Competence coverage	matrix									Gene	eral Co	urses								Ma r' Dis
IIIIII SHENT INIVERSITY Laster of Science in Fi	re Safety Engineering		and Industrial Fire Safety	Applications in Fire	ו: Detection and	E051494 Active Fire Protection II: Smoke and Heat Control	Engineering	slation	no	Design	Project		ıar	E039161 Thermodynamics, Heat and Mass Transfer	it Ambient and Elevated	People and Fire		trategies	Engineering	tati
cademic year 2021-20	22		Explosions and Indus	Mechanics	Active Fire Protection I: Detection and ion	tive Fire Protectior	for Fire Safety	e Safety and Legislation	E051610 Passive Fire Protection	Performance-Based	e Safety Strategy Project	E051430 Fire Dynamics	e Research Seminar	ermodynamics, He	E051570 Material Behaviour at Ambient Temperatures	E051461 Interaction between People and Fire	E051550 Risk Management	Compartmentation Strategies	Structural Fire Engin	COLLOS MASSICE
egend:			E051540 Exp	E051421 Fluid	E051482 Act Suppression	1494 Act	E051700 CFD	E051443 Fire	1610 Pa	E061522 Pel	E051630 Fire	1430 Fire	E051581 Fire	3161 The	I570 Ma perature	1461 Inte	1550 Ris	E051590 Co	E051600 Str	0
=teaching methods =evaluation methods				E05.	Supp	E05.	E05.	E05.	E05.	E06.	E05.	E05.	E05.	E03	E05. Tem	E05.	E05.	E05.	E05.	
ompetences in ne/more scientific scipline(s)	Master and apply advanced knowledge in the own engineering discipline in solving complex problems. Apply Computer Aided Engineering (CAE) tools and advanced communication instruments in a creative and purposeful way.	T 13 E 13 T 6 E 5	T E	E	E	T E T E	T E T E		E	T E T E	T E T E			E		T E T E	T E T	E		
	Master and apply knowledge of physics, chemistry, thermodynamics, heat and mass transfer, fluid mechanics and computational fluid dynamics to critically analyse and evaluate the development of fires in enclosures.	T 8 E 8		T E			T E			T E	T E	T E		T E	T E					
	Master and apply knowledge of structural fire engineering to critically analyse, design and evaluate the performance of structures in case of fire.	T 5 E 5							E	E	E								E	
	Master and apply knowledge of explosions to critically analyse and evaluate the associated risk.	T 4 E 4	T E							T E							T E			
	assessment, human behaviour, passive fire protection systems and active fire protection systems.	T 9 E 9			T E	T E				T E	T E	T E			T E	T E	T E			
	Master and apply the principles necessary to develop a performance-based fire safety design.	T 7 E 7								E	E	E				T E	E		E	
cientific competences	Analyse complex problems and translate them into concrete research questions.	T 10 E 10	T E		E	T E			T E	T E			T E	T E		T E	T E			
	Consult the scientific literature as part of the own research.	T 7 E 7								T E	T E		T E			T E	T E	T E		
	Select and apply the appropriate models, methods and techniques. Develop and validate mathematical models and methods.	T 12 E 12 T 3	T E	E	E	T E	T E			T E T	T E		T E		T E	T E T	T E			
	Interpret research findings in an objective and critical manner.	E3 T7 E7				T E	T E			T E			T E			T E	T E			
	Elaborate problems of fire risk assessment in a critical, autonomous and flexible manner with a limited amount of data.	T 4 E 4	T E							T E							T			
	Perform valid computer simulations of development and consequences of enclosure fires.	T 6 E 6				T E	T E			T	T E					T E				
	Perform valid computer simulations to assess the performance of smoke and heat control systems as means of active fire protection measure.	T 4				T E	_			T E	T E									
	systems in case of fire.	T 3 E 3			_		_				T E								T E	
tellectual ompetences	Independently form an opinion on complex situations and problems, and defend this point of view.	T 13 E 13	T E	T E	T E	T E	T E			E	T E		T E	T E		T E	T E	T E		
	research, conceptual design and production.	T 8 E 8	T E		E	T E				E	T E					T E	T E			
	Critically reflect on one's own way of thinking and acting, and understand the limits of one's competences.	T 10 E 10	T E	T E	T E	T E	T E			T E	T E						T E	T E		
	Stay uptodate with the evolutions in the discipline to elevate the own competences to expert level.	T 7 E 7	T E		T E		T E	T E		T E						T E				
	Readily adapt to changing professional circumstances.	T 3 E 3	T E							T E										
	Develop scientifically sound arguments to optimize passive and active fire protection measures.	T 10 E 10	•		T E	T E			T E	T E	T E				T E	T E	T E	T E		
	Develop scientifically sound arguments to develop a performance- based fire safety design.	T 6 E 6								T E	T E					T E	T E		T E	
ompetences in	, 3	T 14 E 14	T E	T E	T	T E	T E			T E	T E	T E	T E			T E	T E	T E	T	
operation and ommunication	Project management: have the ability to formulate objectives,	T 8 E 8	_		T E	T E				T E	T E		T E			T E			T E	
	Have the ability to work as a member of a team in a multi disciplinary workingenvironment, as well as being capable of taking on supervisory responsibilities.	T 6 E 6			T E	T E				T E	T E					T E	T E			
	Report on technical or scientific subjects verbally, in writing and using graphics. Function in an international environment (students, PhD students, scientific co-workers, scholars).			T E	T E	T E T	T E			T E T	T E T		T E T			T E T	T	T E T	T E	
ocietal competences	Act in an ethical, professional and social way.	E 8	T	Ţ	T	E T	T			E T	E T		Е			Е	E T			
	Recognize the most important business and legal aspects of the	E 9	E T	Е	Е	T	Е			T	Е						Е			
		E 3	Е			Е				E T						Т	T			
	discipline and its social relevance. Master and apply critical insight in existing fire safety legislation and regulations in the development of a fire safety design.	E 3 T 10 E 10	T E			T E		T E		E T E	T E					E T E	T E	T E	T E	
	Act in an ethical, professional and social way when developing and presenting a performance based fire safety design.		_			T		_		T	T					_	T	_	_	

Competence coverage matrix

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GHENT UNIVERSITY Master of Science in Fit Academic year 2021-20 Legend: T=teaching methods E=evaluation methods	022		E051540 Explosions and Industrial Fire Safety	E051421 Fluid Mechanics Applications in Fire	E051482 Active Fire Protection I: Detection and Suppression	E051494 Active Fire Protection II: Smoke and Heat Control	E051700 CFD for Fire Safety Engineering	E051443 Fire Safety and Legislation	E051610 Passive Fire Protection	E061522 Performance-Based Design	E051630 Fire Safety Strategy Project	E051430 Fire Dynamics	E051581 Fire Research Seminar	E039161 Thermodynamics, Heat and Mass Transfer	E051570 Material Behaviour at Ambient and Elevated Temperatures	E051461 Interaction between People and Fire	E051550 Risk Management	E051590 Compartmentation Strategies	E051600 Structural Fire Engineering	E091103 Master's Dissertation
Profession-specific competence	Master the complexity of technical systems by using system and process models.	T 7 E 7	T E	T E		T E	T E			T E							T E			T E
	Reconcile conflicting specifications and prior conditions in a high quality and innovative concept or process.	T 5 E 5	T E		T E					T E							T E			T E
	Synthesize incomplete, contradictory or redundant data into useful information.	T 8	T E		T E	T E				T E			T E			T E	T E			T E
	Possess sufficient ready knowledge and understanding to evaluat the results of complex calculations, or make approximate estimates.	te T 9 E 8	T E	T E	T E	T E	T E			T E	T E						Т			T E
	Pay attention to entire life cycles of systems, machines, and processes.	T 3 E 3	T E		T E					T E										
	Pay attention to sustainability, energyefficiency, environmental cost, use of raw materials and labour costs.	T 3 E 3		T E					T E	T E										
	Pay attention to all aspects of reliability, safety, and ergonomics.	T 3 E 3			T E					T E							T E			
	Have insight into and understanding of the importance of entrepreneurship.	T 2 E 2								T E	T E									
	Show perseverance, innovativeness, and an aptitude for creating added value.	T 7 E 7		T E	T E	T E				T E							T E	T E		T E
	Integrate Fire Safety Engineering related knowledge to develop a performance-based fire safety design.	T 7 E 7					T E			T E	T E					T E	T E		T E	T E
			W 19	W 12	W 20	W 25	W 15	W 2	W 5	W 42	W 27	W 4	W 10	W 4	W 4	W 24	W 30	W 10	W 9	W 35
		E	E 19	E 12	E 20	E 25	E 15	E 2	E 5	E 42	E 27	E 4	E 10	E 4	E 4	E 24	E 27	E 10	E 9	E 35

EMingwALG1.1 Master and apply advanced knowledge in the own engineering discipline in solving complex problems.

Competences in one/more scientific discipline(s)

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Course	Teaching methods	Evaluation methods	Course learning outcome
Noot: leer- en evaluatievormen voorafgegaan door ** werd	den niet teruggevonden in de studiefiche		
E051540 Explosions and Industrial Fire Safety	y lecture seminar	open book examination	TOPICS: industrial fire and explosion protection. COMPETENCES: assess the fire and explosion risks involved with the use, handling, transport or storage of liquid, gaseous and/or solid materials and to
			take the appropriate technical and organisation measures to reduce such a risk to an acceptable level. INSIGHTS: understand the physical processes that occur during explosions.
E051421 Fluid Mechanics Applications in Fire		written examination	Design an original pipe netwerk with fire sprinklers, fed by means of a pump sump
	seminar: coached exercises	report	Understand the interaction of air and water with smoke.
		oral examination	Understand pressurized flow in pipes, pipe networks and manifolds
		open book examination	Calculate flows through vertical and horizontal openings.
			Select a relevant pump and duty point for a pipe network Understand the flow phenomena involved in entrainment of air into a smoke plume and into a momentum driven jet
			Understand atomisation in fire sprinklers and describe the liquid spray
			Understand the background of the hydraulic aspects of an international (European) standard for design of fire sprinkler
			installations.
E051482 Active Fire Protection I: Detection ar	nd lecture	open book examination	Make a critical assessment of the different manual suppression systems and automatic suppression methods for different
Suppression	seminar	report	incident types, by means of
	project	oral examination	calculations and technical considerations.
			Make a critical assessment, by means of calculations and technical considerations, of different fire detection methods.
			Design, together with colleagues, a fire detection installation for a building.
			Design, together with colleagues, a fire suppression installation that is not only based on water extinguishment.
E051494 Active Fire Protection II: Smoke and Heat	Heat Control lecture	written examination	Perform a critical evaluation of a smoke and heat control system design
	seminar: coached exercises	report	Compute and critically evaluate the removal of heat from an enclosure
	project	oral examination	Make a correct CFD calculation in the context of a smoke and heat control system design
		open book examination	Explain the processes involved in the production of smoke in case of fire
			Compute and critically evaluate the movement of smoke inside, into and out of an enclosure
			Calculate an original design of smoke and heat control systems for a realistic configuration
FOR4700 OFD for Fire Cofety Foreign and a	la atoma	and arrania ation	Apply national and international standards and regulative documents for the design of smoke control systems
E051700 CFD for Fire Safety Engineering	lecture	oral examination	Perform CFD simulations with a good quality Apply the Fire Dynamics Simulator (FDS) for a wide variety of fire scenarios
	project	report	Apply the Fire Dynamics Simulator (FDS) for a wide variety of the scenarios Apply CFD and critically evaluate the reliability of the results based on the capabilities of state-of-the-art CFD for Fire Safety
			Engineering
E051610 Passive Fire Protection	lecture	written examination	Classify a building product based on test results
	online lecture		Analyse a construction detail for passive fire protection systems
	seminar: coached exercises		Give an overview of fire protection systems possible for different applications, including their respective advantages and
			disadvantages
E061522 Performance-Based Design	group work	written examination with open	Knowledge: Master and apply the advanced knowledge of previous courses by integrating the fire protection techniques into
	self-reliant study activities	questions	global risk performance
	project	report	based design. Knowledge: Use functional criteria (performance) on a criterian in order to realize and evaluate an original fire sefety design.
	lecture	assignment	Knowledge: Use functional criteria (performance) as a criterion in order to realise and evaluate an original fire safety design. Knowledge: Evaluate self-reliantly the fire risk in a project.
		participation	Skills: Analyse own results and results of others within fire performance based designs in an objective manner.
E051630 Fire Safety Strategy Project	project	assignment	Develop a complete fire safety strategy for a challenging project, including active fire protection systems, passive systems,
LOUTOUG THE Galety Gliategy Fluject	project	assignment	evacuation strategy, use of
			materials, structural fire behaviour,

E039161 Thermodynamics, Heat and Mass Transfer	lecture seminar: coached exercises	written examination oral examination	Understand and calculate the consequences of heat transfer in case of fire. Quantify thermodynamic properties of pure substances and mixtures. Solve a new complex problem, involving the thermodynamic processes and the different modes of heat transfer that occur in case of fire. Understand the mathematical formulation of the physical processes of heat transfer. Understand the thermodynamic aspects of combustion. Recognize the occurrence of mass transfer in case of fire. Calculate flue gas temperature and composition in case of combustion. Understand and apply the first law of thermodynamics.
E051461 Interaction between People and Fire	lecture project	open book examination report oral examination	Explain the nature of likely human behaviour associated with evacuation in fire situations. Be aware of the limitations of evacuation modelling. Critically assess the engineering literature associated with human behaviour in fire evacuation and evacuation modelling.
E051550 Risk Management	lecture project	oral examination report	Being able to execute qualitative and quantitative risk analyses on practical relevant situations Being able to recognize and describe risks Being able to refect critically about the appropriateness and limitations of available statistical data, risk analyses and risk acceptance criteria Being able to analyse system behaviour and construct fault, event and decision trees
E051590 Compartmentation Strategies	excursion seminar: coached exercises ** fieldwork project lecture	participation report assignment	Draw up compartmentation strategies for uncommon buildings Check in a critical manner implemented compartmentation on-site Draw up and check compartmentation strategies in accordance with prescriptive guidance
E091103 Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initiative and perseverance. Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found them, both to colleagues as to laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execution of research (literature search, topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, conclusions,). Find an appropriate methodology, in accordance with the applicable scientific norms of the specific field of study.

Course	Teaching methods	Evaluation methods	Course learning outcome
Noot: leer- en evaluatievormen voorafgegaan door ** werden niet		Evaluation motilogo	
E051494 Active Fire Protection II: Smoke and Heat	Control project	open book examination	Perform a critical evaluation of a smoke and heat control system design
		report	Make a correct CFD calculation in the context of a smoke and heat control system design
		oral examination	Calculate an original design of smoke and heat control systems for a realistic configuration
E051700 CFD for Fire Safety Engineering	lecture	oral examination	Perform CFD simulations with a good quality
	project	report	Apply the Fire Dynamics Simulator (FDS) for a wide variety of fire scenarios
			Apply CFD and critically evaluate the reliability of the results based on the capabilities of state-of-the-art CFD for Fire Safety
			Engineering
E061522 Performance-Based Design	group work	report	Skills: Select, motivate and apply the proper models, methods and techniques for risk based engineering models.
E051630 Fire Safety Strategy Project	project	assignment	Develop a complete fire safety strategy for a challenging project, including active fire protection systems, passive systems,
			evacuation strategy, use of
			materials, structural fire behaviour,
E051461 Interaction between People and Fire	lecture	open book examination	Identify appropriate human performance data that can be used in evacuation analysis associated with fire.
	project	report	Undertake an evacuation simulation using appropriate evacuation modelling tools and interpret the results in a critical manner.
		oral examination	Be aware of the limitations of evacuation modelling.
E051550 Risk Management	lecture		Being able to execute simple reliability analyses of level 2 and 3
-	seminar		Being able to apply decision theory in order to arrive at justifiable decisions in the framework of risk management
	project		Being able to analyse system behaviour and construct fault, event and decision trees
	• •		Being able to execute qualitative and quantitative risk analyses on practical relevant situations

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EMingwFIRE1.6 Master and apply knowledge of physics, chemistry, thermodynamics, heat and mass transfer, fluid mechanics and

computational fluid dynamics to			
Course	Teaching methods	Evaluation methods	Course learning outcome
loot: leer- en evaluatievormen voorafgegaan door ** werden niet teru	ggevonden in de studietiche		
E051421 Fluid Mechanics Applications in Fire	lecture seminar: coached exercises	written examination report oral examination open book examination	Design an original pipe netwerk with fire sprinklers, fed by means of a pump sump Understand the interaction of air and water with smoke. Understand pressurized flow in pipes, pipe networks and manifolds Calculate flows through vertical and horizontal openings. Select a relevant pump and duty point for a pipe network Understand the flow phenomena involved in entrainment of air into a smoke plume and into a momentum driven jet Understand atomisation in fire sprinklers and describe the liquid spray Understand the background of the hydraulic aspects of an international (European) standard for design of fire sprinkler installations.
E051700 CFD for Fire Safety Engineering	lecture project	oral examination report	Perform CFD simulations with a good quality Apply the Fire Dynamics Simulator (FDS) for a wide variety of fire scenarios Apply CFD and critically evaluate the reliability of the results based on the capabilities of state-of-the-art CFD for Fire Safety Engineering
E061522 Performance-Based Design	group work self-reliant study activities project lecture	written examination with open questions report assignment participation	Knowledge: Draw the appropriate safety conclusions from the risk analysis. Attitudes: Reflect on own way of thinking and acting. Skills: Select, motivate and apply the proper models, methods and techniques for risk based engineering models. Attitudes: Take up independent positions about fire safety designs and defend the point of view. Knowledge: Use functional criteria (performance) as a criterion in order to realise and evaluate an original fire safety design. Skills: Report performance based design orally, in writing and with graphical methods. Skills: Control the results of a performance based design. Knowledge: Evaluate self-reliantly the fire risk in a project. Attitudes: Act in an ethical, professional and social way when presenting and defining performance based design. Attitudes: Be aware of on-going evolutions in the field of interest. Skills: Analyse own results and results of others within fire performance based designs in an objective manner. Attitudes: Communicate and collaborate with colleagues. Skills: Discuss performance based design in the English language. Skills: Make and evaluate approximate estimates in a design. Skills: Apply the concept of risk management and the fire prevention techniques in order to produce a fire safe design with an acceptable risk. Attitudes: Collaborate in the multidisciplinary environment of Fire Safety Engineering. Attitudes: Be aware of the own expertise and improve to expert level. Knowledge: Master and apply the advanced knowledge of previous courses by integrating the fire protection techniques into a global risk performance based design.
E051630 Fire Safety Strategy Project	project	assignment	Develop a complete fire safety strategy for a challenging project, including active fire protection systems, passive systems, evacuation strategy, use of materials, structural fire behaviour,
E051430 Fire Dynamics	lecture seminar: coached exercises	written examination oral examination	Analyse fire dynamics in an enclosure.
E039161 Thermodynamics, Heat and Mass Transfer	lecture seminar: coached exercises	written examination oral examination	Understand and calculate the consequences of heat transfer in case of fire. Solve a new complex problem, involving the thermodynamic processes and the different modes of heat transfer that occur in case of fire. Recognize the occurrence of mass transfer in case of fire.
E051570 Material Behaviour at Ambient and Elevated Temperatures	lecture lecture: plenary exercises	oral examination	Recommend materials as function of the requested application Know, compare and interpret in a critical manner the temperature dependent properties of different materials
E091103 Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initiative and perseverance. Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found them, both to colleagues as to laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execution of research (literature search, topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, conclusions,). Find an appropriate methodology, in accordance with the applicable scientific norms of the specific field of study.

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crmance of Competences in one/more scientific discipline(s)

EMingwFIRE1.7 Master and apply knowledge of structural fire engineering to critically analyse, design and evaluate the performance of

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structures in case of fire.			
Course	Teaching methods	Evaluation methods	Course learning outcome
Noot: leer- en evaluatievormen voorafgegaan door ** werden	niet teruggevonden in de studiefiche		
E051610 Passive Fire Protection	lecture online lecture seminar: coached exercises	written examination	Classify a building product based on test results Analyse a construction detail for passive fire protection systems Give an overview of fire protection systems possible for different applications, including their respective advantages and disadvantages
E061522 Performance-Based Design	group work self-reliant study activities project lecture	participation report assignment	Knowledge: Draw the appropriate safety conclusions from the risk analysis. Attitudes: Reflect on own way of thinking and acting. Skills: Select, motivate and apply the proper models, methods and techniques for risk based engineering models. Knowledge: Use functional criteria (performance) as a criterion in order to realise and evaluate an original fire safety design. Skills: Report performance based design orally, in writing and with graphical methods. Skills: Control the results of a performance based design. Skills: Make and evaluate approximate estimates in a design. Skills: Apply the concept of risk management and the fire prevention techniques in order to produce a fire safe design with an acceptable risk. Attitudes: Be aware of the own expertise and improve to expert level. Knowledge: Master and apply the advanced knowledge of previous courses by integrating the fire protection techniques into a global risk performance based design. Skills: Determine the uncertainties in the design.
E051630 Fire Safety Strategy Project	project	assignment	Develop a complete fire safety strategy for a challenging project, including active fire protection systems, passive systems, evacuation strategy, use of materials, structural fire behaviour,
E051600 Structural Fire Engineering	lecture lecture: response lecture seminar: coached exercises	oral examination assignment participation	Determine design specifications (e.g., concrete cover, insulation thicknesses) for structural elements, in function of the fire resistance requirements Determine the deformation and capacity of structural elements in common building materials (timber, concrete, steel) during fire exposure Analyse the effect of restraint conditions on structural fire performance
E091103 Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initiative and perseverance. Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found them, both to colleagues as to laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execution of research (literature search, topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, conclusions,). Find an appropriate methodology, in accordance with the applicable scientific norms of the specific field of study.

EMingwFIRE1.3 Master and apply knowledge of explosions to critically analyse and evaluate the associated risk.

Competences in one/more scientific discipline(s)

Course	Teaching methods	Evaluation methods	Course learning outcome
Noot: leer- en evaluatievormen voorafgegaan door ** werden niet	teruggevonden in de studiefiche		
E051540 Explosions and Industrial Fire Safety	lecture seminar	open book examination	TOPICS: industrial fire and explosion protection. COMPETENCES: assess the fire and explosion risks involved with the use, handling, transport or storage of liquid, gaseous and/or solid materials and to take the appropriate technical and organisation measures to reduce such a risk to an acceptable level. INSIGHTS: understand the physical processes that occur during explosions.
E061522 Performance-Based Design	group work self-reliant study activities project lecture	report	Knowledge: Draw the appropriate safety conclusions from the risk analysis. Skills: Select, motivate and apply the proper models, methods and techniques for risk based engineering models. Knowledge: Use functional criteria (performance) as a criterion in order to realise and evaluate an original fire safety design. Knowledge: Evaluate self-reliantly the fire risk in a project. Skills: Apply the concept of risk management and the fire prevention techniques in order to produce a fire safe design with an acceptable risk. Attitudes: Be aware of the own expertise and improve to expert level. Skills: Determine the uncertainties in the design.
E051550 Risk Management	lecture project	oral examination report	Being able to execute qualitative and quantitative risk analyses on practical relevant situations Being able to recognize and describe risks Being able to analyse system behaviour and construct fault, event and decision trees
E091103 Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initiative and perseverance. Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found them, both to colleagues as to laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execution of research (literature search, topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, conclusions,). Find an appropriate methodology, in accordance with the applicable scientific norms of the specific field of study.

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EMingwFIRE1.8 Master and apply the advanced knowledge of fire dynamics, risk assessment, human behaviour, passive fire protection <<

Course	systems and active fire protection	Teaching methods	Evaluation methods	Course learning outcome
	uluatievormen voorafgegaan door ** werden niet terug		Evaluation methods	Course learning outcome
-051/182 Δcti	ve Fire Protection I: Detection and	lecture	open book examination	Make a critical assessment of the different manual suppression systems and automatic suppression methods for different
	pression	seminar project	report oral examination	incident types, by means of calculations and technical considerations. Make a critical assessment, by means of calculations and technical considerations, of different fire detection methods.
				Design, together with colleagues, a fire detection installation for a building. Design, together with colleagues, a fire suppression installation that is not only based on water extinguishment. Write a report and present it orally to colleagues, with respect to the design of an automatic fire protection installation.
051494 Acti	ve Fire Protection II: Smoke and Heat Cont	trol lecture	written examination	Perform a critical evaluation of a smoke and heat control system design
		seminar: coached exercises	report	Compute and critically evaluate the removal of heat from an enclosure
		project	oral examination	Make a correct CFD calculation in the context of a smoke and heat control system design
			open book examination	Explain the processes involved in the production of smoke in case of fire
				Compute and critically evaluate the movement of smoke inside, into and out of an enclosure Calculate an original design of smoke and heat control systems for a realistic configuration
061522 Perf	ormance-Based Design	group work	written examination with open	Knowledge: Draw the appropriate safety conclusions from the risk analysis.
001022 1 011	official based besign	self-reliant study activities	questions	Attitudes: Reflect on own way of thinking and acting.
		project	report	Skills: Select, motivate and apply the proper models, methods and techniques for risk based engineering models.
		lecture	assignment	Attitudes: Take up independent positions about fire safety designs and defend the point of view.
			participation	Knowledge: Use functional criteria (performance) as a criterion in order to realise and evaluate an original fire safety design
				Skills: Report performance based design orally, in writing and with graphical methods. Skills: Control the results of a performance based design.
				Knowledge: Evaluate self-reliantly the fire risk in a project.
				Attitudes: Act in an ethical, professional and social way when presenting and defining performance based design.
				Attitudes: Be aware of on-going evolutions in the field of interest.
				Skills: Analyse own results and results of others within fire performance based designs in an objective manner.
				Attitudes: Communicate and collaborate with colleagues.
				Skills: Discuss performance based design in the English language.
				Skills: Make and evaluate approximate estimates in a design.
				Skills: Apply the concept of risk management and the fire prevention techniques in order to produce a fire safe design with a acceptable risk.
				Attitudes: Collaborate in the multidisciplinary environment of Fire Safety Engineering.
				Attitudes: Be aware of the own expertise and improve to expert level.
				Knowledge: Master and apply the advanced knowledge of previous courses by integrating the fire protection techniques into
				global risk performance
				based design.
051620 Eiro	Safety Strategy Project	project	accignment	Skills: Determine the uncertainties in the design. Develop a complete fire safety strategy for a challenging project, including active fire protection systems, passive systems,
031030 File	Salety Strategy Project	project	assignment	evacuation strategy, use of
				materials, structural fire behaviour,
051430 Fire	Dynamics	lecture	written examination	Analyse fire dynamics in an enclosure.
		seminar: coached exercises	oral examination	
	erial Behaviour at Ambient and Elevated	lecture	oral examination	Understand testing methods to determine properties of materials
ıem	nperatures	lecture: plenary exercises		Know, compare and interpret in a critical manner the temperature dependent properties of different materials Recommend materials as function of the requested application
051461 Into	raction between People and Fire	lecture	open book examination	Explain the nature of likely human behaviour associated with evacuation in fire situations.
SOLIOI IIIG	addidit bottooti i dopio and i no	project	report	Be aware of the limitations of evacuation modelling.
		. ,	oral examination	Critically assess the engineering literature associated with human behaviour in fire evacuation and evacuation modelling.
051550 Risk	Management	lecture	written examination	Being able to execute simple reliability analyses of level 2 and 3
		seminar	report	Being able to recognize and describe risks
		project	oral examination	Being able to refect critically about the appropriateness and limitations of available statistical data, risk analyses and risk
				acceptance criteria Reing able to apply decision theory in order to arrive at justifiable decisions in the framework of risk management
				Being able to apply decision theory in order to arrive at justifiable decisions in the framework of risk management Being able to analyse system behaviour and construct fault, event and decision trees
				Being able to execute qualitative and quantitative risk analyses on practical relevant situations
091103 Mas	ster's Dissertation	master's dissertation	oral examination	Define, study and analyse the research problem in a specific domain.
			assignment	Give proof of independency, motivation, dedication, drive to innovation and creativity, initiative and perseverance.
			5	Self-assessment with adequate and critical self-correction and objectivity.
				Communicate adequately on the research, the results and problems, present and found them, both to colleagues as to
				laypeople.
				Render and synthesise the results concisely.
				Critically analyse, formulate, study, execute and/or process different aspects in the execution of research (literature search,
				topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, conclusions,).

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<<	EMingwFIRE1.9 Master and app	ply the principles necessary to	develop a performance-base	ed fire safety design. Competences in one/more scientific discipline(s
Course		Teaching methods	Evaluation methods	Course learning outcome
Noot: leer- en	evaluatievormen voorafgegaan door ** werden niet t	teruggevonden in de studiefiche		
	erformance-Based Design	group work self-reliant study activities project lecture	written examination with open questions report assignment participation	Knowledge: Draw the appropriate safety conclusions from the risk analysis. Attitudes: Reflect on own way of thinking and acting. Skills: Select, motivate and apply the proper models, methods and techniques for risk based engineering models. Attitudes: Take up independent positions about fire safety designs and defend the point of view. Knowledge: Use functional criteria (performance) as a criterion in order to realise and evaluate an original fire safety design. Skills: Report performance based design orally, in writing and with graphical methods. Skills: Control the results of a performance based design. Knowledge: Evaluate self-reliantly the fire risk in a project. Attitudes: Act in an ethical, professional and social way when presenting and defining performance based design. Attitudes: Be aware of on-going evolutions in the field of interest. Skills: Analyse own results and results of others within fire performance based designs in an objective manner. Attitudes: Communicate and collaborate with colleagues. Skills: Discuss performance based design in the English language. Skills: Make and evaluate approximate estimates in a design. Skills: Apply the concept of risk management and the fire prevention techniques in order to produce a fire safe design with an acceptable risk. Attitudes: Collaborate in the multidisciplinary environment of Fire Safety Engineering. Attitudes: Be aware of the own expertise and improve to expert level. Knowledge: Master and apply the advanced knowledge of previous courses by integrating the fire protection techniques into a global risk performance based design.
	ire Safety Strategy Project	project	participation assignment	Develop a complete fire safety strategy for a challenging project, including active fire protection systems, passive systems, evacuation strategy, use of materials, structural fire behaviour,
E051430 F	ire Dynamics	lecture	oral examination	Analyse fire dynamics in an enclosure.
E051461 Ir	teraction between People and Fire	lecture project	open book examination report oral examination	Critically assess an evacuation analysis performed using evacuation modelling tools. Undertake an evacuation simulation using appropriate evacuation modelling tools and interpret the results in a critical manner. Be aware of the limitations of evacuation modelling. Identify appropriate human performance data that can be used in evacuation analysis associated with fire. Critically assess the suitability of various evacuation modelling tools.
E051550 R	isk Management	lecture seminar project	written examination report oral examination	Being able to execute simple reliability analyses of level 2 and 3 Being able to refect critically about the appropriateness and limitations of available statistical data, risk analyses and risk acceptance criteria Being able to analyse system behaviour and construct fault, event and decision trees Being able to execute qualitative and quantitative risk analyses on practical relevant situations
E051600 S	tructural Fire Engineering	lecture lecture: response lecture seminar: coached exercises	oral examination assignment participation	Determine design specifications (e.g., concrete cover, insulation thicknesses) for structural elements, in function of the fire resistance requirements Determine the deformation and capacity of structural elements in common building materials (timber, concrete, steel) during fire exposure Analyse the effect of restraint conditions on structural fire performance
E091103 M	laster's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initiative and perseverance. Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found them, both to colleagues as to laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execution of research (literature search, topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, conclusions,). Find an appropriate methodology, in accordance with the applicable scientific norms of the specific field of study.

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EMingwALG2.1 Analyse complex problems and translate them into concrete research questions.

Course	Teaching methods	Evaluation methods	Course learning outcome
Noot: leer- en evaluatievormen voorafgegaan door ** werden niet teru	_		
E051540 Explosions and Industrial Fire Safety	lecture seminar	open book examination	TOPICS: industrial fire and explosion protection. COMPETENCES: assess the fire and explosion risks involved with the use, handling, transport or storage of liquid, gaseou and/or solid materials and to take the appropriate technical and organisation measures to reduce such a risk to an acceptable level. INSIGHTS: understand the physical processes that occur during explosions.
E051482 Active Fire Protection I: Detection and Suppression	lecture seminar project	open book examination report oral examination	Make a critical assessment of the different manual suppression systems and automatic suppression methods for different incident types, by means of calculations and technical considerations. Make a critical assessment, by means of calculations and technical considerations, of different fire detection methods. Design, together with colleagues, a fire detection installation for a building. Design, together with colleagues, a fire suppression installation that is not only based on water extinguishment.
E051494 Active Fire Protection II: Smoke and Heat Cor	seminar: coached exercises project	written examination report oral examination open book examination	Calculate an original design of smoke and heat control systems for a realistic configuration Compute and critically evaluate the removal of heat from an enclosure Make a correct CFD calculation in the context of a smoke and heat control system design Compute and critically evaluate the movement of smoke inside, into and out of an enclosure
E051610 Passive Fire Protection	lecture online lecture seminar: coached exercises	written examination	Analyse a construction detail for passive fire protection systems
E061522 Performance-Based Design	group work self-reliant study activities project lecture	written examination with open questions	Skills: Analyse own results and results of others within fire performance based designs in an objective manner. Skills: Select, motivate and apply the proper models, methods and techniques for risk based engineering models. Knowledge: Evaluate self-reliantly the fire risk in a project.
E051581 Fire Research Seminar	lecture lecture: plenary exercises project	assignment job performance assessment	Report in a structured and scientific manner, using appropriate language Perform a comprehensive literature study on a specified fire related topic, including scientific referencing Schedule work on a dedicated project, plan ahead and report intermediate steps
E039161 Thermodynamics, Heat and Mass Transfer	lecture seminar: coached exercises	written examination oral examination	Understand the mathematical formulation of the physical processes of heat transfer. Solve a new complex problem, involving the thermodynamic processes and the different modes of heat transfer that occur case of fire.
E051461 Interaction between People and Fire	lecture	report	Explain the nature of likely human behaviour associated with evacuation in fire situations. Critically assess the engineering literature associated with human behaviour in fire evacuation and evacuation modelling.
E051550 Risk Management	lecture seminar project	oral examination report	Being able to execute simple reliability analyses of level 2 and 3 Being able to recognize and describe risks Being able to refect critically about the appropriateness and limitations of available statistical data, risk analyses and risk acceptance criteria Being able to apply decision theory in order to arrive at justifiable decisions in the framework of risk management Being able to analyse system behaviour and construct fault, event and decision trees Being able to execute qualitative and quantitative risk analyses on practical relevant situations
E091103 Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initiative and perseverance. Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found them, both to colleagues as to laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execution of research (literature search topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, conclusions,). Find an appropriate methodology, in accordance with the applicable scientific norms of the specific field of study.

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EMingwALG2.2 Consult the scientific literature as part of the own research.

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Scientific competences

Course	Teaching methods	Evaluation methods	Course learning outcome
Noot: leer- en evaluatievormen voorafgegaan door ** werden niet	teruggevonden in de studiefiche		
E061522 Performance-Based Design	group work self-reliant study activities	participation report	Attitudes: Be aware of the own expertise and improve to expert level. Attitudes: Reflect on own way of thinking and acting.
	project	assignment	Skills: Select, motivate and apply the proper models, methods and techniques for risk based engineering models.
	lecture	3	Attitudes: Act in an ethical, professional and social way when presenting and defining performance based design.
			Attitudes: Be aware of on-going evolutions in the field of interest.
			Attitudes: Collaborate in the multidisciplinary environment of Fire Safety Engineering.
E051630 Fire Safety Strategy Project	project	participation	Develop a complete fire safety strategy for a challenging project, including active fire protection systems, passive systems,
,,		assignment	evacuation strategy, use of
		-	materials, structural fire behaviour,
E051581 Fire Research Seminar	lecture	assignment	Report in a structured and scientific manner, using appropriate language
	lecture: plenary exercises	· ·	Perform a comprehensive literature study on a specified fire related topic, including scientific referencing
	project		Present to audiences with different backgrounds
E051461 Interaction between People and Fire	lecture	report	Critically assess the engineering literature associated with human behaviour in fire evacuation and evacuation modelling.
E051550 Risk Management	project	oral examination	Being able to execute qualitative and quantitative risk analyses on practical relevant situations
		report	Being able to recognize and describe risks
			Being able to refect critically about the appropriateness and limitations of available statistical data, risk analyses and risk
			acceptance criteria
E051590 Compartmentation Strategies	excursion	participation	Draw up compartmentation strategies for uncommon buildings
	seminar: coached exercises	report	Check in a critical manner implemented compartmentation on-site
	** fieldwork	assignment	Draw up and check compartmentation strategies in accordance with prescriptive guidance
	project lecture		
E091103 Master's Dissertation	master's dissertation	oral examination	Define, study and analyse the research problem in a specific domain.
		assignment	Give proof of independency, motivation, dedication, drive to innovation and creativity, initiative and perseverance.
		3	Self-assessment with adequate and critical self-correction and objectivity.
			Communicate adequately on the research, the results and problems, present and found them, both to colleagues as to
			laypeople.
			Render and synthesise the results concisely.
			Critically analyse, formulate, study, execute and/or process different aspects in the execution of research (literature search,
			topical study, research and the
			reflection on the research, experiments, experimentations, designs, simulations, results, conclusions,).
			Find an appropriate methodology, in accordance with the applicable scientific norms of the specific field of study.

<<	EMingwALG2.3 Select and apply the appropriate models, methods and techniques.
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competences

<<	EMingwALG2.3 Select and apply the	ne appropriate models, met	nods and techniques.	Scientific competence
Course		Teaching methods	Evaluation methods	Course learning outcome
Noot: leer- er	evaluatievormen voorafgegaan door ** werden niet terugg	evonden in de studiefiche		
E051540 E	Explosions and Industrial Fire Safety	lecture seminar	open book examination	TOPICS: industrial fire and explosion protection. COMPETENCES: assess the fire and explosion risks involved with the use, handling, transport or storage of liquid, gaseous and/or solid materials and to take the appropriate technical and organisation measures to reduce such a risk to an acceptable level. INSIGHTS: understand the physical processes that occur during explosions.
E051421 F	Fluid Mechanics Applications in Fire	lecture seminar: coached exercises	written examination report oral examination open book examination	Design an original pipe netwerk with fire sprinklers, fed by means of a pump sump Understand the interaction of air and water with smoke. Understand pressurized flow in pipes, pipe networks and manifolds Calculate flows through vertical and horizontal openings. Select a relevant pump and duty point for a pipe network Understand the flow phenomena involved in entrainment of air into a smoke plume and into a momentum driven jet Understand atomisation in fire sprinklers and describe the liquid spray Understand the background of the hydraulic aspects of an international (European) standard for design of fire sprinkler installations.
	Active Fire Protection I: Detection and Suppression	lecture seminar project	open book examination report oral examination	Design, together with colleagues, a fire suppression installation that is not only based on water extinguishment. Design, together with colleagues, a fire detection installation for a building.
E051494 A	Active Fire Protection II: Smoke and Heat Control	ol project	open book examination report oral examination	Calculate an original design of smoke and heat control systems for a realistic configuration Make a correct CFD calculation in the context of a smoke and heat control system design
E051700 (CFD for Fire Safety Engineering	lecture project	oral examination report	Perform CFD simulations with a good quality Apply the Fire Dynamics Simulator (FDS) for a wide variety of fire scenarios Apply CFD and critically evaluate the reliability of the results based on the capabilities of state-of-the-art CFD for Fire Safety Engineering
E061522 F	Performance-Based Design	group work self-reliant study activities project lecture	participation report assignment	Skills: Determine the uncertainties in the design. Skills: Select, motivate and apply the proper models, methods and techniques for risk based engineering models. Knowledge: Master and apply the advanced knowledge of previous courses by integrating the fire protection techniques into a global risk performance based design.
E051630 F	Fire Safety Strategy Project	project	assignment	Develop a complete fire safety strategy for a challenging project, including active fire protection systems, passive systems, evacuation strategy, use of materials, structural fire behaviour,
E051581 F	Fire Research Seminar	lecture: plenary exercises	oral examination assignment	Perform a systematic data analysis.
	Material Behaviour at Ambient and Elevated Femperatures	lecture lecture: plenary exercises	oral examination	Understand testing methods to determine properties of materials Know, compare and interpret in a critical manner the temperature dependent properties of different materials Recommend materials as function of the requested application
E051461 I	nteraction between People and Fire	lecture project	open book examination report oral examination	Critically assess the suitability of various evacuation modelling tools. Be aware of the limitations of evacuation modelling. Identify appropriate human performance data that can be used in evacuation analysis associated with fire.
E051550 F	Risk Management	lecture seminar project	written examination report oral examination	Being able to execute simple reliability analyses of level 2 and 3 Being able to recognize and describe risks Being able to refect critically about the appropriateness and limitations of available statistical data, risk analyses and risk acceptance criteria Being able to apply decision theory in order to arrive at justifiable decisions in the framework of risk management Being able to analyse system behaviour and construct fault, event and decision trees Being able to execute qualitative and quantitative risk analyses on practical relevant situations
E091103 M	Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initiative and perseverance. Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found them, both to colleagues as to laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execution of research (literature search, topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, conclusions,). Find an appropriate methodology, in accordance with the applicable scientific norms of the specific field of study.

EMingwALG2.4 Develop and validate mathematical models and methods.

Scientific competences

Course	Teaching methods	Evaluation methods	Course learning outcome
Noot: leer- en evaluatievormen voorafgegaan door ** werden niet	teruggevonden in de studiefiche		
E061522 Performance-Based Design	group work self-reliant study activities project lecture	participation report assignment	Skills: Make and evaluate approximate estimates in a design. Skills: Select, motivate and apply the proper models, methods and techniques for risk based engineering models.
E051461 Interaction between People and Fire	lecture	report	Explain the nature of likely human behaviour associated with evacuation in fire situations. Be aware of the limitations of evacuation modelling. Identify appropriate human performance data that can be used in evacuation analysis associated with fire. Critically assess the engineering literature associated with human behaviour in fire evacuation and evacuation modelling.
E051550 Risk Management	lecture seminar project	written examination report oral examination	Being able to execute simple reliability analyses of level 2 and 3 Being able to refect critically about the appropriateness and limitations of available statistical data, risk analyses and risk acceptance criteria Being able to apply decision theory in order to arrive at justifiable decisions in the framework of risk management Being able to analyse system behaviour and construct fault, event and decision trees Being able to execute qualitative and quantitative risk analyses on practical relevant situations

EMingwALG2.5 Interpret research findings in an objective and critical manner.

Course		Teaching methods	Evaluation methods	Course learning outcome
	evaluatievormen voorafgegaan door ** werden niet i		_,	
051494 A	Active Fire Protection II: Smoke and Heat 0	Control project	open book examination report oral examination	Perform a critical evaluation of a smoke and heat control system design Make a correct CFD calculation in the context of a smoke and heat control system design Calculate an original design of smoke and heat control systems for a realistic configuration
051700 C	CFD for Fire Safety Engineering	lecture project	oral examination report	Perform CFD simulations with a good quality Apply the Fire Dynamics Simulator (FDS) for a wide variety of fire scenarios Apply CFD and critically evaluate the reliability of the results based on the capabilities of state-of-the-art CFD for Fire Safety Engineering
061522 P	Performance-Based Design	group work self-reliant study activities project lecture	participation report assignment	Skills: Determine the uncertainties in the design. Attitudes: Reflect on own way of thinking and acting. Knowledge: Evaluate self-reliantly the fire risk in a project. Attitudes: Act in an ethical, professional and social way when presenting and defining performance based design. Skills: Analyse own results and results of others within fire performance based designs in an objective manner. Attitudes: Communicate and collaborate with colleagues. Skills: Make and evaluate approximate estimates in a design. Attitudes: Collaborate in the multidisciplinary environment of Fire Safety Engineering. Attitudes: Be aware of the own expertise and improve to expert level.
051581 F	ire Research Seminar	lecture lecture: plenary exercises project	assignment job performance assessment	Report in a structured and scientific manner, using appropriate language Perform a comprehensive literature study on a specified fire related topic, including scientific referencing Schedule work on a dedicated project, plan ahead and report intermediate steps Present to audiences with different backgrounds
051461 Ir	nteraction between People and Fire	lecture	report	Critically assess the engineering literature associated with human behaviour in fire evacuation and evacuation modelling.
051550 R	Risk Management	project	oral examination report	Being able to execute simple reliability analyses of level 2 and 3 Being able to recognize and describe risks Being able to refect critically about the appropriateness and limitations of available statistical data, risk analyses and risk acceptance criteria Being able to apply decision theory in order to arrive at justifiable decisions in the framework of risk management Being able to analyse system behaviour and construct fault, event and decision trees Being able to execute qualitative and quantitative risk analyses on practical relevant situations
091103 N	Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initiative and perseverance. Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found them, both to colleagues as to laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execution of research (literature search, topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, conclusions,). Find an appropriate methodology, in accordance with the applicable scientific norms of the specific field of study.

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EMingwFIRE2.1 Elaborate problems of fire risk assessment in a critical, autonomous and flexible manner with a limited amount of data.

cientific	competences	
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EMingwFIRE2.1 Elaborate prole	blems of fire risk assessment i	in a critical, autonomous a	nd flexible manner with a limited amount of data.	Scientific competence
Course	Teaching methods	Evaluation methods	Course learning outcome	
Noot: leer- en evaluatievormen voorafgegaan door ** werden niet	teruggevonden in de studiefiche			
E051540 Explosions and Industrial Fire Safety	lecture seminar	open book examination	TOPICS: industrial fire and explosion protection. COMPETENCES: assess the fire and explosion risks involved with the use, handling, tra and/or solid materials and to take the appropriate technical and organisation measures to reduce such a risk to an ac INSIGHTS: understand the physical processes that occur during explosions.	
E061522 Performance-Based Design	group work self-reliant study activities project lecture	participation report assignment	Knowledge: Draw the appropriate safety conclusions from the risk analysis. Skills: Select, motivate and apply the proper models, methods and techniques for risk battitudes: Take up independent positions about fire safety designs and defend the point Skills: Control the results of a performance based design. Knowledge: Evaluate self-reliantly the fire risk in a project. Skills: Discuss performance based design in the English language. Skills: Make and evaluate approximate estimates in a design. Skills: Apply the concept of risk management and the fire prevention techniques in order acceptable risk. Skills: Determine the uncertainties in the design.	of view.
E051550 Risk Management	project seminar	written examination report oral examination	Being able to execute qualitative and quantitative risk analyses on practical relevant situ Being able to recognize and describe risks Being able to refect critically about the appropriateness and limitations of available statis acceptance criteria Being able to analyse system behaviour and construct fault, event and decision trees	
E091103 Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, ini Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the exect topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, Find an appropriate methodology, in accordance with the applicable scientific norms of the second content of	them, both to colleagues as to ution of research (literature search, conclusions,).

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EMingwFIRE2.2 Perform valid computer simulations of development and consequences of enclosure fires.

< EMingwFIRE2.2 Perform valid computer simulations of development and consequences of enclosure fires. Scientific con			Scientific competences	
Course	Teaching methods	Evaluation methods	Course learning outcome	
Noot: leer- en evaluatievormen voorafgegaan door ** werden ni	et teruggevonden in de studiefiche			
E051494 Active Fire Protection II: Smoke and Hea	t Control lecture project	open book examination report oral examination	Calculate an original design of smoke and heat control systems for a realistic configuration Make a correct CFD calculation in the context of a smoke and heat control system design	
E051700 CFD for Fire Safety Engineering	lecture project	oral examination report	Perform CFD simulations with a good quality Apply the Fire Dynamics Simulator (FDS) for a wide variety of fire scenarios Apply CFD and critically evaluate the reliability of the results based on the capabilities of s Engineering	tate-of-the-art CFD for Fire Safety
E061522 Performance-Based Design	group work self-reliant study activities project lecture	assignment report	Skills: Determine the uncertainties in the design. Skills: Select, motivate and apply the proper models, methods and techniques for risk base Skills: Report performance based design orally, in writing and with graphical methods. Skills: Control the results of a performance based design. Knowledge: Evaluate self-reliantly the fire risk in a project. Attitudes: Act in an ethical, professional and social way when presenting and defining perf Skills: Analyse own results and results of others within fire performance based designs in Attitudes: Communicate and collaborate with colleagues. Skills: Discuss performance based design in the English language. Skills: Make and evaluate approximate estimates in a design. Attitudes: Collaborate in the multidisciplinary environment of Fire Safety Engineering. Knowledge: Master and apply the advanced knowledge of previous courses by integrating global risk performance based design.	ormance based design. an objective manner.
E051630 Fire Safety Strategy Project	project	assignment	Develop a complete fire safety strategy for a challenging project, including active fire prote evacuation strategy, use of materials, structural fire behaviour,	ection systems, passive systems,
E051461 Interaction between People and Fire	lecture project	report	Critically assess an evacuation analysis performed using evacuation modelling tools. Be aware of the limitations of evacuation modelling. Critically assess the suitability of various evacuation modelling tools.	
E091103 Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initial Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found the laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execut topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, or Find an appropriate methodology, in accordance with the applicable scientific norms of the	ion of research (literature search, onclusions,).

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EMingwFIRE2.3 Perform valid computer simulations to assess the performance of smoke and heat control systems as means of active fire protection measure.

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Scientific competences

protection measure.			
Course	Teaching methods	Evaluation methods	Course learning outcome
Noot: leer- en evaluatievormen voorafgegaan door ** werden	niet teruggevonden in de studiefiche		
E051494 Active Fire Protection II: Smoke and He	eat Control lecture project	open book examination report oral examination	Calculate an original design of smoke and heat control systems for a realistic configuration Make a correct CFD calculation in the context of a smoke and heat control system design
E061522 Performance-Based Design group work self-reliant study activities project lecture E051630 Fire Safety Strategy Project project		assignment	Skills: Determine the uncertainties in the design. Skills: Select, motivate and apply the proper models, methods and techniques for risk based engineering models. Skills: Report performance based design orally, in writing and with graphical methods. Skills: Control the results of a performance based design. Knowledge: Evaluate self-reliantly the fire risk in a project. Attitudes: Act in an ethical, professional and social way when presenting and defining performance based design. Skills: Analyse own results and results of others within fire performance based designs in an objective manner. Attitudes: Communicate and collaborate with colleagues. Skills: Discuss performance based design in the English language. Skills: Make and evaluate approximate estimates in a design. Attitudes: Collaborate in the multidisciplinary environment of Fire Safety Engineering. Knowledge: Master and apply the advanced knowledge of previous courses by integrating the fire protection techniques int global risk performance based design.
E051630 Fire Safety Strategy Project	project	assignment	Develop a complete fire safety strategy for a challenging project, including active fire protection systems, passive systems, evacuation strategy, use of materials, structural fire behaviour,
E091103 Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initiative and perseverance. Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found them, both to colleagues as to laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execution of research (literature search, topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, conclusions,). Find an appropriate methodology, in accordance with the applicable scientific norms of the specific field of study.

EMingwFIRE2.4 Perform valid computer simulations of the behaviour of structural systems in case of fire.

Scientific competences

Course	Teaching methods	Evaluation methods	Course learning outcome
Noot: leer- en evaluatievormen voorafgegaan door ** werder	n niet teruggevonden in de studiefiche		
E051630 Fire Safety Strategy Project	project	assignment	Develop a complete fire safety strategy for a challenging project, including active fire protection systems, passive systems, evacuation strategy, use of materials, structural fire behaviour,
E051600 Structural Fire Engineering	seminar: coached exercises	participation assignment	Determine design specifications (e.g., concrete cover, insulation thicknesses) for structural elements, in function of the fire resistance requirements Determine the deformation and capacity of structural elements in common building materials (timber, concrete, steel) during fire exposure Analyse the effect of restraint conditions on structural fire performance
E091103 Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initiative and perseverance. Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found them, both to colleagues as to laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execution of research (literature search, topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, conclusions,). Find an appropriate methodology, in accordance with the applicable scientific norms of the specific field of study.

<<	EMingwALG3.1	Independently f	orm an opinion of	on complex situations	and problems, ar	nd defend this point of	view.

Course	Teaching methods	Evaluation methods	Course learning outcome
oot: leer- en evaluatievormen voorafgegaan door ** werden niet terugge	_		
051540 Explosions and Industrial Fire Safety	lecture seminar	open book examination	TOPICS: industrial fire and explosion protection. COMPETENCES: assess the fire and explosion risks involved with the use, handling, transport or storage of liquid, gaseous and/or solid materials and to take the appropriate technical and organisation measures to reduce such a risk to an acceptable level. INSIGHTS: understand the physical processes that occur during explosions.
E051421 Fluid Mechanics Applications in Fire	lecture seminar: coached exercises	written examination report oral examination open book examination	Design an original pipe netwerk with fire sprinklers, fed by means of a pump sump Understand the interaction of air and water with smoke. Understand pressurized flow in pipes, pipe networks and manifolds Calculate flows through vertical and horizontal openings. Select a relevant pump and duty point for a pipe network Understand the flow phenomena involved in entrainment of air into a smoke plume and into a momentum driven jet Understand atomisation in fire sprinklers and describe the liquid spray Understand the background of the hydraulic aspects of an international (European) standard for design of fire sprinkler installations.
051482 Active Fire Protection I: Detection and Suppression	project	oral examination report	Write a report and present it orally to colleagues, with respect to the design of an automatic fire protection installation. Design, together with colleagues, a fire detection installation for a building. Design, together with colleagues, a fire suppression installation that is not only based on water extinguishment.
051494 Active Fire Protection II: Smoke and Heat Contro	ol lecture project	open book examination report oral examination	Perform a critical evaluation of a smoke and heat control system design Make a correct CFD calculation in the context of a smoke and heat control system design Calculate an original design of smoke and heat control systems for a realistic configuration Apply national and international standards and regulative documents for the design of smoke control systems
E051700 CFD for Fire Safety Engineering	lecture project	oral examination report	Perform CFD simulations with a good quality Apply the Fire Dynamics Simulator (FDS) for a wide variety of fire scenarios Apply CFD and critically evaluate the reliability of the results based on the capabilities of state-of-the-art CFD for Fire Safety Engineering
E061522 Performance-Based Design	group work self-reliant study activities project lecture	participation report assignment	Skills: Determine the uncertainties in the design. Attitudes: Reflect on own way of thinking and acting. Skills: Report performance based design orally, in writing and with graphical methods. Skills: Control the results of a performance based design. Knowledge: Evaluate self-reliantly the fire risk in a project. Attitudes: Act in an ethical, professional and social way when presenting and defining performance based design. Skills: Analyse own results and results of others within fire performance based designs in an objective manner. Skills: Discuss performance based design in the English language. Skills: Make and evaluate approximate estimates in a design. Skills: Apply the concept of risk management and the fire prevention techniques in order to produce a fire safe design with an acceptable risk. Attitudes: Be aware of the own expertise and improve to expert level.
5051630 Fire Safety Strategy Project	demonstration project	oral examination peer assessment participation	Develop a complete fire safety strategy for a challenging project, including active fire protection systems, passive systems, evacuation strategy, use of materials, structural fire behaviour,
E051581 Fire Research Seminar	lecture lecture: plenary exercises project	oral examination job performance assessment assignment	Report in a structured and scientific manner, using appropriate language Perform a comprehensive literature study on a specified fire related topic, including scientific referencing Schedule work on a dedicated project, plan ahead and report intermediate steps Present to audiences with different backgrounds
039161 Thermodynamics, Heat and Mass Transfer	lecture seminar: coached exercises	written examination oral examination	Solve a new complex problem, involving the thermodynamic processes and the different modes of heat transfer that occur in case of fire.
051461 Interaction between People and Fire	lecture	report	Explain the nature of likely human behaviour associated with evacuation in fire situations. Critically assess the engineering literature associated with human behaviour in fire evacuation and evacuation modelling.
051550 Risk Management	project	oral examination report	Being able to execute simple reliability analyses of level 2 and 3 Being able to recognize and describe risks Being able to refect critically about the appropriateness and limitations of available statistical data, risk analyses and risk acceptance criteria Being able to apply decision theory in order to arrive at justifiable decisions in the framework of risk management Being able to analyse system behaviour and construct fault, event and decision trees Being able to execute qualitative and quantitative risk analyses on practical relevant situations
E051590 Compartmentation Strategies	excursion seminar: coached exercises ** fieldwork project lecture	participation report assignment	Draw up compartmentation strategies for uncommon buildings Check in a critical manner implemented compartmentation on-site Draw up and check compartmentation strategies in accordance with prescriptive guidance
091103 Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initiative and perseverance. Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found them, both to colleagues as to laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execution of research (literature search, topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, conclusions,). Find an appropriate methodology, in accordance with the applicable scientific norms of the specific field of study.

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EMingwALG3.2 Apply knowledge in a creative, purposeful and innovative way to research, conceptual design and production.

ntellectua	l competences
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Course	Teaching methods	Evaluation methods	Course learning outcome	
	Teaching methods	Evaluation methods	Course learning outcome	
Noot: leer- en evaluatievormen voorafgegaan door ** werden niet teru	iggevonden in de studieriche			
E051540 Explosions and Industrial Fire Safety	lecture seminar	open book examination	TOPICS: industrial fire and explosion protection. COMPETENCES: assess the fire and explosion risks involved with the use, handling, tran and/or solid materials and to take the appropriate technical and organisation measures to reduce such a risk to an accellNSIGHTS: understand the physical processes that occur during explosions.	
E051482 Active Fire Protection I: Detection and Suppression	project	oral examination report	Write a report and present it orally to colleagues, with respect to the design of an automat Design, together with colleagues, a fire detection installation for a building. Design, together with colleagues, a fire suppression installation that is not only based on vertical design.	·
E051494 Active Fire Protection II: Smoke and Heat Cor	ntrol lecture project	open book examination report oral examination	Calculate an original design of smoke and heat control systems for a realistic configuration Make a correct CFD calculation in the context of a smoke and heat control system design	
E061522 Performance-Based Design	group work self-reliant study activities project lecture	participation report assignment	Knowledge: Master and apply the advanced knowledge of previous courses by integrating global risk performance based design. Attitudes: Reflect on own way of thinking and acting. Attitudes: Take up independent positions about fire safety designs and defend the point of Skills: Report performance based design orally, in writing and with graphical methods. Skills: Control the results of a performance based design. Attitudes: Act in an ethical, professional and social way when presenting and defining perf Attitudes: Be aware of on-going evolutions in the field of interest. Skills: Analyse own results and results of others within fire performance based designs in Skills: Discuss performance based design in the English language. Skills: Apply the concept of risk management and the fire prevention techniques in order to acceptable risk.	view. formance based design. an objective manner.
E051630 Fire Safety Strategy Project	project	participation assignment	Develop a complete fire safety strategy for a challenging project, including active fire prote evacuation strategy, use of materials, structural fire behaviour,	ection systems, passive systems,
E051461 Interaction between People and Fire	lecture	report	Critically assess the engineering literature associated with human behaviour in fire evacuated Be aware of the limitations of evacuation modelling. Identify appropriate human performance data that can be used in evacuation analysis ass Critically assess the suitability of various evacuation modelling tools.	_
E051550 Risk Management	project	oral examination report	Being able to execute qualitative and quantitative risk analyses on practical relevant situat Being able to recognize and describe risks Being able to refect critically about the appropriateness and limitations of available statistic acceptance criteria Being able to analyse system behaviour and construct fault, event and decision trees	
E091103 Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initial Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found the laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execut topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, continuant propriate methodology, in accordance with the applicable scientific norms of the	nem, both to colleagues as to tion of research (literature search, onclusions,).

EMingwALG3.3 Critically reflect on one's own way of thinking and acting, and understand the limits of one's competences.

<<	EMingwALG3.3 Critically reflect or	Intellectual competences			
Course		Teaching methods	Evaluation methods	Course learning outcome	
Noot: leer- er	n evaluatievormen voorafgegaan door ** werden niet terugg	evonden in de studiefiche			
E051540 I	Explosions and Industrial Fire Safety	lecture seminar	open book examination	TOPICS: industrial fire and explosion protection. COMPETENCES: assess the fire and explosion risks involved with the use, handling, transportant and/or solid materials and to take the appropriate technical and organisation measures to reduce such a risk to an accepta INSIGHTS: understand the physical processes that occur during explosions.	
E051421 I	Fluid Mechanics Applications in Fire	lecture seminar: coached exercises	written examination report oral examination open book examination	Design an original pipe netwerk with fire sprinklers, fed by means of a pump sump Understand the interaction of air and water with smoke. Understand pressurized flow in pipes, pipe networks and manifolds Calculate flows through vertical and horizontal openings. Select a relevant pump and duty point for a pipe network Understand the flow phenomena involved in entrainment of air into a smoke plume and into a Understand atomisation in fire sprinklers and describe the liquid spray Understand the background of the hydraulic aspects of an international (European) standard installations.	·
	Active Fire Protection I: Detection and Suppression	project	oral examination report	Write a report and present it orally to colleagues, with respect to the design of an automatic find Design, together with colleagues, a fire detection installation for a building. Design, together with colleagues, a fire suppression installation that is not only based on wat	•
E051494 /	Active Fire Protection II: Smoke and Heat Contr	ol lecture project	open book examination report oral examination	Perform a critical evaluation of a smoke and heat control system design Make a correct CFD calculation in the context of a smoke and heat control system design Calculate an original design of smoke and heat control systems for a realistic configuration	
E051700 (CFD for Fire Safety Engineering	lecture project	oral examination report	Perform CFD simulations with a good quality Apply the Fire Dynamics Simulator (FDS) for a wide variety of fire scenarios Apply CFD and critically evaluate the reliability of the results based on the capabilities of state Engineering	e-of-the-art CFD for Fire Safety
E061522 I	Performance-Based Design	group work self-reliant study activities project lecture	participation report assignment	Attitudes: Be aware of the own expertise and improve to expert level. Attitudes: Reflect on own way of thinking and acting. Attitudes: Take up independent positions about fire safety designs and defend the point of vie Knowledge: Evaluate self-reliantly the fire risk in a project. Attitudes: Act in an ethical, professional and social way when presenting and defining perforn Attitudes: Be aware of on-going evolutions in the field of interest. Skills: Analyse own results and results of others within fire performance based designs in an	mance based design.
E051630 I	Fire Safety Strategy Project	project	participation	Develop a complete fire safety strategy for a challenging project, including active fire protection evacuation strategy, use of materials, structural fire behaviour,	
	Risk Management	project	oral examination report	Being able to execute simple reliability analyses of level 2 and 3 Being able to recognize and describe risks Being able to refect critically about the appropriateness and limitations of available statistical acceptance criteria Being able to apply decision theory in order to arrive at justifiable decisions in the framework Being able to analyse system behaviour and construct fault, event and decision trees Being able to execute qualitative and quantitative risk analyses on practical relevant situation	of risk management
E051590 (Compartmentation Strategies	excursion seminar: coached exercises ** fieldwork project lecture	participation report assignment	Draw up compartmentation strategies for uncommon buildings Check in a critical manner implemented compartmentation on-site Draw up and check compartmentation strategies in accordance with prescriptive guidance	
E091103 I	Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initiativ Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found them laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execution topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, concisions an appropriate methodology, in accordance with the applicable scientific norms of the specific control of the second control of	n, both to colleagues as to n of research (literature search,

EMingwALG3.4 Stay uptodate with the evolutions in the discipline to elevate the own competences to expert level.

Intellectual	competences
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Course	Teaching methods	Evaluation methods	Course learning outcome
Noot: leer- en evaluatievormen voorafgegaan door ** werden niet te	eruggevonden in de studiefiche		
E051540 Explosions and Industrial Fire Safety	lecture seminar	open book examination	TOPICS: industrial fire and explosion protection. COMPETENCES: assess the fire and explosion risks involved with the use, handling, transport or storage of liquid, gaseous and/or solid materials and to take the appropriate technical and organisation measures to reduce such a risk to an acceptable level. INSIGHTS: understand the physical processes that occur during explosions.
E051482 Active Fire Protection I: Detection and Suppression	lecture seminar project	open book examination report oral examination	Make a critical assessment of the different manual suppression systems and automatic suppression methods for different incident types, by means of calculations and technical considerations. Make a critical assessment, by means of calculations and technical considerations, of different fire detection methods. Design, together with colleagues, a fire detection installation for a building. Design, together with colleagues, a fire suppression installation that is not only based on water extinguishment.
E051700 CFD for Fire Safety Engineering	lecture project	oral examination report	Perform CFD simulations with a good quality Apply the Fire Dynamics Simulator (FDS) for a wide variety of fire scenarios Apply CFD and critically evaluate the reliability of the results based on the capabilities of state-of-the-art CFD for Fire Safety Engineering
E051443 Fire Safety and Legislation	lecture	open book examination	adopt an attitude aimed at the follow-up and application of the most recent legislation
E061522 Performance-Based Design	lecture self-reliant study activities	participation report assignment	Attitudes: Be aware of the own expertise and improve to expert level. Attitudes: Be aware of on-going evolutions in the field of interest.
E051461 Interaction between People and Fire	lecture	report	Critically assess the engineering literature associated with human behaviour in fire evacuation and evacuation modelling.
E091103 Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initiative and perseverance. Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found them, both to colleagues as to laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execution of research (literature search, topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, conclusions,). Find an appropriate methodology, in accordance with the applicable scientific norms of the specific field of study.

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EMingwALG3.5 Readily adapt to changing professional circumstances.

Intellectual competences

Course	Teaching methods	Evaluation methods	Course learning outcome
Noot: leer- en evaluatievormen voorafgegaan door ** werden niet	teruggevonden in de studiefiche		
E051540 Explosions and Industrial Fire Safety	lecture seminar	open book examination	TOPICS: industrial fire and explosion protection. COMPETENCES: assess the fire and explosion risks involved with the use, handling, transport or storage of liquid, gaseous and/or solid materials and to take the appropriate technical and organisation measures to reduce such a risk to an acceptable level. INSIGHTS: understand the physical processes that occur during explosions.
E061522 Performance-Based Design	group work self-reliant study activities project lecture	participation report assignment	Attitudes: Collaborate in the multidisciplinary environment of Fire Safety Engineering. Knowledge: Evaluate self-reliantly the fire risk in a project. Attitudes: Act in an ethical, professional and social way when presenting and defining performance based design. Skills: Analyse own results and results of others within fire performance based designs in an objective manner. Attitudes: Communicate and collaborate with colleagues.
E091103 Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initiative and perseverance. Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found them, both to colleagues as to laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execution of research (literature search, topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, conclusions,). Find an appropriate methodology, in accordance with the applicable scientific norms of the specific field of study.

EMingwFIRE3.1 Develop scientifically sound arguments to optimize passive and active fire protection measures.

Intellectual	competences
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EMingwFIRE3.1 Develop scientifically sound arguments to optimize passive and active fire protection measures.				
Course	Teaching methods	Evaluation methods	Course learning outcome	
Noot: leer- en evaluatievormen voorafgegaan door ** werden niet terug	ggevonden in de studiefiche			
E051482 Active Fire Protection I: Detection and Suppression	lecture seminar project	open book examination report oral examination	Make a critical assessment of the different manual suppression systems and automatic sincident types, by means of calculations and technical considerations. Make a critical assessment, by means of calculations and technical considerations, of diffusion, together with colleagues, a fire detection installation for a building. Design, together with colleagues, a fire suppression installation that is not only based on Write a report and present it orally to colleagues, with respect to the design of an automatic sincident systems.	fferent fire detection methods. n water extinguishment.
E051494 Active Fire Protection II: Smoke and Heat Con	trol project	open book examination report oral examination	Perform a critical evaluation of a smoke and heat control system design Make a correct CFD calculation in the context of a smoke and heat control system design Calculate an original design of smoke and heat control systems for a realistic configuration	
E051610 Passive Fire Protection	lecture online lecture seminar: coached exercises	written examination	Classify a building product based on test results Analyse a construction detail for passive fire protection systems Give an overview of fire protection systems possible for different applications, including t disadvantages	
E061522 Performance-Based Design	group work self-reliant study activities project lecture	written examination with open questions report assignment participation	Skills: Apply the concept of risk management and the fire prevention techniques in order acceptable risk. Attitudes: Reflect on own way of thinking and acting. Skills: Report performance based design orally, in writing and with graphical methods. Skills: Control the results of a performance based design. Attitudes: Act in an ethical, professional and social way when presenting and defining pe Skills: Discuss performance based design in the English language.	
E051630 Fire Safety Strategy Project	project	assignment	Develop a complete fire safety strategy for a challenging project, including active fire pro- evacuation strategy, use of materials, structural fire behaviour,	tection systems, passive systems,
E051570 Material Behaviour at Ambient and Elevated Temperatures	lecture lecture: plenary exercises	oral examination	Understand testing methods to determine properties of materials Know, compare and interpret in a critical manner the temperature dependent properties of Recommend materials as function of the requested application	of different materials
E051461 Interaction between People and Fire	lecture project	open book examination report oral examination	Explain the nature of likely human behaviour associated with evacuation in fire situations Undertake an evacuation simulation using appropriate evacuation modelling tools and in	
E051550 Risk Management	project	oral examination report	Being able to execute qualitative and quantitative risk analyses on practical relevant situal Being able to analyse system behaviour and construct fault, event and decision trees	ations
E051590 Compartmentation Strategies	excursion seminar: coached exercises ** fieldwork project lecture	participation report assignment	Draw up compartmentation strategies for uncommon buildings Check in a critical manner implemented compartmentation on-site Draw up and check compartmentation strategies in accordance with prescriptive guidance	ce
E091103 Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, init Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the executopical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, Find an appropriate methodology, in accordance with the applicable scientific norms of the	them, both to colleagues as to ution of research (literature search, conclusions,).

EMingwFIRE3.2 Develop scientifically sound arguments to develop a performance-based fire safety design.

Course	Teaching methods	Evaluation methods	Course learning outcome	
Noot: leer- en evaluatievormen voorafgegaan door ** werden niet				
E061522 Performance-Based Design	group work self-reliant study activities project lecture	participation report assignment	Skills: Determine the uncertainties in the design. Attitudes: Take up independent positions about fire safety designs and defend the point of view. Skills: Report performance based design orally, in writing and with graphical methods. Skills: Control the results of a performance based design. Attitudes: Act in an ethical, professional and social way when presenting and defining performance based design. Attitudes: Communicate and collaborate with colleagues. Skills: Discuss performance based design in the English language. Skills: Make and evaluate approximate estimates in a design. Skills: Apply the concept of risk management and the fire prevention techniques in order to produce a fire safe design vacceptable risk. Attitudes: Collaborate in the multidisciplinary environment of Fire Safety Engineering.	vith an
E051630 Fire Safety Strategy Project	project	assignment	Develop a complete fire safety strategy for a challenging project, including active fire protection systems, passive syste evacuation strategy, use of materials, structural fire behaviour,	ms,
E051461 Interaction between People and Fire	lecture project	open book examination report oral examination	Explain the nature of likely human behaviour associated with evacuation in fire situations. Undertake an evacuation simulation using appropriate evacuation modelling tools and interpret the results in a critical nodentify appropriate human performance data that can be used in evacuation analysis associated with fire.	nanner.
E051550 Risk Management	project seminar	oral examination report	Being able to execute simple reliability analyses of level 2 and 3 Being able to refect critically about the appropriateness and limitations of available statistical data, risk analyses and ris acceptance criteria Being able to apply decision theory in order to arrive at justifiable decisions in the framework of risk management Being able to analyse system behaviour and construct fault, event and decision trees Being able to execute qualitative and quantitative risk analyses on practical relevant situations	k
E051600 Structural Fire Engineering	lecture lecture: response lecture seminar: coached exercises	oral examination assignment participation	Determine design specifications (e.g., concrete cover, insulation thicknesses) for structural elements, in function of the resistance requirements Determine the deformation and capacity of structural elements in common building materials (timber, concrete, steel) d exposure Analyse the effect of restraint conditions on structural fire performance	
E091103 Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initiative and perseverance. Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found them, both to colleagues as to laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execution of research (literature sea topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, conclusions,). Find an appropriate methodology, in accordance with the applicable scientific norms of the specific field of study.	

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EMingwALG4.1 Have the ability to communicate in English about the own field of specialisation. Competences in cooperation and competences.					Competences in cooperation and communication
Course		Teaching methods	Evaluation methods	Course learning outcome	
Noot: leer- ei	n evaluatievormen voorafgegaan door ** werden niet teruggev	vonden in de studiefiche			
E051540	Explosions and Industrial Fire Safety	lecture seminar	open book examination	TOPICS: industrial fire and explosion protection. COMPETENCES: assess the fire and explosion risks involved with and/or solid materials and to take the appropriate technical and organisation measures to reduce INSIGHTS: understand the physical processes that occur during expressions.	ce such a risk to an acceptable level.
E051421	• • • • • • • • • • • • • • • • • • • •	lecture seminar: coached exercises	written examination report oral examination open book examination	Design an original pipe netwerk with fire sprinklers, fed by means of Understand the interaction of air and water with smoke. Understand pressurized flow in pipes, pipe networks and manifolds. Calculate flows through vertical and horizontal openings. Select a relevant pump and duty point for a pipe network. Understand the flow phenomena involved in entrainment of air into Understand atomisation in fire sprinklers and describe the liquid sprunderstand the background of the hydraulic aspects of an internat installations.	of a pump sump s s o a smoke plume and into a momentum driven jet oray
	Active Fire Protection I: Detection and Suppression	project	oral examination report	Write a report and present it orally to colleagues, with respect to the	ne design of an automatic fire protection installation.
E051494	Active Fire Protection II: Smoke and Heat Control	seminar: coached exercises project	written examination report oral examination open book examination	Perform a critical evaluation of a smoke and heat control system of Make a correct CFD calculation in the context of a smoke and heat Calculate an original design of smoke and heat control systems for Apply national and international standards and regulative documents.	t control system design r a realistic configuration
E051700	, , ,	lecture project	oral examination report	Perform CFD simulations with a good quality Apply the Fire Dynamics Simulator (FDS) for a wide variety of fire Apply CFD and critically evaluate the reliability of the results based Engineering	
E061522	Performance-Based Design	group work project lecture	written examination with open questions report assignment participation	Attitudes: Collaborate in the multidisciplinary environment of Fire S Attitudes: Communicate and collaborate with colleagues. Skills: Discuss performance based design in the English language	
E051630	Fire Safety Strategy Project	demonstration	oral examination	Develop a complete fire safety strategy for a challenging project, in evacuation strategy, use of materials, structural fire behaviour,	ncluding active fire protection systems, passive systems,
E051430	Fire Dynamics	lecture practicum	oral examination	Analyse fire dynamics in an enclosure.	
E051581		lecture lecture: plenary exercises project	oral examination job performance assessment assignment	Report in a structured and scientific manner, using appropriate lan Present to audiences with different backgrounds	guage
E051461	Interaction between People and Fire	lecture project	open book examination report oral examination	Critically assess an evacuation analysis performed using evacuation Undertake an evacuation simulation using appropriate evacuation Critically assess the suitability of various evacuation modelling too	modelling tools and interpret the results in a critical manner.
E051550	9	lecture seminar project	written examination report oral examination	Being able to execute simple reliability analyses of level 2 and 3 Being able to recognize and describe risks Being able to refect critically about the appropriateness and limitat acceptance criteria Being able to apply decision theory in order to arrive at justifiable of Being able to analyse system behaviour and construct fault, event Being able to execute qualitative and quantitative risk analyses on	decisions in the framework of risk management and decision trees
E051590		excursion seminar: coached exercises ** fieldwork project lecture	participation report assignment	Draw up compartmentation strategies for uncommon buildings Check in a critical manner implemented compartmentation on-site Draw up and check compartmentation strategies in accordance wi	
E051600	ğ ğ	lecture lecture: response lecture seminar: coached exercises	oral examination assignment participation	Determine design specifications (e.g., concrete cover, insulation the resistance requirements Determine the deformation and capacity of structural elements in concepts and exposure Analyse the effect of restraint conditions on structural fire performance.	common building materials (timber, concrete, steel) during fire
E091103	Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific doma Give proof of independency, motivation, dedication, drive to innova Self-assessment with adequate and critical self-correction and object Communicate adequately on the research, the results and problem laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process differe topical study, research and the reflection on the research, experiments, experimentations, designs Find an appropriate methodology, in accordance with the applicab	ain. ation and creativity, initiative and perseverance. ectivity. ns, present and found them, both to colleagues as to nt aspects in the execution of research (literature search, s, simulations, results, conclusions,).

EMingwALG4.2 Project management: have the ability to formulate objectives, report efficiently, keep track of targets, follow the progress of the Competences in cooperation and communication

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Course	Teaching methods	Evaluation methods	Course learning outcome
Noot: leer- en evaluatievormen voorafgegaan door ** werden niet terug	ggevonden in de studiefiche		
E051482 Active Fire Protection I: Detection and Suppression	project	report	Write a report and present it orally to colleagues, with respect to the design of an automatic fire protection installation. Design, together with colleagues, a fire detection installation for a building. Design, together with colleagues, a fire suppression installation that is not only based on water extinguishment.
E051494 Active Fire Protection II: Smoke and Heat Con-	trol project	report	Calculate an original design of smoke and heat control systems for a realistic configuration Make a correct CFD calculation in the context of a smoke and heat control system design
E061522 Performance-Based Design	group work self-reliant study activities project lecture	participation report assignment	Skills: Determine the uncertainties in the design. Skills: Select, motivate and apply the proper models, methods and techniques for risk based engineering models. Skills: Report performance based design orally, in writing and with graphical methods. Skills: Control the results of a performance based design. Attitudes: Act in an ethical, professional and social way when presenting and defining performance based design. Skills: Analyse own results and results of others within fire performance based designs in an objective manner. Skills: Discuss performance based design in the English language. Skills: Make and evaluate approximate estimates in a design. Skills: Apply the concept of risk management and the fire prevention techniques in order to produce a fire safe design with an acceptable risk.
E051630 Fire Safety Strategy Project	project	assignment	Develop a complete fire safety strategy for a challenging project, including active fire protection systems, passive systems, evacuation strategy, use of materials, structural fire behaviour,
E051581 Fire Research Seminar	lecture lecture: plenary exercises project	assignment job performance assessment	Report in a structured and scientific manner, using appropriate language Perform a comprehensive literature study on a specified fire related topic, including scientific referencing Schedule work on a dedicated project, plan ahead and report intermediate steps
E051461 Interaction between People and Fire	project	open book examination oral examination	Undertake an evacuation simulation using appropriate evacuation modelling tools and interpret the results in a critical manner.
E051600 Structural Fire Engineering	seminar: coached exercises	participation assignment	Determine design specifications (e.g., concrete cover, insulation thicknesses) for structural elements, in function of the fire resistance requirements Determine the deformation and capacity of structural elements in common building materials (timber, concrete, steel) during fire exposure Analyse the effect of restraint conditions on structural fire performance
E091103 Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initiative and perseverance. Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found them, both to colleagues as to laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execution of research (literature search, topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, conclusions,). Find an appropriate methodology, in accordance with the applicable scientific norms of the specific field of study.

EMingwALG4.3 Have the ability to work as a member of a team in a multidisciplinary workingenvironment, as well as being capable of taking on Competences in cooperation and communication supervisory responsibilities.

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supervisory responsibilities.			
Course	Teaching methods	Evaluation methods	Course learning outcome
Noot: leer- en evaluatievormen voorafgegaan door ** werden niet t	teruggevonden in de studiefiche		
E051482 Active Fire Protection I: Detection and Suppression	project	report	Design, together with colleagues, a fire suppression installation that is not only based on water extinguishment. Design, together with colleagues, a fire detection installation for a building.
E051494 Active Fire Protection II: Smoke and Heat C	Control project	oral examination	Calculate an original design of smoke and heat control systems for a realistic configuration Make a correct CFD calculation in the context of a smoke and heat control system design
E061522 Performance-Based Design	group work project lecture	participation report assignment	Attitudes: Collaborate in the multidisciplinary environment of Fire Safety Engineering. Attitudes: Take up independent positions about fire safety designs and defend the point of view. Skills: Control the results of a performance based design. Attitudes: Act in an ethical, professional and social way when presenting and defining performance based design.
E051630 Fire Safety Strategy Project	project	participation assignment	Develop a complete fire safety strategy for a challenging project, including active fire protection systems, passive systems, evacuation strategy, use of materials, structural fire behaviour,
E051461 Interaction between People and Fire	project	open book examination oral examination	Undertake an evacuation simulation using appropriate evacuation modelling tools and interpret the results in a critical manner
E051550 Risk Management	project	oral examination report	Being able to execute qualitative and quantitative risk analyses on practical relevant situations Being able to recognize and describe risks Being able to refect critically about the appropriateness and limitations of available statistical data, risk analyses and risk acceptance criteria Being able to apply decision theory in order to arrive at justifiable decisions in the framework of risk management Being able to analyse system behaviour and construct fault, event and decision trees

EMingwALG4.4 Report on tell 1. The second of the secon	EMingwALG4.4 Report on technical or scientific subjects verbally, in writing and using graphics.			
Course	Teaching methods	Evaluation methods	Course learning outcome	
Noot: leer- en evaluatievormen voorafgegaan door ** werden i	niet teruggevonden in de studiefiche			
E051421 Fluid Mechanics Applications in Fire	lecture seminar: coached exercises	written examination report oral examination open book examination	Design an original pipe netwerk with fire sprinklers, fed by means of a pump sump Understand the interaction of air and water with smoke. Understand pressurized flow in pipes, pipe networks and manifolds Calculate flows through vertical and horizontal openings. Select a relevant pump and duty point for a pipe network Understand the flow phenomena involved in entrainment of air into a smoke plume and into a Understand atomisation in fire sprinklers and describe the liquid spray Understand the background of the hydraulic aspects of an international (European) standard installations.	•
E051482 Active Fire Protection I: Detection and Suppression	project	report	Write a report and present it orally to colleagues, with respect to the design of an automatic fi Design, together with colleagues, a fire detection installation for a building. Design, together with colleagues, a fire suppression installation that is not only based on water	
E051494 Active Fire Protection II: Smoke and He	at Control project	oral examination report	Calculate an original design of smoke and heat control systems for a realistic configuration Make a correct CFD calculation in the context of a smoke and heat control system design	
E051700 CFD for Fire Safety Engineering	lecture project	oral examination report	Perform CFD simulations with a good quality Apply the Fire Dynamics Simulator (FDS) for a wide variety of fire scenarios Apply CFD and critically evaluate the reliability of the results based on the capabilities of state Engineering	e-of-the-art CFD for Fire Safety
E061522 Performance-Based Design	group work project lecture	participation report assignment	Skills: Report performance based design orally, in writing and with graphical methods.	
E051630 Fire Safety Strategy Project	demonstration project	oral examination peer assessment assignment participation	Develop a complete fire safety strategy for a challenging project, including active fire protection evacuation strategy, use of materials, structural fire behaviour,	on systems, passive systems,
E051581 Fire Research Seminar	lecture lecture: plenary exercises project	oral examination job performance assessment assignment	Report in a structured and scientific manner, using appropriate language Present to audiences with different backgrounds	
E051461 Interaction between People and Fire	project	open book examination oral examination	Critically assess an evacuation analysis performed using evacuation modelling tools. Undertake an evacuation simulation using appropriate evacuation modelling tools and interpr	et the results in a critical manner.
E051590 Compartmentation Strategies	excursion seminar: coached exercises ** fieldwork project lecture	participation report assignment	Draw up compartmentation strategies for uncommon buildings Check in a critical manner implemented compartmentation on-site Draw up and check compartmentation strategies in accordance with prescriptive guidance	
E051600 Structural Fire Engineering	lecture lecture: response lecture seminar: coached exercises	oral examination assignment participation	Determine design specifications (e.g., concrete cover, insulation thicknesses) for structural el resistance requirements Determine the deformation and capacity of structural elements in common building materials exposure Analyse the effect of restraint conditions on structural fire performance	
E091103 Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initiative Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found them laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execution topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, concising an appropriate methodology, in accordance with the applicable scientific norms of the specific process.	n, both to colleagues as to n of research (literature search,

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EMingwFIRE4.1 Function in an international environment (students, PhD students, scientific co-workers, scholars).

Course	Teaching methods	Evaluation methods	Course learning outcome
loot: leer- en evaluatievormen voorafgegaan door ** werd	en niet teruggevonden in de studiefiche		
E051494 Active Fire Protection II: Smoke and	Heat Control project	oral examination report	Perform a critical evaluation of a smoke and heat control system design Make a correct CFD calculation in the context of a smoke and heat control system design Calculate an original design of smoke and heat control systems for a realistic configuration Apply national and international standards and regulative documents for the design of smoke control systems
E061522 Performance-Based Design	group work project lecture	participation report assignment	Attitudes: Collaborate in the multidisciplinary environment of Fire Safety Engineering. Attitudes: Communicate and collaborate with colleagues. Skills: Discuss performance based design in the English language.
E051630 Fire Safety Strategy Project	demonstration project	oral examination peer assessment assignment participation	Develop a complete fire safety strategy for a challenging project, including active fire protection systems, passive systems, evacuation strategy, use of materials, structural fire behaviour,
E051581 Fire Research Seminar	lecture lecture: plenary exercises project	assignment job performance assessment	Report in a structured and scientific manner, using appropriate language Schedule work on a dedicated project, plan ahead and report intermediate steps Present to audiences with different backgrounds
E051461 Interaction between People and Fire		open book examination report oral examination	Explain the nature of likely human behaviour associated with evacuation in fire situations. Undertake an evacuation simulation using appropriate evacuation modelling tools and interpret the results in a critical manner. Be aware of the limitations of evacuation modelling. Identify appropriate human performance data that can be used in evacuation analysis associated with fire. Critically assess the suitability of various evacuation modelling tools. Critically assess an evacuation analysis performed using evacuation modelling tools. Critically assess the engineering literature associated with human behaviour in fire evacuation and evacuation modelling.
E051550 Risk Management	project	oral examination report	Being able to execute qualitative and quantitative risk analyses on practical relevant situations Being able to recognize and describe risks Being able to refect critically about the appropriateness and limitations of available statistical data, risk analyses and risk acceptance criteria Being able to analyse system behaviour and construct fault, event and decision trees
E051590 Compartmentation Strategies	excursion seminar: coached exercises ** fieldwork project lecture	participation report assignment	Draw up compartmentation strategies for uncommon buildings Check in a critical manner implemented compartmentation on-site Draw up and check compartmentation strategies in accordance with prescriptive guidance
E091103 Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initiative and perseverance. Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found them, both to colleagues as to laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execution of research (literature search, topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, conclusions,). Find an appropriate methodology, in accordance with the applicable scientific norms of the specific field of study.

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EMingwALG5.1 Act in an ethical, professional and social way.

Societal competences

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Course	Teaching methods	Evaluation methods	Course learning outcome	
Noot: leer- en evaluatievormen voorafgegaan door ** werden niet teru	ggevonden in de studiefiche			
E051540 Explosions and Industrial Fire Safety	lecture seminar	open book examination	TOPICS: industrial fire and explosion protection. COMPETENCES: assess the fire and explosion risks involved with the use, handling, transport or storage of liquid, gaseous and/or solid materials and to take the appropriate technical and organisation measures to reduce such a risk to an acceptable level. INSIGHTS: understand the physical processes that occur during explosions.	
E051421 Fluid Mechanics Applications in Fire	lecture seminar: coached exercises	written examination report oral examination open book examination	Design an original pipe netwerk with fire sprinklers, fed by means of a pump sump Understand the interaction of air and water with smoke. Understand pressurized flow in pipes, pipe networks and manifolds Calculate flows through vertical and horizontal openings. Select a relevant pump and duty point for a pipe network Understand the flow phenomena involved in entrainment of air into a smoke plume and into a momentum driven jet Understand atomisation in fire sprinklers and describe the liquid spray Understand the background of the hydraulic aspects of an international (European) standard for design of fire sprinkler installations.	
E051482 Active Fire Protection I: Detection and Suppression	project	report	Write a report and present it orally to colleagues, with respect to the design of an automatic fire protection installation. Design, together with colleagues, a fire detection installation for a building. Design, together with colleagues, a fire suppression installation that is not only based on water extinguishment.	
E051494 Active Fire Protection II: Smoke and Heat Con	trol project	oral examination report	Calculate an original design of smoke and heat control systems for a realistic configuration Make a correct CFD calculation in the context of a smoke and heat control system design	
E051700 CFD for Fire Safety Engineering	lecture project	oral examination report	Perform CFD simulations with a good quality Apply the Fire Dynamics Simulator (FDS) for a wide variety of fire scenarios Apply CFD and critically evaluate the reliability of the results based on the capabilities of state-of-the-art CFD for Fire Safety Engineering	
E061522 Performance-Based Design	group work self-reliant study activities project lecture	participation report assignment	Skills: Analyse own results and results of others within fire performance based designs in an objective manner. Attitudes: Reflect on own way of thinking and acting. Attitudes: Act in an ethical, professional and social way when presenting and defining performance based design.	
E051630 Fire Safety Strategy Project	project	assignment	Develop a complete fire safety strategy for a challenging project, including active fire protection systems, passive systems, evacuation strategy, use of materials, structural fire behaviour,	
E051550 Risk Management	lecture project	oral examination report	Being able to execute qualitative and quantitative risk analyses on practical relevant situations Being able to recognize and describe risks Being able to refect critically about the appropriateness and limitations of available statistical data, risk analyses and risk acceptance criteria Being able to apply decision theory in order to arrive at justifiable decisions in the framework of risk management	
E091103 Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initiative and perseverance. Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found them, both to colleagues as to laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execution of research (literature search, topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, conclusions,). Find an appropriate methodology, in accordance with the applicable scientific norms of the specific field of study.	

EMingwALG5.2 Recognize the most important business and legal aspects of the own engineering discipline.

Societal competences

Course	Teaching methods	Evaluation methods	Course learning outcome
Noot: leer- en evaluatievormen voorafgegaan door ** werden niet	teruggevonden in de studiefiche		
E051540 Explosions and Industrial Fire Safety	lecture seminar	open book examination	TOPICS: industrial fire and explosion protection. COMPETENCES: assess the fire and explosion risks involved with the use, handling, transport or storage of liquid, gaseous and/or solid materials and to take the appropriate technical and organisation measures to reduce such a risk to an acceptable level. INSIGHTS: understand the physical processes that occur during explosions.
E051494 Active Fire Protection II: Smoke and Heat 0	Control project	oral examination report	Apply national and international standards and regulative documents for the design of smoke control systems
E061522 Performance-Based Design	group work self-reliant study activities project lecture	participation report assignment	Attitudes: Act in an ethical, professional and social way when presenting and defining performance based design. Skills: Control the results of a performance based design.

EMingwALG5.3 Understand the historical evolution of the own engineering discipline and its social relevance.

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Societal competences

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Course	Teaching methods	Evaluation methods	Course learning outcome
Noot: leer- en evaluatievormen voorafgegaan door ** werden niet	teruggevonden in de studiefiche		
E061522 Performance-Based Design	lecture self-reliant study activities	participation	Attitudes: Be aware of on-going evolutions in the field of interest.
E051461 Interaction between People and Fire	lecture	report	Explain the nature of likely human behaviour associated with evacuation in fire situations.
E051550 Risk Management	lecture		Being able to recognize and describe risks
E091103 Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initiative and perseverance. Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found them, both to colleagues as to laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execution of research (literature search, topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, conclusions,). Find an appropriate methodology, in accordance with the applicable scientific norms of the specific field of study.

FMingwFIRE5 1 Master and apply critical insight in existing fire safety legislation and regulations in the development of a fire safety design

Societal	competences
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Course	Teaching methods	Evaluation methods	Course learning outcome	
oot: leer- en evaluatievormen voorafgegaan door ** werden niet t	_	Lvaluation methods	Course learning outcome	
ioot. leer- en evaluatievormen vooralgegaan door - werden niet t	teruggevonden in de stadienone			
E051540 Explosions and Industrial Fire Safety	lecture seminar	open book examination	TOPICS: industrial fire and explosion protection. COMPETENCES: assess the fire and explosion risks involved with the use, handling, trans and/or solid materials and to take the appropriate technical and organisation measures to reduce such a risk to an acceptive INSIGHTS: understand the physical processes that occur during explosions.	
E051494 Active Fire Protection II: Smoke and Heat C	Control project	oral examination report	Apply national and international standards and regulative documents for the design of smoken	ke control systems
E051443 Fire Safety and Legislation	lecture	open book examination	critical insight into existing legislation and regulations adopt an attitude aimed at the follow-up and application of the most recent legislation	
E061522 Performance-Based Design	group work self-reliant study activities project lecture	participation report assignment	Attitudes: Collaborate in the multidisciplinary environment of Fire Safety Engineering. Skills: Report performance based design orally, in writing and with graphical methods. Skills: Control the results of a performance based design. Knowledge: Evaluate self-reliantly the fire risk in a project. Attitudes: Act in an ethical, professional and social way when presenting and defining perfo Attitudes: Communicate and collaborate with colleagues. Skills: Discuss performance based design in the English language. Skills: Apply the concept of risk management and the fire prevention techniques in order to acceptable risk.	•
E051630 Fire Safety Strategy Project	demonstration project	assignment	Develop a complete fire safety strategy for a challenging project, including active fire protect evacuation strategy, use of materials, structural fire behaviour,	ction systems, passive systems,
E051461 Interaction between People and Fire	lecture	report	Explain the nature of likely human behaviour associated with evacuation in fire situations.	
E051550 Risk Management	lecture project	oral examination report	Being able to refect critically about the appropriateness and limitations of available statistical acceptance criteria	al data, risk analyses and risk
E051590 Compartmentation Strategies	excursion seminar: coached exercises ** fieldwork project lecture	participation report assignment	Draw up compartmentation strategies for uncommon buildings Check in a critical manner implemented compartmentation on-site Draw up and check compartmentation strategies in accordance with prescriptive guidance	
E051600 Structural Fire Engineering	lecture lecture: response lecture seminar: coached exercises	oral examination assignment participation	Determine design specifications (e.g., concrete cover, insulation thicknesses) for structural resistance requirements Determine the deformation and capacity of structural elements in common building material exposure Analyse the effect of restraint conditions on structural fire performance	
E091103 Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initiat Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found the laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execution topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, confind an appropriate methodology, in accordance with the applicable scientific norms of the	em, both to colleagues as to on of research (literature search, nclusions,).

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EMingwFIRE5.2 Act in an ethical, professional and social way when developing and presenting a performance based fire safety design.

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Societal	competences
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Course	Teaching methods	Evaluation methods	Course learning outcome
Noot: leer- en evaluatievormen voorafgegaan door ** werden i	niet teruggevonden in de studiefiche		
E051494 Active Fire Protection II: Smoke and He	eat Control lecture seminar: coached exercises	written examination report	Perform a critical evaluation of a smoke and heat control system design Make a correct CFD calculation in the context of a smoke and heat control system design
	project	oral examination open book examination	Calculate an original design of smoke and heat control systems for a realistic configuration
E061522 Performance-Based Design	group work self-reliant study activities project lecture	participation report assignment	Skills: Analyse own results and results of others within fire performance based designs in an objective manner. Attitudes: Reflect on own way of thinking and acting. Attitudes: Act in an ethical, professional and social way when presenting and defining performance based design.
E051630 Fire Safety Strategy Project	demonstration	oral examination	Develop a complete fire safety strategy for a challenging project, including active fire protection systems, passive systems, evacuation strategy, use of materials, structural fire behaviour,
E051550 Risk Management	lecture project	oral examination report	Being able to execute qualitative and quantitative risk analyses on practical relevant situations Being able to recognize and describe risks Being able to refect critically about the appropriateness and limitations of available statistical data, risk analyses and risk acceptance criteria Being able to apply decision theory in order to arrive at justifiable decisions in the framework of risk management Being able to analyse system behaviour and construct fault, event and decision trees
E091103 Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initiative and perseverance. Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found them, both to colleagues as to laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execution of research (literature search, topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, conclusions,). Find an appropriate methodology, in accordance with the applicable scientific norms of the specific field of study.

EMingwALG6.1 Master the complexity of technical systems by using system and process models.

Profession-specific competence

EMINGWALG6.1 Master the cor			
Course	Teaching methods	Evaluation methods	Course learning outcome
Noot: leer- en evaluatievormen voorafgegaan door ** werden niet	teruggevonden in de studiefiche		
E051540 Explosions and Industrial Fire Safety	lecture seminar	open book examination	TOPICS: industrial fire and explosion protection. COMPETENCES: assess the fire and explosion risks involved with the use, handling, transport or storage of liquid, gaseous and/or solid materials and to take the appropriate technical and organisation measures to reduce such a risk to an acceptable level. INSIGHTS: understand the physical processes that occur during explosions.
E051421 Fluid Mechanics Applications in Fire	lecture seminar: coached exercises	written examination report oral examination open book examination	Design an original pipe netwerk with fire sprinklers, fed by means of a pump sump Understand the interaction of air and water with smoke. Understand pressurized flow in pipes, pipe networks and manifolds Calculate flows through vertical and horizontal openings. Select a relevant pump and duty point for a pipe network Understand the flow phenomena involved in entrainment of air into a smoke plume and into a momentum driven jet Understand atomisation in fire sprinklers and describe the liquid spray Understand the background of the hydraulic aspects of an international (European) standard for design of fire sprinkler installations.
E051494 Active Fire Protection II: Smoke and Heat	Control project	oral examination report	Calculate an original design of smoke and heat control systems for a realistic configuration Make a correct CFD calculation in the context of a smoke and heat control system design
E051700 CFD for Fire Safety Engineering	lecture project	oral examination report	Perform CFD simulations with a good quality Apply the Fire Dynamics Simulator (FDS) for a wide variety of fire scenarios Apply CFD and critically evaluate the reliability of the results based on the capabilities of state-of-the-art CFD for Fire Safety Engineering
E061522 Performance-Based Design	group work self-reliant study activities project lecture	participation report assignment	Skills: Determine the uncertainties in the design. Skills: Select, motivate and apply the proper models, methods and techniques for risk based engineering models. Skills: Report performance based design orally, in writing and with graphical methods. Skills: Control the results of a performance based design. Skills: Discuss performance based design in the English language. Skills: Make and evaluate approximate estimates in a design. Skills: Apply the concept of risk management and the fire prevention techniques in order to produce a fire safe design with a acceptable risk.
E051550 Risk Management	lecture project	oral examination report	Being able to execute qualitative and quantitative risk analyses on practical relevant situations Being able to recognize and describe risks Being able to analyse system behaviour and construct fault, event and decision trees
E091103 Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initiative and perseverance. Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found them, both to colleagues as to laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execution of research (literature search, topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, conclusions,). Find an appropriate methodology, in accordance with the applicable scientific norms of the specific field of study.

EMingwALG6.2 Reconcile conflicting specifications and prior conditions in a highquality and innovative concept or process.

Profession_s	specific comp	atanca
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Course	Teaching methods	Evaluation methods	Course learning outcome
Noot: leer- en evaluatievormen voorafgegaan door ** werden niet t	teruggevonden in de studiefiche		
E051540 Explosions and Industrial Fire Safety	lecture seminar	open book examination	TOPICS: industrial fire and explosion protection. COMPETENCES: assess the fire and explosion risks involved with the use, handling, transport or storage of liquid, gaseous and/or solid materials and to take the appropriate technical and organisation measures to reduce such a risk to an acceptable level. INSIGHTS: understand the physical processes that occur during explosions.
E051482 Active Fire Protection I: Detection and Suppression	project	oral examination report	Design, together with colleagues, a fire suppression installation that is not only based on water extinguishment. Design, together with colleagues, a fire detection installation for a building.
E061522 Performance-Based Design	group work self-reliant study activities project lecture	participation report assignment	Skills: Apply the concept of risk management and the fire prevention techniques in order to produce a fire safe design with an acceptable risk. Skills: Select, motivate and apply the proper models, methods and techniques for risk based engineering models. Skills: Control the results of a performance based design. Attitudes: Act in an ethical, professional and social way when presenting and defining performance based design. Skills: Discuss performance based design in the English language. Skills: Make and evaluate approximate estimates in a design.
E051550 Risk Management	lecture project	oral examination report	Being able to execute qualitative and quantitative risk analyses on practical relevant situations
E091103 Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initiative and perseverance. Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found them, both to colleagues as to laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execution of research (literature search, topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, conclusions,). Find an appropriate methodology, in accordance with the applicable scientific norms of the specific field of study.

EMingwALG6.3 Synthesize incomplete, contradictory or redundant data into useful information.

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Profession-specific competence

Course	Teaching methods	Evaluation methods	Course learning outcome
Noot: leer- en evaluatievormen voorafgegaan door ** werden niet t	eruggevonden in de studiefiche		
E051540 Explosions and Industrial Fire Safety	lecture seminar	open book examination	TOPICS: industrial fire and explosion protection. COMPETENCES: assess the fire and explosion risks involved with the use, handling, transport or storage of liquid, gaseous and/or solid materials and to take the appropriate technical and organisation measures to reduce such a risk to an acceptable level. INSIGHTS: understand the physical processes that occur during explosions.
E051482 Active Fire Protection I: Detection and	project	oral examination	Design, together with colleagues, a fire suppression installation that is not only based on water extinguishment.
Suppression		report	Design, together with colleagues, a fire detection installation for a building.
E051494 Active Fire Protection II: Smoke and Heat C	Control project	oral examination report	Calculate an original design of smoke and heat control systems for a realistic configuration Make a correct CFD calculation in the context of a smoke and heat control system design
E061522 Performance-Based Design	group work self-reliant study activities project lecture	participation report assignment	Skills: Apply the concept of risk management and the fire prevention techniques in order to produce a fire safe design with an acceptable risk. Skills: Select, motivate and apply the proper models, methods and techniques for risk based engineering models.
E051581 Fire Research Seminar	lecture lecture: plenary exercises project	assignment job performance assessment	Report in a structured and scientific manner, using appropriate language Perform a comprehensive literature study on a specified fire related topic, including scientific referencing Present to audiences with different backgrounds
E051461 Interaction between People and Fire	lecture	report	Identify appropriate human performance data that can be used in evacuation analysis associated with fire.
E051550 Risk Management	lecture project	oral examination report	Being able to execute qualitative and quantitative risk analyses on practical relevant situations Being able to refect critically about the appropriateness and limitations of available statistical data, risk analyses and risk acceptance criteria
E091103 Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creativity, initiative and perseverance. Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and found them, both to colleagues as to laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the execution of research (literature search, topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, results, conclusions,). Find an appropriate methodology, in accordance with the applicable scientific norms of the specific field of study.

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<<	EMingwALG6.4 Possess suffici estimates.	ent ready knowledge and unde	erstanding to evaluate the re	sults of complex calculations, or make approximate	Profession-specific competend
Course		Teaching methods	Evaluation methods	Course learning outcome	
Voot: leer- e	en evaluatievormen voorafgegaan door ** werden niet te	eruggevonden in de studiefiche			
E051540	Explosions and Industrial Fire Safety	lecture seminar	open book examination	TOPICS: industrial fire and explosion protection. COMPETENCES: assess the fire and explosion risks involved with the use, hand and/or solid materials and to take the appropriate technical and organisation measures to reduce such a risk to	
				INSIGHTS: understand the physical processes that occur during explosions.	
E051421	Fluid Mechanics Applications in Fire	lecture seminar: coached exercises	written examination report oral examination open book examination	Design an original pipe netwerk with fire sprinklers, fed by means of a pump sump Understand the interaction of air and water with smoke. Understand pressurized flow in pipes, pipe networks and manifolds Calculate flows through vertical and horizontal openings. Select a relevant pump and duty point for a pipe network Understand the flow phenomena involved in entrainment of air into a smoke plum Understand atomisation in fire sprinklers and describe the liquid spray Understand the background of the hydraulic aspects of an international (European	ne and into a momentum driven jet
F054400	Active Fire Protection I: Detection and	nucio at	and aversination	installations.	and an water outing wish mont
	Suppression	project	oral examination report	Design, together with colleagues, a fire suppression installation that is not only bath Design, together with colleagues, a fire detection installation for a building.	ased on water extinguishment.
	Active Fire Protection II: Smoke and Heat C	control lecture seminar: coached exercises project	written examination report oral examination open book examination	Perform a critical evaluation of a smoke and heat control system design Compute and critically evaluate the removal of heat from an enclosure Make a correct CFD calculation in the context of a smoke and heat control system Compute and critically evaluate the movement of smoke inside, into and out of an	n enclosure
-0E1700	CED for Fire Cofety Engineering	lactura	aral avamination	Calculate an original design of smoke and heat control systems for a realistic con	figuration
EU51700	CFD for Fire Safety Engineering	lecture project	oral examination report	Perform CFD simulations with a good quality Apply the Fire Dynamics Simulator (FDS) for a wide variety of fire scenarios Apply CFD and critically evaluate the reliability of the results based on the capabil Engineering	lities of state-of-the-art CFD for Fire Safety
E061522	Performance-Based Design	group work self-reliant study activities project lecture	written examination with open questions report assignment participation	Skills: Determine the uncertainties in the design. Attitudes: Reflect on own way of thinking and acting. Attitudes: Take up independent positions about fire safety designs and defend the Knowledge: Evaluate self-reliantly the fire risk in a project. Attitudes: Act in an ethical, professional and social way when presenting and defin Skills: Analyse own results and results of others within fire performance based de Skills: Make and evaluate approximate estimates in a design. Skills: Apply the concept of risk management and the fire prevention techniques in acceptable risk. Attitudes: Be aware of the own expertise and improve to expert level.	ning performance based design. esigns in an objective manner.
E051630	Fire Safety Strategy Project	project	assignment	Develop a complete fire safety strategy for a challenging project, including active evacuation strategy, use of materials, structural fire behaviour,	fire protection systems, passive systems,
E051550	Risk Management	project		Being able to execute qualitative and quantitative risk analyses on practical relevance Being able to refect critically about the appropriateness and limitations of available acceptance criteria	
Ē091103	Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creating Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, refind an appropriate methodology, in accordance with the applicable scientific nor	I found them, both to colleagues as to be execution of research (literature search, results, conclusions,).

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EMingwALG6.5 Pay attention to entire life cycles of systems, machines, and processes.

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Profession-specific competence

Course	Teaching methods	Evaluation methods	Course learning outcome
Noot: leer- en evaluatievormen voorafgegaan door ** werden niet t	eruggevonden in de studiefiche		
E051540 Explosions and Industrial Fire Safety	lecture seminar	open book examination	TOPICS: industrial fire and explosion protection. COMPETENCES: assess the fire and explosion risks involved with the use, handling, transport or storage of liquid, gaseous and/or solid materials and to take the appropriate technical and organisation measures to reduce such a risk to an acceptable level. INSIGHTS: understand the physical processes that occur during explosions.
E051482 Active Fire Protection I: Detection and Suppression	project	report	Design, together with colleagues, a fire suppression installation that is not only based on water extinguishment. Design, together with colleagues, a fire detection installation for a building.
E061522 Performance-Based Design	group work self-reliant study activities project lecture	participation report assignment	Skills: Apply the concept of risk management and the fire prevention techniques in order to produce a fire safe design with an acceptable risk. Skills: Select, motivate and apply the proper models, methods and techniques for risk based engineering models.

EMingwALG6.6 Pay attention to sustainability, energyefficiency, environmental cost, use of raw materials and labour costs.

EMingwALG6.6 Pay attention to the second	EMingwALG6.6 Pay attention to sustainability, energyefficiency, environmental cost, use of raw materials and labour costs.			Profession-specific competence
Course	Teaching methods	Evaluation methods	Course learning outcome	
Noot: leer- en evaluatievormen voorafgegaan door ** werden niet	t teruggevonden in de studiefiche			
E051421 Fluid Mechanics Applications in Fire	lecture seminar: coached exercises	written examination report oral examination open book examination	Design an original pipe netwerk with fire sprinklers, fed by means of a pump sump Understand the interaction of air and water with smoke. Understand pressurized flow in pipes, pipe networks and manifolds Calculate flows through vertical and horizontal openings. Select a relevant pump and duty point for a pipe network Understand the flow phenomena involved in entrainment of air into a smoke plum Understand atomisation in fire sprinklers and describe the liquid spray Understand the background of the hydraulic aspects of an international (European installations.	e and into a momentum driven jet
E051610 Passive Fire Protection	lecture online lecture	written examination	Give an overview of fire protection systems possible for different applications, incl disadvantages	luding their respective advantages and
E061522 Performance-Based Design	group work self-reliant study activities project lecture	participation report assignment	Skills: Apply the concept of risk management and the fire prevention techniques in acceptable risk.	n order to produce a fire safe design with an

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EMingwALG6.7 Pay attention to all aspects of reliability, safety, and ergonomics.

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Profession-specific competence

Course	Teaching methods	Evaluation methods	Course learning outcome
Noot: leer- en evaluatievormen voorafgegaan door ** werden niet t	eruggevonden in de studiefiche		
E051482 Active Fire Protection I: Detection and Suppression	project	oral examination report	Design, together with colleagues, a fire suppression installation that is not only based on water extinguishment. Design, together with colleagues, a fire detection installation for a building.
E061522 Performance-Based Design	group work self-reliant study activities project lecture	participation report assignment	Knowledge: Draw the appropriate safety conclusions from the risk analysis. Attitudes: Take up independent positions about fire safety designs and defend the point of view. Skills: Control the results of a performance based design. Knowledge: Evaluate self-reliantly the fire risk in a project. Attitudes: Act in an ethical, professional and social way when presenting and defining performance based design. Skills: Discuss performance based design in the English language. Skills: Make and evaluate approximate estimates in a design. Skills: Apply the concept of risk management and the fire prevention techniques in order to produce a fire safe design with an acceptable risk. Skills: Determine the uncertainties in the design.
E051550 Risk Management	lecture seminar project	written examination report oral examination	Being able to execute simple reliability analyses of level 2 and 3 Being able to recognize and describe risks Being able to refect critically about the appropriateness and limitations of available statistical data, risk analyses and risk acceptance criteria Being able to apply decision theory in order to arrive at justifiable decisions in the framework of risk management Being able to analyse system behaviour and construct fault, event and decision trees Being able to execute qualitative and quantitative risk analyses on practical relevant situations

EMingwALG6.8 Have insight into and understanding of the importance of entrepreneurship.

Profession-specific competence

Course	Teaching methods	Evaluation methods	Course learning outcome
Noot: leer- en evaluatievormen voorafgegaan door ** werder	n niet teruggevonden in de studiefiche		
E061522 Performance-Based Design	group work self-reliant study activities project lecture	participation report assignment	Skills: Apply the concept of risk management and the fire prevention techniques in order to produce a fire safe design with an acceptable risk. Attitudes: Be aware of on-going evolutions in the field of interest.
E051630 Fire Safety Strategy Project	demonstration project	oral examination peer assessment assignment participation	Develop a complete fire safety strategy for a challenging project, including active fire protection systems, passive systems, evacuation strategy, use of materials, structural fire behaviour,

< EMingwALG6.9 Show perseverand	e, innovativeness, and an a	aptitude for creating adde	d value.	Profession-specific competen
Course	Teaching methods	Evaluation methods	Course learning outcome	
Noot: leer- en evaluatievormen voorafgegaan door ** werden niet terugg	evonden in de studiefiche			
E051421 Fluid Mechanics Applications in Fire	lecture seminar: coached exercises	written examination report oral examination open book examination	Design an original pipe netwerk with fire sprinklers, fed by means of a pump sump Understand the interaction of air and water with smoke. Understand pressurized flow in pipes, pipe networks and manifolds Calculate flows through vertical and horizontal openings. Select a relevant pump and duty point for a pipe network Understand the flow phenomena involved in entrainment of air into a smoke plum Understand atomisation in fire sprinklers and describe the liquid spray Understand the background of the hydraulic aspects of an international (Europear installations.	e and into a momentum driven jet
E051482 Active Fire Protection I: Detection and Suppression	project	oral examination report	Write a report and present it orally to colleagues, with respect to the design of an Design, together with colleagues, a fire detection installation for a building. Design, together with colleagues, a fire suppression installation that is not only ba	
E051494 Active Fire Protection II: Smoke and Heat Contr	ol project	oral examination report	Calculate an original design of smoke and heat control systems for a realistic confidence and correct CFD calculation in the context of a smoke and heat control system.	figuration n design
E061522 Performance-Based Design	group work self-reliant study activities project lecture	participation report assignment	Attitudes: Be aware of the own expertise and improve to expert level. Attitudes: Be aware of on-going evolutions in the field of interest.	
E051550 Risk Management	project	oral examination report	Being able to execute qualitative and quantitative risk analyses on practical relevance Being able to analyse system behaviour and construct fault, event and decision transfer and the system behaviour and construct fault, event and decision transfer and the system behaviour and construct fault, event and decision transfer and the system behaviour and construct fault.	
E051590 Compartmentation Strategies	excursion seminar: coached exercises ** fieldwork project lecture	participation report assignment	Draw up compartmentation strategies for uncommon buildings Check in a critical manner implemented compartmentation on-site Draw up and check compartmentation strategies in accordance with prescriptive of	
E091103 Master's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creative Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, reflection and appropriate methodology, in accordance with the applicable scientific normalizations.	found them, both to colleagues as to e execution of research (literature search, esults, conclusions,).

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<< E	MingwFIRE6.1 Integrate Fire s	Safety Engineering related kno	Profession-specific competence		
Course		Teaching methods	Evaluation methods	Course learning outcome	
Noot: leer- en evalu	uatievormen voorafgegaan door ** werden niet t	teruggevonden in de studiefiche			
E051700 CFD	for Fire Safety Engineering	lecture project	oral examination report	Perform CFD simulations with a good quality Apply the Fire Dynamics Simulator (FDS) for a wide variety of fire scenarios Apply CFD and critically evaluate the reliability of the results based on the capabil Engineering	ities of state-of-the-art CFD for Fire Safety
E061522 Perfo	ormance-Based Design	group work self-reliant study activities project lecture	written examination with open questions report assignment participation	Knowledge: Draw the appropriate safety conclusions from the risk analysis. Attitudes: Reflect on own way of thinking and acting. Skills: Select, motivate and apply the proper models, methods and techniques for Attitudes: Take up independent positions about fire safety designs and defend the Knowledge: Use functional criteria (performance) as a criterion in order to realise skills: Report performance based design orally, in writing and with graphical meth Skills: Control the results of a performance based design. Knowledge: Evaluate self-reliantly the fire risk in a project. Attitudes: Act in an ethical, professional and social way when presenting and defir Attitudes: Be aware of on-going evolutions in the field of interest. Skills: Analyse own results and results of others within fire performance based des Attitudes: Communicate and collaborate with colleagues. Skills: Discuss performance based design in the English language. Skills: Make and evaluate approximate estimates in a design. Skills: Apply the concept of risk management and the fire prevention techniques in acceptable risk. Attitudes: Collaborate in the multidisciplinary environment of Fire Safety Engineeri Attitudes: Be aware of the own expertise and improve to expert level. Knowledge: Master and apply the advanced knowledge of previous courses by int global risk performance based design. Skills: Determine the uncertainties in the design.	and evaluate an original fire safety design. ods. ning performance based design. signs in an objective manner. n order to produce a fire safe design with an ling.
E051630 Fire \$	Safety Strategy Project	project	assignment	Develop a complete fire safety strategy for a challenging project, including active feacuation strategy, use of materials, structural fire behaviour,	ire protection systems, passive systems,
E051461 Intera	action between People and Fire	project	open book examination report oral examination	Critically assess an evacuation analysis performed using evacuation modelling too Undertake an evacuation simulation using appropriate evacuation modelling tools	
E051550 Risk	Management	project	oral examination report	Being able to execute qualitative and quantitative risk analyses on practical relevance Being able to recognize and describe risks Being able to refect critically about the appropriateness and limitations of available acceptance criteria Being able to analyse system behaviour and construct fault, event and decision trees.	e statistical data, risk analyses and risk
E051600 Struc	ctural Fire Engineering	lecture lecture: response lecture seminar: coached exercises	oral examination assignment participation	Determine design specifications (e.g., concrete cover, insulation thicknesses) for stresistance requirements Determine the deformation and capacity of structural elements in common building exposure Analyse the effect of restraint conditions on structural fire performance	structural elements, in function of the fire
E091103 Mast	er's Dissertation	master's dissertation	oral examination assignment	Define, study and analyse the research problem in a specific domain. Give proof of independency, motivation, dedication, drive to innovation and creative Self-assessment with adequate and critical self-correction and objectivity. Communicate adequately on the research, the results and problems, present and laypeople. Render and synthesise the results concisely. Critically analyse, formulate, study, execute and/or process different aspects in the topical study, research and the reflection on the research, experiments, experimentations, designs, simulations, refind an appropriate methodology, in accordance with the applicable scientific normalized.	found them, both to colleagues as to e execution of research (literature search, esults, conclusions,).

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