NATIONAL UNIVERSITY OF ENGINEERING

COLLEGE OF INDUSTRIAL AND SYSTEMS ENGINEERING

INDUSTRIAL ENGINEERING PROGRAM

SYLLABUS - GP113 JOB DESIGN II

I. GENERAL INFORMATION

CODE   : GP113
SEMESTER   : 6
CREDITS   : 4
HOURS PER WEEK   : 5 (Theory – Practice)
PREREQUISITES   : GP112 Job Design I
CONDITION   : Compulsory
INSTRUCTOR   : Irene Arce
INSTRUCTOR E-MAIL : irene_arce1@yahoo.es

II. COURSE DESCRIPTION

This course is designed to train students in the employment of techniques to measure the work in the framework of the production system operator, this techniques essentially consists of study of times and system of predetermined times used for the calculation of standard times and their different applications.

III. COURSE OUTCOMES

1. Design works using the production system operator.
2. Develop the technique of study of times to measure work, calculate standard times of different types of works taking into consideration all elements that influence it.
3. Develop the techniques that make up the predetermined times system, specially MTM (Methods Time Measurement), as alternative to establish the standard work times that are part of a project.
4. Correctly interpret work requirements and develop more adequate methods in keeping with the production systems operator.
5. Get familiar with team works through the development of different prototypes used to apply work measurement techniques, explaining design characteristics, the functional usefulness and the size of the different resources used.
6. Assess concepts of quality, efficiency and productivity in the development of the different works.

IV. LEARNING UNITS

1. WORK MEASUREMENT AND PRODUCTION SYSTEM OPERATOR / 5 HOURS
Basic concepts: work, system, enterprise, product, productivity, production, work measurement, measurement techniques, types, advantages, usefulness / Production system operator, basic model, elements and characteristics, cases.

2. METHODS ENGINEERING, BASIC FUNDAMENTALS / 5 HOURS

Definitions, basic study procedures, scope, uses, importance, applications, work layout, OSP (Open Source Physics), name and work groups, slogan.

3. TIMES STUDY / 5 HOURS
Definition, chronometers: S(a/b), C(a/b), H(a/b), sexagesimal chronometer, centesimal chronometer, hour chronometer, accuracy work, accuracy control, study execution, work cycle, equivalent work cycle, equivalent time units, equivalent observations, accuracy control diagrams. Equivalences calculations, examples and applications.

4. STYDY IN THE JOB / 5 HOURS
Method analysis and method notes: materials, machinery, instruments and tools, job, operators / Decomposition in elementary operations / Type of elementary operations / Timekeeping, operator election, reading methods, reading on the move, reading back to zero, time registers.

5. ASSESSMENT / 5 HOURS
Definition and concepts, factors modifying times in execution, activity levels. Concept of normal time, average operator, normal activity, assessment scale, 100-scale, bedaux scale, scale with incentives, assessment factor, analyst training, training methods, grade analysis, real grade, absolute error, systematic error, partial dispersion, total dispersion, conservative defect, anchorage defect, size of grades, other grade techniques, calculation procedures, determination of the number of observations.

6. NORMAL TIME / 5 HOURS
Concepts, methods, leveling, performance, numeric, short, triangle-triangle graph, proportion, applications, exercises and cases.

7. SUPPLEMENTS / 5 HOURS
Concepts, types of supplements, fatigue supplements, basic and variable fatigue, personal needs supplement, process characteristics supplement, forced inactivity, machine interference, wright curves, wright formulae, special supplements, periodic activities, machine supervision, contingence, discretionary.

8. STANDARD TIMES / 7 HOURS
Concepts, standard time of a basic process, standard time of a process with frequency elements, standard time with a process with machine elements, standard time and workload, efficiency, standard production, optimum time, optimum production, saturation, standard time with small elements.

9. PREDETERMINED TIMES / 6 HOURS
Definition, advantages, disadvantages, MTM system, procedure, MTM register, general, basic motion, MTM value table, types of control in the MTM application, type of motion, tolerances, stamndard time, applications.

V. LABORATORIES AND PRACTICAL EXPERIENCES

Lab 1: Accuracy control.
Lab 2: Analyst training.
Lab 3: Times study.
Lab 4: MTM

VI. METHODOLOGY

This course is carried out in theory, practical and lab sessions. In theory sessions, the instructor introduces theoretical concepts and applications. In practical sessions, different cases, exercise and problems are solved. In lab sessions, projects related to work measurement are developed. At the end of the course, students must hand over the prototype design and expose a paper. In all sessions, students' active participation is encouraged.

VII. EVALUATION FORMULA

The average grade PF is calculated as follows:

PF = 0.20EA + 0.30EB + 0.025PC1 + 0.025PC2 + 0.025PC3 +0.025PC3+0.02LB1 + 0.04LB2 + 0.06 LB3 + 0.08LB4+0.20TFI

EA: Mid-Term Exam	EB: Final Exam	TFI: Final Research paper
PC: Quizzes	LB: Final paper	

VIII. BIBLIOGRAPHY

1. **NIEBEL, BENJAMIN W. FRIEVALSDS ANDRINS**
   Industrial Engineering. Standard Methods. Work Design (Spanish)
   Alfa Omega Editorial, México (2000)

2. **MEYERS FRED E.**
   Times and Motion Study (Spanish)
   Prentice Hall Editorial (2000)

3. **HODSON, WILLIAM**
   Industrial Engineering Handbook
   McGraw-Hill Editorial (2003)