NATIONAL UNIVERSITY OF ENGINEERING
COLLEGE OF GEOLOGICAL, MINING AND METALLURGICAL ENGINEERING
METALLURGICAL ENGINEERING PROGRAM

ME630 – COMPUTER AIDED DESIGN

I. GENERAL INFORMATION

CODE	**:**	ME630 Computer Aided Design
SEMESTER	**:**	6 -10
CREDITS	**:**	3
HOURS PER WEEK	**:**	5 (Theory – Practice)
PREREQUISITES	**:**	TM301 General Topography
CONDITION	**:**	Elective

II. COURSE DESCRIPTION

This course provides students with the enough knowledge for designing plans and projects in several areas of Metallurgical Engineering effectively and quickly using computing tools like CAD tools. Its objective is to train students in the knowledge and use of AUTOCAD software (Computer-aided design). This course consists of: Environment description, configuration, drawing and edition tools, consultation tools, and layers, texts, images, blocks, dimensioning and printing management.

III. COURSE OUTCOMES

1. Identify and use AUTOCAD commands and design standards.
2. Create plan templates.
3. Design of: architectural, structural electrical wiring, sanitary installations and topographical plans.
4. Rapidly and draw and print plans with accuracy.
5. Improve his/her productivity and efficacy.

IV. LEARNING UNITS

1. DRAW COMMANDS / 12 HOURS
Work environment description / Visualization commands / Dynamic Input. Command: Line, coordinate system: Precision tools (Endpoint, Midpoint, Intersection). Commands: Circle, ARC, Polygon, Rectang, Polyline, Hatch, consultation, text and Mtext.

2. LAYER MANAGEMENT / 4 HOURS
Layer manager / Layer state and properties / Line type / Line thickness.

3. EDITING COMMANDS / 12 HOURS
Commands: Move / Copy / Trim / Extend / Offset, Erase, Selection methods / Commands: Rotate, scale and image manager / Command: Mirror, break, array, explode.

4. ATTRIBUTES AND BLOCKS / 8 HOURS
Project Final Outline, blocks, use of Tools Palettes, Attributes, Extraction of attributes, Dynamic blocks / Progress 1 of the final project. Topographic points import through script files.

5. DIMENSIONING AND PRINTING
Plotting – Part 1 / progress 02 of the final project, Dimensioning – Part 1 / Dimensioning – Part 2, Plotting – Part 2 / Progress 03 of the final project / Plan handing over and project theoretical support.

VI. METHODOLOGY

This course uses an active method in the learning-teaching process that encourages students to participate in every class. The instructor exposes and gives examples to complement students' activity using the available audiovisual aids. Classroom work is complemented with lab trials, workshops and their corresponding reports.

VII. EVALUATION FORMULA

The average grade PF is calculated as follows:

PF = (EP+EF+(P1+P2+P3+P4)/4)/3

EP: Mid-Term Exam EF: Final Exam
P: Quizzes

VIII. BIBLIOGRAPHY

1. **GEORGE, OMURA**
   AUTOCAD 2009 (Spanish)
   Editorial Anaya Multimedia

2. **AUTODESK, AUTOCAD 2010**
   User's Handbook 2010 (Spanish)

3. **AUTODESK. AUTOCAD 2010**
   Command Reference

4. **WHITE, FRANKFERNEY E. GUTIERREZ**
   AUTOCAD 2007 (Spanish)
   Colombian Alfaomega Editorial

5. **REYES, ANTONIO MANUEL**
   AUTOCAD 2005. 2004 (Spanish)
   Ed. Anaya Multimedia

6. **TAJADURA ZAPIRAIN JOSÉ / LÓPEZ. FERNÁNDEZ JAVIER**
   ADVANCED AUTOCAD 2007 (Spanish)

IX. COURSE CONTRIBUTIONS TO STUDENT OUTCOMES ATTAINMENT

Course contributions to Student Outcomes are shown in the following table:

Level 1: Know
Level 2: Comprehend, calculate
Level 3: Model, apply, solve
Level 4: Apply at advanced level, design. Achievement of Student Outcome

Outcome	Contribution
1. Engineering Design Design and integrate metallurgical systems and components satisfying requirements and needs as well as given technical, economic, social and legal constraints and limitations.	4
2. Problem solving Identify, formulate and solve engineering problems properly using the methods, techniques and tools of metallurgical engineering.	4
3. Sciences Application Apply the knowledge and skills of mathematics, sciences and engineering to solve metallurgical engineering problems.	4
4. Experimentation and Testing Conceive and conduct experiments and tests, analyze data and interpret results.	4
5. Modern Engineering Practice Use and apply techniques, methods and tools of modern engineering necessary for the practice of metallurgical engineering.	4
6. Engineering Impact Understand the impact of metallurgical engineering solutions on people and society in local and global contexts.	4
7. Project Management Determine the budgets, schedules and feasibility of engineering projects, and participate in its management for the attainment of goals.	3
8. Environmental Appraisal Take into account the importance of preserving and improving the environment in the development of their personal and professional activities.	3
9. Lifelong Learning Recognize the need to keep their knowledge and skills up-to-date according to advances of metallurgical engineering and engage in lifelong learning.	3
10. Contemporary Issues Know and analyze relevant contemporary issues in local, national and global contexts.	3
11. Ethics and Professional Responsibility Evaluate their decisions and actions from a moral perspective and assume responsibility for the executed projects.	3
12. Communication Communicate clearly and effectively in oral, written and graphical formats, interacting with different types of audiences.	4
13. Teamworking Appraise the importance of teamworking and participate actively and effectively in multidisciplinary teams.	