

FSE Based Firefighting (E051560)

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

Credits	3.0	Study time	90 h	Contact hrs	22.5 h
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Course offerings and teaching methods in academic year 2018-2019

A (semester 1)	English	demonstration	2.5 h
		lecture	17.5 h
		seminar: coached exercises	2.5 h
B (semester 2)		seminar: coached exercises	2.5 h
		demonstration	2.5 h
		lecture	17.5 h

Lecturers in academic year 2018-2019

Lambert, Karel	TW03	lecturer-in-charge
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Offered in the following programmes in 2018-2019

	crdts	offering
Bridging Programme Master of Science in Fire Safety Engineering	3	B
International Master of Science in Fire Safety Engineering	3	A
Master of Science in Fire Safety Engineering	3	B
Postgraduate Studies in Fire Safety Engineering	3	C

Teaching languages

English

Keywords

Practical fire behaviour, firefighting, extinguishment techniques, tactics, industrial incidents, ventilation firefighting research

Position of the course

This is a course in the International Master of Science in Fire Safety Engineering. In this course, the student acquires basic knowledge about firefighting. After successful completion of the course, the student must be able to:

- Discuss fire behaviour and extinguishment techniques with fire fighters and fire officers;
- Describe the development of a compartment fire in a qualitative way;
- Describe the different forms of Rapid Fire Progress;
- Describe the different aspects of industrial incidents;
- Understand the different extinguishment systems that are in use in the European fire service and discuss their working principle.
- Describe the different tactics that are used during firefighting
- Understand the basic concepts of fire ventilation

Contents

- Water and other extinguishing agents: extinguishment effect of water, steam generation, different extinguishment methods (direct, indirect), gas cooling, hose stream techniques, extinguishment systems (low vs high pressure, piercing nozzles, cobra cold-cutter), calculation of the extinguishment capacity of a fire hose, rules of thumb in determining the flow.
- Fire behaviour from a fire fighting point of view: the ventilated fire vs the under-ventilated fire; Rapid fire progress: Flashover, ventilation induced flashover, backdraft, Fire gas ignition (Flash-fire, smoke explosion, roll-over, auto-ignition), wind-driven fires.
- Industrial firefighting: fire-explosion phenomena; two dimensional fires (pool fires),

three dimensional fires (torch fires), flash-fires/unconfined vapour cloud explosion (UVCE), BLEVE, intervention strategies for industrial fire and explosion risks, physical effects and damage to people and installations.

- Fire ventilation: definitions, working principle, influence of the environment, natural vs forced ventilation, types of fans, PPA, positioning of fans, ventilation openings
- Firefighting research: influence of contemporary building on the fire behaviour, influence of creating ventilation openings, positioning of fans, the parameters influencing backdraft.
- Practical fire dynamics: the students will participate in a basic live fire training. This will result in practical understanding of fire development, smoke layer formation and descent, radiant heat and the effect of extinguishment techniques.

Initial competences

Insight in physics, construction, chemistry. Be able to search, collect, interpret, integrate and present relevant scientific and technical information.

Final competences

- 1 Discuss fire behaviour and extinguishment techniques with fire fighters and fire officers in the language used in the fire service.
- 2 Describe the development of a compartment fire in a qualitative way: initial stage, development stage, flashover, fully developed stage, decay stage, smoke formation, radiation.
- 3 Describe the different forms of Rapid Fire Progress and explain the mechanism and the dangers of each phenomenon.
- 4 Describe the different aspects of industrial incidents.
- 5 Understand the different extinguishment systems that are in use in the European fire service and discuss their working principle.
- 6 Describe the basic concepts of fire ventilation.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Demonstration, lecture, seminar: coached exercises

Extra information on the teaching methods

Lecture, seminar: coached exercise.

Live fire training.

Writing a summary of a scientific paper

The theory is taught as hearing classes. The coached exercises will take place in class.

It will be the application of the theory. Part of the exercises will take place at the fire academy. Students will participate in a live fire drill and will experience the development of a compartment fire in the initial stage and development stage. Extinguishment techniques will be demonstrated to the students.

Learning materials and price

Slides

References

- Sårdqvist S (2002) Water and other extinguishment agents
- Bengtsson L (2001) Enclosure fires
- Lambert K, Baaij S (2011) Brandverloop: technisch bekeken; tactisch toegepast
- Lambert K, Baaij S (2013) Progression du feu: approche technique, application tactique
- Lambert K, Baaij S (2015) Fire dynamics: technical approach, tactical application
- Lambert K, Baaij S, Nieling H, Vandenberghe H (2015) Brandbestrijding: technisch bekeken, tactisch toegepast
- Merci B, Beji T (2016) Fluid Mechanics Aspects of Fire and Smoke Dynamics in Enclosures

Course content-related study coaching

Interactive support through Minerva (forums, e-mail), in person: after agreement on date, fix contact hour: immediately before and after hearing classes.

Evaluation methods

end-of-term evaluation

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

Written examination, oral examination, report

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

Written examination, oral examination, report

Examination methods in case of permanent evaluation

Possibilities of retake in case of permanent evaluation

not applicable

Extra information on the examination methods

Writing a summary of a scientific paper.

Oral examination with written preparation (closed book).

Calculation of the examination mark

60 % theory

20 % exercises

20 % Discussion of the summary of the paper