

**COURSE DATA****DATA SUBJECT**

Code: 46905
Name: Basic Sciences
Cycle: Master's Degree
ECTS Credits: 3
Academic year: 2026-27

STUDY (S)

Degree	Center	Acad. year	Period
2275 - Master's Degree in Occupational Health and Safety	Facultat de Ciències Socials	1	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
2275 - Master's Degree in Occupational Health and Safety	Ciencias básicas	COMPULSORY

COORDINATION

VERDU ANDRES JORGE

SUMMARY

People who work as occupational safety technicians constantly need a basic understanding of science for their work. This course aims to help students acquire and review basic concepts and tools in physics, chemistry, and biology that are necessary for studying those prevention disciplines that involve the quantification, measurement, and control of various agents posing occupational risks—and which therefore have a scientific and technological foundation—such as Industrial Hygiene, Safety, Occupational Medicine, Health and Prevention, and Ergonomics.

PREVIOUS KNOWLEDGE**RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE**

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS



COMPETENCES / LEARNING OUTCOMES

2275 - Master's Degree in Occupational Health and Safety

Be able to analyse new problems using the knowledge and tools learnt and reason rigorously and systematically.

Be able to apply knowledge and problem-solving abilities in new or unfamiliar environments within broader (or multidisciplinary) contexts related to the field of study.

Be aware of the risks posed by the presence of physical, chemical and biological agents in the workplace.

Conduct searches in scientific literature and rigorously analyse and interpret the results of scientific studies carried out in the field of occupational health and safety.

Demonstrate knowledge and understanding of the importance of addressing sustainability and climate change, in accordance with Article 35.2 of Law 7/2021, of 20 May, on Climate Change and Energy Transition.

Develop critical and self-critical reasoning within the field of study, considering aspects such as professional ethics, moral values and the social implications of the different activities carried out.

Develop initiative, critical thinking and creativity.

Know how to analyse the needs and demands of the recipients of the functions of the occupational health and safety specialists, considering different contexts.

Know how to communicate effectively, both orally and in writing, adapting to the characteristics of the situation and the audience.

Learn autonomously, making informed decisions in different contexts, making judgements based on experimentation and analysis and transferring knowledge to new situations.

Perform risk assessments (related to industrial hygiene, safety at work, ergonomics and applied psychosociology) with maximum safety for the operator and the environment.

Plan, advise and make decisions based on ethical and legal criteria.

Search for and select information in scientific and professional databases and documents and have the ability to synthesise and interpret it.

Understand the interrelationships between environmental and occupational health.

DESCRIPTION OF CONTENTS

1. Quantities: Units and Uncertainty



The International System of Units (SI). Decimal prefixes and unit conversions. Precision and accuracy. Uncertainty and significant figures.

2. Energy

Basic concepts and relationships. Conservation and transformation of energy. Thermal energy and heat: relationship to temperature and mechanisms of transfer. Power and intensity.

3. Vibrations and Waves. Harmonic Case

Vibrations. Characterization of harmonic vibrations (amplitude and period-frequency) and their representation. The concept of a wave as the propagation of vibrations and its characterization in the harmonic case: vibration quantities plus phase, propagation speed, and wavelength. Types of waves. Energy and intensity of a wave, variation with distance from the source. Waves of special interest: sound and electromagnetic waves and their spectrum

4. Structure and Composition of Matter

States of matter and phase changes. General and specific properties of matter. Composition of matter: elements, compounds, and mixtures. The atomic model and the periodic table. Structure of the atom: isotopes and radioactivity.

5. Gases and the concept of the mole

Avogadro's number and the concept of the mole. The ideal gas law. Mixtures of gases: Dalton's law. Vapor pressure. Expression of concentration: conversion between volumetric and mass concentrations.

6. Solutions

Solutions: solvent and solute. Expressing concentration: converting between different units.

7. Microorganisms as causative agents of infection and/or disease in humans

Causes of disease. The cell. Pathogens: viruses, bacteria, fungi, protozoa, helminths, and arthropods. Sterilization and disinfection: antimicrobial agents.

8. Epidemiology of diseases caused by biological agents.

Pathogenicity mechanisms. Chain of infection. Epidemiology of infectious diseases. Prevention of infectious diseases

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	20,00
Classroom practices	10,00
Total hours	30,00

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	15,00
Independent study and work	20,00
Preparation of lessons	10,00
Preparation for assessment activities	0,00
Resolution of case studies	0,00
Total hours	45,00



TEACHING METHODOLOGY

EVALUATION

Assessment will be based on a written exam (75%) and continuous assessment of evaluable activities carried out both inside and outside the classroom (25%). A score of 5.0 out of 10.0 on the written exam is required to have the scores averaged. A final passing grade requires a minimum overall score of 5.0 out of 10.0.

Written exam, to be taken after the completion of the theoretical and practical classes. In this exam, students must answer questions related to the theoretical aspects of the syllabus, as well as solve problems and practical cases similar to those covered during the course.

Continuous assessment of work completed in and outside the classroom: Throughout the course, to develop and reinforce the material covered, students will be assigned various assessable activities that must be completed and submitted by the established deadlines; some are to be completed in the classroom and others outside of it. If the continuous assessment is not passed, an exam will be administered to evaluate all the continuous assessment activities that can be retaken.

The course grade will be subject to the provisions of the University of Valencia's Regulations on Assessment and Grading for Bachelor's and Master's Degrees (ACGUV 108/2017 de 30 de mayo de 2017). http://www.uv.es/graus/normatives/2017_108_Reglament_avaluacio_qualificacio.pdf

REFERENCES