

# Course Specifications

Valid as from the academic year 2024-2025

# Performance-Based Design (E061520)

Course size	(nominal values; actual values may depend on programme)					
Credits 6.0	Study time 180 h					
Course offerings and tea	ching methods in academic ye	ear 2024-2025				
A (semester 2)	English Gent		lecture			0.0h
			Q	group work		0.0h
			i	ndependent worl	(	0.0h
Lecturers in academic ye	ear 2024-2025					
van Hees, Patrick			TW14	lecturer-in-charge		
Offered in the following programmes in 2024-2025				crdts	offering	
Postgraduate Studies in Fire Safety Engineering				6	А	

#### **Teaching languages**

English

#### Keywords

Risk management, Risk evaluation, Design, Performance Criteria

#### Position of the course

In the hearing classes students learn to develop performance bases designs, starting from a risk evaluation. This course is integrating the fire protection techniques into a global design. During work classes students are confronted with case studies, in order to ultimately make a design themselves. This is realised in groups and will be presented to the lecturer and fellow students. The final goal is that students acquire the ability to produce and original performance based design. This course complements the following key competence: 1. use performance as a criterion in order to produce and evaluate an original fire safety design, 2. Evaluate critically the fire risk in a project and to draw the appropriate conclusion, 3. communicate and collaborate with colleagues, 4. the ability to collaborate in the multidisciplinary environment of FSE. 5. Apply knowledge of fire dynamics, active and passive systems, human behaviour and calculations.

# Contents

- Risk analysis: Identification and quantification of the fire risk
- Concept of risk management, risk reduction and economical aspects
- Performance based designs: Components of a fire safety system, objectives and criteria, qualitative design review, Characterisation of a building and its occupancy. Deterministic and probalistic design procedures, Design procedures of subsystems.

#### Initial competences

Apply the concepts and technology of passive fire protection. Apply the concepts and technology of active fire protection. Select and apply the correct fire models. Assessing evacuation possibilities during fire. Apply basic concept of risk analysis

#### **Final competences**

- 1 Knowledge: Evaluate self-reliantly the fire risk in a project.
- 2 Knowledge: Draw the appropriate safety conclusions from the risk analysis.
- 3 Knowledge: Use functional criteria (performance) as a criterion in order to realise and evaluate an original fire safety design.
- 4 Knowledge: Master and apply the advanced knowledge of previous courses by integrating the fire protection techniques into a global risk performance based

design.

- 5 Skills: Apply the concept of risk management and the fire prevention techniques in order to produce a fire safe design with an acceptable risk.
- 6 Skills: Select, motivate and apply the proper models, methods and techniques for risk based engineering models.
- 7 Skills: Analyse own results and results of others within fire performance based designs in an objective manner.
- 8 Skills: Report performance based design orally, in writing and with graphical methods.
- 9 Skills: Control the results of a performance based design.
- 10 Skills: Make and evaluate approximate estimates in a design.
- 11 Skills: Determine the uncertainties in the design.
- 12 Skills: Discuss a performance based design in the English language.
- 13 Attitudes: Take up independent positions about fire safety designs and defend the point of view.
- 14 Attitudes: Reflect on own way of thinking and acting.
- 15 Attitudes: Be aware of the own expertise and improve to expert level.
- 16 Attitudes: Be aware of on-going evolutions in the field of interest.
- 17 Attitudes: Collaborate in the multidisciplinary environment of Fire Safety Engineering.
- 18 Attitudes: Communicate and collaborate with colleagues.
- 19 Attitudes: Act in an ethical, professional and social way when presenting and defining performance based design.

# 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

The classes are mixed with lectures, small exercises individually or in group. De lectures include demonstrations, exercises, etc. Furthermore an individual peer review is made which is presented and discussed in group. A group work finishes the course. The students present their group work in the final seminar, are peer reviewed by their colleagues students. The work is discussed in class forum and a report is submitted at the end of the course.

#### Study material

Type: Handbook

Name: Performance- Based Fire Safety Design Indicative price: € 65 Optional: yes Language : English Author : Morgan J. Hurley and Eric R. Rosenbaum ISBN: 978-1-48224-655-1 Number of Pages : 220 Alternative : SFPE guide for performance based design or SFPE Handbook för FPE Oldest Usable Edition : All Online Available : No Available in the Library : No Available through Student Association : No Usability and Lifetime within the Course Unit : regularly Usability and Lifetime within the Study Programme : regularly Usability and Lifetime after the Study Programme : intensive Additional information: -

# Type: Handbook

Name: SFPE Handbook of Fire Protection Engineering, pp 1233–1261 Indicative price: € 1,100 Optional: yes Language : English Author : Morgan J Hurley, Daniel T Gottuk, John R Hall Jr, Kazunori Harada, Erica D Kuligowski ISBN : 978-1-49392-564-3 Number of Pages : 3493 Alternative : -Oldest Usable Edition : 2015 Online Available : No Available in the Library : Yes Available through Student Association : No Usability and Lifetime within the Course Unit : regularly Usability and Lifetime within the Study Programme : regularly Usability and Lifetime after the Study Programme : intensive Additional information: Electronically available through the library

#### Type: Handbook

Name: Guidelines for Peer Review in the Fire Protection Design Process Indicative price: Free or paid by faculty Optional: no Language : English Author : SFPE ISBN: 978-0-92522-310-4 Number of Pages : 19 Alternative : -Oldest Usable Edition : 2020 Online Available : Yes Available in the Library : No Available through Student Association : No Usability and Lifetime within the Course Unit : regularly Usability and Lifetime within the Study Programme : regularly Usability and Lifetime after the Study Programme : regularly Additional information: -

#### Type: Slides

Name: SFPE guide and ISO procedure Indicative price: Free or paid by faculty Optional: no Language : English Number of Slides : 50 Oldest Usable Edition : all Available on Ufora : Yes Online Available : No Available in the Library : No Available through Student Association : No Additional information: -

#### References

Performance-Based Fire Safety Design, Morgan J. Hurley and Eric R. Rosenbaum CRC Press 2015Print ISBN: 978-1-4822-4655-1eBook ISBN: 978-1-4822-4656-8

#### Course content-related study coaching

Interactive support via UFORA (forums, e-mail), personally: through electronic appointment

#### Assessment moments

end-of-term and continuous assessment

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

Skills test, Professional practice, Oral assessment, Participation, Peer and/or self assessment, Presentation, Written assessment, Assignment

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

Skills test, Professional practice, Oral assessment, Participation, Peer and/or self assessment, Presentation, Written assessment, Assignment

#### Examination methods in case of permanent assessment

Professional practice, Oral assessment, Skills test, Participation, Presentation, Peer and/or self assessment, Written assessment, Assignment

# Possibilities of retake in case of permanent assessment

examination during the second examination period is possible in modified form

# Extra information on the examination methods

During continuous assessment and end-of term period: written closed-book evaluation; report of project work and individual tasks; presentation of report (individual and group), peer review of reports.

# Calculation of the examination mark

35% project work (group work)25% individual assignment40% written evaluationOn each of the separate parts the student needs to obtain at least 50%

# **Facilities for Working Students**

Non attendence due to work is possible after agreement and with possible additional individual tasks.