



# NATIONAL UNIVERSITY OF ENGINEERING

## COLLEGE OF CIVIL ENGINEERING

### CIVIL ENGINEERING PROGRAM

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## CO921 – CONSTRUCTION PROJECTS MANAGEMENT II

### I. GENERAL INFORMATION

<b>CODE</b>	: CO921 – Construction Projects Management II
<b>SEMESTER</b>	: 9
<b>CREDITS</b>	: 03
<b>HOURS PER WEEK</b>	: 06 (Workshop)
<b>PREREQUISITES</b>	: CO821 – Construction Projects Management I
<b>CONDITION</b>	: Mandatory

### II. COURSE DESCRIPTION

The course prepares the student in the application of the concepts, methods and techniques for cost management of an infrastructure project in the stages; of estimation, formulation of the budget and the control of the real costs in work. The concepts of costs that allow quantifying the measures, the determination of the unit costs and the general expenses necessary for the formulation of the budgets will be presented. The procedures to calculate the price readjustment will be presented, as well as the methodology to assess the progress of the work. The techniques that allow to contrast the supply budget with the results of the expenditure in the control items at the construction stage will be shown. Application problems are developed in engineering and a specialized software will be used.

### III. COURSE OUTCOMES

At the end of the course the student will:

- Analyze the technical file of a work and identify the necessary items for the formulation of the budget, quantify the volume of work using metering methodology.
- Develop the cost analysis of the items, which he identified, distinguishing the conformation of the crews, performance and determines the inputs of labor, materials, tools and equipment.
- Identify the general expenses necessary for direct cost management and formulate the base budget of the file.
- Include the price readjustment system and calculate the readjustments in the valuations to be collected according to the progress of the work.
- Carry out the analysis of the tender proposal and determine the bid budget, identify the contracting modalities.
- Structure the control phases using the offer or target budget and formulate the information system for the control of costs on site. Learn how to formulate production reports, propose corrective measures if necessary, and organize the operating result report for management.

#### IV. LEARNING UNITS

**1. FILE ANALYSIS, IDENTIFICATION AND METHOD OF PARTIES / 20 hours**

Estimate for preliminary projects / Integration of construction costs; fixed, variable, direct and indirect / Reading plans / Technical specifications / EDT work breakdown structure / Measurement regulation, measurement methods.

**2. DIRECT COSTS / 12 hours**

Creation of work crews / Determination of the performance of the crews / Quantification of inputs; labor, materials, tools and equipment / freight calculation / price of inputs; Labor, materials, tools and equipment.

**3. INDIRECT COSTS, BASE BUDGET / 6 hours**

Fixed costs and variable costs / General expenses / Utilities / taxes / Profit / Base budget for contract, budget for direct administration.

**4. PRICE SETTING SYSTEM, VALUATIONS / 20 hours**

Polynomial formulas, unified price indices, geographical areas / Work progress schedule, valued schedule / Advances, amortizations / Price adjustments / Valuations.

**5. BIDDING PROCESS, MODALITIES. BUDGET OFFER / 9 hours**

Types of selection processes, contracting modalities / Evaluation of the base budget, unit costs specifications / Formulation of the budget offer.

**6. COST CONTROL PROCESS IN THE WORK / 15 hours**

Cost management planning / Offer budget / Target budget / Structuring by control phases / Programming / S curve / Field information, production reports / Identification of deviations, corrective measures / Monthly operating result report for management.

#### V. LABORATORIES AND PRACTICAL EXPERIENCES

Structured work: File of costs for a building lot, developed with software.

#### VI. METHODOLOGY

The course is developed in sessions of theory, practice. In the theory sessions, the teacher presents the concepts, theorems and applications. In the practical sessions, various problems are solved and their solution is analyzed. At the end of the course the student must prepare and present an integrating work or project. In all sessions, student participation is promoted.

#### VII. EVALUATION FORMULA

The learning will be evaluated through the "D" system.

- 6 Qualified practices, the one with the lower grade is eliminated: Weight 1, each
- Structured Work, first phase Research program: Weight 1
- Structured Work, second phase Final essay: Weight 1

$$FA = \frac{QP1 + QP2 + QP3 + QP4 + QP5 + SW1 + SW2}{7}$$

## VIII. BIBLIOGRAPHY

- RAMOS, Jesus. (2008) Costs and Budgets in Buildings, Capeco Editorial.
- HALPIN, Daniel. (1991) Financial and Cost Concepts in the Construction Industry, Noriega Limusa.
- STEPHENSON, Lance. (2015) Total Cost Management Framework, AACE International.