

ENGINEERING FOR SAFETY OF CRITICAL INDUSTRIAL AND CIVIL

(Lecce - Università degli Studi)

Teaching SAFETY AND RESILIENCE OF INDUSTRIAL COMPONENTS AND STRUCTURES

GenCod A007232

Owner professor Rosa DE FINIS

Teaching in italian SAFETY AND RESILIENCE OF INDUSTRIAL COMPONENTS AND

Teaching SAFETY AND RESILIENCE OF INDUSTRIAL COMPONENTS AND

SSD code ING-IND/14

Reference course ENGINEERING FOR SAFETY OF CRITICAL INDUSTRIAL AND

Course type Laurea Magistrale

Credits 6.0

Teaching hours Front activity hours: 54.0

For enrolled in 2023/2024

Taught in 2024/2025

Course year 2

Language ENGLISH

Curriculum INDUSTRIAL ENGINEERING SYSTEMS

Location Lecce

Semester First Semester

Exam type Oral

Assessment Final grade

Course timetable

<https://easyroom.unisalento.it/Orario>

BRIEF COURSE DESCRIPTION

-Reliability analysis;
-Robust Design;
-Design of mechanical systems subjected to periodic and impulsive loads.

REQUIREMENTS

A degree in Industrial Engineering, Mechanical Engineering or related disciplines is required.

COURSE AIMS

The objective of this course is to provide the main tools for performing reliability analysis of mechanical components and structures. The first part of the course will provide the theoretical and practical tools for assessing the reliability of mechanical systems. The course will cover the definition of failure and reliability, the main statistical distributions that can be associated with the functions of reliability, unreliability and failure rates, such as the normal, exponential and Weibull distributions, and the preventive FMEA/FMECA reliability assessment techniques and probabilistic FTA design. In addition, the tools for realising a robust system, in order to guarantee stable performance regardless of the combined effect of uncontrollable variables, will be provided by means of the Robust Design-Method Taguchi approach.

In the second part of the course, issues relating to the elastic and inelastic response of mechanical systems to impact loads and shocks will be examined. The examination will include numerical tools for transient analysis and material characterisation at impact. Finally, the course will provide elements for the design of structures against the risk of explosion.

TEACHING METHODOLOGY

The course topics are presented through lectures and exercises carried out in class. Problems are proposed for homework with subsequent classroom discussion.

ASSESSMENT TYPE

The examination consists of two parts: a written and oral test.

REFERENCE TEXT BOOKS

1. Shigley J.E., Mischke C.R., Budynas R.G., Progetto e costruzione di macchine, McGraw-Hill
2. Atzori B., Appunti di Costruzione di Macchine, Ediz. Cortina, Padova
3. Juvinal R.C. - Marshek K.M., Fondamenti della progettazione dei componenti di macchine, ETS
4. Giovannozzi R., Costruzione di Macchine vol.1 e 2, Ed. Patron, Bologn
5. Notes taken during the lecture
6. Materials provided by the instructor