GHENT UNIVERSITY

Course Specifications

Valid in the academic year 2023-2024

Advanced Fire Safety Engineering (E900541)

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

Àgueda, Alba BARCELO3 lecturer-in-charge

Offered in the following programmes in 2023-2024	crdts	offering
International Master of Science in Fire Safety Engineering	6	A

Teaching languages

English

Keywords

Detection, suppression, smoke control, fire resistance, prescription, performance-based design

Position of the course

During this course, the students learn how to perform a simple fire safety engineering design, to identify systems for fire detection and alarm, to understand the impact of fire exposure on construction assemblies, to recognize the performance characteristics and limitations of smoke control systems, and to understand the performance-based design process.

Contents

1 Introduction: Codes and standards – prescriptive versus performance-based design
2 Fire detection and alarm: Detection concepts and principles - Technologies associated with fire detectors - Alarm system classification and design criteria.
3 Fire suppression: Theoretical aspects of fire suppression and extinction - Manual systems – Automatic systems: water-based systems, inert gas systems, chemical systems.
4 Smoke and heat control: Smoke management design approaches. Smoke movement. Pressurization systems and zoned smoke control systems.
5 Fire resistance: Properties of building materials. Standard tests for fire resistance of structural members. Methods for determining fire resistance of structural members (steel, concrete, timber). Methods of protection.
6 Performance-based design: performance-based design process – design objectives and performance criteria – design fire scenarios – trial design development and analysis

Initial competences

Insight into the basic concepts of physics, chemistry, thermodynamics, heat and mass transfer. Gather, look up, interpret, integrate and present relevant information in a systematic manner.

Final competences

1 Appreciate the role and importance of fire safety engineering in the design of modern infrastructures
2 Describe the range of approaches adopted, with an awareness of distinctions and limitations
3 Justify fire design specifications with reference to appropriate codes and

standards, with appropriate consideration of information that may be incomplete or uncertain

4 Undertake design calculations of fundamental aspects of fire systems and infrastructures

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, Lecture, Independent work

Extra information on the teaching methods

Theory and exercises are taught during lectures, periodic individual assignments, study cases in groups.

Learning materials and price

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

References

- B. Karlsson and J.G. Quintiere, "Enclosure Fire Dynamics", CRC Press (2000). ISBN: 0849313007
- J.H. Klote and J.A. Milke, "Principles of Smoke Management", Society of Fire Protection Engineers (2002).
- The SFPE Handbook of Fire Protection Engineering", Fifth Edition, NFPA - SFPE (2016).
- Morgan J. Hurley and Eric R. Rosenbaum . Performance-Based Fire Safety Design CRC Press 2015Print ISBN: 978-1-4822-4655-1eBook ISBN: 978-1-4822-4656-8
- Buchanan, A.H., Abu, A.K. Structural Design for Fire Safety, John Wiley & Sons, 2017.ISBN: 9780470972892

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% continuous assessment

Facilities for Working Students

There are no special facilities for working students