Course syllabus

Riskbedömning
Risk Assessment

VBRN01, 8 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

Main field: Fire Safety Technology.
Compulsory for: MFST1
Language of instruction: The course will be given in English

Aim

The aim of the course is that, in combination with earlier courses, the students gain the capability of utilizing tools for risk assessment and how they can support decisions in the area of risk management and especially in the area of fire safety engineering. Furthermore, the course is aimed at providing a foundation for continuing studies in the risk management field.

Learning outcomes

Knowledge and understanding
For a passing grade the student must

- be able to describe different perspectives of the concept of risk and be aware of the implications of adopting the different perspecives in a risk management context.
- be able to describe risk assessment methods, their areas of applicability, especially in the area of fire safety engineering and their strengths and weaknesses.
- be able to describe relevant risk measures, their limitations and strengths and how they can be applied to evaluate risks.
- be able to describe different types of uncertainty and how they can be addressed and handled in a risk assessment context.

- be able to describe how input from risk assessments can be utilised as a basis for decision-making and emergency preparedness planning.
- demonstrate an understanding of various sources of information that can be used and the challenges in using them as input to risk assessments.

Competences and skills
For a passing grade the student must

- be able to utilize, the concepts, methods and tools used in risk assessment, in new situations and in situations related to fire safety.
- be able to evaluate the contents of existing risk assessments.
- be able to report, both orally and in writing, and discuss the implications of a performed risk assessment in a way understandable to persons with different knowledge backgrounds.
- be able to utilise material in scientific publications relevant for risk assessment
- be able to utilise methods and tools for basic decision problems concerning risks.

Judgement and approach
For a passing grade the student must

- be able to critically reflect on the benefits and limitations of risk assessments as an input to decision making.
- be able to reflect upon ethical and subjective dimensions of risk assessments.

Contents

The overriding elements in the course consist of: Introduction to the field of risk assessment and management, the concept of risk, risk assessment methodology within the field of fire safety engineering, uncertainty analysis, risk measures and risk evaluation.

During the course, a number of individual home assignments, as well as a group project assignment, are to be completed. The project assignment contains relevant issues associated to the engineering field. The project assignment is to be reported in written form and also orally.

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)
Assessment: The examination represents a combination of results of a written examination, the project assignment undertaken and individual home assignments.

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: 0113. **Name:** Risk Assessment.
Credits: 3. **Grading scale:** TH. **Assessment:** Written examination. **Contents:** The aim of the course is that, in combination with earlier courses, the students gain the capability of utilizing tools for risk assessment and how they can support decisions in the area of risk management. Furthermore, the course is aimed at providing a foundation for continuing studies in the risk management field.
Code: 0213. **Name:** Project Assignments.
Credits: 5. **Grading scale:** UG. **Assessment:** Successfully completed individual home assignments and group project assignment. **Contents:** During the course, a number of individual home assignments, as well as one major group project assignment, are to be completed. For the project assignments, tutors are available for consultation. The project assignments are to be reported in written and oral form.

Admission

Admission requirements:

- FMA430 Calculus in Several Variables or FMAB30 Calculus in Several Variables
- EXTA60 Statistics or FMS012 Mathematical Statistics, Basic Course or FMS032 Mathematical Statistics, Basic Course or FMS035 Mathematical Statistics, Basic Course or FMS140 Mathematical Statistics, Basic Course or FMSF20 Mathematical Statistics, Basic Course or FMSF45 Mathematical Statistics, Basic Course or FMSF50 Mathematical Statistics, Basic Course or FMSF55 Mathematical Statistics, Basic Course or FMSF75 Mathematical Statistics, Basic Course or FMSF80 Mathematical Statistics, Basic Course or TNX071 Statistics with Decision Theory

The number of participants is limited to: No
The course overlaps following course/s: VBR180

Reading list

- Kaplan, S., Haimes, Y. Y. and Garrick, B. J.: Fitting hierarchal holographic modeling into the theory of scenario structuring and a resulting refinement to the quantitative definition of risk. 2001. Risk Analysis 21(5), pp. 807-819.
- Apostolakis, G.: How Useful is Quantitative Risk Assessment. 2004. Risk Analysis 24(3); 515-520.
- Hazards Evaluation Procedures. CCPS, New York, 1985. Ch. 4.4-4.7.
- Frequency Modeling Techniques. CCPS, New York, 2000. Ch. 3.2.
- Minimal Cut Set Analysis. CCPS, New York, 2000. Appendix D.
- Risk Measures. CCPS, New York, 2000. Ch. 4.
- Case Study. CCPS, New York, 2000. Ch. 8.1.
- Evans, A. W. and Verlander, N. Q.: What is Wrong with Criterion FN-Lines for Judging the Tolerability of risk. 1997. Risk Analysis 17(2): 157-168.
- Garrick, B. J.: Technological stigmatism, risk perception, and truth. 1998. Reliability Engineering & System Safety 59: 41-45.
- Hansson, S. O. : Risk: objective or subjective, facts or values. 2010. Journal of Risk Research 13(2): 231-238.
- Henrion, M. and Granger Morgan, M.: Uncertainty: A Guide to Dealing with Uncertainty in Quantitative Risk and Policy analysis. Cambridge, Cambridge University Press., 1990.
- IEC: Dependability Management. , Application Guide - Risk analysis of Technological Systems. International Electrotechnical Commission, Geneva, 1995.
- Kaplan, S.: The Words of Risk Analysis. 1997. Risk Analysis 17(4): 407-417.
- Kaplan, S. & Garrick, B. J.: On the Quantitative Definition of Risk. 1981. Risk Analysis 1(1): 11-27.
- Kaplan, S., Haimes, Y.Y. & Garrick, B. J.: Fitting Hierarchal Holographic Modeling into the Theory of Scenario Structuring and a Resulting Refinement to the Quantitative Definition of Risk. 2001. Risk Analysis 21(5): 807-819.
- Klinke, A. and Renn, O.: A New Approach to Risk Evaluation and Management: Risk-Based, Precaution-Based, and Discourse-Based Strategies. 2002. Risk Analysis 22(6): 1071-1094.
- Kolluru, R. V.: Risk Assessment and Management: A Unified Approach, Risk Assessment and Management Handbook: For Environment, Health and Safety Professionals. New York, McGraw-Hill, 1996.
- Lauridsen, K. et al: Assessing the Uncertainties in the Process of Risk Analysis for Chemical Establishments: Part I, Towards a Safer World, European Conference on Safety and Reliability. ESREL, Torino Italy, 2001.
- Lauridsen, K. et al: Assessing the Uncertainties in the Process of Risk Analysis for Chemical Establishments: Part II, Towards a Safer World, European Conference on Safety and Reliability. ESREL, Torino Italy, 2001.

- Otway, H. and von Winterfeldt, D.: Expert Judgement in Risk Analysis and Management Process, Context, and Pitfalls. 1992. Risk Analysis 12(1): 83-93.
- Paté-Cornell, M. E.: Uncertainties in Risk Analysis: Six Levels of Uncertainty Treatment. 1996. Reliability Engineering & System Safety 54: 95-111.
- Pidgeon, N.: Risk Assessment, risk Values and the Social Science Programme: Why We Do Need Risk Perception Research. 1998. Reliability Engineering & System safety 59: 5-15.
- Renn, O.: The Role of Risk Perception for Risk Management. 1998. Reliability Engineering & System Safety 59: 49-68.
- Slovic, P. : The Risk Game. 2001. Journal of Hazardous Materials 86: 17-24.
- Slovic, P., Finucane, M.L., Peters, E. and MacGregor, D.M.: Risk as Analysis and Risk as Feelings: Some thought about Affect, Reason, Risk, and Rationality. 2004. Risk Analysis 24(2): 311-322.

Contact and other information

Course coordinator: Håkan Frantzich, hakan.frantzich@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.