

## Course guide

### 240818 - 240818 - Industrial Hygiene II

**Last modified:** 15/05/2023

**Unit in charge:** Barcelona School of Building Construction  
**Teaching unit:** 1039 - UPF - Universitat Pompeu Fabra.

**Degree:** MASTER'S DEGREE IN OCCUPATIONAL HEALTH AND SAFETY (Syllabus 2016). (Compulsory subject).

**Academic year:** 2023    **ECTS Credits:** 6.0    **Languages:** Spanish

#### LECTURER

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**Coordinating lecturer:** ALBERTO JAVIER ROJAS ROYO

**Others:** Segon quadrimestre:  
MIGUEL ANGEL ALBA HIDALGO - 10  
CRISTINA BERCERO ANTILLER - 10  
ALBERTO JAVIER ROJAS ROYO - 10

#### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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**Specific:**

1. Know the relation between occupational and health safeties.
2. Identify and distinguish the advanced evaluation techniques and noise control in the industry, the transmission mechanisms and ways of entry to biological agents.
3. Know to develop emergency and security plans, make training and information plans assigned to workers, including the detection of needs and establish the evaluating systems and monitoring measures, lay out corrective measures in front of risks of chemical nature, physical or biological; carry out risk evaluations and set out corrective measures related to the physical and mental load at work; make the epidemiologic study design to identify risk factors of occupational nature, apply its basics and manipulation and applications of the main chemical analysis techniques in the hygienic world.

#### TEACHING METHODOLOGY

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The face-to-face methodology will be the "class" with the participation of the students.  
The tutorial methodology will be offered to solve specific problems of individual students.  
Team work will be proposed to solve risk assessment problems.  
Laboratory practices of noise, vibration, thermo-hygrometric variables, etc. measurement devices will be offered. for work groups.  
Mandatory reading documents and voluntary reading books will be proposed.  
"Internet" searches of relevant databases and documents will be proposed.

**Material:**

Class notes. Specific bibliographies of the 'Internet. Notes from the teacher. Reference books

## LEARNING OBJECTIVES OF THE SUBJECT

Industrial Hygiene is a technical discipline that aims to prevent the appearance of occupational diseases by acting on the work environment. For this purpose, Industrial Hygiene studies this environment by identifying the possible pollutants and energies that may be present, and subsequently trying to estimate the magnitude of the exposure and compare it with the legal regulations that set the maximum admissible exposure levels or, failing that, with the evaluation criteria to use. In this way, prioritizing preventive action always considering collective protection before individual protection and allows the establishment of monitoring and control programs of occupational exposure to these chemical, biological and physical agents.

In this subject, knowledge of Hygiene focuses on biological and physical agents.

The student will be able to identify, measure and evaluate occupational exposures to physical and biological agents potentially present in work environments, the most common industrial activities in our productive environment. The student will be familiar with the evaluation criteria and regulations for use in Industrial Hygiene regarding this type of pollutants and will know the measurement systems and techniques and the exposure control methods.

## STUDY LOAD

Type	Hours	Percentage
Self study	96,0	64.00
Hours large group	54,0	36.00

**Total learning time:** 150 h

## CONTENTS

### -BIOLOGICAL AGENTS

#### Description:

Types and characteristics. Health effects. RD 664/1997: definitions and classifications, exposure to biological agents, risk assessment. Control methods. Evaluation methodologies: quantitative evaluation, measurement techniques. Qualitative evaluation. Exposure to biological agents in different sectors of activity. Most relevant biological agents, main preventive measures.

**Full-or-part-time:** 1h

Theory classes: 1h

### -NOISE

#### Description:

Types of noise. Physical parameters. Sound pressure level and frequency. Physiology of hearing. noise effects. Weighting scales. Measuring equipment. Measurement reports. Applicable regulations. noise management. Exposure assessment. Noise control. Acoustic absorption. Calculation of sound power. Acoustic conditioning of premises. Acoustic absorption coefficient. Apparent local area. Reverberation time. Exposure control systems. Selection and use of PPE.

**Full-or-part-time:** 1h

Theory classes: 1h

#### **-ISOLATION**

**Description:**

Acoustic insulation of materials. Design bases for cabins and closures. Net insulation between premises. Insertion losses.

**Full-or-part-time:** 1h

Theory classes: 1h

#### **-THERMAL ENVIRONMENT**

**Description:**

Hot and cold environments. Characteristic. Thermo-hygrometric variables. Adaptation of the organism to the thermal environment. Thermal stress risk assessment methodologies. General preventive measures.

**Full-or-part-time:** 1h

Theory classes: 1h

#### **-VIBRATIONS**

**Description:**

Mechanical vibrations. Characteristic parameters. Acceleration. Frequency, frequency spectra. Regulation hand-arm and whole body vibrations. Evaluation criteria. Control systems.

**Full-or-part-time:** 1h

Theory classes: 1h

#### **-NON-IONIZING RADIATION**

**Description:**

Static fields. ELF radiation. Radiofrequencies. Microwave. Optical radiation. lasers. Health effects. Measurement systems. Evaluation criteria. Applicable regulations. Preventive measures.

**Full-or-part-time:** 1h

Theory classes: 1h

#### **-IONIZING RADIATION**

**Description:**

Characteristic parameters. Measurement systems. Instruments. Accreditations. Occupational risk assessment systems. Preventive measures. Applicable regulations.

**Full-or-part-time:** 1h

Theory classes: 1h

### **GRADING SYSTEM**

The final evaluation of the subject will be the result of the continuous evaluation during the semester, taking into account the attendance, attitude and knowledge of the classes and the laboratory practice sessions. Additionally, there will be three mandatory evaluation tests.

If the student wants to take advantage of the possibility of a one-time evaluation, he will have to state it in writing to the school secretary before March 18, 2013.

## EXAMINATION RULES.

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Both the attendance to the practical laboratory classes and the delivery of the summary work thereof is mandatory.

## BIBLIOGRAPHY

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### Basic:

- Guia técnica para la evaluación y prevención de los riesgos relacionados con la exposición a agentes biológicos: RD 664/1997, de 12 de mayo BOE nº 124, de 24 de mayo [on line]. Madrid: INSHT, 2001 [Consultation: 12/12/2013]. Available on: [http://www.insht.es/InshtWeb/Contenidos/Normativa/GuiasTecnicas/Ficheros/agen\\_bio.pdf](http://www.insht.es/InshtWeb/Contenidos/Normativa/GuiasTecnicas/Ficheros/agen_bio.pdf).
- Guía técnica para la evaluación y prevención de los riesgos relacionados con las vibraciones mecánicas : RD 1311/2005, de 4 de noviembre BOE nº 265, de 5 de noviembre [on line]. Madrid: INSHT, 2008 [Consultation: 12/12/2013]. Available on: <http://www.insht.es/InshtWeb/Contenidos/Normativa/GuiasTecnicas/Ficheros/Vibraciones.pdf>.
- Guía técnica para la evaluación y prevención de los riesgos relativos a la utilización de los lugares de trabajo [Recurs electrònic] : Real Decreto 486/1997, de 14 de abril BOE nº 97, de 23 de abril [on line]. Madrid: Centro Nacional de Nuevas Tecnologías, 2006 [Consultation: 12/12/2013]. Available on: <http://www.insht.es/InshtWeb/Contenidos/Normativa/GuiasTecnicas/Ficheros/lugares.pdf>.
- Bernal Domínguez, Félix. Higiene industrial. 5a ed.. Madrid: Instituto Nacional de Seguridad e Higiene en el Trabajo, DL 2008. ISBN 9788474257571.
- Bernal Domínguez, Félix. Higiene industrial : problemas resueltos. Madrid: Instituto Nacional de Seguridad e Higiene en el Trabajo, DL 2006. ISBN 8474257174.
- Guía técnica para la evaluación y prevención de los riesgos relacionados con la exposición de los trabajadores al ruido: REAL DECRETO 286/2006, de 10 de marzo [on line]. Madrid: INSHT, 2008 [Consultation: 12/12/2013]. Available on: [http://www.insht.es/InshtWeb/Contenidos/Normativa/GuiasTecnicas/Ficheros/gu%C3%ADa\\_t%C3%A9cnica\\_ruido.pdf](http://www.insht.es/InshtWeb/Contenidos/Normativa/GuiasTecnicas/Ficheros/gu%C3%ADa_t%C3%A9cnica_ruido.pdf).

## RESOURCES

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### Other resources:

#### Noise

- INSHT. (2009). Technical guide for the assessment and prevention of risks related to the exposure of workers to noise. Madrid: INSHT.
- Royal Decree 286/2006, of 10 March, on the protection of the health and safety of workers against risks related to exposure to noise. BOE no. 60, of 11/03/2006.
- FREMAP. (2013). Guía Práctica para el Análisis y la Gestión del Ruido Industrial (Practical Guide for the Analysis and Management of Industrial Noise). Madrid: FREMAP

#### Vibrations

- INSHT. (2009). Technical Guide for the assessment and prevention of risks related to mechanical vibrations. Madrid: INSHT
- Royal Decree 1311/2005, of 4 November, on the protection of the health and safety of workers from risks arising or likely to arise from exposure to mechanical vibration. BOE no. 265, of 5 November 2005, pages 36385 to 36390 (6 pages).

#### Thermal environment

- INSHT. (2015). Technical guide for the assessment and prevention of risks related to the use of workplaces. Madrid: INSHT.
- Real Decreto 486/1997, de 14 de abril, por el que se establecen las disposiciones mínimas de seguridad y salud en los lugares de trabajo. "BOE" no. 97, of 23/04/1997.

#### Artificial optical radiation (ROA).

- INSHT. (2015). Technical guide for the assessment and prevention of risks related to artificial optical radiation. Madrid: INSHT.
- ROYAL DECREE 486/2010, of 23 April, on the protection of the health and safety of workers against risks related to exposure to artificial optical radiation. BOE no. 99, of 24 April 2010, pages 36103 to 36120 (18 pages).
- Royal Decree 1066/2001, of 28 September 2001, approving the Regulation establishing conditions for the protection of the public radioelectric domain, restrictions on radioelectric emissions and health protection measures against radioelectric emissions. BOE no. 234, of 29/09/2001.

#### Electromagnetic fields (EMF)

- Royal Decree 299/2016, of 22 July, on the protection of the health and safety of workers against risks related to exposure to electromagnetic fields. BOE no. 182, of 29 July 2016, pages 52811 to 52829 (19 pages).
- INSHT. (2019). Technical guide for the assessment and prevention of risks arising from exposure to electromagnetic fields in the workplace. Madrid: INSST.

#### Biological agents

- INSHT. (2014). Technical guide for the assessment and prevention of risks related to exposure to biological agents. Madrid: INSHT.
- Real Decreto 664/1997, de 12 de mayo, sobre la protección de los trabajadores contra los riesgos relacionados con la exposición a

agentes biológicos durante el trabajo. "BOE" no. 124, 24/05/1997.