALUATION FORMULA

Evaluation System "D"

The average of quizzes is the arithmetic average of the notes of the 03 quizzes performed: **AQP**

Note of 01 monographic work: **M**

Sub Evaluation system (quizzes of the course) "D"

The average of quizzes (AQP), is the arithmetic average of three notes of the three quizzes.

$$\text{AQP} = (\text{Q1} + \text{Q2} + \text{Q3}) / 3$$

Monographic work: **M**

Progress of the monograph until week 09:	10% of the grade
Final report of the monograph:	25% of the grade
Monograph support:	30% of the grade
Presentation of the model:	35% of the grade

Final Average (FA):

$$\text{FA} = (\text{AQP} + \text{M}) / 2$$

The minimum passing grade will be 10.

VIII. BIBLIOGRAPHY

- Pahl, G and Beitz, W. **Engineering Design Council**, Edit. Springer, Edition 1996, London
- Nigel Cross, **Methods of Design**, Editorial Limusa, First Edition, year 1999
- James P Lewis, **Project Leadership**, McGraw-Hill Publishing, 2003 Edition.
- James G. Bralla, **Product Design Manual for Manufacturing**, McGraw-Hill Publishing, 1993 Edition.