

## Performance-Based Design (E061522)

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

**Credits** 6.0      **Study time** 180 h      **Contact hrs** 30.0 h

**Course offerings and teaching methods in academic year 2017-2018**

A (semester 1)	group work	5.0 h
	self-reliant study activities	5.0 h
	lecture	15.0 h
	project	5.0 h

**Lecturers in academic year 2017-2018**

van Hees, Patrick      TW03      lecturer-in-charge

**Offered in the following programmes in 2017-2018**

	crdts	offering
<a href="#">Bridging Programme Master of Science in Fire Safety Engineering</a>	6	A
<a href="#">International Master of Science in Fire Safety Engineering</a>	6	A
<a href="#">Master of Science in Fire Safety Engineering</a>	6	A

**Teaching languages**

English

**Keywords**

Risk management, Risk evaluation, Design, Performancel 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 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, lecture, project, self-reliant study activities

#### **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 finished the course. The students present their group work in the final seminar, are evaluated by their colleagues students, is discussed in class forum and a report is submitted at the end of the course.

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

Syllabus

SFPE guide for performance based design

Performance-Based Fire Safety Design from Morgan J. Hurley and Eric R. Rosenbaum

#### **References**

Sfpe Engineering Guide to Performance-Based Fire Protection (National Fire Protection Association (NFPA)) , 2007 Edition ISBN: 0877657890 100 Euro

Performance-Based Fire Safety Design Morgan J. Hurley and Eric R. Rosenbaum CRC Press 2015 Print ISBN: 978-1-4822-4655-1 eBook ISBN: 978-1-4822-4656-8 65 Euro

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

Interactive support via Minerva (forums, email), personal: via electronic appointment

#### **Evaluation methods**

end-of-term evaluation and continuous assessment

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

Written examination with open questions, participation, assignment, report

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

Written examination with open questions, participation, assignment, report

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

Participation, assignment, report

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

examination during the second examination period is possible

**Extra information on the examination methods**

During examination period: written open/closed-book exam; problems; report of project work and individual tasks; presentation of report (individual and group).

**Calculation of the examination mark**

40% group work  
25% individual report  
35% exam