

## Risk and Vulnerability at the Wildland-Urban Interface (E900543)

**Course size** *(nominal values; actual values may depend on programme)*

**Credits 6.0**

**Study time 180 h**

**Course offerings in academic year 2023-2024**

A (semester 1)

English

Gent

**Lecturers in academic year 2023-2024**

Pastor, Elsa

BARCELO3 lecturer-in-charge

**Offered in the following programmes in 2023-2024**

[International Master of Science in Fire Safety Engineering](#)

**crdts**

6

**offering**

A

### Teaching languages

English

### Keywords

Fire risk management, vulnerability mapping, preventive infrastructures, residential fuels, self-defensible spaces, structures' vulnerability analysis

### Position of the course

The course provide students with practical knowledge on integrated fire management specially oriented to wildland-urban interface communities. The aim is that students should be able to understand and describe the overall WUI fire risk management cycle and strategies at different scales. Furthermore, students should be able to analyse vulnerability at the WUI at community and property level.

### Contents

- 1 Introduction to integrated fire management: the fire management cycle – activities and roles of key actors – Decision making processes.
- 2 The wildland-urban-interface fire problem – WUI fire disasters. Trans-scalar approach for wildland-urban-interface fire risk management (landscape – community – property scales). Regulation framework.
- 3 Risk management at landscape scale: forestry and operational management strategies (landscape design, fuel reduction planning, management of strategic points for suppression).
- 4 Risk and vulnerability management at community scale: vulnerability mapping – preventive and protective measures – fuel reduced strips – preventive infrastructure. Available technology and software – Case studies
- 5 Risk and vulnerability management at property scale: residential fuels – structure integrity – self-defensible spaces – hardening strategies – vulnerability analysis at home-owner level. Available technology and software – Case studies
- 6 Innovative approaches to manage wildland-urban-interface fire risk: Circular economy challenges to mitigate fire risk in WUI communities, new technologies (e.g. VR, IA, smart sensors) for vulnerability characterization and mapping.

### Initial competences

Gather, look up, interpret, integrate and present relevant information in a systematic manner.

### Final competences

- 1 Identify the different socioeconomic and environmental aspects associated with fire management in its complete cycle (prevention, preparedness, response, impact and restoration).
- 2 Recognize the different working scales in WUI fire risk management.
- 3 Classify risk management practices at landscape, community and property scale.
- 4 Recognize factors responsible of vulnerabilities of WUI communities and properties.

5 Analyse building envelope response to fire attack and performance of innovative risk mitigation strategies.

#### **Conditions for credit contract**

This course unit cannot be taken via a credit contract

#### **Conditions for exam contract**

This course unit cannot be taken via an exam contract

#### **Teaching methods**

Group work, Seminar, Excursion, Lecture, Practical, Independent work

#### **Extra information on the teaching methods**

Theory and exercises are taught during lectures, periodic individual assignments, case studies in groups.

Laboratory exercises are performed at the UPC PC labs.

Field trips are organized to have students real contact with land management practices and actors, case studies in WUI communities and novel WUI risk management projects.

#### **Learning materials and price**

All material needed can be found digitally on the course web (for free)

#### **References**

Manzello, S.L. Encyclopedia of wildfires and wildland urban interface WUI fires, Springer, 2020.

#### **Course content-related study coaching**

Interactive support through the electronic learning environment, in person after agreement on date and immediately before and after hearing classes.

#### **Assessment moments**

end-of-term and continuous assessment

#### **Examination methods in case of periodic assessment during the first examination period**

Written assessment with multiple-choice questions, Written assessment with open-ended questions, Written assessment

#### **Examination methods in case of periodic assessment during the second examination period**

Written assessment with multiple-choice questions, Written assessment with open-ended questions, Written assessment

#### **Examination methods in case of permanent assessment**

Assignment

#### **Possibilities of retake in case of permanent assessment**

examination during the second examination period is not possible

#### **Extra information on the examination methods**

The examination of the course consists of three parts: A written mid-term exam, a written final exam and the continuous assessment.

#### **Calculation of the examination mark**

30% mid-term exam, 40% final exam, 30% coursework

#### **Facilities for Working Students**

There are no special facilities for working students