

Master in Fire Safety Engineering starting autumn 2026

- Structure of courses in the study programme
- All course plans

Contents and structure of courses in the study programme

The status column must contain information about whether the course is compulsory, elective, etc.

Term	Name of course, code	Credits	Compulsory/Elective	Comments
1.semester (autumn)	SIK500 Experiment and current developments in Fire Safety	0	Compulsory	
1.semester (autumn)	SIK501 Introduction to Fire Safety	7,5	<i>One of two</i>	For the students with BA in Engineering
1.semester (autumn)	SIK502 Introduction to Fire Prevention	7,5	<i>One of two</i>	For the students with BA in Fire Safety Engineering
1.semester (autumn)	SIK503 Research methodology	7,5	Compulsory	
<i>Sum credits 1. semester:</i>		15		
2.semester (spring)	SIK504 Fire science	7,5	Compulsory	
2.semester (spring)	SIK505 Contingency management and fire preventive work	7,5	Compulsory	
<i>Sum credits 2. semester:</i>		15		
3.semester (autumn)	SIK506 Modelling of Fire Safety	7,5	Compulsory	
3.semester (autumn)	SIK507 Evacuation, Theory and Modelling	7,5	Compulsory	
<i>Sum credits 3. semester:</i>		15		
4.semester (spring)	SIK508 Explosions and Industrial Fire Safety	7,5	Compulsory	
4.semester (spring)	SIK509 Structural fire safety	7,5	Compulsory	
<i>Sum credits 4. semester:</i>		15		

Term	Name of course, code	Credits	Compulsory/Elective	Comments
5.semester (autumn)	SIK510 Fire Risk assessment	7,5	Compulsory	
5.semester (autumn)	SIK511 Smoke and Value Protection Systems	7,5	Elective	<i>The students choose 3 elective courses</i>
5.semester (autumn)	SIK512 Guided self-study	7,5	Elective	<i>The students choose 3 elective courses</i>
<i>Sum credits 5. semester:</i>		15		
6.semester (spring)	SIK512 Guided self-study	7,5	Elective	<i>The students choose 3 elective courses</i>
6.semester (spring)	SIK513 Fire Laboratory and Experiments	7,5	Elective	<i>The students choose 3 elective courses</i>
6.semester (spring)	SIK514 Fire Investigations	7,5	Elective	<i>The students choose 3 elective courses</i>
6.semester (spring)	SIK515 Wildfires and the Wildland Urban Interface	7,5	Elective	<i>The students choose 3 elective courses</i>
<i>Sum credits 6. semester:</i>		15		
7.semester (autumn)	SIK599 Master thesis in Fire Safety Engineering	(15)	Compulsory	
<i>Sum credits 7. semester:</i>		-		
8.semester (spring)	SIK599 Master thesis in Fire Safety Engineering	(15)	Compulsory	
<i>Sum credits 8. semester:</i>		30		

SIK500 Experiment and Current Developments in Fire Safety

Field	FS-kode	I/E	Your text
Code	Obligatory	E	SIK500
Nynorsk name	Obligatory	E	Eksperiment og gjeldande utvikling innan brannsikkerhet
Bokmål name	Obligatory	I	Eksperiment og gjeldende utviklingen innen brannsikkerhet
English name		I	Experiment and current developments in Fire Safety
Credits	Obligatory	E*	0 ECTS
Level		I	Bachelor <input type="checkbox"/> Master <input checked="" type="checkbox"/> PHD <input type="checkbox"/> One-year course <input type="checkbox"/> Continuing education / Commission <input type="checkbox"/> Preliminary course <input type="checkbox"/>
Formal placement		I	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Department		I	Department of Safety, Chemistry and Biomedical Laboratory Sciences
Relates to Study programme		E*	<i>Master in Fire Safety Engineering</i>
Language of instruction	EBSPRAK	E*	English/Norwegian
Teaching semester	EBUNDSEM	E*	Autumn <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Autumn - Spring <input type="checkbox"/> Comment: Autumn or spring Spring – Autumn <input type="checkbox"/> Comment:
Semester of examination	EBSEM	E*	Autumn <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Both autumn and spring <input type="checkbox"/>

Field	FS-kode	I/E	Your text
Course coordinator	EBANSV	E*	Einar Arthur Kolstad
Content and structure	EBINNH	E	This course gives the students first-hand experience with fire experiments and a thorough guide to finding articles on fire safety. This course lasts from Friday morning to Monday afternoon, including the weekend. Several fire experiments will be conducted at the Hall of Flame on Friday and Monday. There will be workshops on specific articles (published less than 6 months before the course) and Journals publishing fire safety articles.
Learning outcome	EBLUB		<p>After completing the course, the student has the following learning outcome:</p> <p>Knowledge The student...</p> <ul style="list-style-type: none"> • have seen fires of different sizes and can approximate the energy production of smaller fires • know how to read an article, three-step reading • know how general fire experiments are conducted <p>Skills The student...</p> <ul style="list-style-type: none"> • can search for articles on specific topics • can judge if the article is worth reading • can use a logging tool to measure temperature and mass • can present data from an experiment in a clear and readable manner <p>General competence The student...</p> <ul style="list-style-type: none"> • can collaborate with other students and lectures

Field	FS-kode	I/E	Your text
			<ul style="list-style-type: none"> • can present their finding orally, both to an audience of peers and in group discussions • know where to find articles on Fire Safety Science
Entry requirements	EBFORK	E	Entry requirements for the master's programme in Fire Safety Engineering
Recommended previous knowledge	EBTILRAD	E	None
Teaching methods	EBARB	E	<p>At the Hall of Flame, a safety lecture will be given. Then, the equipment used during the course will be demonstrated. The students will work in groups when conducting the different experiments, and the lecturer will supervise them.</p> <p>The part on the current development of Fire Safety Science will be taught in a classroom, and each student will need a computer. The students will follow instructions from the supervisor, solving problems both individually and in groups. At the end of the course, there will be a section where the students will present their findings to the class.</p>
Course requirements	EBFORP	E	
Assessment	EBVURD	E	10-15 minutes oral presentation in groups Pass/Fail
Examination support material	EBHJELP	E	Computer for presentation, notes
Credit reduction due to course overlap	Obligatory	E	<i>none</i>
Campus	EBSTAD	E*	Haugesund

Field	FS-kode	I/E	Your text
Course available for international students	EBEXCHANGE	I	Yes
Litterature			<i>Articles (less than six months since published) will be selected and made available for the students before the course starts.</i>
Date of approval		I	27.08.2024

SIK501 Introduction to fire safety

Field	FS-kode	I/E	Your text
Code	Obligatory	E	SIK501
Nynorsk name	Obligatory	E	Introduksjon til brannsjkerheit
Bokmål name	Obligatory	I	Introduksjon til brannsjkerhet
English name		I	Introduction to fire safety
Credits	Obligatory	E*	7.5 ECTS
Level		I	Bachelor <input type="checkbox"/> Master <input checked="" type="checkbox"/> PHD <input type="checkbox"/> One-year course <input type="checkbox"/> Continuing education / Commission <input type="checkbox"/> Preliminary course <input type="checkbox"/>
Formal placement		I	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Department		I	Department of Safety, Chemistry and Biomedical Laboratory Sciences
Relates to Study programme		E*	Master in Fire Safety Engineering
Language of instruction	EBSPRAK	E*	English
Teaching semester	EBUNDSEM	E*	Autumn <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Autumn - Spring <input type="checkbox"/> Comment: Autumn or spring Spring – Autumn <input type="checkbox"/> Comment:
Semester of examination	EBSEM	E*	Autumn <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Both autumn and spring <input type="checkbox"/>
Course coordinator	EBANSV	E*	Einar Arthur Kolstad

Field	FS-kode	I/E	Your text
Content and structure	EBINNH	E	<p>The fire dynamic part of the course will provide students with a brief understanding of the chemistry, physics, and fluid mechanics of fires. It will also introduce students to fire causes, harmful effects of fires, and possible consequence-reducing measures.</p> <p>The Active and Passive Fire Protection part will introduce active and passive fire protection regarding fire suppression systems, fire alarm systems, and passive fire safety in construction. It will focus on the advantages and disadvantages of different protection measures in relation to health and the environment.</p>
Learning outcome	EBLUB		<p>After completing the course, the student has the following learning outcome:</p> <p>Knowledge</p> <p>The student...</p> <ul style="list-style-type: none"> • knows about chemical reactions, energy production, flame temperature, combustion products, and heat transfer in connection with a fire • understands the phenomenon of fire, including the stages of fire and how it is influenced by the environment (smoke, walls, roof) • knows how fire affects the community through fire causes and fire statistics • knows about active and passive fire protection measures in different phases of construction and explains how different standards are applied

Field	FS-kode	I/E	Your text
			<ul style="list-style-type: none"> • knows how to explain the structure of active fire protection measures such as extinguishment, fire alarms, and smoke ventilation systems. Note the advantages and disadvantages of the different systems • knows fire extinguishment theory focusing on the fire tetrahedron and relates it to different active extinguishment systems • understands the usage of materials and construction methods related to passive fire protection, explains the advantages and disadvantages of materials' properties related to fire protection, and suggests methods to improve these properties • understands the structure of different guidance systems used for evacuation and explain their advantages and disadvantages • has knowledge of research and development in the field • can keep their knowledge up to date within the field and know current innovations <p>Skills</p> <p>The student...</p> <ul style="list-style-type: none"> • can calculate heat transfer through structures and between solids. • can calculate flammability limits and flame temperature of liquids and gases • can consider and calculate fire development • can calculate smoke development and smoke spreading • can calculate fire influence on simple structures • can explain and calculate how a fire is influenced by the environment (smoke, walls, roof) • can perform simple sprinkler system calculations

Field	FS-kode	I/E	Your text
			<ul style="list-style-type: none"> • can design simple thermal smoke ventilation systems • based on acknowledged standards, the student can calculate heat transfer through structures and estimate the reduction in material properties due to fire • can design simple separating structures • can apply academic knowledge with the support of literature and research to address problems and make decisions • can reflect on their work in the field, individually and in teams <p>General Competencies</p> <p>The student...</p> <ul style="list-style-type: none"> • can present specialised knowledge of fire dynamics and prevention • can reflect on their work and schedule tasks. • can identify solutions in the field and contribute to discussions related to the impact and significance of the solution. • can assess knowledge in the field
Entry requirements	EBFORK	E	Entry requirements for the master's programme in Fire Safety Engineering
Recommended previous knowledge	EBTILRAD	E	Mathematics, physics, and fluid dynamics
Teaching methods	EBARB	E	Online course based on films and self-studies. The films will be available during the whole course.
Course requirements	EBFORP	E	<p>To enter the final exam (to submit the written assignments), students need to have approved:</p> <ul style="list-style-type: none"> • A quiz on Sources and References • Approved draft of assignment in Fire Dynamics

Field	FS-kode	I/E	Your text
			<ul style="list-style-type: none"> Approved draft of assignment in Active and Passive
Assessment	EBVURD	E	<p>Two individual written assignments: Assignment in Fire Dynamics accounts for 50 % of the final mark Assignment in Active and Passive Fire Protection accounts for 50 % of the final mark</p> <p>Students must pass both assignments to receive a course grade. Students aiming to improve their course grade have the option to improve their grades on one or both assignments. Students have the right to submit an improved version of a failed assignment. The improved version must be submitted by the end of the following semester at the latest. It is only possible to deliver an improved version once.</p> <p>Graded scale from A to E for pass and F for fail.</p>
Examination support material	EBHJELP	E	All support material is permitted
Credit reduction due to course overlap	Obligatory	E	ING2043 – Fire Dynamics - Reduction: 4 ECTS ING2045 - Active and Passive Fire Protection - Reduction: 4 ECTS ING2010 - Fire Dynamics - Reduction: 4 ECTS ING2022 - Fire Dynamics - Reduction: 4 ECTS ING2034 - Fire Dynamics - Reduction: 4 ECTS SIK201S - Bridging course for Master in Fire Safety Engineering - summer course - Reduction: 7.5 ECTS

Field	FS-kode	I/E	Your text
			SIK201 - Bridging course for Master in Fire Safety Engineering - Reduction: 7.5 ECTS
Campus	EBSTAD	E*	Digital (Haugesund)
Course available for international students	EBEXCHANGE	I	yes
Litterature			<i>"An Introduction to Fire Dynamics" by Dougal Drysdale</i> <i>"Enclosure Fire Dynamics" by Karlsen and Quintiere</i>
Date of approval		I	29.05.2024

SIK502 Introduction to Fire Prevention

Field	FS-kode	I/E	Your text
Code	Obligatory	E	SIK502
Nynorsk name	Obligatory	E	<i>Introduksjon til branntiltak</i>
Bokmål name	Obligatory	I	Introduksjon til branntiltak
English name		I	Introduction to Fire Prevention
Credits	Obligatory	E*	7.5 ECTS
Level		I	Bachelor <input type="checkbox"/> Master <input checked="" type="checkbox"/> PHD <input type="checkbox"/> One-year course <input type="checkbox"/> Continuing education / Commission <input type="checkbox"/> Preliminary course <input type="checkbox"/>
Formal placement		I	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Department		I	Department of Safety, Chemistry and Biomedical Laboratory Sciences
Relates to Study programme		E*	<i>Master in Fire Safety Engineering</i>
Language of instruction	EBSPRAK	E*	English
Teaching semester	EBUNDSEM	E*	Autumn <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Autumn - Spring <input type="checkbox"/> Comment: Autumn or spring Spring – Autumn <input type="checkbox"/> Comment:
Semester of examination	EBSEM	E*	Autumn <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Both autumn and spring <input type="checkbox"/>
Course coordinator	EBANSV	E*	Ruben Dabler Strand

Field	FS-kode	I/E	Your text
Content and structure	EBINNH	E	This course will give the students a deeper understanding of Fire Safety Engineering. Case studies will be the main part of the course. It will focus on the ability to comprehensively answer questions regarding the receiver's demand, the type of information, and the need for accuracy. The students will learn to write reports at a sufficient level and hold presentations for different audiences.
Learning outcome	EBLUB		<p>After completing the course, the student has the following learning outcome:</p> <p>Knowledge</p> <p>The student...</p> <ul style="list-style-type: none"> • Knows how to implement fire prevention using performance-based and pre-accepted solutions. • knows how fires affect the society locally, nationally and internationally • knows central fires that have led to changes in fire prevention and regulations • can keep their knowledge up to date within the field and know current innovations • knows the research and development in the field of fire safety in general <p>Skills</p> <p>The student...</p> <ul style="list-style-type: none"> • Can use fire dynamics when reasoning for fire protection solutions related to both performance-based and pre-accepted solutions • can use fire dynamics when reasoning for a solution or when discussing challenges with design or use • can develop computer models based on fire dynamic theory, such as flame height, heat transfer, radiation and mass flow

Field	FS-kode	I/E	Your text
			<ul style="list-style-type: none"> • can apply knowledge and relevant results from research and development for fire prevention measures and justify their choices using modelling • can use a fire risk indexing when discussing fire prevention • can explain fire prevention theory to peers and laymen. <p>General qualification</p> <p>The student...</p> <ul style="list-style-type: none"> • can assess knowledge in the field • can reflect on their work in a team and schedule tasks • can identify solutions in the field and contribute to discussions related to the impact and significance of the solution • can present a well-written answer to a question, using correct language and addressing every aspect of the question
Entry requirements	EBFORK	E	SIK501 or SIK204 or equivalent
Recommended previous knowledge	EBTILRAD	E	Fire dynamics
Teaching methods	EBARB	E	This is an online course based on films, self-studies, and digital teamwork. The films will be available throughout the course.
Course requirements	EBFORP	E	To enter the final exam, students need to have an approved draft of the case report.

Field	FS-kode	I/E	Your text
Assessment	EBVURD	E	<p>The assessment consists of two parts:</p> <ol style="list-style-type: none"> 1. A case study report, 75 % of the final mark 2. Digital presentation with oral examination, 25 % of the final mark <p>To receive a course grade, the students must pass both assignments. If the case study report is not improved, the students cannot do the digital presentation.</p> <p>The students have the right to submit an improved version of the case study report. The improved version must be submitted by the end of the following semester at the latest. It is only possible to deliver an improved version once.</p> <p>Graded scale from A to E for pass and F for fail.</p>
Examination support material	EBHJELP	E	All support material is permitted
Credit reduction due to course overlap	Obligatory	E	<i>none</i>
Campus	EBSTAD	E*	Digital (Haugesund)
Course available for international students	EBEXCHANGE	I	Yes
Litterature			<p><i>"An Introduction to Fire Dynamics" by Dougal Drysdale</i> <i>"Enclosure Fire Dynamics" by Karlsen and Quintiere</i> <i>SFPE handbook ch. 82</i> <i>Articles and reports may vary from year to year.</i></p>
Date of approval		I	29.05.2024

SIK503 Research Methodology

Field	FS-kode	I/E	Your text
Code	Obligatory	E	<i>SIK503</i>
Nynorsk name	Obligatory	E	<i>Forskingsmetode</i>
Bokmål name	Obligatory	I	Forskningsmetode
English name		I	Research methodology
Credits	Obligatory	E*	7.5 ECTS
Level		I	Bachelor <input type="checkbox"/> Master <input checked="" type="checkbox"/> PHD <input type="checkbox"/> One-year course <input type="checkbox"/> Continuing education / Commission <input type="checkbox"/> Preliminary course <input type="checkbox"/>
Formal placement		I	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Department		I	Department of Safety, Chemistry and Biomedical laboratory sciences
Relates to Study programme		E*	<i>Master in Fire Safety Engineering</i>
Language of instruction	EBSPRAK	E*	English
Teaching semester	EBUNDSEM	E*	Autumn <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Autumn - Spring <input type="checkbox"/> Comment: Spring – Autumn <input type="checkbox"/> Comment:
Semester of examination	EBSEM	E*	Autumn <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Both autumn and spring <input type="checkbox"/>
Course coordinator	EBANSV	E*	Maria de las Nieves Fernandez Anez
Content and structure	EBINNH	E	This course focuses on the skills and knowledge required to conduct research effectively. It covers various research designs, data collection methods, and analytical techniques. Students will learn how to formulate research questions, develop hypotheses, and structure their research proposals. Emphasis is placed

Field	FS-kode	I/E	Your text
			on understanding ethical considerations in research and ensuring the reliability and validity of data. Additionally, the course provides guidance on writing and presenting research findings in a clear and concise manner.
Learning outcome	EBLUB		<p>After completing the course, the student has the following learning outcome:</p> <p>Knowledge The student...</p> <ul style="list-style-type: none"> • has knowledge of the research process, including the importance of research, types of research and ethical considerations. • knows how to conduct a comprehensive review of existing literature. • can differentiate between sampling and data collection methods, knowing their types and applications. • knows different techniques for analysing quantitative and qualitative data. <p>Skills The student...</p> <ul style="list-style-type: none"> • can develop clear and concise research questions and hypothesis. • can discuss the selection of appropriate research design based on the research questions. • can discuss ethical considerations in research. • can effectively present research findings orally and visually. • knows how to structure and write research reports. <p>General competence The student...</p> <ul style="list-style-type: none"> • can discuss, evaluate and draft research plans. • can design a research process with specific focus on fire safety topics.

Field	FS-kode	I/E	Your text
Entry requirements	EBFORK	E	Entry requirements for the master's programme in Fire Safety Engineering
Recommended previous knowledge	EBTILRAD	E	
Teaching methods	EBARB	E	Short videos with key concepts made available in Canvas will be available to watch asynchronously during the course. The course will be focus on the work from the student, so activities led from the student will be key.
Course requirements	EBFORP	E	To enter the final exam (submit portfolio), students need to get a portfolio draft approved.
Assessment	EBVURD	E	Portfolio. The portfolio will be formed by activities showing the design of a research plan, with the essential theory. Graded scale from A to E for pass, and F for fail.
Examination support material	EBHJELP	E	All
Credit reduction due to course overlap	Obligatory	E	<i>None</i>
Campus	EBSTAD	E*	Digital (Haugesund)
Course available for international students	EBEXCHANGE	I	
Litterature			Booth, Wayne C., Gregory G. Colomb, and Joseph M. Williams. <i>The craft of research</i> . University of Chicago press, 2009.

Field	FS-kode	I/E	Your text
			<p>Leavy, Patricia. <i>Research design: Quantitative, qualitative, mixed methods, arts-based, and community-based participatory research approaches</i>. Guilford Publications, 2022.</p> <p>Thomas, C. George. <i>Research methodology and scientific writing</i>. Thrissur: Springer, 2021.</p> <p>Dawson, Catherine. <i>Introduction to research methods 5th edition: A practical guide for anyone undertaking a research project</i>. Robinson, 2019.</p>
Date of approval		I	29.05.2024

SIK504 Fire Science

Field	FS-kode	I/E	Your text
Code	Obligatory	E	SIK504
Nynorsk name	Obligatory	E	Brannodynamikk II
Bokmål name	Obligatory	I	Brannodynamikk II
English name		I	Fire Science
Credits	Obligatory	E*	7.5 ECTS
Level		I	Bachelor <input type="checkbox"/> Master <input checked="" type="checkbox"/> PHD <input type="checkbox"/> One-year course <input type="checkbox"/> Continuing education / Commission <input type="checkbox"/> Preliminary course <input type="checkbox"/>
Formal placement		I	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Department		I	Department of Safety, Chemistry and Biomedical laboratory sciences
Relates to Study programme		E*	<i>Master in Fire Safety Engineering</i>
Language of instruction	EBSPRAK	E*	English
Teaching semester	EBUNDSEM	E*	Autumn <input type="checkbox"/> Spring <input checked="" type="checkbox"/> Autumn - Spring <input type="checkbox"/> Comment: Spring – Autumn <input type="checkbox"/> Comment:
Semester of examination	EBSEM	E*	Autumn <input type="checkbox"/> Spring <input checked="" type="checkbox"/> Both autumn and spring <input type="checkbox"/>
Course coordinator	EBANSV	E*	Ruben D. Strand
Content and structure	EBINNH	E	Fire dynamics are essential knowledge when working with fire safety analysis and fire-related research. This course shall give students a thorough

Field	FS-kode	I/E	Your text
			<p>understanding of fire dynamics and interactions between a fire and its surroundings. The course includes an in-depth understanding of the flame structure, heat, burn rate, diffusion and turbulence. Further, focus on understanding different ignition mechanisms, including transient scenarios and fire-related issues within buildings and industry, e.g., fire in wood, building materials, liquid fire, and jet and gas fires, are central topics.</p>
Learning outcome	EBLUB		<p>After completing the course, the student has the following learning outcome:</p> <p>Knowledge The student...</p> <ul style="list-style-type: none"> • has a thorough knowledge of central fire dynamic topics for fire safety engineering • has a thorough understanding of their knowledge gaps in the field of fire dynamics • has in-depth knowledge of different ignition mechanisms, including transient scenarios • has in-depth knowledge of different fuels and fire behaviour • has a thorough knowledge of premixed and diffusion flames • has considerable knowledge of enclosure fire development and plume theories • have a thorough knowledge of research and development in the field <p>Skills The student...</p> <ul style="list-style-type: none"> • can discuss and outline procedures to solve fire engineering problems • can calculate and assess typical fire engineering problems • can calculate explosive limits • can calculate and analyse the combustion velocity

Field	FS-kode	I/E	Your text
			<ul style="list-style-type: none"> • can calculate and analyse the mass loss rate in fires • can calculate and analyse energy production • can assess different fire related risks • can calculate and analyse the production of smoke, including composition, quantity and concentration • can analyse transient scenarios and solve numerical problems, e.g., humidity and heat transport <p>General competence The student...</p> <ul style="list-style-type: none"> • can reflect on their own work and other sources of information • can analyse relevant fire safety and research issues • can apply fire safety knowledge and skills in new areas • can communicate their results and master relevant terminology • can communicate about fire safety issues and fire risks to different stakeholders
Entry requirements	EBFORK	E	Successfully completed all course requirements (compulsory activities) for SIK503 and for either SIK501 or SIK502.
Recommended previous knowledge	EBTILRAD	E	
Teaching methods	EBARB	E	Asynchronous/Synchronous digital lectures, herein; exercises, problem-based learning and demonstrations. Group Work and self-guidance are also used.
Course requirements	EBFORP	E	
Assessment	EBVURD	E	Part 1: Portfolio assessment, count for 50 % of the final mark. Part 2: Oral exam, 30 minutes, count for 50 % of the final mark.

Field	FS-kode	I/E	Your text
			<p>The students must pass both parts to receive a course grade. Students aiming to improve their course grade have the option to improve their grade on one or both parts.</p> <p>Graded scale from A to E for pass, and F for fail.</p>
Examination support material	EBHJELP	E	<p>Portfolio: Access to all aids</p> <p>Oral exam: No aids.</p>
Credit reduction due to course overlap	Obligatory	E	None
Campus	EBSTAD	E*	Digital (Haugesund)
Course available for international students	EBEXCHANGE	I	
Litterature			<p><u>Selected chapters from:</u></p> <ul style="list-style-type: none"> - Introduction to Fire Dynamics, 3rd edition, ISBN 9780470319031 - SFPE Handbook of Fire Protection Engineering, 5th edition, ISBN 978-1-4939-2565
Date of approval		I	29.05.2024

SIK505 Contingency Management and Fire preventive work

Field	FS-kode	I/E	Your text
Code	Obligatory	E	SIK505
Nynorsk name	Obligatory	E	Beredskapsleiing og brannførebyggjande arbeid
Bokmål name	Obligatory	I	Beredskapsledelse og brannforebyggende arbeid
English name		I	Contingency Management and Fire preventive work
Credits	Obligatory	E*	7,5 ETCS
Level		I	Bachelor <input type="checkbox"/> Master <input checked="" type="checkbox"/> PHD <input type="checkbox"/> One-year course <input type="checkbox"/> Continuing education / Commission <input type="checkbox"/> Preliminary course <input type="checkbox"/>
Formal placement		I	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Department		I	Department of Safety, Chemistry and Biomedical laboratory sciences
Relates to Study programme		E*	<i>Master in Fire Safety Engineering</i>
Language of instruction	EBSPRAK	E*	English / Norwegian
Teaching semester	EBUNDSEM	E*	Autumn <input type="checkbox"/> Spring <input checked="" type="checkbox"/> Autumn - Spring <input type="checkbox"/> Comment: Spring – Autumn <input type="checkbox"/> Comment:

Field	FS-kode	I/E	Your text
Semester of examination	EBSEM	E*	Autumn <input type="checkbox"/> Spring <input checked="" type="checkbox"/> Both autumn and spring <input type="checkbox"/>
Course coordinator	EBANSV	E*	Maria Monika Metallinou
Content and structure	EBINNH	E	<p>Prevention of accidents and emergencies is the primary task of all safety work. The Norwegian Fire and Explosion Prevention Act allocates to the Fire Service considerable responsibilities in fire prevention. At the same time the Fire Service is the main task force for fire incidents and other accidents, as decided based on the Municipalities' Risk and Vulnerability Analysis. This dual responsibility is reflected in the way the Fire Departments are organized and in their everyday practices. The deliverables in the course will help the student understand the everyday life of a Norwegian Fire Department, both with respect to Fire Preventive work and as Task force. This will be achieved by using the Norwegian Regulation on Fire Prevention FOR-2015-12-17-1710, and the Norwegian Fire and Rescue Service Regulation, FOR-2021-09-15-2755 in case studies and deliverables. Aspects of health issues due to exposure to smoke contaminants are addressed, as well as ways to reduce primary and secondary exposure to those contaminants.</p> <p>Since the Norwegian Emergency Response system is a collaboration between public, private and organized volunteer actors, cooperation among relevant actors must be established and trained on a regular basis. Knowledge about the other emergency management actors in Norway is therefore included in the course. The students therefore will train in developing a contingency plan for a case organization / company.</p> <p>Though using the view-point of the Fire Service as a focal point, the course covers broader issues in emergency management. The course will give the student an overview of the contingency discipline both from a practical and</p>

Field	FS-kode	I/E	Your text
			<p>a research-based point of view. A major accident can have both natural and technological causes, and efficient management under time pressure by a group of collaborating actors requires good established plans and collaborative relations. Efficient contingency management is based on systematic preparatory work. In recent literature preventive work and contingency management form a continuum, where contingency management already starts when some of the preventive barriers have failed. Understanding the connection between contingency planning and incident management is a key feature.</p> <p>The students will produce three deliverables through group work, thus ensuring project based education and cooperation among the students. 60% of the graded marks will be based on the deliverables, the rest 40% on written, individual examination.</p> <p>Comment: The terms “Contingency” and “Emergency” are used as synonymous in the course. In European literature the term “Contingency” is often used , while “Emergency” is most common in the US literature.</p>
Learning outcome	EBLUB		<p>Knowledge</p> <p>The student</p> <ul style="list-style-type: none"> • has knowledge about the relevant laws and authorities for emergency preparedness • has knowledge about the structure of the Norwegian emergency response system, the main actors and their respective roles • have a thorough understanding of how results of risk and vulnerability analysis as well as results of evaluation after exercises

Field	FS-kode	I/E	Your text
			<p>and/or real responses can be used to dimension, plan and improve emergency preparedness</p> <ul style="list-style-type: none"> • has in-depth knowledge about the principles of proactive emergency management has thorough knowledge of possible mental traps which may compromise situational awareness during responses • has thorough knowledge of the different levels of emergency management in organisations, and their respective duties during incidents <p>Skills</p> <p>The student</p> <ul style="list-style-type: none"> • Can undertake a fire preventive supervision and allocate the findings to the appropriate paragraphs in the Fire preventive regulation, FOR-2015-12-17-1710 • Can verify how a Fire Service comply with the requirements in the Fire and Rescue Service regulation, FOR-2021-09-15-2755. • Can develop a contingency plan for a company, to plan their internal protection organization, and comply with the Industrial Safety Regulation, FOR-2019-05-22-672. • can use proactive emergency management at the tactical, operational and strategic levels • can use professional fire safety skills and knowledge about emergency management to help in the planning of safe and effective responses • can apply relevant national and international regulations and standards

Field	FS-kode	I/E	Your text
			<ul style="list-style-type: none"> • can advocate for the importance of evaluating and learning from exercises and real events, so that the identified learning points are followed up • can identify weaknesses and limitations in emergency preparedness and suggest cost-efficient improvements <p>General competence</p> <p>The student</p> <ul style="list-style-type: none"> • can collaborate with peers on advanced topics • can present advanced knowledge through a written presentation • can update their knowledge through literature • can use standards and regulations in their profession
Entry requirements	EBFORK	E	Successfully completed all course requirements (compulsory activities) for SIK503 and for either SIK501 or SIK502.
Recommended previous knowledge	EBTILRAD	E	
Teaching methods	EBARB	E	The course will be taught through asynchronous video-lectures as the main teaching resource, combined with research literature and some policy documents. One of the portfolio assignments is a group task, enhancing groupwork skills. Digital meetings with each of the group and the whole class will be regularly held. Both portfolio assignments involve two feedbacks on drafts, thus combining self-study and groupwork with guidance.
Course requirements	EBFORP	E	

Field	FS-kode	I/E	Your text
Assessment	EBVURD	E	Part 1: Oral digital exam, 4 hours, counts for 40% of the final grade. Part 2: Portfolio, counts for 60% of the final grade. Both parts must be passed.
Examination support material	EBHJELP	E	Portfolio: Access to all aids Exam: Access to all aids
Credit reduction due to course overlap	Obligatory	E	7.5 ECTS overlap with ING4009
Campus	EBSTAD	E*	Digital (Haugesund)
Course available for international students	EBEXCHANGE	I	
Litterature			<p>Textbooks</p> <ol style="list-style-type: none"> 1. Canton, L.G. (2019) <i>Emergency management: Concepts and strategies for effective programs</i>. John Wiley & Sons. 2. Bullock, J.; Haddow, G.; Coppola, D. (2017). <i>Introduction to emergency management</i>. Butterworth-Heinemann. 3. Lunde, I.K. (2019). <i>Praktisk krise- og beredskapsledelse</i>. Universitetsforlaget. <p>Acts and Regulations*</p> <ol style="list-style-type: none"> 1. The Norwegian Fire and Explosion Protection Act, LOV-2002-06-14-20, latest update: LOV-2023-01-27-1.

Field	FS-kode	I/E	Your text
			<ol style="list-style-type: none"> 2. The Norwegian Fire and Rescue Service Regulation, FOR-2021-09-15-2755. 3. The Norwegian Regulation on Fire Prevention, FOR-2015-12-17-1710. 4. The Norwegian Civil Protection Act, LOV-2010-06-25-45, update: LOV-2021-04-16-20. 5. The Norwegian Regulation on municipal emergency preparedness duties. FOR-2011-08-22-894. 6. The Norwegian Industrial Safety Regulation, FOR-2019-05-22-672. <p><i>* Relevant parts are translated to English for International students.</i></p> <p>Scientific articles (not exhaustive)</p> <ol style="list-style-type: none"> 1. Endsley, M.R. (1995). Toward a theory of situational awareness in dynamic systems. <i>Human Factors</i>, 37(1), 32 - 64. 2. Olsen, O.E.; Kruke, B.I.; Hovden, J. (2007). Societal safety: Concepts, borders and dilemmas. <i>Journal of Contingencies and Crisis Management</i>, 15(2), 69 – 79. 3. Sommer, M. <i>Learning in emergency response work. (2015)</i>, PhD-Thesis, The University of Stavanger. 4. Van Laere, J.; Lindblom, J. Cultivating a longitudinal learning process through recurring crisis management training exercises in twelve Swedish municipalities (2018). <i>Journal of Contingencies and Crisis management</i>, 1-12. 5. Brooks, B.; Curnin, S.; Owen, C.; Bearman, C. (2020). Managing cognitive biases during disaster response. <i>Cognition, Technology & Work</i>, 22, 249 – 261. 6. Wingfors, H.; Nyholm, J.R.; Magnusson, R.; Wijkmark, C.H. (2018). Impact of Fire Suit Ensembles on Firefighter PAH Exposures as Assessed by Skin Deposition and Urinary Biomarkers. <i>Annals of Work Exposures and health</i>, 62(2)m 221 – 231.

Field	FS-kode	I/E	Your text
			<p>7. Vílchez, J.A.; Villafaña, D.; Casal, J. (2013). A dispersion safety factor for LNG vapor clouds. <i>Journal of Hazardous Materials</i>, 246-247, 181-188.</p> <p>8. Rego, F.; Rodríguez, J.; Calzada, V., Xanthopoulos, G. (2018) <i>Forest Fires: Sparking Firesmart policies in the EU</i>. Faivre, N. (ed.), European Union, ISBN 978-92-79-77493-5.</p> <p>9. Metallinou, M.M. (2017). Single- and double-loop organizational learning through a series of pipeline emergency exercises. <i>Journal of Contingencies and Crisis Management</i>, 1-14.</p> <p>10. Lambert, K.; Merci, B.; Gryspeers, C.; Jekovec, N. (2021). Search & rescue operations during interior firefighting: A study into crawling speeds. <i>Fire Safety Journal</i> 121, 1-10.</p> <p>11. Grabowski, A. (2021). Practical skills training in enclosure fires: An experimental study with cadets and firefighters using CAVE and HMD-based virtual training simulators. <i>Fire Safety Journal</i> 125, 1-16.</p> <p>12. Wijkmark, C.H.; Metallinou, M.M.; Heldal, I. (2021). Remote virtual simulation for incident commanders – cognitive aspects. <i>Applied Sciences</i>, 11, 1-19.</p> <p>13. Gjedrem, A.; Metallinou, M.M. (2023). Wildland-urban interface fires in Norwegian coastal heathlands – identifying risk reducing measures. <i>Safety Science</i>, 159, 1-32.</p> <p>14. Jensen, J.; Thompson, S. (2015). The Incident Command System: a literature review. <i>Disasters</i>, 40(1), 1-25.</p>
Date of approval		I	

SIK507 Evacuation, Theory and Modelling

Field	FS-kode	I/E	Your text
Code	Obligatory	E	SIK507
Nynorsk name	Obligatory	E	Evakuering, teori og modellering
Bokmål name	Obligatory	I	Evakuering, teori og modellering
English name		I	Evacuation, Theory and Modelling
Credits	Obligatory	E*	7.5 ECTS
Level		I	Bachelor <input type="checkbox"/> Master <input checked="" type="checkbox"/> PHD <input type="checkbox"/> One-year course <input type="checkbox"/> Continuing education / Commission <input type="checkbox"/> Preliminary course <input type="checkbox"/>
Formal placement		I	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Department		I	Department of Safety, Chemistry and Biomedical laboratory sciences
Relates to Study programme		E*	<i>Master in Fire Safety Engineering</i>
Language of instruction	EBSPRAK	E*	English
Teaching semester	EBUNDSEM	E*	Autumn <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Autumn - Spring <input type="checkbox"/> Comment: Spring – Autumn <input type="checkbox"/> Comment:
Semester of examination	EBSEM	E*	Autumn <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Both autumn and spring <input type="checkbox"/>
Course coordinator	EBANSV	E*	Xiaoqin Hu (Vicky)
Content and structure	EBINNH	E	The course will provide in-depth knowledge on evacuation modeling and simulation. Human behavior in emergence and human response patterns during

Field	FS-kode	I/E	Your text
			evacuation should be analyzed and discussed. The effect of thermal load on structures and smoke/toxic gases spread should be analysed to provide information on available time for evacuation. Required evacuation time will be modeled and compared with available evacuation time. The configurational, environmental, behavioural and procedural aspects influencing evacuation process should be addressed. Modelling will form basis for the selection of impact reducing measures (barriers) so that the risk is limited.
Learning outcome	EBLUB		<p>After completing the course, the student has the following learning outcome:</p> <p>Knowledge The student...</p> <ul style="list-style-type: none"> • has knowledge of human psychological and physiological responses to fires and discuss the factors that influence human behaviour. • understands modelling methodologies used to represent the enclosure, population and the behaviour of population • has thorough knowledge of the effect of toxic gases, smoke and heat on escape routes • has in-depth knowledge of the capabilities and limitations of evacuation models <p>Skills The student...</p> <ul style="list-style-type: none"> • can make use of hand calculations to estimate the time for evacuation • can use advanced simulation programs to calculate time for evacuation from different scenarios • can calculate FED (Fractional Effective Dose) and indicate adverse effects as a result of this

Field	FS-kode	I/E	Your text
			<ul style="list-style-type: none"> can identify and assess weaknesses in design with regard to consequence of fire in the building, industry and transport <p>General competence The student...</p> <ul style="list-style-type: none"> can apply computer tools to conduct calculations and visualize the results. can interpret model predictions can make qualified assessments for successful evacuation from fires and propose improvement
Entry requirements	EBFORK	E	Successful completion of SIK503 and one of either SIK501 or SIK502.
Recommended previous knowledge	EBTILRAD	E	Fire Dynamics, Fire modeling and simulation
Teaching methods	EBARB	E	The course will be based on asynchronous/synchronous digital lectures, exercises, demonstrations and problem-based learning. Group and independent study with guidance is also used.
Course requirements	EBFORP	E	
Assessment	EBVURD	E	<p>Part 1: Portfolio assessment, count for 40 % of the final mark Part 2: Oral exam, 30 minutes, count for 60 % of the final mark</p> <p>The students must pass both parts to receive a course grade. Students aiming to improve their course grade have the option to improve the grade on one or both parts.</p> <p>Graded scale from A to E for pass, and F for fail.</p>

Field	FS-kode	I/E	Your text
Examination support material	EBHJELP	E	During final oral examination: Nothing
Credit reduction due to course overlap	Obligatory	E	<i>No</i>
Campus	EBSTAD	E*	Digital (Haugesund)
Course available for international students	EBEXCHANGE	I	
Litterature			<ol style="list-style-type: none"> 1. <u>SFPE Handbook: Chapter56-64 (Evacuation)</u> 2. <u>Principles and Practice of Evacuation Modelling, E.R.Galea(ed.), Fire SafetyEngineering Group, UniversityofGreenwich, London</u> 3. <i>NFPA 101H Life Safety Code Handbook, 14 ed., National Fire Protection Association, 2021.</i> 4. User manuals of Pathfinder, Thunderhead Engineering 5. <i>Pathfinder Technical Reference Manual, Thunderhead Engineering</i> 6. Fire Dynamics Simulator with Evacuation: FDS+Evac Technical Reference and User's Guide, VTT Technical Research Centre of Finland
Date of approval		I	29.05.2024

SIK506 Modelling of Fire Safety

Field	FS-kode	I/E	Your text
Code	Obligatory	E	SIK506
Nynorsk name	Obligatory	E	Modellering av brannsikkerhet
Bokmål name	Obligatory	I	Modellering av brannsikkerhet
English name		I	Modelling of Fire Safety
Credits	Obligatory	E*	7.5 ECTS
Level		I	Bachelor <input type="checkbox"/> Master <input checked="" type="checkbox"/> PHD <input type="checkbox"/> One-year course <input type="checkbox"/> Continuing education / Commission <input type="checkbox"/> Preliminary course <input type="checkbox"/>
Formal placement		I	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Department		I	Department of Safety, Chemistry and Biomedical laboratory sciences
Relates to Study programme		E*	<i>Master in Fire Safety Engineering</i>
Language of instruction	EBSPRAK	E*	English
Teaching semester	EBUNDSEM	E*	Autumn <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Autumn - Spring <input type="checkbox"/> Comment: Spring – Autumn <input type="checkbox"/> Comment:
Semester of examination	EBSEM	E*	Autumn <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Both autumn and spring <input type="checkbox"/>
Course coordinator	EBANSV	E*	Sanjay Kumar Khattri
Content and structure	EBINNH	E	Computer-based models are invaluable for understanding fire behavior and improving fire safety measures. The course will delve into the theory and practical aspects of computational fire simulation tools like CFAST (Consolidated Model of Fire and Smoke Transport) and FDS

Field	FS-kode	I/E	Your text
			<p>(Fire Dynamics Simulator). CFAST is a two-zone fire model while FDS is a computational fluid dynamics model of fire-driven fluid flow. We will examine the conservation equations that FDS solves, which are a form of the Navier-Stokes equations, and how these equations are used to model the behavior of smoke and heat transport from fires. In the course, we will cover the fundamental equations of zone models. We will analyze the strengths and weaknesses of two-zone modeling and CFD approaches in fire simulations. We will explore various processes like heat transfers, pyrolysis through FDS, and their corresponding equations. We will discuss how FDS implements various boundary conditions. These tools can predict intricate fire behaviors, furnishing crucial data on fire safety. Such information can significantly improve the fire safety of structures and at the same time bolster firefighting and rescue operations. Beyond immediate firefighting, engineers can employ these computational tools to simulate fires in diverse settings, aiding in designing buildings, tunnels, and other infrastructures that prioritize safety. We will gain hands-on experience with fire modeling software like CFAST and FDS. This includes solving practical problems and validating the results against real-world data. The course will be delivered online through live lectures on Zoom or Teams.</p>
Learning outcome	EBLUB		<p>After completing the course, the student has the following learning outcome:</p> <p>Knowledge The student...</p> <ul style="list-style-type: none"> • has knowledge of the foundational theory of two-zone and CFD fire models. • has knowledge of the strengths and weaknesses of the two-zone and CFD fire models. • has knowledge of the importance of various processes like combustion, pyrolysis, and turbulence in fire simulations. <p>Skills The student...</p>

Field	FS-kode	I/E	Your text
			<ul style="list-style-type: none"> • has developed proficiency in utilizing CFAST two-zone models. The student can use the tool to calculate the time to flashover and smoke layer heights. • has gain practical skills in deploying the FDS CFD fire model and visualizing the results. • can use the FDS to perform fire simulations in various environments like tunnels and compartments. Furthermore, the student can compare simulation results to the available experimental data to validate the model. • can use Pyrosim for constructing practical fire case simulations. <p>General competence The student...</p> <ul style="list-style-type: none"> • has developed proficiency in utilizing computer tools to solve fire safety problems, visualizing the outcomes, and interpreting the results for practical application. • can use sensitivity analysis and understands the impact of grid size on the precision of fire safety simulations. • has a clear understanding of the limitations inherent in simulation results.
Entry requirements	EBFORK	E	Successful completion of SIK503 and one of either SIK501 or SIK502.
Recommended previous knowledge	EBTILRAD	E	Fire Dynamics, Fluid Mechanics, Python Programming
Teaching methods	EBARB	E	Teaching methods for the course include digital lectures, practical exercises to develop proficiency in using software tools, demonstrative sessions for learning about the use of fire models, and problem-based learning scenarios where we use the software tools to solve fire safety problems. Both collaborative group studies and guided independent studies are integral to the learning process.

Field	FS-kode	I/E	Your text
Course requirements	EBFORP	E	
Assessment	EBVURD	E	<p>The assessment has two parts:</p> <ul style="list-style-type: none"> • Portfolio assessment accounts for 40 % of the final mark. • Digital oral exam, 30 minutes, accounts for 60 % of the final mark. <p>The students must pass both parts to receive a course grade. Students aiming to improve their course grade have the option to improve the grade on one or both parts.</p> <p>Graded scale from A to E for pass, and F for fail.</p>
Examination support material	EBHJELP	E	During final oral examination: Nothing
Credit reduction due to course overlap	Obligatory	E	None
Campus	EBSTAD	E*	Digital (Haugesund)
Course available for international students	EBEXCHANGE	I	
Litterature			<ol style="list-style-type: none"> 1. <u>SFPE Handbook of Fire Protection Engineering.</u> 2. <u>User manual and technical references of CFAST and FDS.</u> 3. <u>Enclosure Fire Dynamics by Karlsson and Quintiere.</u>
Date of approval		I	29.05.2024

SIK508 Explosions in Industrial Fire Safety

Field	FS-kode	I/E	Your text
Code	Obligatory	E	SIK508
Nynorsk name	Obligatory	E	<i>Eksplasjonar og brann tryggleik i industrien</i>
Bokmål name	Obligatory	I	<i>Eksplasjoner og brann sikkerhet i industrien</i>
English name		I	<i>Explosions in industrial fire safety</i>
Credits	Obligatory	E*	7,5 ETCS
Level		I	Bachelor <input type="checkbox"/> Master <input checked="" type="checkbox"/> PHD <input type="checkbox"/> One-year course <input type="checkbox"/> Continuing education / Commission <input type="checkbox"/> Preliminary course <input type="checkbox"/>
Formal placement		I	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Department		I	Department of Safety, Chemistry and Biomedical laboratory sciences
Relates to Study programme		E*	<i>Master in Fire Safety Engineering</i>
Language of instruction	EBSPRAK	E*	English
Teaching semester	EBUNDSEM	E*	Autumn <input type="checkbox"/> Spring <input checked="" type="checkbox"/> Autumn - Spring <input type="checkbox"/> Comment: Spring – Autumn <input type="checkbox"/> Comment:
Semester of examination	EBSEM	E*	Autumn <input type="checkbox"/> Spring <input checked="" type="checkbox"/> Both autumn and spring <input type="checkbox"/>
Course coordinator	EBANSV	E*	Maria de las Nieves Fernandez Anez

Field	FS-kode	I/E	Your text
Content and structure	EBINNH	E	Explosions and industrial fire safety focus on learning the theory explaining explosion occurrence and behaviour, including gas, vapours and dust explosions, explosive atmospheres classification, focusing on major accidents in industry, and knowledge of ignition sources and barriers. In addition, it is important to know how to identify danger and find probability and consequences. The subject object is to give the students a good foundation for the work faced within technical safety and risk engineering.
Learning outcome	EBLUB		<p>After completing the course, the student has the following learning outcome:</p> <p>Knowledge The student...</p> <ul style="list-style-type: none"> • has knowledge of different mechanisms related to explosions, both initiation and propagation. • understands the differences and similarities between gas, vapour and dust explosions. • has knowledge of zone classifications under the ATEX directives. • understands the concepts of barriers and quality of barriers over time. • knows the different causes of leakages, fire and explosion, and the consequences for humans and materials. • has knowledge of actual incidents that have changed the safety level in the industry. <p>Skills The student...</p> <ul style="list-style-type: none"> • can evaluate explosion risks in industrial facilities. • can investigate accidents and incidents, identifying the function that have failed due to technical, human and organizing barriers (MTO).

Field	FS-kode	I/E	Your text
			<ul style="list-style-type: none"> • can prepare safety documentation based on probability and consequences, and can contribute to industrial risk analysis and emergency preparedness analysis. • can identify risks using HAZID, HAZOP, and LOPA and identify gaps compared to the required SIL level. <p>General competence The student...</p> <ul style="list-style-type: none"> • should know the course terminology and symbols and understand the documentation related with fire safety engineering in the industry. • can contribute with state of the art knowledge during safety evaluations and identify solutions to reduce the risk of accidents.
Entry requirements	EBFORK	E	Successful completion of SIK504 and SIK505.
Recommended previous knowledge	EBTILRAD	E	
Teaching methods	EBARB	E	The course will be fully digital. Videos will be made available on the digital platform to visualize asynchronously. It will be based on collections of lectures, exercises, problem-based learning, group work, and self-guided learning.
Course requirements	EBFORP	E	To enter the final exam, students need to have approved: <ul style="list-style-type: none"> • attend to all presentations of case studies. • participate (actively) in the discussion groups online.
Assessment	EBVURD	E	Assessment in three parts:

Field	FS-kode	I/E	Your text
			<p>Part 1: oral examination, accounts for 50 % of the final mark. The candidate will receive a number of questions 1 week before the exam date, to prepare them for the date of the exam. The exam will last for maximum 30 minutes, with the discussion of three of the questions provided to the candidates.</p> <p>Part 2: assignment, accounts for 30 % of the final mark. Project case study analysing a real life accident or incident that involved, or could have involved fire. A final report will be assessed.</p> <p>Part 3: portfolio, accounts for 20 % of the final mark. The portfolio will include small tasks and exercises that will be developed during the duration of the courses.</p> <p>The students must pass all parts to receive a course grade. Students aiming to improve their course grade have the option to improve the grade on one or more parts.</p> <p>Graded scale from A to E for pass, and F for fail.</p>
Examination support material	EBHJELP	E	Simple calculator.
Credit reduction due to course overlap	Obligatory	E	None
Campus	EBSTAD	E*	Digital (Haugesund)
Course available for international students	EBEXCHANGE	I	
Litterature			Books:

Field	FS-kode	I/E	Your text
			<p>Amyotte, Paul. An introduction to dust explosions: understanding the myths and realities of dust explosions for a safer workplace. Butterworth-Heinemann, 2013.</p> <p>Eckhoff, Rolf K. Dust explosions in the process industries: identification, assessment and control of dust hazards. Elsevier, 2003.</p> <p>Eckhoff, Rolf K. Explosion hazards in the process industries. Gulf Professional Publishing, 2016.</p> <p>Fernandez-Anez, Nieves, et al. Explosion risk of solid biofuels. Vol. 10. Springer International Publishing, 2020.</p> <p>King, Ralph. Safety in the process industries. Elsevier, 2013.</p> <p>Kletz, Trevor. Still going wrong!: case histories of process plant disasters and how they could have been avoided. Elsevier, 2003.</p> <p>Kletz, Trevor. Learning from accidents. Routledge, 2007.</p> <p>Ogle, Russell A. Dust explosion dynamics. Butterworth-Heinemann, 2016.</p>
Date of approval		I	29.05.2024

SIK509 Structural fire safety

Field	FS-kode	I/E	Your text
Code	Obligatory	E	SIK509
Nynorsk name	Obligatory	E	<i>Strukturell brann tryggleik</i>
Bokmål name	Obligatory	I	<i>Strukturell brannsikkerhet</i>
English name		I	Structural fire safety
Credits	Obligatory	E*	7.5 ECTS
Level		I	Bachelor <input type="checkbox"/> Master <input checked="" type="checkbox"/> PHD <input type="checkbox"/> One-year course <input type="checkbox"/> Continuing education / Commission <input type="checkbox"/> Preliminary course <input type="checkbox"/>
Formal placement		I	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Department		I	Department of Safety, Chemistry and Biomedical laboratory sciences
Relates to Study programme		E*	<i>Master in Fire Safety Engineering</i>
Language of instruction	EBSPRAK	E*	English
Teaching semester	EBUNDSEM	E*	Autumn <input type="checkbox"/> Spring <input checked="" type="checkbox"/> Autumn - Spring <input type="checkbox"/> Comment: Spring – Autumn <input type="checkbox"/> Comment:
Semester of examination	EBSEM	E*	Autumn <input type="checkbox"/> Spring <input checked="" type="checkbox"/> Both autumn and spring <input type="checkbox"/>
Course coordinator	EBANSV	E*	Stefan Andersson
Content and structure	EBINNH	E	This course gives students a thorough understanding of structural fire safety, -engineering, and -design. The course includes in-depth understanding of fire

Field	FS-kode	I/E	Your text
			safety design of structures. Topics include assessment of fire performance for different types of structures under different fire scenarios and simple and more advanced models for fire exposure and structural fire design.
Learning outcome	EBLUB		<p>Knowledge: The student...</p> <ul style="list-style-type: none"> • has thoroughly knowledge about the different fire resistance requirements • has thorough knowledge about national and international testing standards for structures in buildings and industry • has thorough knowledge about different fire scenarios and their expected effect on different materials and structures • has advanced knowledge of the effect of fire on material properties and forces/loads in structural systems • have knowledge of research and development in the field • can apply and update their knowledge in the field due to new developments <p>Skills: The student...</p> <ul style="list-style-type: none"> • can calculate and analyze different fire scenarios of relevance for structural fire safety • can calculate different fire scenarios for design – using standard fire curves for internal and external fire exposure, models for different types of fires, the time equivalent approach, parametric fire curves and advanced fire modelling • can calculate thermal response using design charts, simple and advanced methods • can perform structural design using tabulated data, simple and advanced methods • can calculate fire performance for steel, concrete, composite steel and concrete, and different types of wood/timber elements

Field	FS-kode	I/E	Your text
			<ul style="list-style-type: none"> • can analyze and design steel, concrete, composite steel and concrete, and different types of wood/timber elements for fire exposure <p>General competence: The student...</p> <ul style="list-style-type: none"> • can analyze relevant fire safety and research issues • can apply fire safety knowledge and skills in new areas and in advanced projects • can communicate their results and master relevant terminology • can identify problematic situations and suggest relevant cost-effective solutions • can communicate about fire safety issues and fire risks to users, owners, relevant authorities, specialists in the field and the general public
Entry requirements	EBFORK	E	Successful completion of SIK504 and SIK505.
Recommended previous knowledge	EBTILRAD	E	
Teaching methods	EBARB	E	The course will be based on collections of lectures, exercises, and problem-based learning. Group Works, self-guidance is also used.
Course requirements	EBFORP	E	
Assessment	EBVURD	E	The course will be assessed through an exam at the end of the semester (50%) and a portfolio including project assignments developed during the course (50%).

Field	FS-kode	I/E	Your text
Examination support material	EBHJELP	E	All materials can be used
Credit reduction due to course overlap	Obligatory	E	7.5 ECTS overlap with ING 4008
Campus	EBSTAD	E*	Digital (Haugesund)
Course available for international students	EBEXCHANGE	I	
Litterature			<i>Parts of:</i> <i>SFPE Handbook of Fire Protection Engineering, 5th Edition, M. Hurley (ed), New York: Springer, 2015</i> <i>Eurocodes EN 1991, 1992, 1993, 1994, 1995</i> <i>Buchanan, A., Structural Design for Fire Safety, 2nd edition, John Wiley, 2016</i>
Date of approval		I	29.05.2024

SIK510 Fire risk assessment

Field	FS-kode	I/E	Your text
Code	Obligatory	E	SIK510
Nynorsk name	Obligatory	E	<i>Brannteknisk Risikovurdering</i>
Bokmål name	Obligatory	I	<i>Brannteknisk Risikovurdering</i>
English name		I	Fire risk assessment
Credits	Obligatory	E*	7.5 ECTS
Level		I	Bachelor <input type="checkbox"/> Master <input checked="" type="checkbox"/> PHD <input type="checkbox"/> One-year course <input type="checkbox"/> Continuing education / Commission <input type="checkbox"/> Preliminary course <input type="checkbox"/>
Formal placement		I	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Department		I	Department of Safety, Chemistry and Biomedical laboratory sciences
Relates to Study programme		E*	<i>Master in Fire Safety Engineering</i>
Language of instruction	EBSPRAK	E*	English
Teaching semester	EBUNDSEM	E*	Autumn <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Autumn - Spring <input type="checkbox"/> Comment: Spring – Autumn <input type="checkbox"/> Comment:
Semester of examination	EBSEM	E*	Autumn <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Both autumn and spring <input type="checkbox"/>
Course coordinator	EBANSV	E*	Stefan Andersson
Content and structure	EBINNH	E	The course shall give the students a thorough understanding of assessment of fire risks. Underlying causes of fires shall be identified with regards to people, material assets and the environment. Measures (barriers) to prevent fires and the escalation of fires are included along with cost analysis. The course deals with the use of national and international standards for conducting qualitative

Field	FS-kode	I/E	Your text
			and quantitative fire risk analysis. Assessment of different criteria for acceptance of risk and uncertainty and sensitivity analyses is included in the course.
Learning outcome	EBLUB		<p>Knowledge</p> <p>The student...</p> <ul style="list-style-type: none"> • has a thoroughly knowledge of the potential harm of fires to people, property and the environment with cost analysis • has advanced knowledge of factors that increase risks of fire, barrier philosophy to reduce risks • has in-depth knowledge of typical causes of fires • has a thorough knowledge of factors affecting the vulnerability of fire protection measures, including human, organizational and technical measures • has detailed knowledge of probability theory, risk and vulnerability analysis and Bayesian philosophy • • has a thorough knowledge of national and international regulations and standards for assessing fire risk <p>Skills</p> <p>The student...</p> <ul style="list-style-type: none"> • can understand situations and conditions that provide increased fire risk • can manage work related to recognized methods for estimating fire risk • can perform preliminary hazard analysis and use event- and fault tree analysis • can estimate the probability / frequency of fires

Field	FS-kode	I/E	Your text
			<ul style="list-style-type: none"> • can evaluate barriers and propose risk reducing measures • can use creative techniques and identify relevant fire scenarios • can analyse fire risk under complex conditions where people, material assets, or the environment are / could be involved • can choose appropriate acceptance criteria, models and methods for risk analysis <p>General competence</p> <p>The student...</p> <ul style="list-style-type: none"> • has the understanding and knowledge of methodology to work with other types of risk • can present the results of risk analysis in an understandable way for the client and the public
Entry requirements	EBFORK	E	Successful completion of SIK506 and SIK507.
Recommended previous knowledge	EBTILRAD	E	
Teaching methods	EBARB	E	The course will be based on a collection of lectures, exercises, problem-based learning, and case studies.
Course requirements	EBFORP	E	
Assessment	EBVURD	E	The course will be assessed through an exam at the end of the semester (50%) and a portfolio including project assignments developed during the course (50%).

Field	FS-kode	I/E	Your text
Examination support material	EBHJELP	E	All material
Credit reduction due to course overlap	Obligatory	E	7.5 ECTS overlap with ING4005
Campus	EBSTAD	E*	Digital (Haugesund)
Course available for international students	EBEXCHANGE	I	
Litterature			<i>Parts of: SFPE Handbook of Fire Protection Engineering, 5th Edition, M. Hurley (ed), New York: Springer, 2015 Guidelines for Chemical Process Quantitative Risk Analysis 2nd Edition, Center for Chemical Process Safety of the American Institute of Chemical Engineers, 2000 Standards and guidelines of relevance for fire risk assessment. Research articles announced later.</i>
Date of approval		I	29.05.2024

SIK511 Smoke and Value Protection Systems

Field	FS-kode	I/E	Your text
Code	Obligatory	E	SIK511
Nynorsk name	Obligatory	E	Brannrøyk og sikring av verdier
Bokmål name	Obligatory	I	Brannrøyk og sikring av verdier
English name		I	Smoke and value protection systems
Credits	Obligatory	E*	7.5 ECTS
Level		I	Bachelor <input type="checkbox"/> Master <input checked="" type="checkbox"/> PHD <input type="checkbox"/> One-year course <input type="checkbox"/> Continuing education / Commission <input type="checkbox"/> Preliminary course <input type="checkbox"/>
Formal placement		I	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Department		I	Department of Safety, Chemistry and Biomedical laboratory sciences
Relates to Study programme		E*	<i>Master in Fire Safety Engineering</i>
Language of instruction	EBSPRAK	E*	English
Teaching semester	EBUNDSEM	E*	Autumn <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Autumn - Spring <input type="checkbox"/> Comment: Spring – Autumn <input type="checkbox"/> Comment:
Semester of examination	EBSEM	E*	Autumn <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Both autumn and spring <input type="checkbox"/>
Course coordinator	EBANSV	E*	Xiaoqin Hu (Vicky)/Arjen Kraaijeveld

Field	FS-kode	I/E	Your text
Content and structure	EBINNH	E	<p>This course is two-fold; first, it concerns smoke and combustion products, which constitute the majority of the curriculum. Secondly, it concerns systems for the protection of values, e.g., life, material, and production.</p> <p>Part 1: Fire-related deaths often involve smoke inhalation. Hence, an essential part of fire safety engineering involves knowledge of smoke production, composition, toxicity, and behaviour, all of which depend on the particular fuel and surrounding environment (scenario). The course shall provide in-depth knowledge of essential combustion products from typical fuels and smoke behaviour. In particular, the methods available to engineers for estimating the yields of combustion products from fire are introduced. The species yield is used in the conservation equations to predict the resulting species concentration. The experimental methods used to measure combustion product yields and concentrations are introduced. The course will pay extra attention to particle-laden smoke as its behaviour differs from gaseous species. The smoke formation process and its modelling methods are discussed. The smoke properties which influence smoke movement are addressed. The behaviour of smoke within a building or open space will be described, and smoke control systems in these large-scale enclosures are discussed.</p> <p>Part 2: Early detection and early intervention are essential in fire safety. Knowledge regarding the different principles of detection and extinguishing systems is important for fire engineers. This part of the course shall give the candidates an overview of the different physical phenomena that are the basis for the detection and extinguishment of a fire. In addition, actual standards and regulations are presented.</p> <p>Active fire protection with regard to different fire suppression systems and fire alarm systems will be presented. Focus is on the advantages and disadvantages</p>

Field	FS-kode	I/E	Your text
			of different protection measures in relation to health and environment, and protection of assets.
Learning outcome	EBLUB		<p>Knowledge The student...</p> <ul style="list-style-type: none"> • has an in-depth understanding of the terms and concepts necessary for estimating the yield of a species • has a thorough knowledge of the smoke formation process and smoke properties related to smoke movement and visibility(smoke dynamics) • has in-depth knowledge of toxicity based on typical fuels • has knowledge of general measures for smoke control • has advanced knowledge of active fire protection measures in different construction phases. Including requirements related to operators and documentation • has a thorough knowledge of standards for planning and execution of active fire protection measures • has in-depth knowledge of fire detection and alarm systems • has a thorough knowledge of the structure of fire suppression systems using water, gas and foam. • has a thorough knowledge of the correlation between detection and suppression systems, including an assessment of overall reliability <p>Skill The student...</p> <ul style="list-style-type: none"> • can estimate species yield in compartment fires from experimental data

Field	FS-kode	I/E	Your text
			<ul style="list-style-type: none"> • can explain the terms in the species conservation equation that involves species yield and movement • can explain the toxic effect of combustion products in terms of human safety • can describe the smoke movement and discuss improvements in smoke control systems • can discuss the smoke movement within large-scale enclosures and in the open space both from a theoretical and modelling perspective • can write an assessment, by means of technical considerations and calculations to advise on preferred fire detection and fire suppression and/or extinguishment system. • can design an inert gas system according to a acknowledged standards and suppliers DIOM <p>General competence</p> <p>The student...</p> <ul style="list-style-type: none"> • can write and structure an academic report • can reflect on his / her own work and take an active role when working in groups • can work individually to gain new knowledge • can communicate their professional work, written and verbally. • can make use of research to support findings and statements. • can use computer tools to perform design of active systems. • can identify solutions to problems in his field and contribute to discussion related to importance and impact of the solutions. • can assess knowledge in the field.
Entry requirements	EBFORK	E	Successful completion of SIK506 and SIK507.

Field	FS-kode	I/E	Your text
Recommended previous knowledge	EBTILRAD	E	Fire Dynamics
Teaching methods	EBARB	E	Asynchronous/synchronous digital lectures, including exercises, demonstrations. Group Work and self-guidance are also used. The latter is essential in a digital course as part of a web-based master's degree.
Course requirements	EBFORP	E	
Assessment	EBVURD	E	Part 1: Portfolio assessment, count for 50 % of the final mark. Part 2: Oral exam, 30 minutes, count for 50 % of the final mark. The students must pass both parts to receive a course grade. Students aiming to improve their course grade have the option to improve their grade on one or both parts. Graded scale from A to E for pass, and F for fail.
Examination support material	EBHJELP	E	Portfolio: Access to all aids Oral exam: No aids.
Credit reduction due to course overlap	Obligatory	E	N/A
Campus	EBSTAD	E*	Digital (Haugesund)
Course available for international students	EBEXCHANGE	I	
Literature			Part 1: 1. SFPE Handbook 2. An introduction to fire dynamics (chapter 11) 3. Enclosure Fire Dynamics (chapter 8-9) 4. Tunnel fire dynamics 5. An introduction to computational fluid dynamics (chapter 12)

Field	FS-kode	I/E	Your text
			Other literature announced at the start of the semester, including selected scientific journal articles Part 2: <ol style="list-style-type: none">1. SFPE handbook of Fire Protection Engineering Vol II ; Chapter 49,42, 44, 45, 46 and 48.2. White papers and other literature from suppliers.3. Selected scientific journal articles to be announced at the start of the semester
Date of approval		I	6.01.2026

SIK512 Guided self-study

Field	FS-kode	I/E	Your text
Code	Obligatory	E	SIK512
Nynorsk name	Obligatory	E	<i>Rettleia sjølstudie</i>
Bokmål name	Obligatory	I	Veiledet selvstudie
English name		I	Guided self-study
Credits	Obligatory	E*	7.5 ECTS
Level		I	Bachelor <input type="checkbox"/> Master <input checked="" type="checkbox"/> PHD <input type="checkbox"/> One-year course <input type="checkbox"/> Continuing education / Commission <input type="checkbox"/> Preliminary course <input type="checkbox"/>
Formal placement		I	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Department		I	Department of Safety, Chemistry and Biomedical Laboratory Sciences
Relates to Study programme		E*	<i>Master in Fire Safety Engineering</i>
Language of instruction	EBSPRAK	E*	English/Norwegian
Teaching semester	EBUNDSEM	E*	Autumn <input checked="" type="checkbox"/> Spring <input checked="" type="checkbox"/> Autumn - Spring <input type="checkbox"/> Comment: Autumn or spring Spring – Autumn <input type="checkbox"/> Comment:
Semester of examination	EBSEM	E*	Autumn <input type="checkbox"/> Spring <input type="checkbox"/> Both autumn and spring <input checked="" type="checkbox"/>
Course coordinator	EBANSV	E*	Einar Arthur Kolstad
Content and structure	EBINNH	E	The course intends for the student to be trained in analytical skills and literature surveys related to defined problem statements. This course can serve as a preparation for the writing process of a master's thesis. An ongoing

Field	FS-kode	I/E	Your text
			<p>research project can define the origin of the problem statement. The topic might also be within technology or science needed for the planned writing of the master thesis. In these cases, the topic for the study will be engineering, which is well suited for the master thesis. Experiments could be a part of the course.</p> <p>This course gives the student practice in advanced technical report writing. It also aims to allow the student to develop an innovative idea or be a research assistant supervised by an active scholar. As a research assistant, the student shall take an active role and do a limited amount of work in an ongoing research project.</p>
Learning outcome	EBLUB		<p>After completing the course, the student has the following learning outcome:</p> <p>Knowledge The student...</p> <ul style="list-style-type: none"> • has knowledge of research and development in the field • knows how to update its knowledge, and knows current innovations. • has knowledge of research and development in the field. <p>Skills The student...</p> <ul style="list-style-type: none"> • can select relevant literature to understand a specific subject better • can structuring a technical report based on a defined problem • can define suitable research methods for examining a technological problem statement • can use relevant research tools for the actual problem limited to mathematical modelling and/or laboratory experiments if they are relevant to the problem statement • can search in technological literature databases on well-defined problem statements

Field	FS-kode	I/E	Your text
			<p>General competence The student...</p> <ul style="list-style-type: none"> • can present specialised knowledge. • can reflect on their work and schedule tasks. • can identify solutions in the field and contribute to discussions related to the impact and significance of the solution. • can communicate their professional work. • can assess knowledge in the field. • knows when further expertise is necessary and where it can be found
Entry requirements	EBFORK	E	Successful completion of SIK 506 and SIK 507.
Recommended previous knowledge	EBTILRAD	E	
Teaching methods	EBARB	E	The most important input shall come from self-study and supervision by a qualified researcher within the relevant department. Before starting the course, the student might present the actual innovation to the relevant department to find a capable supervisor. In order to work together with a qualified researcher, the student might also contact the researcher directly or the relevant department to find a competent supervisor. The problem statement will be approved by the supervisor and the course responsible.
Course requirements	EBFORP	E	To hand in the final exam, students need to have approved: <ul style="list-style-type: none"> • Problem statement: a short presentation of the subject. • Mid-term report: A short notice on the progress. • Final draft/version.

Field	FS-kode	I/E	Your text
Assessment	EBVURD	E	<p>Course paper with adjusted oral examination.</p> <p>Grading scale is A-F where F is fail.</p> <p>The deadline for submitting the assignment will be announced electronically to the student. The paper should be written in English or Norwegian. The examination result for the paper will be published at Studentweb at least 24 hours before the oral examination.</p> <p>Adjusted oral examination, 45 minutes</p> <p>Time and meeting links will be announced electronically to the candidate.</p> <p>The candidate will give a 15-minute presentation of the course paper followed by a session with questions and answers lasting up to 30 minutes. In case of re-censoring the paper, the same presentation must be used again.</p> <p>Each candidate must listen to the presentations and examinations of the other students taking the same course in the same semester.</p> <p>The grade for the course paper may be adjusted up or down by a maximum of one grade.</p> <p>After approval from the course responsible, the term paper might be replaced by an oral exam. This is normally for calculation-intensive topics or for topics involving the use of dedicated software.</p>
Examination support material	EBHJELP	E	All support material is permitted

Field	FS-kode	I/E	Your text
Credit reduction due to course overlap	Obligatory	E	<i>Supervisors ensure that the student does not get credits for a subject/topic for which they have already received credits.</i>
Campus	EBSTAD	E*	Digital (Haugesund)
Course available for international students	EBEXCHANGE	I	
Litterature			Various are chosen by the student and approved by the supervisor.
Date of approval		I	29.05.2024

SIK513 Fire Laboratory and Experiments

Field	FS-kode	I/E	Your text
Code	Obligatory	E	SIK513
Nynorsk name	Obligatory	E	<i>Brannlaboratoriet og eksperimentelle forsøk</i>
Bokmål name	Obligatory	I	Brannlaboratoriet og eksperimentelle forsøk
English name		I	Fire Laboratory and Experiments
Credits	Obligatory	E*	7.5 ECTS
Level		I	Bachelor <input type="checkbox"/> Master <input checked="" type="checkbox"/> PHD <input type="checkbox"/> One-year course <input type="checkbox"/> Continuing education / Commission <input type="checkbox"/> Preliminary course <input type="checkbox"/>
Formal placement		I	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Department		I	Department of Safety, Chemistry and Biomedical laboratory sciences
Relates to Study programme		E*	<i>Master in Fire Safety Engineering</i>
Language of instruction	EBSPRAK	E*	English
Teaching semester	EBUNDSEM	E*	Autumn <input type="checkbox"/> Spring <input checked="" type="checkbox"/> Autumn - Spring <input type="checkbox"/> Comment: Spring – Autumn <input type="checkbox"/> Comment:
Semester of examination	EBSEM	E*	Autumn <input type="checkbox"/> Spring <input checked="" type="checkbox"/> Both autumn and spring <input type="checkbox"/>
Course coordinator	EBANSV	E*	Anita K. Meyer and Ruben D. Strand
Content and structure	EBINNH	E	Experiments are essential in fundamental research, consideration of material properties and certification of products and product solutions. It is difficult to imagine how fire safety could be engineered for all aspects of society without the knowledge gained from experiments. This course seeks to both introduce

Field	FS-kode	I/E	Your text
			and provide in-depth knowledge on fundamental aspects of experimental and laboratory work. The course shall provide the candidates with the necessary theoretical foundation to plan, perform, process and analyse experimental work safely. Emphasis shall be given to critical consideration of performed experiments and identification of potential threats to validity. The course includes aspects such as risk identification and implementation of risk-reducing measures, knowledge of test standards, developing case-specific standards, developing test procedures, instrumentation, equipment, data collection, data processing and data analyses.
Learning outcome	EBLUB		<p>After completing the course, the student has the following learning outcome:</p> <p>Knowledge The student...</p> <ul style="list-style-type: none"> • has thorough knowledge of safe operations in laboratory/experimental settings through identification of risks related to both the surroundings and related to the particular experiment in question, lifting operations, and safety of constructions • has in-depth knowledge of safety measures related to the identified risks • knows essential standards/methods for fire testing of materials and constructional solutions and their limitations • has thorough knowledge of essential equipment used in fire experiments • knows how to analyse the test and test environment to identify external and internal threats to validity <p>Skills The student...</p> <ul style="list-style-type: none"> • can develop basic risk assessments and implement necessary measures

Field	FS-kode	I/E	Your text
			<ul style="list-style-type: none"> • can develop general laboratory safety procedures and test-specific safety procedures • can develop case-specific methods and tests to acquire identified parameters/solve problems • can plan experiments, both from standards and other individual fire tests, and provide detailed test procedures • can process raw data into the desired data format • can analyse test data using knowledge of fire dynamics • can describe the use and set-up of essential equipment <p>General Competence The student...</p> <ul style="list-style-type: none"> • can work individually to gain new knowledge • knows how to make use of research to support findings and statements • knows how experimental work is planned, performed, processed and analysed
Entry requirements	EBFORK	E	Successful completion of SIK508 and SIK509.
Recommended previous knowledge	EBTILRAD	E	Fire Science and basic Excel knowledge (or similar)
Teaching methods	EBARB	E	Asynchronous/Synchronous digital lectures, herein, exercises, problem-based learning and demonstrations. Group Work and self-guidance are also used. The latter is essential in a digital course as part of a web-based master's degree.
Course requirements	EBFORP	E	
Assessment	EBVURD	E	Part 1: Portfolio assessment, count for 50 % of the final mark. Part 2: Digital oral exam, 30 minutes, count for 50 % of the final mark.

Field	FS-kode	I/E	Your text
			The students must pass both parts to receive a course grade. Students aiming to improve their course grade have the option to improve their grade on one or both parts. Graded scale from A to E for pass, and F for fail.
Examination support material	EBHJELP	E	Portfolio: Access to all aids Oral exam: No aids.
Credit reduction due to course overlap	Obligatory	E	None
Campus	EBSTAD	E*	Campus Haugesund
Course available for international students	EBEXCHANGE	I	
Litterature			<u>Selected chapters from:</u> - Introduction to Fire Dynamics, 3 rd edition, ISBN 9780470319031 - SFPE Handbook of Fire Protection Engineering, 5 th edition, ISBN 978-1-4939-2565 <u>Research articles:</u> - Log, T. Consumer Grade Weather Stations for Wooden Structure Fire Risk Assessment, Sensors. 2018 , 18, 3244. - Log, T. Modelling Indoor Relative Humidity and Wood Moisture Content As A Proxy For Wooden Home Fire Risk, 2019 , 19, 5050. Kraaijeveld, A., Gunnarshaug, A., Schei, B., Log., T. Burning Rate and Time to Flashover In Wooden ¼ Scale Compartments as A Function of Fuel Moisture Content. <u>Other:</u> - Compendium on selected topics - Selected international standards on fire testing
Date of approval		I	29.05.2024

SIK514 Fire Investigations

Field	FS-kode	I/E	Your text
Code	Obligatory	E	SIK514
Nynorsk name	Obligatory	E	<i>Branntekniske undersøkingar</i>
Bokmål name	Obligatory	I	Branntekniske undersøkelser
English name		I	Fire Investigations
Credits	Obligatory	E*	7.5 ECTS
Level		I	Bachelor <input type="checkbox"/> Master <input checked="" type="checkbox"/> PHD <input type="checkbox"/> One-year course <input type="checkbox"/> Continuing education / Commission <input type="checkbox"/> Preliminary course <input type="checkbox"/>
Formal placement		I	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Department		I	Department of Safety, Chemistry and Biomedical laboratory sciences
Relates to Study programme		E*	<i>Master in Fire Safety Engineering</i>
Language of instruction	EBSPRAK	E*	English
Teaching semester	EBUNDSEM	E*	Autumn <input type="checkbox"/> Spring <input checked="" type="checkbox"/> Autumn - Spring <input type="checkbox"/> Comment: Spring – Autumn <input type="checkbox"/> Comment:
Semester of examination	EBSEM	E*	Autumn <input type="checkbox"/> Spring <input checked="" type="checkbox"/> Both autumn and spring <input type="checkbox"/>
Course coordinator	EBANSV	E*	Torgrim Log

Field	FS-kode	I/E	Your text
Content and structure	EBINNH	E	The purpose of this course is to give the student an overview of the investigation discipline both from a practical and a research based point of view. A fire incident can have both natural, human and technological causes. In the aftermath of an incident, it may be quite challenging to reveal possible causes of a fire and mechanisms involved during the fire development. The student will be introduced to both industrial and civil sector fire and explosion investigations as well as the role as an expert witness in police investigations and court cases. A strong focus will be given to the learning potential from fire investigations for a safer future in the industry and the civil sector.
Learning outcome	EBLUB		<p>After completing the course, the student has the following learning outcome:</p> <p>Knowledge The student...</p> <ul style="list-style-type: none"> • knows the fire and ventilation dynamics involved in selected particularly challenging historic wildfires, civil sector and industrial fire and explosion incidents • knows the different focus of fire and explosion investigations in fire brigades, industry, insurance companies and police force • has knowledge about possible error traps involved in fire and explosion investigations • knows ignition properties and fire spread mechanisms for a number of accelerants, inventory and structural materials • knows possible collapse mechanisms in structures exposed to fires and explosions • knows the principles of NFPA 921: Guide for Fire and Explosion Investigation • knows high-level tools for analysing incidents including human behaviour, responsibility, system analysis, timelines and other analytical methods • knows the principles for testifying in the court

Field	FS-kode	I/E	Your text
			<p>Skills The student...</p> <ul style="list-style-type: none"> • can use fire and explosion dynamics to analyse historic fire and explosion incidents • can identify possible error traps in a given investigation • can develop a preliminary investigation plan and adjust the plan based on revealed knowledge during the course of the investigation • can work with several hypotheses during an investigation • can acknowledge and thus, counteract possible confirmation biases • can identify incendiary fire signs, evidence, motivations, and detection of accelerants • can treat interviewees with due respect and conduct unbiased and neutral interviews as well as evaluate witness credibility • can neutrally evaluate the strength and validity of his/her own investigation • can avoid spoliation of evidence <p>General competence The student...</p> <ul style="list-style-type: none"> • can use the basic principles of fire and explosion dynamics to reveal possible ignition sources and likely fire development in case studies • can identify impacts of materials involved, heat radiation, convection and ventilation patterns and their reciprocal influence on the fire development and burn patterns • can put up hypotheses for the investigation and use falsification to limit the number of hypotheses • can analyse human, technical and organizational factors that may affect the incident and hence the response in a positive or negative direction

Field	FS-kode	I/E	Your text
			<ul style="list-style-type: none"> • can discuss what could have been the consequences under slightly changed circumstances • can make proper diagrams and incident reports • can identify learning points from own and other investigations
Entry requirements	EBFORK	E	Successful completion of SIK508 and SIK509.
Recommended previous knowledge	EBTILRAD	E	
Teaching methods	EBARB	E	Asynchronous/Synchronous digital lectures, herein, exercises, problem-based learning and demonstrations. Group Work and self-guidance are also used. The latter is essential in a digital course as part of a web-based master's degree.
Course requirements	EBFORP	E	
Assessment	EBVURD	E	Portfolio (50 %) Digital oral Exam (50 %) Both parts must be passed to pass the course. Grade: A - E / passed; F / failed.
Examination support material	EBHJELP	E	Portfolio: Access to all aids Oral exam: No aids.
Credit reduction due to course overlap	Obligatory	E	N/A
Campus	EBSTAD	E*	Digital (Haugesund)
Course available for international students	EBEXCHANGE	I	
Litterature			Non exhaustive literature list:

Field	FS-kode	I/E	Your text
			<ul style="list-style-type: none"> - <i>Fire Investigator: Principles and Practice</i>, 6th Edition, ISBN 978-1284247053 Selected research articles, examples: <ul style="list-style-type: none"> - Stauffer, E. Interpol review of fire investigation 2016 – 2019, <i>Forensic Sci. Int.: Synergy</i>, 2020, 2, 368-381. - Babrauskas, V. Charring rate of wood as a tool for fire investigations, <i>Fire Saf. J.</i> 2005, 40 (6), 528-554. - Log, T. Cold Climate Fire Risk; A Case Study of the Lærdalsøyri Fire. <i>Fire Technol.</i> 2015, 52, 1815–1843. - Steen-Hansen, A. et al. Learning from fire investigations and research – A Norwegian perspective on moving from a reactive to a proactive fire safety management, <i>Fire Safety J.</i> 2021, 120, 103047. - Log, T. et al. Unmanaged heathland – a fire risk in subzero temperatures? <i>Fire Safety J.</i> 2017, 90, 62–71. - Bakka, M.S. et al. Analysis of a High-Voltage Room Quasi-Smoke Gas Explosion. <i>Energies</i> 2020, 13, 601. - Log, T.; Gunnarshaug, A. Analysis of a Costly Fiberglass-Polyester Air Filter Fire. <i>Energies</i> 2022, 15, 7719. - Log, T.; Gjedrem, A.M. A Fire Revealing Coastal Norway’s Wildland–Urban Interface Challenges and Possible Low-Cost Sustainable Solutions. <i>Int. J. Environ. Res. Public Health</i> 2022, 19, 3038.
Date of approval		I	28.08.2024

SIK515 Wildfires and Wildland Urban Interface

Field	FS-kode	I/E	Your text
Code	Obligatory	E	SIK515
Nynorsk name	Obligatory	E	Branner i landskapet og randsona
Bokmål name	Obligatory	I	Branner i landskapet og randsonen
English name		I	Wildfires and the Wildland Urban Interface
Credits	Obligatory	E*	7.5 ECTS
Level		I	Bachelor <input type="checkbox"/> Master <input checked="" type="checkbox"/> PHD <input type="checkbox"/> One-year course <input type="checkbox"/> Continuing education / Commission <input type="checkbox"/> Preliminary course <input type="checkbox"/>
Formal placement		I	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Department		I	Department of Safety, Chemistry and Biomedical laboratory sciences
Relates to Study programme		E*	<i>Master in Fire Safety Engineering</i>
Language of instruction	EBSPRAK	E*	English
Teaching semester	EBUNDSEM	E*	Autumn <input type="checkbox"/> Spring <input checked="" type="checkbox"/> Autumn - Spring <input type="checkbox"/> Comment: Spring – Autumn <input type="checkbox"/> Comment:
Semester of examination	EBSEM	E*	Autumn <input type="checkbox"/> Spring <input checked="" type="checkbox"/> Both autumn and spring <input type="checkbox"/>
Course coordinator	EBANSV	E*	Nieves Fernandes Anez and Ruben D. Strand
Content and structure	EBINNH	E	It is evident from the many wildfires and wildland-urban interface (WUI) fires around the world that understanding these scenarios has become an integral part of engineering a fire-safe society. The course seeks to introduce and

Field	FS-kode	I/E	Your text
			provide a thorough understanding of vegetation fires. The course concerns the wildfire phenomenon, including type of fuel, fuel conditions, fire behaviour in the wild, fire plume and flame spread by heat and ember transport. Further, other central topics are weather conditions, fire spread rates, and wildland-to-structure fire spread (and vice versa). Additionally, the course emphasises fire risk identification and risk-mitigating measures.
Learning outcome	EBLUB		<p>After completing the course, the student has the following learning outcome:</p> <p>Knowledge The student...</p> <ul style="list-style-type: none"> • has knowledge of the characteristics of wildfires, including fire plumes and fire spread mechanisms • can analyse and discuss the type of fuel and associated fire risk • can analyse how weather, vegetation conditions, topography and settlements can influence on the possible fire scenarios and associated risks • can describe the wildfire risk from a historical perspective, distinguishing between good and bad fires • has knowledge of wildland-to-structure and structure-to-wildland fire spread • can analyse the evacuation of settlements • can discuss the general principle and validity of fire danger indices • knows about fuel removal techniques such as mulching and prescribed burning • knows about ancient land management techniques for productive and fire-safe landscapes • knows about the likely influence of climate change and land management on future wildfire conditions

Field	FS-kode	I/E	Your text
			<p>Skills The student...</p> <ul style="list-style-type: none"> • can use hand calculations and computer-assisted tools to determine wildfire spread • can develop strategies for controlling/extinguishing wildfires • can develop strategies for wildfire and WUI risk mitigation • can recommend risk-mitigating measures in the vicinity of homes • can assess fuel moisture content (FMC) of thermally thin fuels, e.g., grass and twigs • can use satellite imagery and computer-assisted tools to assess wildfire risk • can evaluate potential ladder fuel and possible transition from ground fuel fires to fully developed canopy fires <p>General competence The student...</p> <ul style="list-style-type: none"> • can work individually to gain new knowledge • can make use of research to support findings and statements
Entry requirements	EBFORK	E	Successful completion of SIK508 and SIK509.
Recommended previous knowledge	EBTILRAD	E	
Teaching methods	EBARB	E	Asynchronous/Synchronous digital lectures, herein, exercises, problem-based learning and demonstrations. Group Work and self-guidance are also used. The latter is essential in a digital course as part of a web-based master's degree.
Course requirements	EBFORP	E	

Field	FS-kode	I/E	Your text
Assessment	EBVURD	E	<p>The assessment has to parts:</p> <ul style="list-style-type: none"> • Portfolio assessment, including 3 assignments, accounts for 50 % of the final mark • Oral exam, 30 minutes, accounts for 50 % of the final mark. <p>Graded scale fram A to E for pass, and F for fail.</p>
Examination support material	EBHJELP	E	<p>All aids can be used for the portfolio. The oral exam is a discussion. There will not be time for using books, but notes may be an alternative.</p>
Credit reduction due to course overlap	Obligatory	E	None
Campus	EBSTAD	E*	Digital (Haugesund)
Course available for international students	EBEXCHANGE	I	
Litterature			<p>Books:</p> <p>Belcher, Claire M., ed. <i>Fire phenomena and the Earth system: an interdisciplinary guide to fire science</i>. John Wiley & Sons, 2013.</p> <p>Mell, William E., et al. "Wildland fire behavior modeling: perspectives, new approaches and applications." <i>Proceedings of 3rd fire behavior and fuels conference</i>. 2010.</p> <p>Manzello, Samuel L., ed. <i>Encyclopedia of wildfires and wildland-urban interface (WUI) fires</i>. Cham: Springer International Publishing, 2020.</p> <p>Journal papers:</p>

Field	FS-kode	I/E	Your text
			<p>Stewart, Susan I., et al. "Defining the wildland–urban interface." <i>Journal of Forestry</i> 105.4 (2007): 201-207.</p> <p>Schug, Franz, et al. "The global wildland–urban interface." <i>Nature</i> 621.7977 (2023): 94-99.</p> <p>Fernandez-Anez, Nieves, et al. "Current wildland fire patterns and challenges in Europe: A synthesis of national perspectives." <i>Air, Soil and Water Research</i> 14 (2021): 11786221211028185.</p> <p>The list of journal papers will be updated at the beginning of the course to ensure that it includes novelties in the field.</p>
Date of approval		I	29.05.2024

SIK599 Master thesis in Fire Safety Engineering

Field	FS-kode	I/E	Your text
Code	Obligatory	E	<i>SIK599</i>
Nynorsk name	Obligatory	E	<i>Masteroppgave for brannsikkerhet</i>
Bokmål name	Obligatory	I	<i>Masteroppgåve for brannsikkerheit</i>
English name		I	Master thesis in Fire Safety Engineering
Credits	Obligatory	E*	30 ETCS
Level		I	Bachelor <input type="checkbox"/> Master <input checked="" type="checkbox"/> PHD <input type="checkbox"/> One-year course <input type="checkbox"/> Continuing education / Commission <input type="checkbox"/> Preliminary course <input type="checkbox"/>
Formal placement		I	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Department		I	Department of Safety, Chemistry and Biomedical laboratory sciences
Relates to Study programme		E*	<i>Master in Fire Safety Engineering</i>
Language of instruction	EBSPRAK	E*	English
Teaching semester	EBUNDSEM	E*	Autumn <input type="checkbox"/> Spring <input type="checkbox"/> Autumn - Spring <input checked="" type="checkbox"/> Comment: Spring – Autumn <input type="checkbox"/> Comment:
Semester of examination	EBSEM	E*	Autumn <input type="checkbox"/> Spring <input type="checkbox"/> Both autumn and spring <input checked="" type="checkbox"/>
Course coordinator	EBANSV	E*	Ruben Dobler Strand

Field	FS-kode	I/E	Your text
Content and structure	EBINNH	E	The thesis must be an individual work in which the candidate shows that they have the ability to independently specialised in a narrowly defined field. The project is concluded with a written report.
Learning outcome	EBLUB		<p>After completing the course, the student has the following learning outcome:</p> <p>Knowledge The student...</p> <ul style="list-style-type: none"> • has specialized knowledge of research and problem-solving in the specific areas of the master's thesis • has knowledge of scientific methods within fire science and engineering, including definition of research questions, literature studies and evaluation methods. <p>Skills The student...</p> <ul style="list-style-type: none"> • can analyse relevant fire safety problems based on different information from previous studies and work in the relevant field • can apply relevant scientific methods to analyse the problem relate critically to different sources of information. • can investigate the problem and discuss their results and conclusion in relation to the relevant literature. • can carry out an independent limited research work. <p>General Competence The student...</p> <ul style="list-style-type: none"> • can reflect and critically evaluate their own work. • can analyse academic and research ethical issues.

Field	FS-kode	I/E	Your text
			<ul style="list-style-type: none"> • can convey extensive independent research work. • can explain the status of research and development in this field and carry out an independent , bounded thesis. • can account for research and development in the field.
Entry requirements	EBFORK	E	<p>The student must have passed 60 ECTS from the theoretical part of the master.</p> <p>Successful completion of SIK500 Experiment and current developments in Fire Safety</p>
Recommended previous knowledge	EBTILRAD	E	All the previous courses of the master in fire safety engineering (90 ECTS)
Teaching methods	EBARB	E	<p>Independent work in the form of a research project carried out under an academic supervisor's supervision and documented in a written master's thesis. The supervisor(s) shall advise on the formulation and demarcation of the subjects, and problem approaches for the thesis, literature, academic content, tasks, and progress plan. The supervisor(s) discuss drafts of the thesis with the candidate. This shall normally take place in meetings, but other arrangements can be agreed upon. The supervision takes place on demand and shall be evenly distributed over the master's education period.</p>
Course requirements	EBFORP	E	<p>To deliver the master thesis, the students need to have approved:</p> <ol style="list-style-type: none"> 1. Participate on kick-off meeting at the beginning of the thesis. 2. Deliver a disposition to subject coordinator, first two months. 3. Achieve an approved final draft/version. 4. Present the master thesis in 10 minutes on "Presentation day", followed by 5 min of questions. A month before handling in the thesis. <p>All three compulsory activities are possible to do both in the autumn and spring semester.</p>

Field	FS-kode	I/E	Your text
Assessment	EBVURD	E	The assessment is based on the submitted thesis. Two sensors, one internal and one external, will assess the thesis. Graded scale from A to E for pass, and F for fail.
Examination support material	EBHJELP	E	All, however the thesis must be an independent achievement.
Credit reduction due to course overlap	Obligatory	E	
Campus	EBSTAD	E*	Digital (Haugesund)
Course available for international students	EBEXCHANGE	I	
Litterature			The literature used depends on the topic of each thesis, and will be adapted to them.
Date of approval		I	29.05.2024