



NATIONAL UNIVERSITY OF ENGINEERING
COLLEGE OF CHEMICAL AND TEXTILE ENGINEERING
CHEMICAL ENGINEERING PROGRAM

SA633 – INDUSTRIAL SAFETY AND HYGIENE

I. GENERAL INFORMATION

CODE	: SA633 Industrial Safety and Hygiene
SEMESTER	: 9-10
CREDITS	: 3
HOURS PER WEEK	: 4 (Theory – Practice)
PREREQUISITES	: PA113 Methods Engineering I
CONDITION	: Compulsory

II. COURSE DESCRIPTION

This course is designed to allow students develop a solid preventive culture, complementing the knowledge already acquired in the career with tools that facilitate the exercise an effective and efficient control of the constant risks in every industrial process, revealing the importance of labor risks preventions during the development of a work and its close ties with the concepts of quality and productivity.

III. COURSE OUTCOMES

1. Interpret and apply national technical regulations and rules regarding current labor risks prevention in the industry sector.
2. Learn main labor risk factors in industrial works.
3. Work out risk analysis: identify dangers; assess risks and operational control mechanisms.
4. Design, implement, manage and assess labor risks prevention plans in industrial works.
5. Research work accidents: assess consequences, identify causes and establish corrective actions.
6. Identify, assess and control the most frequent significant environmental aspects in industrial works.

IV. LEARNING UNITS

1. RISK FACTORS AND REGULATION FRAMEWORK

Safety and health conditions in construction works in Peru. Risk factors in construction works. Work accidents, causes and consequences. National technical regulations and rules regarding to safety and health, applicable to industrial works. Individual protection equipment (IPE) and collective protection systems (CPS). Technical specifications. Technical-economic assessment. IPE / CPS selection. Signs. National and international rules.

2. OPERATIONAL RISKS IN INDUSTRIAL WORKS

Safety in industrial works. Risks generated from the use of manual machines and tools. Risks generated from the operation and use of materials. Risks generated from the use of electricity. Risks in specific activities: demolitions, excavations, land movement (heavy equipment), formwork, removal of formwork. Concrete placement and production. Steel placement and preparation. Metal working jobs (electric, oxyacetylene and compressed gas cylinder welding), working in confined spaces, mechanical lifting of loads.

Industrial hygiene in construction works. Concepts. Chemical agent, explosion control, use of dangerous chemical products. Physical agents, noise, vibrations and radiations.

3. OPERATIONAL RISKS MANAGEMENT IN INDUSTRIAL WORKS

Risk analysis. Identification of dangers, risk assessment, operational control mechanisms. Elaboration of standards and work procedures. Management of non-conformities. Verification mechanisms, identification, assessment and register of non-conformities. Establishment of corrective action, work accident investigation. Determination of causes (analysis methods), mitigation and corrective actions. Work accident statistics. Performance indicators analysis and formulation of line actions for continuous improvement. Response planes in emergencies: design, implementation, testing (Drills) and adjustment.

4. DEVELOPMENT OF PREVENTIVE BEHAVIOR IN WORKERS, RISKS PREVENTION PLAN

Behavior change fundamentals. REAZON – WILLPOWER, key binomial. Training as tools to achieve the preventive behavior in the worker. Communication techniques. How to design an effective training program in keeping with the work? Work head leadership. Command line responsibilities (engineers and foremen). Safety committee as key element of an intrinsically safe production process. System concept for the design, implementation, management and assessment of the risks prevention plan in mining and construction works.

V. LABORATORY EXPERIENCES

Visit to work 1: Identification of risks.

Visit to work 2: Safety plan assessment.

Visit to work 3: Control and management system assessment.

VI. METHODOLOGY

Expository-Interactive method: instructor lecture, student exposition. Guided discussion method: managing of the group to approach situations and come to conclusions and recommendations. Demonstration method: Execution. The instructor executes to show how and what it has to be done with, and the students execute it to prove they have learned.

VII. EVALUATION FORMULA

The average grade PF is calculated as follows:

$$PF = (EP+EF+((P1+P2+P3+P4+P5+P6)/5))/3$$

EP: Mid-Term Exam

EF: Final Exam

P#: Quizzes

VIII. BIBLIOGRAPHY

1. **ALEJANDRO MENDOZA PLAZA**
Implementing the Business Preventive Culture. Achieve Zero Accidents. AMeP and Safe-Pro Method (Spanish)
Confemetal Foundation, 2004
2. **OSHA 2202 PUBLICATION**
Construction Industry Digest
Revised in 2002, 105 pp
3. **CESAR MINGUES FERNANDEZ**
Prevention planning and execution, Risk Assessment in Industry (Spanish)
Escuela de la Edificación Foundation, 3rd Edition, 2001
4. **Ed. CEP**
Labor Risks Prevention Handbook, Industry and Construction Sector and Related Matters (Spanish), CEP Editorial, 2010