



# UNIVERSITÀ DI PAVIA

Anno Accademico 2020/2021

## LASER SAFETY

<b>Anno immatricolazione</b>	2020/2021
<b>Anno offerta</b>	2020/2021
<b>Normativa</b>	DM270
<b>SSD</b>	FIS/03 (FISICA DELLA MATERIA)
<b>Dipartimento</b>	DIPARTIMENTO DI INGEGNERIA INDUSTRIALE E DELL'INFORMAZIONE
<b>Corso di studio</b>	INDUSTRIAL AUTOMATION ENGINEERING - INGEGNERIA DELL'AUTOMAZIONE INDUSTRIALE
<b>Curriculum</b>	PERCORSO COMUNE
<b>Anno di corso</b>	1°
<b>Periodo didattico</b>	Primo Semestre (28/09/2020 - 22/01/2021)
<b>Crediti</b>	6
<b>Ore</b>	45 ore di attività frontale
<b>Lingua insegnamento</b>	English
<b>Tipo esame</b>	SCRITTO
<b>Docente</b>	MILANI DANTE (titolare) - 6 CFU
<b>Prerequisiti</b>	Understanding of basic principles of electromagnetic theory, geometrical and wave optics.
<b>Obiettivi formativi</b>	<p>The course is designed to teach the necessary knowledge and to understand the rationale of laser safety. At the end of the course the students learned to classify a laser product, carry out laser risk assessment and prescribe prevention and protection measures in all work environments.</p> <p>The program, articulated in lectures and practical lessons, meets the training requirements for the TSL outlined by the CEI (Italian Electrotechnical Committee) and for LPA (Laser Protection Adviser) outlined by IEC International Standards.</p>
<b>Programma e contenuti</b>	Basic knowledge:

Laser fundamental physics and applications  
 Italian laws, european directives and international standards about laser safety  
 Biological effects of laser radiation  
 Exposure Limit Values (ELVs) and Maximum Permissible Exposures (MPEs)  
 Accessible Emission Levels (AELs) and classification of laser products  
 Laser risk assessment  
 Laser radiation collateral hazards  
 Selecting control measures  
 Laser guards and viewing windows  
 Personal protective equipment  
 Lasers in the healthcare environment  
 Lasers in the industrial environment

Expertise:  
 Mathematical approach  
 How to measure the laser radiation  
 Manufacturer's requirements  
 Protective eyewear, laser guard and viewing window choice

Numerical exercises and measures  
 Will be proposed numerical examples and measurements:  
 Calculation of the Exposure Limit Values (ELVs)  
 Calculation of Accessible Emission Levels (AELs)  
 Classification of continuous and pulsed lasers  
 Nominal Ocular Hazard Distance  
 Protective eyewear, laser guard and viewing window choice

**Metodi didattici**

Lectures (hours/year in lecture theatre): 42  
 Practical class and measures (hours/year in lecture theatre): 6

**Testi di riferimento**

Laser safety laws, standards (IEC-EN-CEI, UNI) in force. Lecture notes

**Modalità verifica apprendimento**

Written test generally, which includes theory and numerical exercises.  
 The sufficient students can be accept the mark gotten in the written test or they can do a oral test.

**Altre informazioni**

**Obiettivi Agenda 2030 per lo sviluppo sostenibile**

[Sibl legenda sviluppo sostenibile](#)