AALBORG UNIVERSITET

STUDIEORDNING FOR KANDIDATUDDANNELSEN (CAND.TECH.) I SIKKERHED OG RISIKOSTYRING, 2021

CAND.TECH.
ESBJERG

MODULER SOM INDGÅR I STUDIEORDNINGEN

INDHOLDSFORTEGNELSE

INDUSTRY STANDARDS AND LEGISLATION

2021/2022

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objective:

Students who complete the module:

LEARNING OBJECTIVES

KNOWLEDGE

Knowledge:

- know how the legislation is organised in the field of a given project
- have a basic understanding of the jurisdiction of authorities in the field

SKILLS

Skills:

- Sare able to identify and describe problems related to a project
- can identify the relevant legislation and standards for a given project
- can organize project work to comply with legislation and industry standards

COMPETENCES

Competencies:

- must be able to apply project work as a study form
- must be able to contribute successfully to teamwork within the problem area and make a common presentation of the result of the project work
- must be able to communicate the results of the project work in a project report

LEARNING OBJECTIVES FOR PROBLEM BASED LEARNING:

- Must be able to apply problem solving
- Must be able to use problem identification
- Must be able to apply objectives (cooperation agreement)
- Must be able to use contextual involvement (user involvement)
- Must be able to analyse teamwork/team composition
- Must have knowledge of process analysis
- Must be able to use problem formulation
- Must be able to assess meetings/scheduling of meetings
- Must be able to analyse time planning
- Must be able to apply problem analysis
- Must be able to analyse personal competencies and wishes
- Must be able to assess problem solving
- Must be able to apply project management
- Must be able to apply impact assessment

TYPE OF INSTRUCTION

Type of instruction:

Project work with supervision supplemented with instructions, workshops, presentation seminars, lab tests, etc.

EXTENT AND EXPECTED WORKLOAD

The module is 15 ECTS which is corresponding to 450 hours of study.

EXAM

EXAMS

Name of exam	Industry Standards and Legislation
Type of exam	Oral exam based on a project Exam format: Oral exam based on presentation seminar and project report.
ECTS	15
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Lovgivning og standarder i industrien
Module code	B-RSK-K1-5
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	15
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Michael Havbro Faber
Time allocation for external examiners	B

ORGANISATION

Study Board	Study Board of the Build Environment
Department	Department of the Built Environment
Faculty	Faculty of Engineering and Science

SYSTEMS ENGINEERING

2022/2023

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Students who complete the module:

LEARNING OBJECTIVES

KNOWLEDGE

- Know different models and tools for systems engineering.
- Understand the concept of product lifecycle.
- Understand the interaction of different engineering disciplines comprising systems engineering.

SKILLS

- Can apply tools to manage the complexity of a project in a systems engineering framework.
- Can account for the theory behind applied models.
- Are able use methods that allow early detection of possible failures.
- Can modify system design to mitigate potential risk of failures.

COMPETENCES

- Are able to use correct professional terminology.
- Are able to acquire additional knowledge in the field.

TYPE OF INSTRUCTION

Lectures, etc. supplemented with project work, workshops, presentation seminars.

EXTENT AND EXPECTED WORKLOAD

The module is 5 ECTS which is corresponding to 150 hours of study.

EXAM

EXAMS

Name of exam	Systems Engineering
Type of exam	Written exam Written exam based on a case.
ECTS	5
Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Systems Engineering

Module code	B-RSK-K1-1
Module type	Course
Duration	1 semester
Semester	Spring and Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Michael Havbro Faber

ORGANISATION

Study Board	Study Board of Built Environment
Department	Department of the Built Environment
Faculty	The Faculty of Engineering and Science

APPLIED STATISTICS AND PROBABILITY THEORY

2022/2023

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Students who complete the module:

LEARNING OBJECTIVES

KNOWLEDGE

- Have a basic understanding of probability, uncertainty, stochastic processes and independent and conditional probabilities.
- Know basic probability and statistical models for uncertainties.
- Have knowledge of discrete and continuous probability distributions and their application.
- Know of the basic principles of statistical analysis, including data collection.
- Have knowledge about statistical inferens and hypothesis testing.
- Know the principles of Markov chains and Monte Carlo methods to simulate probability distributions.
- Understands the limitations of models/tools within risk/safety, especially in relation to the input data's validity and credibility.

SKILLS

- Are able to use probability distributions to describe stochastic processes.
- Can estimate statistical parameters from a dataset.
- Can compute confidence intervals.
- Can account for the theory behind applied models.
- Are able to use relevant statistical software to approximate *a posteriori* probability distributions.

COMPETENCES

- Can assess the applicability of probability theory in a given situation.
- Are able to use correct professional terminology.
- Are able to acquire additional knowledge in the field.

TYPE OF INSTRUCTION

Lectures, etc. supplemented with project work, workshops, presentation seminars.

EXTENT AND EXPECTED WORKLOAD

The module is 5 ECTS which is corresponding to 150 hours of study.

EXAM

EXAMS

Name of exam	Applied statistics and Probability Theory
Type of exam	Written exam Written exam based on a case.
ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination

Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Anvendt statistik og sandsynlighedsteori
Module code	B-RSK-K1-2
Module type	Course
Duration	1 semester
Semester	Spring and Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Michael Havbro Faber

ORGANISATION

Study Board	Study Board of Built Environment
Department	Department of the Built Environment
Faculty	The Faculty of Engineering and Science

RISK ANALYSIS

2022/2023

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module adds to the knowledge obtained in Applied Statistics and Probability Theory and Systems Engineering.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Students who complete the module:

LEARNING OBJECTIVES

KNOWLEDGE

- Understand the process of risk analysis and its relation to risk management.
- Know qualitative and quantitative methods for risk analysis including cost-benefit analysis, HAZID/HAZOP, FMEA, FTA og SIL.
- Have knowledge of influence of organizational factors and human errors.

SKILLS

- Are able to perform risk analysis of various types of problems and systems.
- Are able to interpret and use the results from a risk analysis in a decision making process of risk management.

COMPETENCES

- Are able to model, calculate and communicate risk.

TYPE OF INSTRUCTION

Lectures, discussion, group-based project work, student presentations.

EXTENT AND EXPECTED WORKLOAD

The module is 5 ECTS which is corresponding to 150 hours of study.

EXAM

EXAMS

Name of exam	Risk Analysis
Type of exam	Written exam Written exam based on a case.
ECTS	5
Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Risikoanalyse
Module code	B-RSK-K1-3
Module type	Course
Duration	1 semester
Semester	Spring and Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Michael Havbro Faber

ORGANISATION

Study Board	Study Board of Built Environment
Department	Department of the Built Environment
Faculty	The Faculty of Engineering and Science

RISK ANALYSIS AND MANAGEMENT

2022/2023

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module adds to the knowledge obtained in the 1st semester.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Students who complete the module:

LEARNING OBJECTIVES

KNOWLEDGE

- Must have knowledge about the main methods to deal with risk in a management framework.
- Understand the methods for risk analysis and assessment.

SKILLS

- Are able to apply the principles behind risk management to independently identify risk and possible response strategies.
- Are able to perform practical risk analysis for identification, structuring and modelling risk.
- Are able to apply the analysis methods in the various situations related to risk.
- Are able to assess model parameters used in project risk management.
- Can formulate alternative solutions for risk mitigation based on identified risks.
- Are able to choose between alternatives using an appropriate decision making process.

COMPETENCES

- Must be able to apply proper terminology in oral, written and graphical communication and documentation of problems and solutions within risk analysis and management.
- Must be able to communicate the results of risk analyses and risk management decisions performed in the project work in a project report.
- Must be able to contribute successfully to teamwork within risk analysis and management including the decision making process in the problem area and make a common presentation of the result of the project work.

LEARNING OBJECTIVES FOR PROBLEM BASED LEARNING:

- Must be able to assess problemsolving
- Must be able to assess teamwork/team composition
- Must be able to understand and explain what process analysis is
- Must be able to assess impact assessment

TYPE OF INSTRUCTION

Project work with supervision supplemented with instructions, workshops, presentation seminars, lab tests, etc.

EXTENT AND EXPECTED WORKLOAD

The module is 15 ECTS which is corresponding to 450 hours of study.

EXAM

EXAMS

Name of exam	Risk Analysis and Management
Type of exam	Oral exam based on a project Oral exam based on presentation seminar and project report.
ECTS	15
Assessment	7-point grading scale
Type of grading	External examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

ADDITIONAL INFORMATION

Contact information for Dewan Ahsan: dah@sam.sdu.dk. Web: www.sdu.dk/ansat/dah

FACTS ABOUT THE MODULE

Danish title	Risikoanalyse og -styring
Module code	B-RSK-K2-10
Module type	Project
Duration	1 semester
Semester	Spring
ECTS	15
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Dewan Ali Ahsan, Michael Havbro Faber
Time allocation for external examiners	B

ORGANISATION

Study Board	Study Board of Built Environment
Department	Department of the Built Environment
Faculty	The Faculty of Engineering and Science

RISK MANAGEMENT

2022/2023

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module adds to the knowledge obtained in Risk Analysis.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Students who complete the module:

LEARNING OBJECTIVES

KNOWLEDGE

- Know the definitions of risk (and uncertainty)
- Have knowledge about qualitative and quantitative assessment of risk.
- Have a basic knowledge of probability theory related to risk.
- Understand basic concepts such as thresholds and acceptable risk.
- Have an understanding for risk management plans.
- Understand the basic mechanisms behind different risk perceptions and its implications. for risk management and risk communication.
- Understand the importance of risk assessment and understand the importance of economic considerations regarding risk management.

SKILLS

- Are able to use correct terminology for risk management.
- Can evaluate existent risk management plans and response strategies.
- Are able to identify, analyse and prioritize risks.

COMPETENCES

- Can apply the principles behind risk management to undertake risk analyses and formulate response strategies.

TYPE OF INSTRUCTION

Lectures, discussion, group-based project work, student presentations.

EXTENT AND EXPECTED WORKLOAD

The module is 5 ECTS which is corresponding to 150 hours of study.

EXAM

EXAMS

Name of exam	Risk Management
Type of exam	Written exam
ECTS	5
Assessment	Passed/Not Passed
Type of grading	Internal examination

Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

ADDITIONAL INFORMATION

Contact information for Dewan Ahsan: dah@sam.sdu.dk. Web: www.sdu.dk/ansat/dah

FACTS ABOUT THE MODULE

Danish title	Risikostyring
Module code	B-RSK-K2-5
Module type	Course
Duration	1 semester
Semester	Autumn and Spring
ECTS	5
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Dewan Ali Ahsan, Michael Havbro Faber

ORGANISATION

Study Board	Study Board of Built Environment
Department	Department of the Built Environment
Faculty	The Faculty of Engineering and Science

DECISION MAKING

2022/2023

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module adds to the knowledge obtained in Risk Management and Applied Statistics and Probability Theory.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Students who complete the module:

LEARNING OBJECTIVES

KNOWLEDGE

- Know basic concepts behind the decision making process.
- Know different decision making tools such as Bayesian networks, decision trees, cost benefit analyses and Monte Carlo simulations.
- Know different normative, descriptive, prescriptive decision making models.
- Understand the importance of ethical considerations in relation to applying cost benefit models and decision making tools when considering actions involving health and safety of people.

SKILLS

- Are able to evaluate the applicability of a decision making model for a specific case.
- Are able to use the different tools present in software packages.
- Can use the presented tools to support decision making in a risk management framework.

COMPETENCES

- Can develop and apply an appropriate decision making process in a specific case in a risk management context.
- Can select and apply an appropriate decision making model in a specific case.

TYPE OF INSTRUCTION

Lectures, etc. supplemented with assignments, workshops, presentation seminars, lab tests.

EXTENT AND EXPECTED WORKLOAD

The module is 5 ECTS which is corresponding to 150 hours of study.

EXAM

EXAMS

Name of exam	Decision Making
Type of exam	Oral exam
ECTS	5
Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

ADDITIONAL INFORMATION

Contact information for Dewan Ahsan: dah@sam.sdu.dk. Web: www.sdu.dk/ansat/dah

FACTS ABOUT THE MODULE

Danish title	Beslutningstagning
Module code	B-RSK-K2-6
Module type	Course
Duration	1 semester
Semester	Autumn and Spring
ECTS	5
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Dewan Ali Ahsan, Michael Havbro Faber

ORGANISATION

Study Board	Study Board of Built Environment
Department	Department of the Built Environment
Faculty	The Faculty of Engineering and Science

OPERATIONAL RISK MANAGEMENT IN PROJECTS

2022/2023

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module adds to the knowledge obtained in the 1st and 2nd semester.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Students who complete the module:

LEARNING OBJECTIVES

KNOWLEDGE

- Have knowledge about methods to identify possible risk and hazards.
- Understand the factors that influence risk and hazards.
- Understand the methods for preventing and handling emergencies.

SKILLS

- Are able to apply the principles behind emergency management to independently identify emergency scenarios.
- Are able to plan and perform simulations of emergency scenarios.
- Are able to formulate plans to handle different hazards and emergency scenarios in a project setting.
- Can develop alternatives to critical processes in a project using the principles of risk management.

COMPETENCES

- Must be able to apply proper terminology in oral, written and graphical communication and documentation of problems and solutions within operational risk management.
- Must be able to communicate the results of the project work in a project report.
- Must be able to contribute successfully to teamwork within the problem area and make a common presentation of the result of the project work.

TYPE OF INSTRUCTION

Project work with supervision supplemented with instructions, workshops, presentation seminars, lab tests, etc.

EXTENT AND EXPECTED WORKLOAD

The module is 15 ECTS which is corresponding to 450 hours of study.

EXAM

EXAMS

Name of exam	Operational Risk Management in Projects
Type of exam	Oral exam based on a project Oral exam based on presentation seminar and project report.
ECTS	15
Assessment	7-point grading scale
Type of grading	Internal examination

Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Operativ risikohåndtering i projekter
Module code	B-RSK-K3-14
Module type	Project
Duration	1 semester
Semester	Spring and Autumn
ECTS	15
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Kristensen

ORGANISATION

Study Board	Study Board of Built Environment
Department	Department of the Built Environment
Faculty	The Faculty of Engineering and Science

SIMULATION OF EMERGENCIES

2022/2023

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module adds to the knowledge obtained in Applied Statistics and Probability Theory, Risk Management, and Risk Analysis.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Students who complete the module:

LEARNING OBJECTIVES

KNOWLEDGE

- Must have knowledge about evacuation strategies.
- Must have knowledge about the principles and models behind evacuation simulation software (like Simulex, Step, Exodus etc.).
- Understand the influence of human behavior in emergencies.

SKILLS

- Must be able to use software to simulate evacuation routes in case of emergencies.
- Are able to estimate the evacuation time of a building, area or vessel.
- Are able to identify possibilities and limitations related to simulations.

COMPETENCES

- Can critically evaluate and report results from an evacuation simulation.

TYPE OF INSTRUCTION

Lectures, discussion, group-based project work, student presentations.

EXTENT AND EXPECTED WORKLOAD

The module is 5 ECTS which is corresponding to 150 hours of study.

EXAM

EXAMS

Name of exam	Simulation of Emergencies
Type of exam	Written exam Written exam based on a case.
ECTS	5
Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Simulering af nødsituationer
Module code	B-RSK-K3-10
Module type	Course
Duration	1 semester
Semester	Spring and Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Kristensen

ORGANISATION

Study Board	Study Board of Built Environment
Department	Department of the Built Environment
Faculty	The Faculty of Engineering and Science

EMERGENCY MANAGEMENT

2022/2023

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module adds to the knowledge obtained in Risk Management and Decision Making.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Students who complete the module:

LEARNING OBJECTIVES

KNOWLEDGE

- Have knowledge of the various stages of emergency management, mitigation, preparedness, response and recovery, and their mutual relation.
- Understand methods for developing and implementing contingency plans.

SKILLS

- Are able to identify possible emergency scenarios.
- Are able to decide between different strategies in a given scenario.
- Are able to apply appropriate methods within each stage of emergency management to a given scenario.

COMPETENCES

- Are able to use correct professional terminology.
- Can critically develop and evaluate contingency plans.

TYPE OF INSTRUCTION

Lectures, etc. supplemented with project work, workshops, presentation seminars.

EXTENT AND EXPECTED WORKLOAD

The module is 5 ECTS which is corresponding to 150 hours of study.

EXAM

EXAMS

Name of exam	Emergency Management
Type of exam	Oral exam Oral exam.
ECTS	5
Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

ADDITIONAL INFORMATION

Module Coordinator: Associate Professor Dewan Ashan - dah@sam.sdu.dk - University of Southern Denmark - www.sdu.dk

FACTS ABOUT THE MODULE

Danish title	Håndtering af nødsituationer
Module code	B-RSK-K3-11
Module type	Course
Duration	1 semester
Semester	Spring and Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Kristensen

ORGANISATION

Study Board	Study Board of Built Environment
Department	Department of the Built Environment
Faculty	The Faculty of Engineering and Science

MASTER'S THESIS

2022/2023

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module adds to the knowledge obtained in the first three semesters of the master programme.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Students who complete the module:

LEARNING OBJECTIVES

KNOWLEDGE

After completion of the project, the student should within the following topics:

- Have knowledge and comprehension within the field of risk and safety management at the highest international level.
- Be able to critically evaluate knowledge and identify new scientific problems within risk and safety management.
- Have understanding of implications within the related research area including research ethics.

SKILLS

After completion of the project, the student should within the following topics:

- Independently explain choice of scientific theoretical and/or experimental methods to solve a risk and safety management problem.
- During the project, and when finalising it, make an independent and critical estimation of the chosen theories and methods as well as the analyses, results and conclusions.
- Be able to apply a wide range of engineering methods in research and development in the field of risk and safety management.
- Be able to, if necessary, develop new methods for solving a specific problem in the field of risk and safety management.
- Be able to communicate relevant scientific and professional aspects of project work in a clear and systematic way both to specialists and the public.

COMPETENCES

After completion of the project, the student should within the following topics:

- Be able to work independently with a project on a specific problem within risk and safety management at the highest international level.
- Independently be able to define and analyse scientific problems and based on that make and state the reasons for the decisions made.
- Be competent to solve new and complicated technical problems by the use of advanced mathematics, scientific and technological knowledge.
- Be able to evaluate the progress of the project independently and select and include additional literature, experiments or data when needed in order to maintain a scientific basis for the project.
- Be able to control complex and unexpected working situations and be able to develop new solutions.
- Must be able to communicate the results of the project work in a project report.

TYPE OF INSTRUCTION

Project work with supervision supplemented with instructions, workshops, presentation seminars, lab tests, etc.

EXTENT AND EXPECTED WORKLOAD

The module is 30 ECTS which is corresponding to 900 hours of study.

EXAM

EXAMS

Name of exam	Master's Thesis
Type of exam	Master's thesis/final project
ECTS	30
Assessment	7-point grading scale
Type of grading	External examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Kandidatspeciale
Module code	B-RSK-K4-15
Module type	Project
Duration	1 semester
Semester	Autumn and Spring
ECTS	30
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Kristensen, Michael Havbro Faber, Dewan Ali Ahsan
Time allocation for external examiners	D

ORGANISATION

Study Board	Study Board of Built Environment
Department	Department of the Built Environment
Faculty	The Faculty of Engineering and Science

MAINTENANCE MANAGEMENT

2022/2023

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module adds to the knowledge obtained in Applied Statistics and Probability Theory.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Students who complete the module:

LEARNING OBJECTIVES

KNOWLEDGE

- Have knowledge about basic maintenance planning and concepts.
- Understand the principles of maintenance optimization in relation to dependability, quality and safety.

SKILLS

- Are able to apply the concepts to a given system to optimize maintenance plans.
- Can apply modern methods like CMMS to organize maintenance plans.

COMPETENCES

- Are able to apply adequate terminology in oral and written communication.
- Are able to critically discuss different methods for maintenance planning.

TYPE OF INSTRUCTION

Lectures, discussion, group-based project work, student presentations.

EXTENT AND EXPECTED WORKLOAD

The module is 5 ECTS which is corresponding to 150 hours of study.

EXAM

EXAMS

Name of exam	Maintenance Management
Type of exam	Oral exam based on a project Written group assignment and oral exam based upon the written assignment.
ECTS	5
Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

ADDITIONAL INFORMATION

Contact information for Dewan Ahsan: dah@sam.sdu.dk. Web: www.sdu.dk/ansat/dah

FACTS ABOUT THE MODULE

Danish title	Vedligeholdelsesplanlægning
Module code	B-RSK-K2-8
Module type	Course
Duration	1 semester
Semester	Autumn and Spring
ECTS	5
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Dewan Ali Ahsan, Michael Havbro Faber

ORGANISATION

Study Board	Study Board of Built Environment
Department	Department of the Built Environment
Faculty	The Faculty of Engineering and Science

HEALTH AND SAFETY MANAGEMENT

2022/2023

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Students who complete the module:

LEARNING OBJECTIVES

KNOWLEDGE

- Know principles and methods for identification and analysis of accident risk.
- Know methods to reduce occupational risk in complex operations.
- Understand the mechanisms behind experience feedback and learning.

SKILLS

- Are able to identify and manage health and safety hazards in operations.
- Are able to identify organisational and individual obstacles to an efficient learning from experiences on accidents and identify possible strategies to mitigate the effect of these obstaclesare able to apply tools for HSE performance and monitoring.

COMPETENCES

- Can systematically apply methods for identifying and managing accidents in operations.

TYPE OF INSTRUCTION

Lectures, discussion, group-based project work, student presentations.

EXTENT AND EXPECTED WORKLOAD

The module is 5 ECTS which is corresponding to 150 hours of study.

EXAM

EXAMS

Name of exam	Health and Safety Management
Type of exam	Written or oral exam Exam format is decided on by start of semester.
ECTS	5
Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

ADDITIONAL INFORMATION

Contact information for Dewan Ahsan: dah@sam.sdu.dk. Web: www.sdu.dk/ansat/dah

FACTS ABOUT THE MODULE

Danish title	Sundheds- og sikkerhedsstyring
Module code	B-RSK-K3-13
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Dewan Ali Ahsan, Michael Havbro Faber

ORGANISATION

Study Board	Study Board of Built Environment
Department	Department of the Built Environment
Faculty	The Faculty of Engineering and Science

INTEGRATION OF RISK, RESILIENCE AND SUSTAINABILITY

2022/2023

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module is based upon knowledge obtained in Systems Engineering.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

In this module students will learn how to integrate considerations of risk, resilience and sustainability into a common decision analytic framework for societal decision support from local to global scales. Taking basis in systems engineering, the module will focus on state-of-the-art methods for the modelling of combined engineered-ecological-social systems, Bayesian Probabilistic Nets (BPNs), consequential Life Cycle Assessment (LCA) and techniques of network systems analysis. Combining flipped classroom and PBL approaches, students will work in groups on a case study and deliver a digital portfolio of their investigation, which they will present in an oral presentation for a hypothetical decision-making client.

LEARNING OBJECTIVES

KNOWLEDGE

- Demonstrate theoretical understanding of the concepts of systems resilience and quantitative sustainability and the trade-offs between them in the context of risk-informed decision support.
- Demonstrate theoretical understanding of concepts that underpin the scientific frameworks and methods for the joint assessment of risk, resilience and sustainability, including: system boundary, Planetary Boundaries, scale, temporality, (ir)reversibility, (non)linearity, limit, threshold, (de)growth, informational event, indicator, preference, option, action, consequence, utility, equity, accountability.
- Demonstrate theoretical understanding of differences between stated, revealed and informed preferences and how those impact the setting of objectives and the choice of metrics for integrated risk, resilience and sustainability assessment, management and governance.
- Demonstrate theoretical understanding of BPNs and their application in various decision contexts
- Demonstrate theoretical understanding of differences between attributional and consequential LCA and how they impact on system boundaries and systems modeling

SKILLS

- Ability to identify relevant preferences and objectives for risk, resilience and sustainability informed decision making for different stakeholders and at different time-space scales
- Ability to model and quantify resilience characteristics for simple combined engineered-ecological-social systems
- Ability to create a simplified framework for a consequential LCA in the context of a given case study
- Apply simple tools for consequential LCA
- Ability to define and analyze decision problems for simple combined engineered-ecological-social systems and to assess tradeoffs between risk, resilience and sustainability
- Ability to choose relevant indicators for monitoring a systems performance based on informed preferences

COMPETENCES

- Ability to use terms and concepts with clarity and precision
- Ability to communicate scientific results in a manner appropriate for different audiences: scientific peers, decision-makers, general public
- Ability to use data visualization tools for e.g., cluster analysis
- Ability to use digital media for e.g., wiki for project reporting
- Ability to conduct group project work in synchronous and asynchronous learning environments
- Ability to work in a social learning environment in accordance with PBL philosophy

TYPE OF INSTRUCTION

Flipped classroom, classroom-based and virtual discussion sessions, hands-on workshops in relevant digital tools/software.

EXTENT AND EXPECTED WORKLOAD

The module is 5 ECTS which is corresponding to 150 hours of study.

EXAM

EXAMS

Name of exam	Integration of Risk, Resilience and Sustainability
Type of exam	Written or oral exam Portfolio based oral exam
ECTS	5
Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Sammenkædning af risiko, resiliens og bæredygtighed
Module code	B-RSK-K2-16
Module type	Course
Duration	1 semester
Semester	Autumn and Spring
ECTS	5
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Michael Havbro Faber, Linda Nielsen

ORGANISATION

Study Board	Study Board of Built Environment
Department	Department of the Built Environment
Faculty	The Faculty of Engineering and Science

RISK AND RELIABILITY IN ENGINEERING

2022/2023

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module adds to the knowledge obtained in Applied Statistics and Probability Theory.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Students who complete the module:

LEARNING OBJECTIVES

KNOWLEDGE

- Understand the concepts risk, uncertainty, reliability and safety.
- Know statistical methods for modeling physical, model, statistical and measurement uncertainties.
- Know methods for assessment of reliability of structural systems using probabilistic methods.
- Know methods for systems reliability for non-structural components and its applications in engineering.

COMPETENCES

- Will be able to participate in a dialog on modeling of uncertainties, risk analysis and assessment of reliability of structural and nonstructural components and systems.
- Will be able to model, calculate and communicate risk analysis, modeling of uncertainties and assessment of reliabilities for engineering problems.

TYPE OF INSTRUCTION

Lectures, etc. supplemented with project work, workshops, presentation seminars, lab tests.

EXTENT AND EXPECTED WORKLOAD

The module is 5 ECTS which is corresponding to 150 hours of study.

EXAM

EXAMS

Name of exam	Risk and Reliability in Engineering
Type of exam	Written or oral exam Exam format is decided on by start of semester.
ECTS	5
Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Risiko og sikkerhed af konstruktioner
Module code	B-RSK-K3-12

Module type	Course
Duration	1 semester
Semester	Spring and Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Kristensen

ORGANISATION

Study Board	Study Board of Built Environment
Department	Department of the Built Environment
Faculty	The Faculty of Engineering and Science

RISK COMMUNICATION

2022/2023

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module adds to the knowledge obtained in Risk Management.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Students who complete the module:

LEARNING OBJECTIVES

KNOWLEDGE

- Know about and understand the contextual challenges of risk communication.
- Know about and understand the cognitive and emotional processes of risk perception which should guide the development of risk communication strategies.
- Know about and understand theoretical approaches towards risk communication.
- Know about and understand evidence-based strategies and methods of risk communication.

SKILLS

- Will be able to identify, describe and discuss the different theoretical and strategic approaches to risk communication.
- Will be able to analyze the effectiveness of communication strategies and processes in different risk management contexts.
- Will be able to apply different risk communication strategies and methods to develop effective risk communication messages to facilitate risk management in projects.

COMPETENCES

- Will be able to apply adequate terminology in oral and written communication.
- Will be able to critically reflect and discuss different risk communication strategies in a management framework.
- Will be able to present the communication strategies developed in the project work in an oral presentation/written report.

TYPE OF INSTRUCTION

Lectures, discussion, group-based project work, student presentations.

EXTENT AND EXPECTED WORKLOAD

The module is 5 ECTS which is corresponding to 150 hours of study.

EXAM

EXAMS

Name of exam	Risk Communication
Type of exam	Written or oral exam Exam format is decided on by start of semester.
ECTS	5
Assessment	7-point grading scale

Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Risiko kommunikation
Module code	B-RSK-K2-7
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Dewan Ali Ahsan

ORGANISATION

Study Board	Study Board of Built Environment
Department	Department of the Built Environment
Faculty	The Faculty of Engineering and Science