

Course syllabus

Brandskyddssystem Fire Protection Systems

VBRN60, 15 credits, A (Second Cycle)

Valid for: 2023/24

Faculty: Faculty of Engineering, LTH

Decided by: PLED BI/RH

Date of Decision: 2023-04-12

General Information

Compulsory for: BI3

Language of instruction: The course will be given in Swedish

Aim

The objective of the course is to provide the students with knowledge about fire protection systems, including systems for fire ventilation. By combining and applying knowledge gained from previous courses, the student is provided with insight into how this knowledge can be applied and utilised to analyse, evaluate, and design active systems.

Learning outcomes

Knowledge and understanding

For a passing grade the student must

- be able to describe the assembly of fire detectors and detection systems, and explain how they work.
- be able to describe the most common types of extinguishing media (gas-based, water, and powder), and explain their extinguishing effect with respect to various types of fires.
- be able to describe the most common types of extinguishing systems (sprinkler, water-mist, explosion suppression systems, gas-based extinguishing systems, fire fighting foam systems and powder-based systems) and explain their function.
- be able to describe active systems for smoke control and to explain their function.

- be able to describe fire resistance classes for components and test methods for these.
- be able to describe how common building materials behave at high temperatures.
- be able to explain how supporting structures can be protected in case of fire.
- be able to explain the principles and design of a ventilation system.
- be able to explain the principles of how fire gases spread through a ventilation system.

Competences and skills

For a passing grade the student must

- be able to decide which extinguishing medium is suitable for use on different types of fires (fuel, mixture conditions, and magnitude).
- be able to determine the effect of the extinguishing medium on people, property, and the environment.
- be able to determine how combustion gases may be handled using vents, screens, ventilation systems, and pressure adjustments.
- be able to assess existing sprinkler systems and to design a simple sprinkler system.
- be able to estimate the activation time of sprinklers and fire detectors for various fire types by applying computational and computer models.
- be able to design the appropriate fire compartmentation of an uncomplicated building.
- be able to analyze how a simple bearing construction detail behave during a fire.
- be able to apply methods for calculating spread of fire and smoke.
- be able to apply computational methods for smoke spread via ventilation systems and pressurization of buildings, specifically stairwells.

Judgement and approach

For a passing grade the student must

- demonstrate the capability to assess fire protection systems, including systems for fire ventilation with regard to the relevant technical, economical, and environment-related aspects.
- be able to assess engineering solutions with regard to the scientific, community-related, and ethical aspects involved.
- demonstrate the capability to identify need for further knowledge and continuously develop the competence.

Contents

The course includes lectures, which are combined with laboratory sessions and exercises. The lectures deal with fire protection systems, including systems for fire ventilation. The course section is concluded with a written examination which takes place at the beginning of the second term. To the computer lab in PFS, there is a preparatory task that shall be completed to be allowed to perform the computer lab.

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)

Assessment: Successful completion is based on the written examinations, laboratory work, and assignments. The laboratory session is only conducted once a year. The final grade is based on the result of the compulsory written test and the final written exam.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Parts

Code: 0122. **Name:** Written Examination.

Credits: 7,5. **Grading scale:** TH. **Assessment:** Approved written examination. **Contents:** This part of the course includes lectures, which are combined with exercises. The lectures deal with fire protection systems and systems for fire ventilation.

Code: 0222. **Name:** Practical Exercises.

Credits: 7,5. **Grading scale:** UG. **Assessment:** Compulsory laboratory exercises and approved laboratory reports and approved home assignments. **Contents:** Laboratory exercises and home assignments. **Further information:** The laboratory session is only conducted once a year.

Code: 0322. **Name:** Compulsory Test.

Credits: 0. **Grading scale:** UG. **Assessment:** Approved written examination. **Contents:** Written examination. Examination takes place half way through the course. **Further information:** The examination takes place half-way through the course.

Admission

Admission requirements:

- VBR022 Fire Chemistry and Explosions or VBRF20 Fire Chemistry and Heat Transfer

Assumed prior knowledge: VBRF10 Fire Dynamics.

The number of participants is limited to: No

The course overlaps following course/s: VBR082, VBR054

Reading list

- Nilsson, D. & Holmstedt, G.: Kompendium i Aktiva system - Detektion, Report 7030. Brandteknik LTH, 2007.
- Sårdqvist, S.: Vatten och andra släckmedel. SRV, 2002, ISBN: 91-7253-145-2.
- Marcus Runefors: Kompendium i Aktiva system – Sprinkler, Report 3193. Department of Fire Safety Engineering, 2015.
- Kompletterande stenciler.
- Passiva system - föreläsningssanteckningar.

Contact and other information

Examinator: Patrick van Hees, patrick.van_hees@brand.lth.se

Further information: Active participation in group work is required. Each group member must be able to report and be responsible for the content individually. If a group member does not fulfill the requirements for active participation, or disregards his/her commitments, she/he can be reassigned by the examiner to another group or get a fail result. Some lectures may be given in English.