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

# ICC2913 INFORMATION TECHNOLOGIES IN CONSTRUCTION

| | |
|---|---|
| **Credits and contact hours:** | 10 credits / 10 hours (3 hours in lectures; 7 h. individual work hours per week) |
| **Instructor's name:** | Claudio Mourgues |
| **Course coordinator's name** | Claudio Mourgues |
| **Textbook:** | BIM Handbook A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors |
| **Course Catalog Description:** | Construction projects and firms intensively use information coming from many different places on a daily basis. |
| **Prerequisite Courses:** | ICC204 Project Planning and Control and ICC2304 Construction Engineering |
| **Co-requisite Courses:** | None |
| **Status in the Curriculum:** | Required |

**Course Learning Outcomes:**

1. Understanding the importance of information, information technologies and information management for architecture, engineering and construction industries.
2. Understanding the information structure and flows in construction projects and its interrelation between the projects' different actors (principals, contractors, architects, engineers, businessmen, community, etc.)
3. Identify and explain the basic concepts and elements of the information technologies.
4. Identify the main information technologies in architecture, engineering and construction industries.
5. Select information technologies based on the needs of projects and businesses.
6. Use information technologies in specific problems.
7. Evaluate the challenges and impacts of implementing information technologies in different scenarios.
8. Optimize the data structure at the level of the project and business.
9. Being a change agent so that firms and projects treat the information resource more effectively and efficiently.

**Relation of Course to ABET Criteria:**

a. Knowledge of mathematics, science and engineering
b. Design a system, component, or process
c. Broad education necessary for global, economic, environmental and societal context
d. Techniques, skills, and modern tools for engineering practice.

**Topics covered:**

1. Introduction
   1.1. Use and importance of information in architecture, engineering and construction industries.
   1.2. Information flows
   1.3. IT Need
2. IT Basics
   2.1. IT and its elements
3. Models of products, processes and organizations
   3.1. Virtual Design and Construction, VDC
   3.2. Matrix and POP models
   3.3. Product models: BIM, parameter models, laser scanner, model checking, good practices, SIG, VR.
   3.4. Process models, simulation, 4D models
   3.5. Organization models
4. Management systems
   4.1. ERP
   4.2. Planning and progress control
   4.3. Budgets and cost control
   4.4. Materials management
   4.5. Labor management
   4.6. Document management
5. Communication and collaboration
   5.1. Collaborative technologies
   5.2. Extreme collaboration (XC)
   5.3. Collaboration through product models
   5.4. Work immersive space
6. Future applications
   6.1. Robotics and machinery control
   6.2. Mixed reality
   6.3. Services based on location
7. Knowledge management
   7.1. Data-Information-Knowledge
   7.2. Databases
   7.3. Data mining
   7.4. Expert systems
   7.5. Decisions based on cases