

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

ICC2424 EARTH WORK AND CONSTRUCTION METHODS WORKS

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

Instructor's name: Luis Pinilla / Alondra Chamorro

Course coordinator's name Alondra Chamorro

Textbook:

- Bhandari (1997) Engineering Rock Blasting Operations. Balkema.
- O'Brien, Harvers, Stubbs (1996) Standard Handbook of Heavy Construction. McGraw Hill.

Course Catalog Description: Training the student to efficiently perform in heavy construction projects through the knowledge of the characteristics of this type of works and the techniques and equipment used. The student will be prepared to choose and evaluate specialized machinery and organize heavy construction works according to the works' technical characteristics and contractual requirements.

Prerequisite Courses: ICE2604 Fundamentals of geotechnical engineering and ICC2204 Project Planning and Control and ICC2304 Construction Engineering

Co-requisite Courses: None

Status in the Curriculum: Required

Course Learning Outcomes:

1. Know the constructive process of wide-ranging civil works.
2. Economically evaluate and defray civil works projects.
3. Plan and program the execution of civil works projects.
4. Know and assess the environmental effects of large civil works.
5. Know the equipment and operations required for large earthmovings.
6. Know the equipment and operations required for the construction of earth dams.
7. Know the equipment and operations required for blasting operations and rock excavation.
8. Know the equipment and operations required for the construction of open pit excavations: underground, trench, ditch, channel.
9. Know the equipment and operations required for tunnel excavation.
10. Know the equipment and operations required for pile driving works.
11. Know the operation, plan the use of and calculate the operation costs of heavy construction machinery: tractor equipment, compacting machines, bulldozers, motoscrapers, motograders, all types of diggers,

**Relation of Course to ABET
Criteria:**

- shovels, conveyor belts, equipment.
- a. Knowledge of mathematics, science and engineering
 - b. Designing and conducting experiments: to analyze and interpret data
 - c. Designing 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. Introduction: Heavy construction industry, Works and equipment evolution, criteria used in planning and scheduling the construction of civil Works, risk of a heavy construction contract.
2. Heavy construction equipment: Fundamentals of engineering in handling heavy construction equipment: power and thrust. Mechanics and motors. Tractor equipment: tractors, bulldozers, motograders, scrapers, others. Transport equipment. Excavation and loading equipment. Compacting equipment. Lifting equipment: cranes, loaders. Conveyor belts. Ditchers. Other equipment: bombs, compressors, drill, others. Auxiliary equipment.
3. Costs of operating and owning an equipment.
4. Earthmoving: excavation and fillings.
5. Blasting: open excavations and tunnels.
6. Tunnel excavations.
7. Injection and treatment of soils and rocks.
8. Special excavations.