NATIONAL UNIVERSITY OF ENGINEERING
COLLEGE OF CIVIL ENGINEERING

CIVIL ENGINEERING PROGRAM

SYLLABUS - CONSTRUCTION II

I. GENERAL INFORMATION

CODE	**:**	EC712
SEMESTER	**:**	7
CREDITS	**:**	4
HOURS PER WEEK	**:**	5 (Theory – Practice)
PREREQUISITES	**:**	EC711 Construction I, EC121 Strength of Materials I
CONDITION	**:**	Compulsory
DEPARTMENT	**:**	Construction
INSTRUCTOR	**:**	Heddy Jimenez, Lorenzo Castro, Javier Moreno, Eduardo Huari
INSTRUCTOR E-MAIL	**:**	hjimenez@uni.edu.pe

II. COURSE DESCRIPTION

Practical specialized course which allows to apply and deepen knowledge in constructive processes through activities of andragogic nature, that is to say, to learn performing, under the concept of self-motivation. The workshop deals with basic concepts related to the planning of work, quantity estimates, costs, programming, sanitary installations, electrical wiring, quality control, ant it also involves the area of falsework design. In the normative part, it presents and comments the National Constructions Regulation, Acquisition and Contracting Law, Construction license, construction declaration, independence and other regulations.

III. COURSE OUTCOMES

1. Lead the execution of the several civil engineering construction works.
2. Find the best choice among the presented and related to conventional constructive processes.
3. Organize control plans of constructive processes and material quality.
4. Use equipment and materials of cutting edge technological development.
5. Exercise the critical attitude during construction work execution.
6. Encourage innovation and use of unconventional construction systems.
7. Handle and master specifications from several current regulations applicable to the construction industry.

IV. LEARNING UNITS

1. BUILDING ACHITECTURAL AND STRUCTURAL ASPECTS / 15 HOURS

Introduction to plan reading. Plan reading, types of plans, architecture, structures, sanitary installations and electrical wiring. Location plan. Symbols interpretation / Constructive processes of building and gantry structures. Quantity estimate methodology. Recommendation for carrying out an accurate quantity estimate. Provisional works, provisional constructions: water for provisional constructions: water for construction, electrical energy. Preliminary works. Removal works: Demolitions, strokes, levels and layout / Soil movement. Ground leveling. Excavation: massive, ditch, cutting-off and filling. Surplus material disposal. Internal leveling and ramming, sheet piling. Plain concrete works: perimeter footings, footing, paving for footings. Bases, Underpinning piles, retaining wall. Stem wall, step and ramps.

2. CONSTRUCTIVE PROCESS OF A BUILDING STRUCTURE / 25 HOURS
Reinforced concrete works: reinforce concrete elements, theoretical concepts, and confinement vertical elements. Grade and supporting beams / Slabs, types; one-way lightweight slab; girt steel. Concrete. Placement of roof bricks / veneer wall, King Kong brick wall, types of bond: head, stretcher, mortar for settlement; wall indentation / Structure hull, slab pouring, curing, falsework removal / Midterm exam.

3. CONSTRUCTIVE PROCESS FOR BUILDING WORK FINISHES / 20 HOURS
Building finishes, rendering, plastering and molding. Primary lined plastering, indoor and outdoor plastering, column and beam plastering, wall plastering. Frosted plasterwork, embrasure revetment and burnishing / Floor and sidewalks, sub-floor. Baseboards and wainscoats. Types of floors: Venetian tile, cork, marble, vinyl, majolica. Types of baseboards and wainscoats / Woodworking: doors and windows. Metalworking and ironworking: iron doors and windows. Aluminum inner door / Locksmithing: hinges, locks. Systems and mechanisms. Locking accessories. Locksmithery for furniture. Gasses, crystals and similar materials: Single-thick, semi-double thick, double-thick and triple-thick. Paint: Plastered ceiling, indoor and outdoor screen walls, furniture paint in general.

4. CONSTRUCTIVE PROCESS FOR BUILDING INSTALLATIONS / 25 HOURS
Sanitary installations. Drainage and ventilation. Blow-off. Distribution system. Cold water and fire-prevention system. Cold water outlet. Distribution systems, faucets, valves. Hot water system. Distribution and return systems. Rainwater system / Electrical wiring. Roof and wall spout, spot light. Power outlet. Communication, signal, canalization and/or pipelining outlets. Conductors and wires. Panelboards and circuit breakers. Budgeting. Introduction to the analysis of unit cost, performance and man-hour. Price adjustment using polynomial formulas.

V. LABORATORY EXPERIENCES

Field work 1: Identification of architectural and structural aspects of buildings.
Field work 2: Constructive process of the structure of a confined masonry building.
Field work 3: Constructive process of finishes of a confined masonry building.

VI. METHODOLOGY

This course applies an active method in the learning-teaching process, in which students participate every class individually or in work groups. The instructor exposes and gives examples to complements students' activities using the available audiovisual aids. Classroom work is complemented with homework and student reports.

VII. EVALUATION FORMULA

The average grade PF is calculated as follows:

$$PF = 0.33\ EP + 0.33\ EF + 0.17\ PP + 0.17\ TE$$

EP: Mid-Term Exam EF: Final Exam
PP: Average of three quizzes TE: Average of three project reports

VIII. BIBLIOGRAPHY

1. **NATIONAL BUILDING REGULATION**
   LEGAL REGULATIONS OF THE OFFICIAL NEWSPAPER EL PERUANO
   Urban Peru Editorial, 2006

2. **QUANTITY ESTIMATE REGULATION FOR BUILDING WORKS**
   NATIONAL SERVICE OF TRAINING FOR THE CONSTRUCTION INDUSTRY
   UNI Editorial, Lima, 2004

IX. COURSE CONTRIBUTIONS TO STUDENT OUTCOMES ATTAINMENT

Course contributions to Student Outcomes are shown in the following table:

K = Key **R** = Related **Empty box** = Does not apply

	Outcome	Contribution
Engineering Design	Design civil works satisfying requirements and needs as well as given constraints and limitations.	**K**
Problem solving	Identify, formulate and solve engineering problems properly using the methods, techniques and tools of civil engineering.	**K**
Sciences Application	Apply the knowledge and skills of mathematics, sciences and engineering to solve civil engineering problems.	**K**
Experimentation	Conceive and conduct experiments, analyze data and interpret results	
Modern Engineering	Use and apply techniques, methods and tools of modern engineering necessary for the practice of civil engineering.	**K**
Engineering Impact	Understand the impact of engineering solutions on people and society in local and global contexts.	**K**
Project Management	Plan and manage civil engineering projects taking into account efficiency and productivity criteria.	
Environmental Appraisal	Takes into account the importance of preserving and improving the environment in the development of their personal and professional activities.	**K**
Lifelong Learning	Recognize the need to keep their knowledge and skills up to date according to advances of civil engineering and engage in lifelong learning.	**R**
Contemporary Issues	Know and analyze relevant contemporary issues in local, national and global contexts.	**K**
Ethics and Professional Responsibility	Evaluate their decisions and actions from a moral perspective and assume responsibility for the executed projects.	**R**
Communication	Communicate clearly and effectively in oral, written and graphical formats, interacting with different types of audiences.	**K**
Teamworking	Appraise the importance of teamworking and participate actively and effectively in multidisciplinary teams.	**K**