



**NATIONAL UNIVERSITY OF ENGINEERING**  
**COLLEGE OF ENVIRONMENTAL ENGINEERING**  
**SANITARY ENGINEERING PROGRAM**

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**SA125 – ENVIRONMENTAL SANITATION II**

**I. GENERAL INFORMATION**

<b>CODE</b>	: SA125 Environmental Sanitation II
<b>SEMESTER</b>	: 8
<b>CREDITS</b>	: 4
<b>HOURS PER WEEK</b>	: 6 (Theory, Practice)
<b>PREREQUISITES</b>	: SA115 Environmental Sanitation I
<b>CONDITION</b>	: Mandatory

**II. COURSE DESCRIPTION**

The course prepares students for the understanding and analysis of diverse environmental sanitation issues such as food processing and inspection using the Hazard Analysis and Critical Control Points HACCP protocol, sanitation considerations at hospitals and health centers for avoiding disease transmissibility and propagation, as well as sanitary consideration at pool and beaches. Students develop a critical thinking and analysis on sanitation considerations to be taken into account in every-day life and in different types of activities and sectors

**III. COURSE OUTCOMES**

At the end of the course, students:

1. Understand and analyze sanitation considerations to be taken into account in milk, fish and meat processing for assuring quality requirements regarding cleanliness and food safety.
2. Understand and apply the Hazard Analysis and Critical Control Points HACCP protocol for food processing inspection.
3. Understand and analyze the considerations to be taken into account in hospital sanitation for assuring high levels of sterility for avoiding disease transmissibility and propagation.
4. Understand and analyze the considerations to be taken into account in the design and operation of public pools, as well as sanitation considerations in beaches and their facilities.
5. Analyze Peruvian regulations regarding public sanitation.

**IV. LEARNING UNITS**

**1. MILK QUALITY AND PROCESSING**

Importance of food control. Food classes. Enteric diseases and its transmissibility. Fermented milk. Powder milk. Skim milk. Milk cream. Cow stables. Manure disposal. Cow milking. Water supply. Sewerage. Excreta disposal. Animal sanitation. Milk processing plants. Pasteurization. Equipment and facilities requisites. Milk transport. Milk products samples and analysis. Milk originated diseases.

**2. FISH AND MEAT**

Fish based food. Fishing. Fish transport. Fresh fish. Frozen fish. Bad fish. Seafood. Bad fish owed diseases. Fish storage and transportation. Refrigeration systems. Animal meat. Slaughterhouse. Areas and sections of a slaughterhouse. Minimum sanitary conditions. Sanitary inspection. Meat storage and transportation. Meat originated diseases.

### **3. FOOD PROCESSING AND MARKETING**

Food cleaning and disinfection. Hot water disinfection. Steam disinfection. Chemical compounds based disinfection (chlorine, iodo). Hazard analysis and critical control points HACCP for food inspection. Potential risks and hazards analysis. Determination of critical control points. Control and safety specifications. Food storage and storage. Refrigeration systems.

### **4. HOSPITAL SANITATION**

Disease transmissibility. Sterile areas. Control of water quality. Disposal of residual water. Management of disposal of hospital waste. Disinfection. Rat removal. Food inspection: fish, meat, milk. Tank and reservoir cleaning and disinfection.

### **5. POOLS AND BEACHES SANITATION**

Pool design criteria. Sanitation considerations. Water quality. Water chlorination. Water cleaning. Water recirculation. Water recycling. Water tests. Sanitary control of beaches. Beaches cleaning and conservation. Sanitary facilities at beaches. Waste water elimination.

### **6. OTHER SANITARY ISSUES**

Metaxenic diseases. Malaria. Yellow fever. Leishmaniasis. Bartonellosis. Chagas disease. Insects transmitted diseases and control. Rat transmitted diseases and control. Sanitation norms and regulations for housing, commercial and industrial premises..

## **V. PRACTICE WORK**

- Work 1. Milk sanitation
- Work 2. Hospital sanitation
- Work 3. Sanitation norms and regulations

## **V. METHODOLOGY**

The course develops through theory, practice and laboratory sessions. In theory session, the instructor presents the concepts and methods. In practice sessions, students solve different problems related to sanitation consideration in milk, meat and fish processing, hospital sanitation and sanitation regulations. At the end of the course, students present a report on a relevant theme of the course. Active student participation is encouraged throughout the course.

## **VI. EVALUATION FORMULA**

The average grade PF is calculated as follows:

$$PF = (EP + EF + PC) / 3$$

- EP: Mid term exam
- EF: Final exam
- PC: Average of quizzes including final report

## **VII. BIBLIOGRAPHY**

### **1. URBAN AND RURAL SANITATION**

Ehlers and Steel  
McGraw Hill Interamerican. Mexico

### **2. TREATMENT OF DRINKABLE WATER IN RURAL AREAS.**

Panamerican Center of Sanitary Engineering and Environmental Sciences.