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

ICC2414 SURVEYING AND APPLIED GEOINFORMATION

Credits and contact hours: 10 credits / 10 hours (Lectures: 3 hours/week ; Lab: 3 hours/week; 4 hours Independent learning experiences)

Instructor's name: Ignacio Torres /Claudio Mourgues

Course coordinator's name Claudio Mourgues

Textbook:

- Alfaomega (2009) - Topografía - 11th edition - Paul Wolf, Russell Brinker
- IGM (2008) - Atlas Mundial, Santiago, Chile - IGM
- Bellisco Ediciones Técnicas y Científicas (2004) - Topografía para estudios de grado - José Juan de Sanjosé Blasco, Emilio Martínez García & Mariló López González
- CEAC Técnico Construcción (2003) - Topografía práctica para la construcción - Francisco M., Martínez Fernández.
- Escuela Politécnica Superior de Lugo, Universidad de Santiago de Compostela (2002) - Apuntes de teledetección - Ma de la Luz Gil Docampo, Julia Armesto González.

Course Catalog Description: The course aims at getting acquainted with the scenario where surveying and information management technologies take place in relation to geographical data management, and its Civil Engineering applications

Prerequisite Courses: ICC2304 Construction Engineering

Co-requisite Courses: None

Status in the Curriculum: Required

Course Learning Outcomes:

1. Having the ability to interpret different forms of earth surface representation and its different engineering uses.
2. Knowing and experimenting with the use of surveying equipment and GPS.
3. Identify measurement procedures of plants and elevations, and evaluate its applications and limitations.
4. Distinguish between measurement techniques and methods for different demand conditions or surface characteristics.
5. Know different control methods, take preventive measures and solve imperfections.
6. Being able to plan surveying and aerophotogrammetric studies.
7. Understand and apply integrated data management tools (GIS) in a Civil Engineer project

Relation of Course to ABET Criteria:

b. Designing and conducting experiments: to analyze and interpret data.
c. Designing a system, component, or process.
e. Identify, formulate, and solve engineering problems.

Topics covered:

1. Introduction
   - 1.1. Concept of: Geodesy (Ellipsoid, Datum), Cartography and Surveying
   - 1.2. Reference systems (absolute and local)
     - 1.2.1. Spherical Coordinates (geographical coordinates), Cartesian coordinates (projections), polar coordinates (COGO)
   - 1.3. Review: angles and slopes
   - 1.4. Scale concept and associated errors
2. Topographic survey
   - 2.1. Leveling, error control
   - 2.2. Tachymetry, error control
   - 2.3. Generation of level curves
   - 2.4. Practical experience in handling a level, tachymeter and total station
   - 2.5. Knowledge of state-of-the-art surveying instruments
   - 2.6. Applications in different engineering stages and projects.
3. Planimetric surveys and layouts
   - 3.1. Planimetric methods: limitations, precision and applications
   - 3.2. Layout of engineering projects
   - 3.3. Progress control support in civil works
   - 3.4. Earth moving cubication methods
   - 3.5. Planning and costs of a topographic work
4. Other data collection techniques
   - 4.1. GPS - Remote perception (Photogrammetry – Interferometry)
5. Data management in a Geographic Information System (GIS)
   - 5.1. Concepts in a GIS tool (conceptual design, data structure, topology, database, dynamic segmentation)
   - 5.2. CAD versus GIS
   - 5.3. Generation of a digital model of elevation and information derived from slopes, hillslope aspect and height ranges
   - 5.4. Spatial analysis techniques, models and simulations
   - 5.5. GIs application examples in planning, environmental protection and facility management (practical exercises).