NATIONAL UNIVERSITY OF ENGINEERING
COLLEGE OF MECHANICAL ENGINEERING
MECHATRONICS ENGINEERING PROGRAM

MT818 – MECHATRONIC PROJECT

I. GENERAL INFORMATION

CODE	: MT818 Mechatronic Project
SEMESTER	: 10
CREDITS	: 4
HOURS PER WEEK	: 4 (Theory - Practice)
PREREQUISITES	: MC601 Research Methodology
CONDITION	: Obligatory

II. COURSE SUMMARY

This course aims to develop the general skills of Oral Communication, Written Communication, Critical Thinking, Quantitative Reasoning, Information Management, Citizenship and Innovative Thinking; At the same time, it seeks to be a course of verification and control of career competencies.
Also it is destined to the development of the professional thesis. The objective is to provide the space and the necessary advice for the student to significantly advance the thesis project required to obtain the professional title.
The professional theses consist mainly in the manufacture of a prototype or mechatronic system involving the development of hardware and software.
The development of the project will allow to evaluate the technical and human skills acquired by the student during his university studies. The teacher through the consultants can provide the recommendations, orientations and corresponding suggestions, with a view to the student improving those aspects where he presents some shortcomings and weaknesses. The aim is to enable the student to pursue the profession by applying good engineering practices, recognizing the importance of ethics, human values and teamwork as complementary components to their technical and engineering training.

III. COMPETENCES

The student:

1. Formulates an engineering project based on the correct identification of the problem, the state of the art and the technical, social, economic, legal and environmental aspects involved.
2. Implements a solution based on knowledge, criteria and scientific and engineering procedures. He develops a prototype that meets specific real requirements and limitations, applying knowledge and scientific and

engineering procedures, which documents, supports and disseminates appropriately through oral presentations and written reports.

IV. LEARNING UNITS

UNIT N ° 1: DEFINITION OF THE PROJECT

HOURS / WEEK (S): 12 / 1, 2, 3

Achievements:

- Formulate a project based on a fully identified problem situation.
- Proposes viable engineering solutions based on established constraints and specifications.
- Elaborates consistent work schedules based on established methodologies and deadlines.
- Describe theoretical frameworks applying scientific and engineering rigor.

Temary:

- Definition of the problematic situation, the problem and analysis of the state of the art.
- Definition of project justification and objectives.
- Approach of the proposed solution: diagrams, specifications, operation, comparative study of components to be used and limitations.
- Development of the methodology of work.
- Feasibility of the Project.
- Theoretical framework.
- Work Schedule.
- Report on Project Costs and Budgets.
- Definition of the Final Product of Mechatronic Project.
- Last conclusions.
- Bibliographic references.
- Qualified Initial Report: Evaluation of Progress in Formulation and Project Approach.

UNIT N ° 2: PROJECT IMPLEMENTATION STAGE

HOURS / WEEK(S):44 /4 … 16

Achievements:

- • Appropriately supports an implementation progress with scientific rigor and engineering criteria.
- Validates results based on objective performance tests and comparative analysis.
- Implements hardware and software advances based on theoretical considerations, practices, critical thinking, particular requirements, real limitations and engineering criteria.
- Explain verbally with expository clarity and appropriate argumentation.

- Make presentations and technical reports using appropriate scientific / engineering notation and an acceptable level of spelling and writing.
- Works properly in a team, maintaining a cordial relationship with the work group,

Temary:

- Subjection of formulation observations and project approach.
- Definition of the final product.
- Defining progress.
- The theoretical support and scientific rigor.
- Obtaining and presenting results.
- Validation of results.
- Documentation of problems.
- Bibliographic referencing.
- First and Second Qualified Evaluation: Evaluation of the Progress in the Implementation of the Final Product according to the regulation.
- Final Work: Evaluation of the Progress of Implementation and obtention of the Final Product of Mechatronics Project duly completed.

V. LABORATORIES AND PRACTICAL EXPERIENCES

Laboratory: Constant use of the laboratory for software and hardware advances and tests

VI. METHODOLOGY

Active Methodology. The teacher will play the role of facilitator and share their experiences in class contributing to the student's professional growth. The course will be developed in 02 units. During the semester there will be 14 sessions, of which per week will be 2 hours of face-to-face theoretical classes and 2 hours of practical classes (oriented to technical advice).
The course has a regulation that specifies all the procedures and formats to be applied in the formulation of the project and in the development of implementation progress. It also establishes rules and penalties for non-compliance or faults committed by the student. In lectures the teacher explains the regulations and procedures for formulating, documenting, implementing and developing the project progress. He also interacts with each working group in order to discuss the specific aspects of each project.

VII. EVALUATION FORMULA

The final average (PF) of the course is obtained from the following formula

PF = 0.3xP1 + 0.3xP2 + 0.4xPF

P1: Presentation 1 (evaluated by the course teacher).

P2: Presentation 2 (evaluated by the course teacher).
PF: Final Presentation (evaluated by the course teacher and a specialist guest).

Evaluation Schedule:

Evaluation	Week
Evaluation	1 6-7
Assessment	2 12-13
Final Evaluation	15-16

VIII. BIBLIOGRAPHY

BASIC

1. CABALLERO ROMERO, Alejandro (2000) Metodología de la investigación científica: diseños con hipótesis explicativas. Lima: UDEGRAF. (001.42 CABA)
2. DYM, CliveLittle, Patrick (2002) El proceso de diseño en ingeniería: cómo desarrollar soluciones efectivas. México, D.F. Limusa. (670.5752 DYM)

RECOMMENDED

3. SAPAG CHAIN, NassirSapag Chain, Reinaldo (2008) Preparación y evaluación de proyectos. México, D.F. McGraw-Hill Interamericana. (658.404 SAPA/P 2007).
4. MUÑOZ RAZO, CARLOS (2011) Cómo elaborar y asesorar una investigación de tesis. México, D.F Pearson Educación, México 2011.