PONTIFICIA UNIVERSIDAD CATÓLICA DE CHILE
SCHOOL OF ENGINERING
DEPARTAMENT OF CONSTRUCTION ENGINEERING AND MANAGEMENT
ABET COURSE SYLLABI

ICC3264 VALUE ENGINEERING

Credits and contact hours: 10 credits / 10 hours (3 hours in lectures; 7 h. individual work hours per week)

Instructor's name: Alfredo Serpell

Course coordinator's name Alfredo Serpell

Textbook: AACE International (2006) Total cost management framework. 1st ed. J.K. Hollmann (ed.)

Course Catalog Description: The purpose of this course is to provide students with the skillset required to make sound economic decisions in the implementation of activities that people, companies and organizations need to carry out as part of their development and progress efforts. These activities (projects and operations) need to be analyzed not only from the a technical point of view, but also from the economic one, a fundamental component for guaranteeing the success of the results. In this context, Value Engineering is a discipline that seeks to provide independent, accurate and reliable assessments of capital and operating costs associated with the completion of a project to be used in the financial investment decisions and in project control so as to ensure the greatest value of the results thereof.

Prerequisite Courses: ICC2204 Project Planning and Control and ICC2304 Construction Engineering

Co-requisite Courses: None

Status in the Curriculum: Required

Course Learning Outcomes:

1. Understand and describe the extent of value engineering in the context of the project life cycle.
2. Apply the concepts, principles, practices and techniques of cost estimation, economic analysis, cost control and management, economic evaluation and implementation of the project life cycle.
3. Apply methodology for making objective and reliable estimates of project life cycle costs, evaluating the associated uncertainty.
4. Understand and synthesize the economic aspects and factors of a project and model them for analysis,
5. Identify and build the cash flow for the life cycle of a project and analysis its economic attractiveness.

6. Plan the management of financial aspects and cost of the execution stage of a project and apply methodology for the control of its economic performance.
7. Apply modelling tool and analyze the economic performance of a project as well as its risk and uncertainty.

Relation of Course to ABET Criteria:

a. Knowledge of mathematics, science and engineering
c. Design a system, component, or process
e. Identify, formulate, and solve engineering problems
h. Broad education necessary for global, economic, environmental and societal context
k. Techniques, skills, and modern tools for engineering practice.

Topics covered:

1. Course Introduction: Value engineering. Investment analysis. The decision making process in an investment project. The focus of the life cycle evaluation of the project (ECVP). ECVP Application. Cost planning and the ECVP.
2. Basic aspects of investment decisions: Time/money relationships. Interest rates. Criteria for making decisions between alternatives
3. Costs and cost estimates: Fundamentals. Concepts of cost. Cost generators. Costing methods. Cost Estimation Techniques. Incorporation of Risk and uncertainty. Stadistical techniques. Contingency analysis and determination. Budgets.
4. Economic analysis of investment projects: Depreciation and taxes. Cash Flow Determination of a Project. Inflation and its effect on cash flows. Asset replacement decisions. Economic analysis in the public sector.
5. Risk and uncertainty in investment analysis: Evaluation of the investment risks. Sensibility of analysis. Risk analysis tools. Financial costs and management: Financing for projects. Management of capital required for the projects. Margin and utilities. Cost control The value gain system.