NATIONAL UNIVERSITY OF ENGINEERING

COLLEGE OF MECHANICAL ENGINEERING

MECHANICAL ENGINEERING PROGRAM

MN412 – LABORATORY OF MECHANICAL ENGINEERING I

I. GENERAL INFORMATION

CODE	: MN412 Laboratory of Mechanical Engineering I.
SEMESTER	: 6
CREDITS	: 1
HOURS PER WEEK	: 3 (Laboratory)
PREREQUISITES	: MN114 -MN216
CONDITION	: Mandatory

II. COURSE DESCRIPTION

Pressure measurement Measurement of temperature. Measurement of flows. Measurement of power and speed. Study of lubricants. Studies of fuels. Studies of vapor. Analysis of combustion gases and water.

III. COURSE OUTCOMES

the student:

1. Properly uses the instrumentation for the measurement of thermodynamic properties.
2. Develops cognitive activities for the calculation of efficiencies of different types of machines.

IV. UNITS OF LEARNING

1. INTRODUCTION AND FORMATION OF GROUPS.

   The objectives of the Kurdish laboratory of mechanical engineering are indicated and groups of work are formed of 4 to 5 students.

2. THEORY OF THE FIRST FOUR LABORATORY TESTS.

   Temperature measurement, flow measurement, power measurement and speed.

3. PRESSURE MEASUREMENT
Use of U-shaped and inclined liquid column manometers. Bourdon manometer. Deadweight calibrator.

4. TEMPERATURE MEASUREMENT
Use of total and partial immersion vulcan manometers. Thermocouple. Bimetallic.

5. FLOW MEASUREMENT
Use of venturi tube. Plate with hole. Capacity tank. Reynolds tube. Dump.

6. POWER MEASUREMENT AND SPEED.
Electrical power. Power to the axis. Power indicated. Hydraulic power. Brake horsepower. Mechanical tachometer. Electronic tachometer. Lap counter and timer.

7. SUPPORTING THE FOUR FIRST EXPERIENCES
Oral exposition of the first four experiences, individually, in ppt.

8. FIRST WRITTEN CONTROL
Deals with the theory and knowledge acquired in the first four experiences. It is of cancelatory type.

9. THEORY OF THE FOUR LAST LABORATORIES
Study of lubricants. Study of fuels. Study of steam. Analysis of combustion gases and water.

10. LUBRICANT STUDY
Use of Redwood and Universal Viscometers. Densimeter for oil at different temperaturas.

11. COMBUSTIBLES STUDY
Temperature of inflammation and of combustion with the closed glass of Pensky Martens. Determination of calorific power of liquid fuels with the Emerson calorimeter pump.

12. STUDY OF STEAM
Use of the universal calorimeter to determine the quality of a mixture of liquid mass and steam. Maret boiler to determine the latent heat of vaporization.

13. ANALYSIS OF COMBUSTION AND WATER GASES
Use of the combustion gas analyzer, on a dry basis, orsat and / or bacharach 500. Determination of the hardness of the water with the BB solution. Determination of PH of water with paper indicator and / or digital sensor.

14. ORAL SUPPORT OF THE FOUR LAST EXPERIENCES
Oral presentation of the last four experiences, individually, in ppt.

15. SECOND WRITTEN CONTROL
deals with the theory and knowledge acquired in the last four experiences.

V. LABORATORIES AND PRACTICAL EXPERIENCES

8 laboratory experiments will be performed throughout the cycle.

VI. METHODOLOGY

This course is experimental. Is delivered at the beginning of the course theoretical material developed by teachers, in digital system, the content of the eight laboratory experiences.

During individual expositions, in ppt, each student has the opportunity to present an application of what has been learned.

As model of previous exposures is given, the level of content in the oral exposition of the cycle is of better quality than that of the previous cycle.

VII. FORMULA EVALUATION

The evaluation system used is the D system. Average of the Notes of the eight experiences realized during the cycle.

VIII. BIBLIOGRAPHY

1. Shapiro, Ascher. Thermodynamic. Editorial the Ronald press,co (New York)
2. Laboratory teachers. Manual of laboratory of mechanical engineering 1.
3. Marks. Manual of the Mechanical Engineer.
4. Oswaldo M. Morales Taquiri.” Theory and practice of the Laboratory of Mechanical Engineering.”

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