INTRODUCTION TO FAILURE ANALYSIS OF MECHANICAL COMPONENTS
Course Syllabus

I. GENERAL INFORMATION

Course area : Materials Engineering / Mechanical Engineering
Number of hours : 8
Schedule : November 21 (2 pm to 6 pm) and 22 (9 am to 1 pm)
Professor : Dr. Francisco Rumiche
Associate Professor
Mechanical Engineering Department
Pontificia Universidad Católica del Perú

II. SUMMARY

The failure analysis is a procedure to determine the physical cause of the failure of an element, component or industrial equipment. The objective is to establish recommendations to substantially reduce the frequency and the consequences of the failures.
The course will be focused on material related failures and will be offered in two lecture sessions. It will present an introduction to the principles of failure analysis and the fundamental aspects to conduct a failure analysis investigation. A key component of the course is the discussion of real cases of failures and the results of investigations performed at the PUCP Materials Laboratory. Cases include failures in mining machinery, chemical processing equipment, energy production systems, aircraft and petrochemical industry components, among others.

III. OBJECTIVE

General objective:
The objective of the course is to provide the students with fundamental knowledge and primary skills to conduct a failure analysis investigation.

Specific objectives:
By the end of the course the student will be able to:

- Describe the diverse factors that cause mechanical failures.
- Identify the different fracture modes and their characteristics.
- Identify failure mechanisms.
- Apply the procedures to conduct a failure analysis investigation.

IV. CONTENTS

Session 1: November 21
- Introductory concepts
- Materials engineering review
- Fractography

Session 2: November 22
- Failure mechanisms
- Running a failure analysis investigation
- Cases discussion
IV. METHODOLOGY

The course will be offered in expositive sessions, a specialized material will be provided to students. Theoretical classes will be complemented with the discussion of real cases.

V. LITERATURE