



SVEUČILIŠTE U ZAGREBU  
METALURŠKI FAKULTET

UNIVERSITY OF ZAGREB  
FACULTY OF METALLURGY

# UNDERGRADUATE UNIVERSITY STUDY PROGRAM

## OCCUPATIONAL SAFETY, HEALTH AND ENVIRONMENT

### PROGRAM OF THE COURSES

Sisak, June 2019.

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# CONTENT

MATHEMATICS 1	5
PHYSICS	7
CHEMISTRY	10
INTRODUCTION TO SAFETY	12
INTRODUCTION TO ECOLOGY	14
WORK PSYCHOLOGY	16
ENGLISH LANGUAGE 1	19
MATHEMATICS 2	22
FUNDAMENTALS OF ELECTRICAL ENGINEERING	24
ENGINEERING DRAWING AND COMPUTER GRAPHICS	27
THE BASICS OF LAW AND OCCUPATIONAL SAFETY LEGISLATION	29
TOXICOLOGY	31
CHEMICAL AND BIOLOGICAL HAZARDS	34
ENGLISH LANGUAGE 2	36
COMPUTER ASSISTED DATA PROCESSING	40
ENVIRONMENT AND WORKPLACE PROTECTION TECHNIQUES	42
SAFETY MANAGEMENT SYSTEMS	44
HAZARDS AND RISKS IN WORK ENVIRONMENT	47

HEALTH AND SAFETY AT WORK PRINCIPLES	49
TESTING AND CERTIFICATION	52
MATERIALS SCIENCE	56
PHYSICAL DAMAGES	58
MACHINES AND DEVICES WITH INCREASED DANGERS	61
ERGONOMICS AND SAFETY	65
ENERGY SYSTEMS	68
FUNDAMENTALS OF COMBUSTION AND EXTINCTION PROCESSES	70
PERSONAL PROTECTIVE EQUIPMENT AND RESCUE EQUIPMENT	73
HAZARDOUS SUBSTANCES IN THE ENVIRONMENT	76
POLLUTION AND PROTECTION OF SOIL	78
AIR POLLUTION AND PROTECTION	81
WATER POLLUTION AND PROTECTION	83
INTRODUCTION TO ENTREPRENEURSHIP	85
EMERGENCY PLANNING AND RESPONSE	87
FIRE SAFETY OF BUILDINGS	90
PROFESSIONAL DISEASES AND HUMAN HEALTH	92
SUSTAINABLE WASTE MANAGEMENT	95
TECHNICAL AND BUSINESS SAFETY	97

BUSINESS COMMUNICATION AND ANDRAGOGY	100
RISK ASSESSMENT	103
THE BEST AVAILABLE TECHNIQUES IN ENVIRONMENT PROTECTION OF INDUSTRIAL AND OTHER INSTALLATIONS	105
RADIATION PROTECTION	108
PUBLIC HEALTH	110
HEALTH AND SAFETY IN FOOD PRODUCTION	112
SAFETY IN CONSTRUCTION	115
ACTIVE MEASURES FROM FIRE PROTECTION	118
SUSTAINABILITY OF FOUNDRY PROCESSES	120
LOW – EMISSION COMBUSTION	122
STUDENT PRACTICE	124
BACHELOR THESIS	126

1. GENERAL INFORMATION				
1.1. Course teacher	Assist. Prof. Ivan Ivec, PhD		1.6. Year of the study	1
1.2. Name of the course	MATHEMATICS 1		1.7. ECTS credits	5
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+45+0+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course	20 full-time+80 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	3., 5%
2. COURSE DESCRIPTION				
2.1. Course objectives	<p>Use the derivative as a tool to analyze the growth rate in solving the problem of quantitative analysis in engineering.  Determine the features of planar curves by using the tools of differential calculus.  Explain how differential calculus combines the ideas of the slope in geometry, growth in the practical problems and analytical term of derivation as a unified set of tools for quantitative analysis.</p>			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	<p>Apply teamwork-oriented, ethical principles and encourage the development of communication and social skills.  Apply logical conclusion and precision in data processing.  Use acquired theoretical knowledge in engineering practice.</p>			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	<p>Analyze the similarity and differences between real and complex numbers and carry out mathematical operations with them.  Explain the term of real functions and their basic features.  Define the concept of series and examine the convergence.  Explain the concept of growth rate of functions on selected examples in engineering or natural sciences.  Sketch the graph of real functions of one variable and discuss the local behavior in the interval around specific points.</p>			
2.5. Course content (syllabus)	<p>The course systematically treats the notion of derivative and application of derivative to analyze function properties and draw function graphs. As a preparation all basics of number sets, functions and limits are given. Teaching per week is provided below.</p> <ol style="list-style-type: none"> <li>1) Sets and operations on sets, real numbers.</li> <li>2) Complex numbers, vectors in the plane, trigonometry of the right-angled triangle.</li> <li>3) Functions, graphs of functions, graphs of elementary functions.</li> <li>4) Linear, quadratic, exponential and logarithmic functions.</li> <li>5) Determination of the domain of functions.</li> <li>6) Composition of functions, inverse function.</li> <li>7) Repetition, 1st part of preliminary exam.</li> <li>8) Arrays, limit of an array.</li> <li>9) Limit of a function.</li> </ol>			

	10) Definition of derivatives, table of derivatives. 11) Differentiation rules. 12) Tangent and normal to the graph of a function, local extrema and intervals of monotonicity . 13) Drawing graphs of functions. 14) Points of inflection and intervals of convexity / concavity, L'Hospital rule. 15) Repetition, 2nd part of preliminary exam.									
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work					<input type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.7. Comments:	
2.8. Student responsibilities	Conditions for signature: a student must attend at least 70% of lectures and exercises.									
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	YES	<b>NO</b>	Oral exam	<b>YES</b>	NO	
	Experimental work	YES	<b>NO</b>	Report	YES	<b>NO</b>	(other)	YES	NO	
	Essay	YES	<b>NO</b>	Seminar paper	YES	<b>NO</b>	(other)	YES	NO	
	Preliminary exam	<b>YES</b>	NO	Practical work	YES	<b>NO</b>	(other)	YES	NO	
	Project	YES	<b>NO</b>	Written exam	<b>YES</b>	NO	ECTS credits (total)	5		
2.1. Required literature (available in the library and/or via other media)	<b>Title</b>						<b>Number of copies in the library</b>	<b>Availability via other media</b>		
	I. Slapničar, Matematika 1, Fakultet elektrotehnike, strojarstva i brodogradnje u Splitu, Split, 2002.						20	-		
	I. Slapničar, J. Barić, M. Ninčević, Matematika 1 – zbirka zadataka, Fakultet elektrotehnike, strojarstva i brodogradnje u Splitu, Split, 2010.						20	-		
	B. P. Demidovič, Zadaci i riješeni primjeri iz više matematike s primjenom na tehničke nauke, Tehnička knjiga, Zagreb, 1986.						7	-		
2.11. Optional literature	V. P. Minorski, Zbirka zadataka iz više matematike, Tehnička knjiga, Zagreb, 1971.									
2.11. Other (as the proposer wishes to add)	-									

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Analyze the similarity and differences between real and complex numbers and carry out mathematical operations with them.	1st colloquium, written and oral exam
2	Explain the term of real functions and their basic features.	1st colloquium, written and oral exam

3	Define the concept of series and examine the convergence.	2nd colloquium, written and oral exam
4	Explain the concept of growth rate of functions on selected examples in engineering or natural sciences.	2nd colloquium, written and oral exam
5	Sketch the graph of real functions of one variable and discuss the local behavior in the interval around specific points.	2nd colloquium, written and oral exam

1. GENERAL INFORMATION				
1.1. Course teacher	Assoc.Prof. Robert Pezer, PhD		1.6. Year of the study	1
1.2. Name of the course	PHYSICS		1.7. ECTS credits	5
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+45+0+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course	20 full-time+80 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	2., 5%
2. COURSE DESCRIPTION				
2.1. Course objectives	<p>Learn how to use quantitative mathematical skills and fundamental laws of nature in the field of mechanics, waves and vibrations in the technical disciplines.</p> <p>Explain the elements of understanding of the many-body system in the context of the state of matter, interactions and the wave phenomena.</p> <p>Acquire natural science competencies and skills that enable quantitative analysis and description of the phenomenon within the overall complexity of nature (abstraction, simplification and modelling).</p> <p>Learn how to carry out basic laboratory work: measurement, preparation and performing of the experiment, analysis and presentation of results in the form of a written report.</p>			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	<p>Apply logical conclusion and precision in data processing.</p> <p>Use acquired theoretical knowledge in engineering practice.</p>			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	<p>Define, describe and interpret basic physical quantities and their relations to natural phenomena.</p> <p>Analyze and quantitatively describe the motion of the material point and rigid body in space and time by applying Newton's laws.</p> <p>Apply basic mathematical methods in solving different dynamic problems.</p> <p>Describe and quantitatively analyze the strain of simple material using the theory of elasticity.</p> <p>Quantitatively analyze periodic motion and waves.</p>			

	<p>Define and explain wavelength, frequency and amplitude of the wave.          Use conservation laws for the study of natural phenomena, and in particular to apply the work–energy principle.          Demonstrate skills in preparing and performing measurement, quantitative processing and presentation of experimental results in the field of mechanics and wave phenomena.</p>		
2.5. Course content (syllabus)	<p>Mathematics supplement. Kinematics: position, speed and acceleration. (4)          Vectors and position of the material point in 2D and 3D. The concept of speed and acceleration in 3D. (4)          Motion with constant acceleration. Projectile motion and limiting cases (vertical and horizontal). Inertial frames of reference. The observation in physics. (4)          The force as a vector. The physics terms of momentum, impulse and energy. (5)          Newton's laws: an explanation of each law with a detailed description of the meaning and consequences. Presentation of the laws on several standard example systems that promote conceptual understanding. The free body diagram. (5)          The laws of motion and mechanics: friction (static and dynamic), variety of incline motion situations, simple machines and connected bodies, centripetal force, gravity, the movement of satellites, angular velocity, moment of inertia. (7)          1st preliminary exam          The application of the laws of motion: collisions, the conservation of momentum and energy, circular motion (kinematics and moment of inertia), momentum, angular momentum and description of the body rotation. The work–energy principle. (6)          Equilibrium and elasticity: mechanical equilibrium - without external force and torque, elastic force, Hooke's law, microscopic structure of substances, stress and strain, tension, compression, torsion. (5)          The periodic motion: periodic phenomena, oscillations, the study of the mass-elastic spring system, motion equations as differential equations, harmonic oscillator, quantities, relationship with uniform circular motion. (6)          Analysis of oscillation damping (friction impact). Small oscillations of the pendulum, physical pendulum, analogies. (4)          Periodic motion and waves: periodic phenomena, oscillations and waves, examples from nature regarding the role of energy transfer, the harmonic oscillator and the relation with the waves, description of the propagation speed, pulses, types and mathematical description. (5)          Measurement and data processing: the scientific method, experiment, statistical analysis, basic quantities, treating of errors, regression. (4)          LABORATORY EXERCISES (16):          1. Measuring length          2. Measurement of the mass          3. Examination of the second Newton's law          4. Spiral spring and elasticity          5. Physical pendulum          6. Torsion pendulum and moment of inertia          7. Elective          8. Elective          2nd preliminary exam</p>		
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures	<input type="checkbox"/> independent assignments	2.7. Comments:



	<input type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work	<input type="checkbox"/> multimedia and the internet <input checked="" type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)							
2.8. Student responsibilities	Attendance a minimum of 70% lectures, performed obligations in LAB.								
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	YES	<b>NO</b>	Oral exam	<b>YES</b>	NO
	Experimental work	<b>YES</b>	NO	Report	<b>YES</b>	NO	(other)	YES	NO
	Essay	YES	<b>NO</b>	Seminar paper	YES	<b>NO</b>	(other)	YES	NO
	Preliminary exam	<b>YES</b>	NO	Practical work	<b>YES</b>	NO	(other)	YES	NO
	Project	YES	<b>NO</b>	Written exam	<b>YES</b>	NO	ECTS credits (total)	5	
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>						<b>Number of copies in the library</b>	<b>Availability via other media</b>	
	P. Kulišić i sur., Mehanika i toplina, Školska knjiga, Zagreb, 1996.						25		
	N. Cindro, Fizika 1, Školska knjiga, Zagreb, 1988.						14		
	J. Dobrinić, Fizika (mehanika, titranje, toplina), Tehnički fakultet, Rijeka, 1998.						15		
	P. Kulišić i sur., Riješeni zadaci iz mehanike i topline, Školska knjiga, Zagreb, 2007.						16		
2.11. Optional literature	M. Stubičar i sur., Riješeni zadaci iz opće fizike: mehanika, elektricitet i magnetizam, Zagreb, Školska knjiga, 1979. A. Halpern, Beginning Physics I i II, Schaum outline 1995. Charles Kittel, Walter D. Knight, Malvin A. Ruderman, Mehanika 1, Udžbenik fizike Sveučilišta u Berkeleyu. Skupina autora, Ivo Alfirević, Inženjerski priručnik 1: Temelji inženjerskih znanja, Školska knjiga, Zagreb, 1996.								
2.12. Other (as the proposer wishes to add)	-								

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Define, describe and interpret basic physical quantities and their relations to natural phenomena.	1st colloquium, written and oral exam
2	Analyze and quantitatively describe the motion of the material point and rigid body in space and time by applying Newton's laws.	1st colloquium, 2nd colloquium, written and oral exam
3	Apply basic mathematical methods in solving different dynamic problems.	1st colloquium, 2nd colloquium, written and oral exam
4	Describe and quantitatively analyze the stress of simple material using the theory of elasticity.	2nd colloquium, written and oral exam
5	Quantitatively analyze periodic motion and waves.	2nd colloquium, laboratory exercises, written exam
6	Define and explain wavelength, frequency and amplitude of the wave.	2nd colloquium, written and oral exam

7	Use conservation laws for the study of natural phenomena, and in particular to apply the work–energy principle.	1st colloquium, 2nd colloquium, written and oral exam
8	Demonstrate skills in preparing and performing measurement, quantitative processing and presentation of experimental results in the field of mechanics and wave phenomena.	2nd colloquium, laboratory exercises, written exam

1. GENERAL INFORMATION				
1.1. Course teacher	Full Prof. Damir Hršak, PhD		1.6. Year of the study	1
1.2. Name of the course	CHEMISTRY		1.7. ECTS credits	5
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+30+15+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course	20 full-time+80 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5 %
2. COURSE DESCRIPTION				
2.1. Course objectives	Acquiring of basic knowledge and understanding of basic principles in the field of chemistry. Introduction with the division and structure of substances and types of chemical bonds. Understanding of the structure of the periodic table of elements. Good knowledge of solutions and their properties.			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	Apply logical conclusion and precision in data processing. Use acquired theoretical knowledge in engineering practice.			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	Classify of each substance that occurs in nature. Explain the position of each element in the periodic table. Interpret the electronic structure of atoms. Identify the type of chemical bond. Describe reactions in solutions.			
2.5. Course content (syllabus)	LECTURES (30): Substances (2), Structure and properties of pure substances (2), Elements and periodic table (4), Electronic structure of atom (3), First colloquium (1), Chemical Bonds (6), Complex compounds (2), Second colloquium (1), Solutions (5), Chemical reactions (3), Third colloquium (1). Seminar (15): Stoichiometry with application in laboratory exercises: Gases (5), Solutions (7), Redox reactions (3).			

	EXERCISES (30): Processing of laboratory glass (2), Separation of components in heterogeneous mixture (4), Separation of components in homogeneous mixture (8), Determination of relative atomic mass (6), Preparation of complex compound (4), Neutralization titrations (6).									
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work			<input type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input checked="" type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.7. Comments:			
2.8. Student responsibilities	Attendance a minimum of 70% lectures. Passed colloquium of stoichiometry (seminar). Successfully finished laboratory exercises.									
2.9. Monitoring student work	Class attendance	YES	NO	Research	YES	NO	Oral exam	YES	NO	
	Experimental work	YES	NO	Report	YES	NO	(other)	YES	NO	
	Essay	YES	NO	Seminar paper	YES	NO	(other)	YES	NO	
	Preliminary exam	YES	NO	Practical work	YES	NO	(other)	YES	NO	
	Project	YES	NO	Written exam	YES	NO	ECTS credits (total)	5		
2.10. Required literature (available in the library and/or via other media)	Title						Number of copies in the library	Availability via other media		
	I. Filipović, S. Lipanović, General and Inorganic Chemistry part I – General chemistry (in Croatian), Školska knjiga, Zagreb, 1995.						27			
	I. Filipović, S. Lipanović, General and Inorganic Chemistry part II – Chemical elements and their compounds (in Croatian), Školska knjiga, Zagreb, 1995.						27			
2.11. Optional literature	M. S. Silberberg; Principles of General Chemistry, Mc Graw Hill, Boston, 2013. F. A. Cotton, G. Wilkinson, P. L. Gaus, Basic Inorganic Chemistry, John Wiley & Sons, Inc., New York, 1995.									
2.12. Other (as the proposer wishes to add)	-									

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Classify of each substance that occurs in nature.	1st colloquium, laboratory exercises, oral exam
2	Explain the position of each element in the periodic table.	1st colloquium, oral exam
3	Interpret the electronic structure of atoms.	1st colloquium, oral exam
4	Identify the type of chemical bond.	2nd colloquium, laboratory exercises, oral exam

5	Describe reactions in solutions.	3rd colloquium, laboratory exercises, oral exam
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1. GENERAL INFORMATION				
1.1. Course teacher	Ivana Krišto, PhD, lecturer		1.6. Year of the study	1
1.2. Name of the course	INTRODUCTION TO SAFETY		1.7. ECTS credits	4
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+0+15+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course	20 full-time+80 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5 %
2. COURSE DESCRIPTION				
2.1. Course objectives	The aim of the course is to familiarize students with the basics of safety, the basic principles of identifying dangers, hazards and efforts and methods of investigating unwanted events (accidents and incidents) in the working and living environment. Basic concepts with which students will be familiar: basic principles and rules on occupational safety, definition of accidents, incidents, injuries, occupational diseases, work-related illnesses, risk, risk assessment; theories and methodologies of accident and incident investigation: analyzing unwanted events, collecting and processing data and learning from conclusions made by accident investigation.			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	Define the impact of dangers, hazards and efforts on human health and / or the environment. Use applicable regulations and standards relevant to safety and health at work. Analyse the present situation, identify problems, formulate and recommend an optimal technological solution. Use acquired theoretical knowledge in engineering practice. Apply acquired IT knowledge in engineering practice.			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	Properly apply basic, special and recognized safety rules. Define and describe types of danger, harm and effort at work. Analyze and identify sources, ways and causes of injury at work. Analyze the consequences of injury at work.			
2.5. Course content (syllabus)	LECTURES: System and purpose of OSH. 2h Basic Safety Standards and Principles of Prevention. 2h			

	Definition of accidents, incidents, injuries, occupational diseases, work-related illnesses. 2h Dangers, hazards and efforts. 4h Risk and Risk Assessment. 2h Personal protective equipment 2h Theory and Methodology of Accidents and Incidents investigation. 4h Analyze of unwanted events. 4h Collection and processing of data. 2h Statistics on Injury at Work. 2h Costs. 2h Learning from the Investigation. 2h									
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work					<input type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.7. Comments:	
2.8. Student responsibilities	Class attendance min. 70%, created and presented seminar paper on the given theme.									
2.9. Monitoring student work	Class attendance	YES	NO	Research	YES	NO	Oral exam	YES	NO	
	Experimental work	YES	NO	Report	YES	NO	(other)	YES	NO	
	Essay	YES	NO	Seminar paper	YES	NO	(other)	YES	NO	
	Preliminary exam	YES	NO	Practical work	YES	NO	(other)	YES	NO	
	Project	YES	NO	Written exam	YES	NO	ECTS credits (total)	4		
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>						<b>Number of copies in the library</b>	<b>Availability via other media</b>		
	N. Kacian, L. Dolšak, Osnove sigurnosti, IPROZ, Zagreb, 2010.						10			
2.11. Optional literature	Valid safety regulations.									
2.12. Other (as the proposer wishes to add)	It is suggested that a manual or textbook be produced.									

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Properly apply basic, special and recognized safety rules.	Written and oral exam, seminar paper
2	Define and describe types of danger, harm and effort at work.	Written and oral exam, seminar paper

3	Analyze and identify sources, ways and causes of injury at work.	Written and oral exam, seminar paper
4	Analyze the consequences of injury at work.	Written and oral exam, seminar paper

1. GENERAL INFORMATION				
1.1. Course teacher	Assoc.Prof. Ivan Brnardić, PhD		1.6. Year of the study	1
1.2. Name of the course	INTRODUCTION TO ECOLOGY		1.7. ECTS credits	4
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+0+0+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course	20 full-time+80 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
2. COURSE DESCRIPTION				
2.1. Course objectives	To introduce students with basic principles of ecology and laws of nature. To explain and connect ecosystems with industrial systems. To familiarize students with the basic of ecology and sustainability, and to point out their importance in society.			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	Define the impact of dangers, hazards and efforts on human health and / or the environment. Apply teamwork-oriented, ethical principles and encourage the development of communication and social skills. Use applicable regulations and standards relevant to the protection of the working environment.			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	Explain the basic concepts in ecology. Connect the sources of pollution with consequences for the ecosystem and the biogeochemical cycles. Describe and analyze the similarities and differences between ecosystems and industrial systems. Explain the concept of ecology and sustainable development. Search and analyze data from the literature on ecology.			
2.5. Course content (syllabus)	LECTURES (30): Ecology as a scientific discipline. Classification of ecology. Chosen notions from ecology. Environmental factors. The biosphere, atmosphere, hydrosphere, lithosphere and agrosphere. (3) Ecosystems. Aquatic and terrestrial ecosystems. Forests. Biogeochemical cycles. Circulation of water, carbon, oxygen, nitrogen, phosphorus and sulfur. (2) Air pollution, water and soil - sources and consequences. Poisons. (3) The history of the concept of industrial ecology and sustainable development. Examples of industrial ecology. The flows of materials, energy and information, linking industrial systems with ecosystems. (3)			

	<p>Linking of subjects to create closed flows. The starting point - information. The study feasibility of linking. Status of waste and regulations. (4)</p> <p>Feasibility criteria of linking: qualitative, technical, quantitative, legal and economic. Dynamic cooperation and example. (3)</p> <p>Tools that help in subject linking. (3)</p> <p>The impact of industrial ecology to the environment. Introduction with diagnostic tools: life cycle assessment (LCA), input-output analysis, ecological footprint. (4)</p> <p>The application of industrial ecology in metallurgy and transport (examples). Life cycle assessment. Literature searching on ecology. (5)</p>								
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work			<input checked="" type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.7. Comments:		
2.8. Student responsibilities	Regular attendance of lectures (70% of the lectures) and solving of independent task.								
2.9. Monitoring student work	Class attendance	YES	NO	Research	YES	NO	Oral exam	YES	NO
	Experimental work	YES	NO	Report	YES	NO	(other)	YES	NO
	Essay	YES	NO	Seminar paper	YES	NO	(other)	YES	NO
	Preliminary	YES	NO	Practical work	YES	NO	(other)	YES	NO
	Project	YES	NO	Written exam	YES	NO	ECTS credits (total)	4	
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>			<b>Number of copies in the library</b>			<b>Availability via other media</b>		
	I. Brnardić, Predavanja iz Uvoda u ekologiju, Sisak, 2018.						Merlin system for e-learning		
	O. P. Springer, D. Springer, Otrovani modrozeleni planet, Merdijani, Samobor, 2008.			1					
	A. Rastovčan, Uvod u ekologiju, Skripta, Metalurški fakultet, Sisak, 2009.						<a href="https://www.simet.unizg.hr/hr/nastava/predavanja/preddiplomski-sveucilisni-studij-metalurgija/1-godina-preddiplomskog-studija/UVOD%20U%20EKOLOGIJU-%20INTERNET.pdf/view">https://www.simet.unizg.hr/hr/nastava/predavanja/preddiplomski-sveucilisni-studij-metalurgija/1-godina-preddiplomskog-studija/UVOD%20U%20EKOLOGIJU-%20INTERNET.pdf/view</a>		
2.11. Optional literature	<p>T.E. Graedel. B.R. Allenby, Industrial Ecology, Pearson Education, Inc., New Jersey, USA, 2003.</p> <p>D. Bourg and S. Erkman, Perspectives on Industrial Ecology, Scheffielc, UK, 2003.</p> <p>C. Adoue, Implementing Industrial Ecology, Enfield, USA, 2011.</p>								

2.12. Other (as the proposer wishes to add)	
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Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Explain the basics concepts in ecology.	1st colloquium, written and oral exam
2	Connect the sources of pollution with consequences for the ecosystem and the biogeochemical cycles.	1st colloquium, written and oral exam
3	Describe and analyze the similarities and differences between ecosystems and industrial systems.	1st colloquium, written and oral exam
4	Explain the concept of industrial ecology and sustainable development.	2nd colloquium, written and oral exam
5	Search and analyze data from the literature on industrial ecology.	2nd colloquium, written and oral exam

1. GENERAL INFORMATION			
1.1. Course teacher	Assist.Prof. Maša Tonković Grabovac, PhD, Assist.Prof. Adrijana Bjelajac, PhD		1.6. Year of the study 1
1.2. Name of the course	WORK PSYCHOLOGY		1.7. ECTS credits 4
1.3. Associate teachers	Lana Lučić, mag.psych.		1.8. Type of instruction (number of hours L+ E + S + e-learning) 30+30+0+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course 20 full-time+80 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%) 1., 5%
2. COURSE DESCRIPTION			
2.1. Course objectives	<p>The aims of this course are:</p> <ul style="list-style-type: none"> <li>- to inform students about the psychological aspect of work and the psychological problems in work process that affects safety and health of employees</li> <li>- to provide an insight into psychophysical changes during work, interpersonal relationships, and organizational structure of work environment</li> <li>- to introduce students with factors of work performance, motivation, and satisfaction at workplace</li> </ul>		
2.2. Enrolment requirements and/or entry competences required for the course	-		



2.3. Learning outcomes at the level of the programme to which the course contributes	<p>Identify and analyze dangers, hazards and efforts in the workplace.  Apply methods of health protection and measures to increase safety at work.  Recognize the importance of human, socioeconomic and environmental factors on workers' health and working ability.  Apply prevention programs to reduce the impact of danger, harmfulness and efforts in the workplace.  Apply teamwork-oriented, ethical principles and encourage the development of communication and social skills.  Apply the basic principles of working performance assessment.</p>
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	<p>After completing the course and completing all duties student will be able to:</p> <ul style="list-style-type: none"> <li>- define the concept of work psychology</li> <li>- analyse psychophysiological changes during the work process</li> <li>- distinguish principles of independent and teamwork</li> <li>- define factors that affects interpersonal relations in teamwork</li> <li>- analyse psychological aspects of shift and night work</li> <li>- analyse psychosocial factors of work-related injury</li> <li>- analyse psychophysiological strains at workplace</li> <li>- define the role of a psychologist in the assessment of work ability</li> <li>- implement methods of identifying and removing stress at workplace</li> <li>- interpret methods of conducting professional orientation and selection process</li> </ul>
2.5. Course content (syllabus)	<ol style="list-style-type: none"> <li>1. Introduction to work psychology (2), Exercises: Croatian and international legislation on health and safety at work / psychological aspect (2)</li> <li>2. Psychophysiological changes during the work process (2), Exercises: Risk assessment: Psychophysiological strains in workplaces with special working conditions (2)</li> <li>3. Man-environment organization/social functioning (2), Exercises: Risk assessment: Psychophysiological strains in sedentary workplaces (2)</li> <li>4. Workplace adjustment and adaptation (2), Exercises: Consequences of non-ergonomic workstation (2)</li> <li>5. Teamwork (2), Exercises: Case study - Interpersonal relationships in teamwork (2)</li> <li>6. Work schedules (shift and night work) (2), Exercises: Circadian rhythm disorders (2)</li> <li>7. Workplace ergonomics (2), Exercises: Ergonomic intervention (2)</li> <li>8. Psychologic analysis of workplace (2), Exercises: Psychosocial factors analyses in workplace - Questionnaire (2)</li> <li>9. Psychological aspect of workplaces with special working conditions (2), Exercises: Psychological aspects of specific jobs (2)</li> <li>10. Sedentary workplace (2), Exercises: Physical activity and mental health (2)</li> <li>11. Workplace stress management (2), Exercises: Workplace stress level analyses - Questionnaire (2)</li> <li>12. Mobbing (2), Exercises: Mobbing diagnosis instruments - Questionnaire (2)</li> </ol>

	13. Psychological aspects of work-related injuries (2), Exercises: Case study - Work-related injuries due to psychophysical strains (2)								
	14. Professional orientation and selection (2), Exercises: Case Study – PTSD as work-related injury (2)								
	15. Occupational psychologist's role in work ability assessment (2), Exercises: Psychological work ability assessment (2)								
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work			<input checked="" type="checkbox"/> independent assignments <input checked="" type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.7. Comments:		
2.8. Student responsibilities	70% attendance on lectures and exercises, active participation.								
2.9. Monitoring student work	Class attendance	YES	NO	Research	YES	NO	Oral exam	YES	NO
	Experimental work	YES	NO	Report	YES	NO	(other)	YES	NO
	Essay	YES	NO	Seminar paper	YES	NO	(other)	YES	NO
	Preliminary exam	YES	NO	Practical work	YES	NO	(other)	YES	NO
	Project	YES	NO	Written exam	YES	NO	ECTS credits (total)	3	
2.10. Required literature (available in the library and/or via other media)	Title			Number of copies in the library		Availability via other media			
	B. Petz, Psihologija rada, Školska knjiga, Zagreb, 1987.			2					
	D. Stary, Ljudski čimbenici u zaštiti, IPROZ, Zagreb, 2003.					+			
	M. Šarić, E. Žuškin, Medicina rada i okoliša, Odabrana poglavlja, Medicinska naklada, Zagreb, 2002.			3					
	Pravilnik o poslovima s posebnim uvjetima rada – Narodne novine 5/1984.					<a href="https://www.pmf.unizg.hr/download/repository/Pravilnik_o_poslovima_s_posebnim_uvjetima_rada.pdf">https://www.pmf.unizg.hr/download/repository/Pravilnik_o_poslovima_s_posebnim_uvjetima_rada.pdf</a>			
2.11. Optional literature	Atkinson, H.: Uvod u psihologiju. - Jastrebarsko: Slap, 2000. Breakwell, G: Vještine vođenja intervjua. - Jastrebarsko: Slap, 2001. Brown, R.: Grupni procesi. - Jastrebarsko: Slap, 2006. Cooper, D., Robertson, I.: Psihologija odabira zaposlenika. - Jastrebarsko: Slap, 2006. Hudek-Knežević, J., Kardum, I.: Stres i tjelesno zdravlje. - Jastrebarsko: Slap, 2006. Jackson, J: Psihologijsko testiranje. - Jastrebarsko: Slap, 2000. Kroemer, K.H.E., Grandjean, E.: Prilagođavanje rada čovjeku. - Jastrebarsko: Slap, 2000. Miljković, D., Rijavec, M.: Organizacijska psihologija. Odabrana poglavlja. – Zagreb, IEP/D2, 2005. Pennington, D.: Osnove socijalne psihologije. - Jastrebarsko: Slap, 2004.								

	Rheinberg, F.: Motivacija. - Jastrebarsko, Slap, 2004. Zvonarević, M.: Socijalna psihologija. - Zagreb: Školska knjiga, 1989. Standardi psihologijskog testiranja, Hrvatska psihološka komora, 2005.
2.12. Other (as the proposer wishes to add)	

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Define the concept of work psychology.	1st colloquium, laboratory exercises, written exam
2	Analyse psychophysiological changes during work process.	1st colloquium, 2nd colloquium, laboratory exercises, written exam
3	Distinguish principles of independent and teamwork.	1st colloquium, 2nd colloquium, laboratory exercises, written exam
4	Define factors that affects interpersonal relations in teamwork.	1st colloquium, 2nd colloquium, laboratory exercises, written exam
5	Analyse psychological aspects of shift and night work.	1st colloquium, 2nd colloquium, laboratory exercises, written exam
6	Analyse psychosocial factors of work-related injury.	1st colloquium, 2nd colloquium, laboratory exercises, written exam
7	Analyse psychophysiological strains at workplace.	1st colloquium, 2nd colloquium, laboratory exercises, written exam
8	Define the role of a psychologist in the assessment of work ability.	1st colloquium, 2nd colloquium, laboratory exercises, written exam
9	Implement methods of identifying and removing stress at workplace.	1st colloquium, 2nd colloquium, project task, written exam
10	Interpret methods of conducting professional orientation and selection process.	1st colloquium, 2nd colloquium, laboratory exercises, written exam

1. GENERAL INFORMATION				
1.1. Course teacher	Prof. Lidija Milenkov-Ečimović, lecturer		1.6. Year of the study	1
1.2. Name of the course	ENGLISH LANGUAGE 1		1.7. ECTS credits	2
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L + E + S + e-learning)	15+15+0+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course	20 full-time+80 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
2. COURSE DESCRIPTION				
2.1. Course objectives	<p>Application of intermediate-level grammatical and lexical content enabling everyday and formal communication in the foreign language.</p> <p>Developing reading, writing, listening and speaking skills in the foreign language.</p> <p>Development of professional vocabulary of relevant scientific branches in the foreign language.</p> <p>The ability to differentiate between informal, formal and academic registers and the use of linguistic structures specific to them.</p>			

2.2. Enrolment requirements and/or entry competences required for the course	-
2.3. Learning outcomes at the level of the programme to which the course contributes	Apply teamwork-oriented, ethical principles and encourage the development of communication and social skills. Use acquired theoretical knowledge in engineering practice.
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	To be able to express oneself in the everyday language and recognize and use professional language at an intermediate level. To compare and recognize general language vs. the professional language in selected text excerpts. To recognize and apply grammatical and lexical structure specific to informal, formal and academic registers, the language of science and the professional language (conditional clause, reported speech, relative pronouns and clauses, passive). To apply grammatical principles in written and oral exercises evoking everyday communicative situations. Identify and apply English-specific lexical structures (colloquiums, idioms, phrase verbs). Apply a foreign language in expert discussions and presentations, know how to describe your own jobs, tasks, and responsibilities.
2.5. Course content (syllabus)	Course content is devised so as to represent equally all four skills: reading, writing, listening and speaking. During the whole course, the students acquire new contents by means of short written exams, self-correcting, group or pair work, and homework. Students with higher proficiency level may be invited to present a paper on a specific technical subject. The content of individual lectures and exercises:  <ol style="list-style-type: none"> <li>1) <b>Working life.</b> Business communication skills – socializing. Expressing interest. Present simple review. Frequency adverbs.</li> <li>2) <b>Projects. Meetings</b> – Updating and delegating tasks. Present simple and continuous. Starting and ending phone calls.</li> <li>3) <b>Service and systems.</b> Presenting – explaining how something works. Comparing new with old. Comparative forms.</li> <li>4) <b>Security at work.</b> Presenting – explaining and asking about changes. Introducing and responding to news. Present simple and continuous. Connectors.</li> <li>5) <b>Working together.</b> Teamwork and partnerships. Presenting and discussing plans. Talking about the future. Case study: creating a plan for effective teamwork.</li> <li>6) <b>Facilities.</b> Describing a place of work. Making suggestions and recommendations. Linking ideas. Nouns and quantifiers.</li> <li>7) <b>Decisions.</b> Decision-making processes. Participating in a discussion, being persuasive. First and second conditionals.</li> <li>8) <b>Breakdowns and faults.</b> Exchanging information – discussing problems. Advice and recommendation (too and enough). Case study: managing a breakdown in service</li> <li>9) <b>Performance.</b> Meetings – appraising performance and setting objectives. Giving feedback. Past Continuous and Past Perfect.</li> <li>10) <b>Risk.</b> Talking about different kinds of risk. Referencing using pronouns. Establishing rapport and showing interest. Case Study: Tackling risks.</li> </ol>

	<p>11) <b>Learning.</b> Talking about training and learning. Communication strategies. Participle clauses and 'the future in the past'. Expressing dissatisfaction.</p> <p>12) <b>Resources.</b> Meetings: Discussing options and reaching decisions. Using conditionals. Dealing with misunderstandings.</p> <p>13) <b>Leadership.</b> Talking about leadership styles. Meetings: Giving a briefing on change. Distancing and depersonalizing using the passive. Expressing personal views.</p> <p>14) <b>Values.</b> Negotiating and reaching agreement. Using inversion for emphasis. Raising a difficult point.</p> <p>15) <b>Persuasion.</b> Talking about how we are persuaded and influenced. Presenting: Selling an idea. Using discourse markers. Giving and responding to compliments.</p> <p>Immediately after each lesson, within the block hour is followed the oral and written training of the forwarded content.</p>									
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work				<input checked="" type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)				2.7. Comments:	
2.8. Student responsibilities	Attendance (min. 70 %), regular homework, participation in class. Insofar as the student fails to fulfil his/her obligation, they are offered to make up for content missed via a translation of a professional text from English to Croatian.									
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	YES	<b>NO</b>	Oral exam	<b>YES</b>	NO	
	Experimental work	YES	<b>NO</b>	Report	YES	<b>NO</b>	(other)	YES	NO	
	Essay	YES	<b>NO</b>	Seminar paper	YES	<b>NO</b>	(other)	YES	NO	
	Preliminary	<b>YES</b>	NO	Practical work	YES	<b>NO</b>	(other)	YES	NO	
	Project	YES	<b>NO</b>	Written exam	<b>YES</b>	NO	ECTS credits (total)	2		
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>						<b>Number of copies in the library</b>	<b>Availability via other media</b>		
	Business Result Intermediate & Business Result Advanced, Oxford University Press						1			
	J. Eastwood, Oxford Guide to English Grammar, OUP, 2000.						2			
	P. Emmerson, Essential Business Grammar Builder, MacMillan, 2010.						1			
	M. Ibbotson, Cambridge English for Engineering, CUP, 2012.						1			
2.11. Optional literature	M. Swan & C. Walter, The Good Grammar Book, UOP, 2013.									
2.11. Other (as the proposer wishes to add)										

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	To be able to express oneself in the everyday language and recognize and use professional language at an intermediate level.	Auditory exercises, written exam, oral exam
2	To compare and recognize general language vs. the professional language in selected text excerpts.	Auditory exercises, written exam, oral exam
3	To recognize and apply grammatical and lexical structure specific to informal, formal and academic registers, the language of science and the professional language (conditional clause, reported speech, relative pronouns and clauses, passive).	Auditory exercises, written exam, oral exam
4	To apply grammatical principles in written and oral exercises evoking everyday communicative situations.	Auditory exercises, written exam, oral exam
5	Identify and apply English-specific lexical structures (colloquiums, idioms, phrase verbs).	Auditory exercises, written exam, oral exam
6	Apply a foreign language in expert discussions and presentations, know how to describe your own jobs, tasks, and responsibilities.	Auditory exercises, written exam, oral exam

1. GENERAL INFORMATION				
1.1. Course teacher	Assist.Prof. Ivan Ivec, PhD		1.6. Year of the study	1
1.2. Name of the course	MATHEMATICS 2		1.7. ECTS credits	5
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+45+0+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course	20 full-time+80 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	3., 5%
2. COURSE DESCRIPTION				
2.1. Course objectives	Use integrals as a tool to analyze abstract problem of cumulation in solving problems of quantitative analysis in engineering. Solve simple differential equations. In addition to computational skills, students will connect a series of fundamental results of integration, visualization and elementary linear algebra as a tool for studying the cumulation in the engineering problems.			
2.2. Enrolment requirements and/or entry competences required for the course	-			

2.3. Learning outcomes at the level of the programme to which the course contributes	Apply teamwork-oriented, ethical principles and encourage the development of communication and social skills. Apply logical conclusion and precision in data processing. Use acquired theoretical knowledge in engineering practice.										
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	Define the terms of the indefinite and definite integrals and use them to solve the problem of cumulation. Interpret the definite integral (area of planar figures, the arc length of the curve, the volume of the rotating bodies) on the example of the problems that are important in the engineering applications. Define and describe the concepts of order, convergence of the order and apply them to selected engineering applications. Define and solve basic types of first order differential equations that arise in engineering mathematics. Describe and apply a Gaussian elimination method for solving linear systems of equations (argue the existence and uniqueness of solutions).										
2.5. Course content (syllabus)	The course systematically treats the notion of integral and application of integral to surface and volume computation, and to solve ordinary differential equations. Methods for solving the systems of linear equations, as well as the basis of the series, with an emphasis on Taylor's series, are also studied. Teaching per week is provided below.  <ol style="list-style-type: none"> <li>1) Definition of definite and indefinite integrals, table of integrals.</li> <li>2) Differentiation rules, application of derivatives (repetition).</li> <li>3) Method of substitution, partial integration.</li> <li>4) Integration of rational functions, repetition.</li> <li>5) The use of integrals in calculating areas.</li> <li>6) The use of integrals in calculating volumes, approximate calculation of definite integrals.</li> <li>7) Repetition, 1st part of preliminary exam.</li> <li>8) Differential equations with separated variables.</li> <li>9) Linear differential equations.</li> <li>10) Solving linear systems by means of substitution.</li> <li>11) Matrices, solving linear systems by Gaussian elimination method.</li> <li>12) Determinants, solving linear systems by Cramer's rule.</li> <li>13) Series of real numbers, convergence criteria.</li> <li>14) Power series, Taylor series.</li> <li>15) Repetition, 2nd part of preliminary exam.</li> </ol>										
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work	<input type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)	2.7. Comments:								
2.8. Student responsibilities	Conditions for signature: a student must attend at least 70% of lectures and exercises.										
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	YES	<b>NO</b>	Oral exam	<b>YES</b>	NO		



	Experimental work	YES	NO	Report	YES	NO	(other)	YES	NO	
	Essay	YES	NO	Seminar paper	YES	NO	(other)	YES	NO	
	Preliminary exam	YES	NO	Practical work	YES	NO	(other)	YES	NO	
	Project	YES	NO	Written exam	YES	NO	ECTS credits (total)	5		
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>						<b>Number of copies in the library</b>	<b>Availability via other media</b>		
	I. Slapničar, Matematika 2, Fakultet elektrotehnike, strojarstva i brodogradnje u Splitu, Split, 2008.						-	<a href="http://lavica.fesb.hr/mat2/PDF/pr edavanja.pdf">http://lavica.fesb.hr/mat2/PDF/pr edavanja.pdf</a>		
	I. Slapničar, N. Jakovčević Stor, J. Barić, I. Mirošević, Matematika 2 – zbirka zadataka, Fakultet elektrotehnike, strojarstva i brodogradnje u Splitu, Split, 2012.						-	<a href="http://lavica.fesb.hr/mat2/vjezbe/">http://lavica.fesb.hr/mat2/vjezbe/</a>		
	B. P. Demidovič, Zadaci i riješeni primjeri iz više matematike s primjenom na tehničke nauke, Tehnička knjiga, Zagreb, 1986.						7	-		
2.11. Optional literature	V. P. Minorski, Zbirka zadataka iz više matematike, Tehnička knjiga, Zagreb, 1971.									
2.12. Other (as the proposer wishes to add)										

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Define the terms of the indefinite and definite integrals and use them to solve the problem of cumulation.	1st colloquium, written and oral exam
2	Interpret the definite integral (area of planar figures, the arc length of the curve, the volume of the rotating bodies) on the example of the problems that are important in the engineering applications.	1st colloquium, written and oral exam
3	Define and describe the concepts of order, convergence of the order and apply them to selected engineering applications.	Oral exam
4	Define and solve basic types of first order differential equations that arise in engineering mathematics.	2nd colloquium, written and oral exam
5	Describe and apply a Gaussian elimination method for solving linear systems of equations (argue the existence and uniqueness of solutions).	2nd colloquium, written and oral exam

1. GENERAL INFORMATION			
1.1. Course teacher	Assoc.Prof. Robert Pezer, PhD	1.6. Year of the study	1
1.2. Name of the course	FUNDAMENTALS OF ELECTRICAL ENGINEERING	1.7. ECTS credits	5



1.3. Associate teachers	-		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+15+15+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course	20 full-time+80 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	2., 5%
<b>2. COURSE DESCRIPTION</b>				
2.1. Course objectives	<p>Learn how to use quantitative mathematical skills and fundamental laws of nature in the field of electromagnetics, waves in the engineering problems.</p> <p>Acquire natural science competencies and skills that enable quantitative analysis and description of the phenomenon within the overall complexity of nature (abstraction, simplification and modelling).</p> <p>Learn how to carry out basic laboratory work in the field of electromagnetism: measurement, preparation and performing of the experiment, analysis and presentation of results in the form of a written report.</p>			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	<p>Analyse the present situation, identify problems, formulate and recommend an optimal technological solution.</p> <p>Apply logical conclusion and precision in data processing.</p> <p>Use acquired theoretical knowledge in engineering practice.</p>			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	<p>Quantitatively describe simple electrodynamics systems.</p> <p>Qualitatively explain the electrical and magnetic properties of substances.</p> <p>Quantitatively analyse the simple DC and AC electric current circuits.</p> <p>Demonstrate skills in preparing and performing measurement, quantitative processing and presentation of experimental results in the field of electromagnetic phenomena.</p>			
2.5. Course content (syllabus)	<p>LECTURES (30):</p> <p>Electricity and magnetism: charges, fields, currents, electric and magnetic field, Kirchhoff laws, circuits, work and power of electric current, magnetostatic. (5)</p> <p>Direct current: Basic circuitry DC - application of Ohm's Law for the quantification of serial and parallel combination of resistance in circuits. 1st Kirchhoff's law - the application in the analysis of simple circuits. II Kirchhoff's law - the application in the analysis of simple circuits. Electric current circuits with: Ohms resistance, capacitor and inductance. (5)</p> <p>Electrical power and energy, electric motors. (5)</p> <p>1st preliminary exam</p> <p>Basic concepts (periodic changes, harmonic changes, graphical representation, the effects of alternating current, R, L, C circuit). The power and energy of alternating current, complex RLC circuits, vectors, three phase current, star-delta transformation. (5)</p>			

	<p>Electrical and magnetic properties of materials: electrical properties of conductors, dielectrics and semiconductors, magnetic properties of matter. (5)          Electromagnetic radiation: electromagnetic induction, Maxwell's equations and electromagnetic spectrum. The application to the various measurement techniques. (5)</p> <p>LABORATORY EXERCISES (15):          Preparation          1. Ohms law.          2. Time dependence of charging and discharging of capacitors.          3. Determination of power and resistance in the AC circuit.          4. Optional          2nd preliminary exam</p> <p>Seminar (15): presentation of seminar papers on the given topic.</p>								
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work			<input type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input checked="" type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.7. Comments:		
2.8. Student responsibilities	Attendance a minimum of 70% lectures, performed obligations in LAB.								
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	YES	<b>NO</b>	Oral exam	<b>YES</b>	NO
	Experimental work	<b>YES</b>	NO	Report	<b>YES</b>	NO	(other)	YES	NO
	Essay	YES	<b>NO</b>	Seminar paper	YES	<b>NO</b>	(other)	YES	NO
	Preliminary exam	<b>YES</b>	NO	Practical work	<b>YES</b>	NO	(other)	YES	NO
	Project	YES	<b>NO</b>	Written exam	<b>YES</b>	NO	ECTS credits (total)	5	
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>						<b>Number of copies in the library</b>	<b>Availability via other media</b>	
	V. Pinter, Osnove elektrotehnike I i II dio, Tehnička knjiga, Zagreb, 1989.						10		
	N. Cindro, Fizika 2, Školska knjiga, Zagreb, 1988.						11		
2.11. Optional literature	A. Halpern, Beginning Physics II, Schaum outline 1995 B. Juzbašić, Elektronički elementi, Školska knjiga, Zagreb, 1975.								
2.12. Other (as the proposer wishes to add)									

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Quantitatively describe simple electrodynamic systems.	1st colloquium, written and oral exam
2	Qualitatively explain the electrical and magnetic properties of substances.	1st colloquium, 2nd colloquium, written and oral exam
3	Quantitatively analyse the simple DC and AC electric current circuits.	1st colloquium, 2nd colloquium, written and oral exam
4	Demonstrate skills in preparing and performing measurement, quantitative processing and presentation of experimental results in the field of electromagnetic phenomena.	2nd colloquium, laboratory exercises, written exam

1. GENERAL INFORMATION				
1.1. Course teacher	Assist.Prof. Martina Lovrenić-Jugović, PhD		1.6. Year of the study	1
1.2. Name of the course	ENGINEERING DRAWING AND COMPUTER GRAPHICS		1.7. ECTS credits	5
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+30+0+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course	20 full-time+80 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
2. COURSE DESCRIPTION				
2.1. Course objectives	Acquire knowledge necessary to understand and create technical documentation. Acquire knowledge which is strictly necessary for further learning as well as in engineering practice. Acquire the knowledge needed to perform specialized tasks in the domain of the profession.			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	Apply logical conclusion and precision in data processing. Use acquired theoretical knowledge in engineering practice. Apply acquired IT knowledge in engineering practice.			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	Define the basic concepts related to engineering drawing and creation of technical documentation. Use the acquired knowledge to develop new and read or develop existing technical documentation. Determine type and quality of the surface treatment. Know how to properly determine required shape or fit tolerance. Use the acquired knowledge to prepare technical documentation using computer graphics.			
2.5. Course content (syllabus)	1. Standardization and standards (2) 2. Types of lines, Drawing scales, Drawing formats, Technical letters (6) 3. Orthogonal projecting rules (12)			

	4. 1st preliminary exam: includes the units 1-3 5. Cross sections (4) 6. Dimensioning (4) 7. Processing and surface roughness (4) 8. Geometric tolerances (2) 9. Dimension tolerances and fits (6) 10. 2nd preliminary exam: includes the units 5-9 11. Basics of computer graphics (8) 12. Preparing the technical documentation using of computer graphics (12) 13. Program task – production of technical documentation using computers								
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work			<input type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.7. Comments:		
2.8. Student responsibilities	Conditions for signature: - attendance on lectures and exercises > 70% - program task Conditions for taking: -								
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	YES	<b>NO</b>	Oral exam	<b>YES</b>	NO
	Experimental work	YES	<b>NO</b>	Report	YES	<b>NO</b>	(other)	YES	<u>NO</u>
	Essay	YES	<b>NO</b>	Seminar paper	YES	<b>NO</b>	(other)	YES	<u>NO</u>
	Preliminary exam	<b>YES</b>	NO	Practical work	YES	<b>NO</b>	(other)	YES	NO
	Project	YES	<b>NO</b>	Written exam	<b>YES</b>	NO	ECTS credits (total)	5	
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>						<b>Number of copies in the library</b>	<b>Availability via other media</b>	
	B. Kovač, Tehničko crtanje, Školska knjiga, Zagreb, 1967.						15	-	
	L. Lazić, Elementi strojeva, Sveučilišni udžbenik, Sisak, 2001.						13	-	
	T. Galeta, V. Galzina, M. Kljajin, AutoCAD osnove za tehničko crtanje, Slavonski Brod, 2005.							<a href="http://fizika.unio.s.hr/~tgaleta/kpr/materijal/AutoCADv504.pdf">http://fizika.unio.s.hr/~tgaleta/kpr/materijal/AutoCADv504.pdf</a>	
2.11. Optional literature	Inženjerski priručnik IP1 Temelji inženjerskih znanja, Školska knjiga, Zagreb, 1996. M. Opalić, M. Kljajin, S. Sebastijanović, Tehničko crtanje, 2007.								

	M. Opalić, M. Kljajin, Inženjerska grafika, FSB/SFSB, 2010.
2.12. Other (as the proposer wishes to add)	

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Define the basic concepts related to engineering drawing and creation of technical documentation.	1st colloquium, written and oral exam
2	Use the acquired knowledge to develop new and read or develop existing technical documentation.	1st colloquium, 2nd colloquium, written and oral exam
3	Determine type and quality of the surface treatment.	2nd colloquium, written and oral exam
4	Know how to properly determine required shape or fit tolerance.	2nd colloquium and written exam
5	Use the acquired knowledge to prepare technical documentation using computer graphics.	2nd colloquium

1. GENERAL INFORMATION				
1.1. Course teacher	Full Prof. Marinko Učur, PhD		1.6. Year of the study	1
1.2. Name of the course	THE BASICS OF LAW AND OCCUPATIONAL SAFETY LEGISLATION		1.7. ECTS credits	4
1.3. Associate teachers	Ivana Krišto, PhD, lecturer		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+0+15+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course	20 full-time+80 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
2. COURSE DESCRIPTION				
2.1. Course objectives	<p>The general objective is to enable students to perform occupational safety specialists work in accordance with the legal descriptions and the list of these jobs.</p> <p>At the same time, the aim of the course is to enable students to independently apply regulations in the area of occupational safety, liability for damages and damage compensation, criminal offenses and offenses related to occupational safety, cooperation with the employer and his authorized representatives, workers and their representatives, a occupational health specialist and labor inspector, to improve health and safety at work.</p>			
2.2. Enrolment requirements and/or entry competences required for the course	-			

2.3. Learning outcomes at the level of the programme to which the course contributes	Use applicable regulations and standards relevant to safety and health at work. Apply logical conclusion and precision in data processing. Use applicable regulations and standards relevant to the protection of the work environment. Use the acquired IT knowledge in engineering practice.								
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	Properly interpret legal norms and other legal provisions Define concepts, institutes and legal relations. Apply general and individual legal acts. Properly apply knowledge in administrative, misdemeanor, disciplinary and criminal proceedings.								
2.5. Course content (syllabus)	LECTURES (30 h): Basic of law and basics of nomotechnics. 2h Human Rights and Freedoms. 2h Rights at work and in relation to work. 2h Legal arrangement of the national level occupational safety. 2h Legal arrangement of the occupational safety system at international level. 2h Sources of Labor and Employment Rights. 2h Obligations of the employer. 3h Obligations and rights of workers. 3 h Employer's obligations in implementing occupational health and safety. 3h Liability for damage at work and in relation to work 3h Obligations towards supervisory bodies 2h Supervision of the application of safety rules by the workers' representatives. 2h Labor law enforcement practice. 2h SEMINAR (15 h): Students will have obligation to write a paper with a specific theme to demonstrate the ability to interpret legal sources and to work in legislation that regulates the area of safety at work.								
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work	<input type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)	2.7. Comments:						
2.8. Student responsibilities	Class attendance min. 70%, created and presented seminar paper.								
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	YES	<b>NO</b>	Oral exam	<b>YES</b>	NO
	Experimental work	YES	<b>NO</b>	Report	YES	<b>NO</b>	(other)	YES	NO
	Essay	YES	<b>NO</b>	Seminar paper	<b>YES</b>	NO	(other)	YES	NO

	Preliminary exam	YES	NO	Practical work	YES	NO	(other)	YES	NO
	Project	YES	NO	Written exam	YES	NO	ECTS credits (total)	4	
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>						<b>Number of copies in the library</b>	<b>Availability via other media</b>	
	M. Učur, Osnove prava i zakonodavstvo sigurnosti, Rijeka: Veleučilište, Odjel sigurnosti na radu, 2005.						10		
	S. Šokčević, Uređivanje i nadzor zaštite na radu (drugo izmijenjeno izdanje), IPROZ, Zagreb, 2014.						10		
2.11. Optional literature	Valid occupational safety regulations.								
2.13. Other (as the proposer wishes to add)									

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Properly interpret legal norms and other legal provisions.	Written exam, oral exam, seminar paper
2	Define concepts, institutes and legal relations.	Written exam, oral exam, seminar paper
3	Apply general and individual legal acts.	Written exam, oral exam, seminar paper
4	Properly apply knowledge in administrative, misdemeanor, disciplinary and criminal proceedings.	Written exam, oral exam, seminar paper

1. GENERAL INFORMATION				
1.1. Course teacher	Assist.Prof. Tahir Sofilić, PhD		1.6. Year of the study	1
1.2. Name of the course	TOXICOLOGY		1.7. ECTS credits	4
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+15+0+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course	20 full-time+80 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
2. COURSE DESCRIPTION				
2.1. Course objectives	Introduction to basic concepts in toxicology, pollutants/ toxic substances their sources, and impact on the human health and ecosystem. Distribution of natural and anthropogenic pollutants/toxic substances in the environment and the risks for the possible consequences on the people and environment.			

	Introduction to the risks of toxic pollutants on human health and other living organisms in the environment.
2.2. Enrolment requirements and/or entry competences required for the course	-
2.3. Learning outcomes at the level of the programme to which the course contributes	Define the impact of dangers, hazards and efforts on human health and / or the environment. Recognize the relationship of health and environmental risks. Analyse the present situation, identify problems, formulate and recommend an optimal technological solution. Predict methods and determine samples for the determination of contamination of environmental constituents.
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	To recognize the important long-term and current phenomena of pollutants/toxic substances in the workplace atmosphere as well as possible toxicological effects on the human body. Compare toxicological data relating to the presence of industrial pollutants/toxic substances or their groups in the water, air and soil. Identify of toxicological risks associated with the distribution of anthropogenic pollutants/toxic substances on the human body and different parts of the environment (air, water and soil). Describe the appearance of pollutants/toxic substances in the workplace atmosphere and samples of food and change their possible impact on human health.
2.5. Course content (syllabus)	LECTURES (30): Introduction to the subject curriculum and the time schedule for lectures and seminars. (1) Poisoning and poisons. Sources of poisoning, definition of poisons and their classification. (2) Toxicology and its branches. Division of toxicology into analytical, clinical, forensic, regulatory, occupational and environmental toxicology. (2) Toxic effect. Frequency of exposure to poisons, dose and dose-response / effect ratio of poisons, adverse effects of poisons and measure of venom effect. (3) Toxicokinetic. Intake of toxins into the body and its absorption, Factors of absorption of toxins / toxic substances, Influence of toxic substances on absorption, Influence of organism on absorption, Influence of external factors on absorption. (3) Places of intake of toxins in the body, Intake of toxins by the digestive system, Intake of toxins by the respiratory system, Intake of toxins through the skin, Intake of toxins by injection. (4) Distribution / distribution of toxic substances in the body. Biological conversion, excretion and accumulation of toxic substances in the body. (3) Excretion and elimination of toxic substances from the body. Excretion in the urinary tract, faeces, exhaled air, other pathways. Elimination process acceleration techniques (4) Risk evaluation. Use of biomonitoring in risk assessment. Human biomonitoring. (2) Treatment of poisoning. Prevention of further absorption of toxins. Application of antidotes / antidotes. (2) Poisoning as a cause of occupational diseases. Occupational diseases and Occupational diseases caused by chemical hazards. (4) EXERCISES (15): Auditory exercises – Methods of analysis in toxicology (3). Sampling in toxicology studies. (2) Field work- visit to laboratory for testing of the content of pollutants in biological samples. (10)



2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input checked="" type="checkbox"/> field work			<input checked="" type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.7. Comments:		
2.8. Student responsibilities	Class attendance min. 70%.								
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	<b>YES</b>	NO	Oral exam	<b>YES</b>	NO
	Experimental work	<b>YES</b>	NO	Report	YES	<b>NO</b>	(other)	YES	NO
	Essay	YES	<b>NO</b>	Seminar paper	YES	<b>NO</b>	(other)	YES	NO
	Preliminary exam	<b>YES</b>	NO	Practical work	<b>YES</b>	NO	(other)	YES	NO
	Project	YES	<b>NO</b>	Written exam	<b>YES</b>	NO	ECTS credits (total)	4	
Required literature (available in the library and/or via other media)	<b>Title</b>			<b>Number of copies in the library</b>		<b>Availability via other media</b>			
	T. Sofilić, EKOTOKSIKOLOGIJA, skripta, Sveučilište u Zagrebu Metalurški fakultet, Sisak, 2014.					<a href="https://www.simet.unizg.hr/nastava/predavanja/preddiplomski-sveucilisni-studij-metalurgija">https://www.simet.unizg.hr/nastava/predavanja/preddiplomski-sveucilisni-studij-metalurgija</a>			
	T. Sofilić, H. Makić, TOKSIKOLOGIJA, skripta, Sveučilište u Zagrebu Metalurški fakultet, Sisak, 2019.					<a href="https://www.simet.unizg.hr/hr/nastava/predavanja/preddiplomski-sveucilisni-studij-sigurnost-zdravlje-na-radu-i-radni-okolis/1-godina-preddiplomskog-studija/toksikologija/view">https://www.simet.unizg.hr/hr/nastava/predavanja/preddiplomski-sveucilisni-studij-sigurnost-zdravlje-na-radu-i-radni-okolis/1-godina-preddiplomskog-studija/toksikologija/view</a>			
2.11. Optional literature	F. Plavšić, R. Pervan Špiranec, A. Wolf-Čoporda, F. Marović, K. Capak, Priručnik o toksikologiji, Korunić d.o.o., Zagreb, 1998.								
2.12. Other (as the proposer wishes to add)									

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	To recognize the important long-term and current phenomena of pollutants/toxic substances in the workplace atmosphere as well as possible toxicological effects on the human body.	1st colloquium, 2nd colloquium, 3rd colloquium, written and oral exam
2	Compare toxicological data relating to the presence of industrial pollutants/toxic substances or their groups in the water, air and soil.	1st colloquium, 2nd colloquium, 3rd colloquium, auditory / numerical exercises; written and oral exam

3	Identify of toxicological risks associated with the distribution of anthropogenic pollutants/toxic substances on the human body and different parts of the environment (air, water and soil).	1st colloquium, 2nd colloquium, 3rd colloquium, written and oral exam
4	Describe the appearance of pollutants/toxic substances in the workplace atmosphere and samples of food and change their possible impact on human health.	1st colloquium, 2nd colloquium, 3rd colloquium, auditory / numerical exercises; written and oral exam

1. GENERAL INFORMATION				
1.1. Course teacher	Assosc.Prof. Tamara Holjevac Grgurić, PhD		1.6. Year of the study	1
1.2. Name of the course	CHEMICAL AND BIOLOGICAL HAZARDS		1.7. ECTS credits	4
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+0+15+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course	20 full-time+80 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	2., 5%
2. COURSE DESCRIPTION				
2.1. Course objectives	Acquiring knowledge about the main harmful substances in the working environment and their impact on the human body. Introduction to the classification of biological and chemical factors.			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	Define the impact of dangers, hazards and efforts on human health and / or the environment. Identify and analyze dangers, hazards and efforts in the workplace. Recognize the relationship of health and environmental risks. Apply methods of health protection and measures to increase safety at work. Recognize the importance of human, socioeconomic and environmental factors on workers' health and working ability.			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	To classify the basic types of hazards. Define sources of biological hazards and their impact on human health. Analyze possible chemical hazards of the workplace. Explain and estimate hazards risks. Evaluate the synergistic effect of chemical hazards and radiation on human health.			
2.5. Course content (syllabus)	LECTURES (30): 1. Clasification of hazards in workplace. (2) 2. Biological hazards. Classification of biological hazards. Principles of microbiology (2) 3. Viruses. Bacteria. Fungi. (2) 4. Parasites. Allergens. Transmitters of biological hazards. (2)			

	5. 1. preliminary exam. (1) 6. Chemical hazards. Toxic chemicals. Impact on human health. (2) 7. Solvents. Acids. Compressed gases. (2) 8. Metals. Corrosive substances. (2) 9. Pesticides. (2) 10. Explosive substances. Radioactive substances. (2) 11. Biological limit values for exposure to substances that may be carcinogenic and mutagenic to humans. (2) 12. 2. preliminary exam (1) 13. Nature and hazard risks. Personal protection. (2) 14. Managing and storage. (2) 15. Synergistic effect of chemicals and radiation. (2) 16. Risk assessment. (1) 17. 3. preliminary exam (1)  SEMINAR (15): seminar paper.									
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input checked="" type="checkbox"/> partial e-learning <input type="checkbox"/> field work				<input checked="" type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input checked="" type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.7. Comments:		
2.8. Student responsibilities	Conditions for signature: a student must attend at least 70% of lectures and seminars. Seminar presentation.									
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	<b>YES</b>	NO	Oral exam	<b>YES</b>	NO	
	Experimental work	YES	<b>NO</b>	Report	YES	<b>NO</b>	(other)	YES	NO	
	Essay	YES	<b>NO</b>	Seminar paper	<b>YES</b>	NO	(other)	YES	NO	
	Preliminary exam	<b>YES</b>	NO	Practical work	YES	<b>NO</b>	(other)	YES	NO	
	Project	<b>YES</b>	NO	Written exam	<b>YES</b>	NO	ECTS credits (total)	4		
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>						<b>Number of copies in the library</b>	<b>Availability via other media</b>		
	G. M. Stave, P. H. Wald, Physical and Biological Hazards of the Workplace, John Wiley&Sons, New Jersey, 2017.						10			
	P. A. Carson, C. J. Mumford, Hazardous Chemicals Handbook, Linacre House, Jordan Hill, Oxford, 2013.						10			
2.11. Optional literature	G. J. Hathaway, N. H. Proctor, Chemical Hazards of the Workplace, John Wiley & Sons, New Jersey, 2004. Zakon o kemikalijama (NN18/2013)									

	Pravilnik o zaštiti radnika od rizika zbog izloženosti biološkim agensima pri radu (NN155/08) Pravilnik o zaštiti radnika od rizika izloženosti opasnim kemikalijama pri radu (NN91/2015) Pravilnik o zaštiti radnika od rizika zbog izloženosti kancerogenima i/ili mutagenima (91/2015)
2.12. Other (as the proposer wishes to add)	

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	To classify the basic types of hazards.	1st colloquium, written and oral exam
2	Define sources of biological hazards and their impact on human health.	1st colloquium, written and oral exam
3	Analyze possible chemical hazards of the workplace.	1st and 2nd colloquium, seminar paper, written and oral exam
4	Explain and estimate hazards risks.	2nd colloquium, seminar paper, written and oral exam
5	Evaluate the synergistic effect of chemical hazards and radiation on human health.	2nd colloquium, seminar paper, written and oral exam

1. GENERAL INFORMATION				
1.1. Course teacher	Prof. Lidija Milenković-Ečimović, lecturer		1.6. Year of the study	1
1.2. Name of the course	ENGLISH LANGUAGE 2		1.7. ECTS credits	2
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L + E + S + e-learning)	15+15+0+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course	20 full-time+80 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
2. COURSE DESCRIPTION				
2.1. Course objectives	<p>Application of intermediate-level grammatical and lexical content enabling everyday and formal communication in the foreign language.</p> <p>Developing reading, writing, listening and speaking skills in the foreign language.</p> <p>Development of professional vocabulary of relevant scientific branches in the foreign language.</p> <p>The ability to differentiate between informal, formal and academic registers and the use of linguistic structures specific to them.</p>			
2.2. Enrolment requirements and/or entry competences required for the course	-			

2.3. Learning outcomes at the level of the programme to which the course contributes	Use acquired theoretical knowledge in engineering practice. Apply teamwork-oriented, ethical principles and encourage the development of communication and social skills.
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	To be able to express oneself in the everyday language and recognize and use professional language at an intermediate level. To compare and recognize general language vs. the professional language in selected text excerpts. To recognize and apply grammatical and lexical structure specific to informal, formal and academic registers, the language of science and the professional language (conditional clause, reported speech, relative pronouns and clauses, passive). To apply grammatical principles in written and oral exercises evoking everyday communicative situations. Identify and apply English-specific lexical structures (colloquiums, idioms, phrase verbs). Apply a foreign language in expert discussions and presentations; know how to describe your own jobs, tasks, and responsibilities. To attend vocational literature in a foreign language, to actively participate in international conferences in the field of the profession, to extend the language competencies individually to the principles of lifelong learning.
2.5. Course content (syllabus)	Course content is devised so as to represent equally all four skills: reading, writing, listening and speaking. During the whole course, the students acquire new contents by means of short written exams, self-correcting, group or pair work, and homework, Students with higher proficiency level may be invited to present a paper on a specific technical subject. The content of individual lectures and exercises: <ol style="list-style-type: none"> <li>1) Introduction: What is occupational health and safety?  Poor working conditions affect worker health and safety.  The importance of occupational health and safety.  Modal verbs, gerund; expressing purpose.</li> <li>2) Health and safety programmes.  Extent of the problem worldwide.  Accidents. Diseases. The range of hazards.  Passive voice. Impersonal reporting.</li> <li>3) Importance of management commitment.  The importance of training.  Role of the health and safety representative.  Describing responsibilities. Imperative.</li> <li>4) Identifying hazards in the work place.  Analysing, discussing, drawing conclusions.</li> <li>5) Ergonomics. Basic ergonomic principles.  Workstations. Identifying problems and developing solutions to ergonomic problems.  Job design check-list.  Describing, evaluating, analysing, presenting skills.</li> <li>6) Legislation and Enforcement.</li> </ol>

	<p>Relevant ILO Codes of Practice, guides and manuals.  ILO Conventions and Recommendations.  Language of legal documents.</p> <p>7) Pollution. Integrated Pollution Control.  Understanding environmental legislation.</p> <p>8) Air pollutants and health. Occupational exposure standard.  Air quality standards and management.  Expressing future predictions.</p> <p>9) Biodiversity. Carbon cycle. Nitrogen cycle.  Numerals: fractions, exponents, percentages.</p> <p>10) Greenhouse gases. Carbon dioxide.  Word formation. Parts of speech.</p> <p>11) Waste Management. Landfills. Litter.  Giving suggestions, exchanging information.</p> <p>12) Noise control. Regulations and control.  Zero conditional. Using time expressions.</p> <p>13) Case studies.</p> <p>14) Writing reports.</p> <p>15) Revision of grammar and vocabulary.</p> <p>Immediately after each lesson, within the block hour is followed the oral and written training of the forwarded content.</p>								
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work			<input checked="" type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.7. Comments:		
2.8. Student responsibilities	Attendance (min. 70 %), regular homework, participation in class. Insofar as the student fails to fulfil his/her obligation, they are offered to make up for content missed via a translation of a professional text from English to Croatian.								
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	YES	<b>NO</b>	Oral exam	<b>YES</b>	NO
	Experimental work	YES	<b>NO</b>	Report	YES	<b>NO</b>	(other)	YES	NO
	Essay	YES	<b>NO</b>	Seminar paper	YES	<b>NO</b>	(other)	YES	NO
	Preliminary exam	<b>YES</b>	NO	Practical work	YES	<b>NO</b>	(other)	YES	NO
	Project	YES	<b>NO</b>	Written exam	<b>YES</b>	NO	ECTS credits (total)	2	

	<b>Title</b>	<b>Number of copies in the library</b>	<b>Availability via other media</b>
2.10. Required literature (available in the library and/or via other media)	Introduction to Occupational Health and Safety; International Labor Organization		<a href="http://training.itcilo.it/actrav_cdrom2/en/osh/intro/inmain.htm">http://training.itcilo.it/actrav_cdrom2/en/osh/intro/inmain.htm</a>
	J. Eastwood, Oxford Guide to English Grammar, OUP, 2000.	2	
	P. Emmerson, Essential Business Grammar Builder, MacMillan, 2010.	1	
	M. Ibbotson, Cambridge English for Engineering, CUP, 2012.	1	
2.11. Optional literature	M. Swan & C. Walter, The Good Grammar Book, UOP, 2013. Andrew Porteous, Dictionary of Environmental Science and Technology, 3rd edition, Wiley		
2.12. Other (as the proposer wishes to add)			

<b>Ordinal number</b>	<b>Expected learning outcomes at the level of the course (3-10)</b>	<b>Methods for monitoring of the achievement of learning outcomes</b>
1	To be able to express oneself in the everyday language and recognize and use professional language at an intermediate level.	Auditory exercises, written exam, oral exam
2	To compare and recognize general language vs. the professional language in selected text excerpts.	Auditory exercises, written exam, oral exam
3	To recognize and apply grammatical and lexical structure specific to informal, formal and academic registers, the language of science and the professional language (conditional clause, reported speech, relative pronouns and clauses, passive).	Auditory exercises, written exam, oral exam
4	To apply grammatical principles in written and oral exercises evoking everyday communicative situations.	Auditory exercises, written exam, oral exam
5	Identify and apply English-specific lexical structures (colloquiums, idioms, phrase verbs).	Auditory exercises, written exam, oral exam
6	Apply a foreign language in expert discussions and presentations; know how to describe your own jobs, tasks, and responsibilities.	Auditory exercises, written exam, oral exam
7	To attend vocational literature in a foreign language, to actively participate in international conferences in the field of the profession, to extend the language competencies individually to the principles of lifelong learning.	Auditory exercises, written exam, oral exam

1. GENERAL INFORMATION			
1.1. Course teacher	Assoc.Prof. Robert Pezer, PhD Assist.Prof. Ivan Ivec, PhD		1.6. Year of the study 2
1.2. Name of the course	COMPUTER ASSISTED DATA PROCESSING		1.7. ECTS credits 4
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L + E + S + e-learning) 30+30+0+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course 10 full-time+40 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%) 3., 5%
2. COURSE DESCRIPTION			
2.1. Course objectives	<ol style="list-style-type: none"> <li>1) Introduce a wide range of computer assisted data processing.</li> <li>2) Enable students to design and code simple computer programs.</li> <li>3) Realize the fundamentals of programming computers in C programming language and for the spreadsheet applications.</li> </ol>		
2.2. Enrolment requirements and/or entry competences required for the course	-		
2.3. Learning outcomes at the level of the programme to which the course contributes	<p>Apply teamwork-oriented, ethical principles and encourage the development of communication and social skills. Apply logical conclusion and precision in data processing. Use computer applications for prevent pollution of the working environment and reduce the risk of injuries. Apply acquired IT knowledge in engineering practice.</p>		
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	<ol style="list-style-type: none"> <li>1) Format text, create and search spreadsheets, create simpler presentations.</li> <li>2) Write a computer program using appropriate elements of the programming language/spreadsheet structure and syntax.</li> <li>3) Develop a computer program that includes an arbitrary number of repetitions, the branching structure, working with strings and arrays in order to solve engineering numerical analysis problem.</li> </ol>		
2.5. Course content (syllabus)	<p>The course systematically treats the notion of modern computer and data processing on a modern computer. There is also an introduction to programming to help students to better understand the potential of computer assisted data processing. Teaching per week is provided below.</p> <ol style="list-style-type: none"> <li>1) Text processing.</li> <li>2) Basics of spreadsheets.</li> <li>3) Formulas and functions in spreadsheets.</li> <li>4) Basics of making presentations.</li> <li>5) Image and sound processing. Internet search.</li> </ol>		



	6) Data storage. Operating systems. 7) Networks and the Internet. Computer graphics. 8) Repetition and the first test. 9) An algorithm and a flowchart. Introduction to programming. 10) Flow control in programming. 11) Loop in programming. 12) Programming of Excel in VBA – part I. 13) Programming of Excel in VBA – part II. 14) Artificial intelligence. 15) Repetition and the second test.								
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work			<input checked="" type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input checked="" type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.7. Comments:		
2.8. Student responsibilities	Conditions for signature: attendance at lectures and exercises min. 70%.								
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	YES	<b>NO</b>	Oral exam	<b>YES</b>	NO
	Experimental work	YES	<b>NO</b>	Report	YES	<b>NO</b>	(other)	YES	NO
	Essay	YES	<b>NO</b>	Seminar paper	YES	<b>NO</b>	(other)	YES	NO
	Preliminary exam	<b>YES</b>	NO	Practical work	YES	<b>NO</b>	(other)	YES	NO
	Project	<b>YES</b>	NO	Written exam	YES	<b>NO</b>	ECTS credits (total)	4	
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>				<b>Number of copies in the library</b>		<b>Availability via other media</b>		
	J. Glenn Brookshear, David T. Smith, Dennis Brylow: Computer Science – An Overview, 11. izdanje, Pearson Education, Boston, 2012.						<a href="http://larr.com/wp-content/uploads/2014/08/ComputerS.pdf">http://larr.com/wp-content/uploads/2014/08/ComputerS.pdf</a>		
2.11. Optional literature	C. Reynolds, P. Tymann, Schaum's Outlines of Principles of Computer Science, 2. izdanje, McGraw-Hill, New York, 2009. D. Gustafson, Schaum's Outlines of Software Engineering, McGraw-Hill, New York, 2002. J. Walkenbach, Excel 2010 Bible, Wiley Publishing, Inc., 2010.								
2.12. Other (as the proposer wishes to add)									

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Format text, create and search spreadsheets, create simpler presentations.	Laboratory exercises, oral exam

2	Write a computer program using appropriate elements of the programming language/spreadsheet structure and syntax.	2nd colloquium, oral exam
3	Develop a computer program that includes an arbitrary number of repetitions, the branching structure, working with strings and arrays in order to solve engineering numerical analysis problem.	Project task, 2nd colloquium, oral exam

1. GENERAL INFORMATION			
1.1. Course teacher	Assoc.Prof. Tamara Holjevac Grgurić, PhD Assoc. Prof. Ivan Brnardić, PhD		1.6. Year of the study 2
1.2. Name of the course	ENVIRONMENT AND WORKPLACE PROTECTION TECHNIQUES		1.7. ECTS credits 4
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L + E + S + e-learning) 30+0+30+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course 10 full-time+40 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%) 2., 5%
2. COURSE DESCRIPTION			
2.1. Course objectives	Acquiring knowledge and skills for monitoring and control the living and working environment with the aim of preventing accidents and injuries and reducing the risk to human health. Introduction with sampling of harmful substances and techniques for determining their concentrations in workplace.		
2.2. Enrolment requirements and/or entry competences required for the course	-		
2.3. Learning outcomes at the level of the programme to which the course contributes	Define the impact of dangers, hazards and efforts on human health and / or the environment. Apply methods of health protection and measures to increase safety at work. Recognize the importance of human, socioeconomic and environmental factors on workers' health and working ability. Apply logical conclusion and precision in data processing.		
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	Identify physical, chemical and biological factors in the workplace. Apply sampling methods of harmful substances. Apply microclimate, vibration and noise testing techniques. Choose an appropriate measuring technique for estimating concentrations of chemical and biological hazards. Analyze the concentration of emissions in the industrial waste gases. Recommend adequate techniques for reducing workplace accident risks. Assess the impact of hazards on human health.		

	Recommend appropriate personal protection.		
2.5. Course content (syllabus)	<p>LECTURES (30):</p> <ol style="list-style-type: none"> <li>1. Introduction to the environment and workplace protection. (1)</li> <li>2. Identify the sources of risk. Measurement of physical factors. Maintenance and documentation of test equipment. Reporting. (2)</li> <li>3. Microclimate measurements: temperature, relative humidity and air velocity. Measuring of thermal radiation. (2)</li> <li>4. Managing the health and safety risks from lighting in the workplace. Illuminance measurement. (2)</li> <li>5. Noise assessment. Noise control techniques. Sound level meter, sound calibrator, frequency analyzer. Reduction of industrial noise. Personal protective equipment. (2)</li> <li>6. Vibration control and measurement. Measurement of vibrations that affect the hands and vibrations that affect the entire body. Reducing the risk of vibration. (2)</li> <li>7. Measurement of chemical hazards concentration. Dust sampling system, determination of dust concentration and conimetric analysis. Measurement of dust concentration in the form of fibers. (2)</li> <li>8. Measurement of concentration of organic and inorganic gases and vapors. Gas and vapor sampling equipment. Gas chromatograph. UV / VIS / IR spectrophotometer. HPLC. (3)</li> <li>9. Measurement of electromagnetic radiation. (2)</li> <li>10. Measurement of emissions in the air from the stationary sources. Limit values and requirements. Individual and continuous measurements. (2)</li> <li>11. Methods for measuring pollution concentrations in the industrial waste gases. Pollutant sampling methods. (2)</li> <li>12. Measurement of the concentration of particles, sulfur oxides, carbon oxides, nitrogen oxides; chemiluminescence, non-permeable infrared spectrometry, adsorption on active carbon. (3)</li> <li>13. Determination of the mass concentration of PCDD / PCDF, PCB, total organic carbon. Determination of phenol by p-nitroaniline method. (2)</li> <li>14. Smoke determination: visual and photometric. (1)</li> <li>15. Sampling and measurement of biological hazards in the working atmosphere according to standards ISP/MYC/AC-01, ISP/MYC/AC-03, NIOSH 0800.. (2)</li> </ol> <p>SEMINAR (15): Seminar paper. Field work.</p>		
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input checked="" type="checkbox"/> partial e-learning <input checked="" type="checkbox"/> field work	<input checked="" type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input checked="" type="checkbox"/> work with mentor <input type="checkbox"/> (other)	2.7. Comments:

2.8. Student responsibilities	Conditions for signature: a student must attend at least 70% of lectures and seminars. Seminar presentation. Attending to Field work.									
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	<b>YES</b>	NO	Oral exam	<b>YES</b>	NO	
	Experimental work	YES	<b>NO</b>	Report	YES	<b>NO</b>	(other)	YES	NO	
	Essay	YES	<b>NO</b>	Seminar paper	<b>YES</b>	NO	(other)	YES	NO	
	Preliminary exam	<b>YES</b>	NO	Practical work	<b>YES</b>	NO	(other)	YES	NO	
	Project	YES	<b>NO</b>	Written exam	<b>YES</b>	NO	ECTS credits (total)	4		
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>							<b>Number of copies in the library</b>	<b>Availability via other media</b>	
	A. J. P. Dalton, Safety, Health and Environmental Hazards at the Workplace, Cassel, 1998.							10		
	G. Licitra, G. d'Amore, M. Magnoni, Physical Agents in the Environment and Workplace, CRC Press, Taylor & Francis Group, Boca Raton, 2018.								DA	
	T. South, Managing Noise and Vibration at Work, Elsevier Butterworth-Heinemann, Burlington, 2004.								DA	
2.11. Optional literature	G. J. Hathaway, N. H. Proctor, Chemical Hazards of the Workplace, John Wiley & Sons, New Jersey, 2004. Pravilnik o ispitivanju radnog okoliša (NN16/2016)									
2.12. Other (as the proposer wishes to add)										

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Identify physical, chemical and biological factors in the workplace.	1st colloquium, written and oral exam
2	Apply sampling methods of harmful substances.	1st colloquium, seminar paper, written and oral exam
3	Apply microclimate, vibration and noise testing techniques.	2nd colloquium, seminar paper, written and oral exam
4	Choose an appropriate measuring technique for estimating concentrations of chemical and biological hazards.	1st colloquium, seminar paper, written and oral exam
5	Analyze the concentration of emissions in the industrial waste gases.	1st colloquium, seminar paper, written and oral exam
6	Recommend adequate techniques for reducing workplace accident risks.	1st and 2nd colloquium, seminar paper, written and oral exam
7	Assess the impact of hazards on human health.	1st and 2nd colloquium, seminar paper, written and oral exam
8	Recommend appropriate personal protection.	1st and 2nd colloquium, seminar paper, written and oral exam

1. GENERAL INFORMATION			
1.1. Course teacher	Ivana Krišto, PhD, lecturer	1.6. Year of the study	2
1.2. Name of the course	SAFETY MANAGEMENT SYSTEMS	1.7. ECTS credits	4

1.3. Associate teachers	Zvonko Kardum, mag. sec.		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+30+0+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course	10 full-time+40 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1.,5%
<b>2. COURSE DESCRIPTION</b>				
2.1. Course objectives	The aim of this course is to introduce students with certified safety management systems. The following general competences are accepted through this course: building and monitoring the safety management system, developing analytical skills in business performance as a system, mastering and implementing system-based management. Specific competencies that are developed include: development of documentation for the needs of management systems, development of knowledge related to management systems: quality, environment, security, risks.			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	Identify and analyze dangers, hazards and efforts in the workplace. Use applicable regulations and standards relevant to safety and health at work. Analyse the present situation, identify problems, formulate and recommend an optimal technological solution. Manage safety at work systems in organizations and the local community. Apply logical conclusion and precision in data processing. Use computer applications for prevent pollution of the working environment and reduce the risk of injuries. Apply acquired IT knowledge in engineering practice.			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	Apply adequate safety management systems. Apply rules in the area of security management system. Make the necessary documentation in security management systems			
2.5. Course content (syllabus)	LECTURES (30): Basic concepts of the standardization system. 1h National standards. 2h International standards. 1h Harmonized standards. 1h Industry standards. 1h Forms of normative document, statutory norms. 4h Adopting the norm. 2h			

	Normative institutions. 2h Structure of Croatian Standardization. 4h International organizations. 2h Getting acquainted with accreditation and certification systems. 4h Valid security management systems, accreditation and certification system. 6h								
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work			<input type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.7. Comments:		
2.8. Student responsibilities	Class attendance min. 70 %.								
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	YES	<b>NO</b>	Oral exam	YES	<b>NO</b>
	Experimental work	YES	<b>NO</b>	Report	YES	<b>NO</b>	(other)	YES	NO
	Essay	YES	<b>NO</b>	Seminar paper	YES	<b>NO</b>	(other)	YES	NO
	Preliminary exam	YES	<b>NO</b>	Practical work	<b>YES</b>	NO	(other)	YES	NO
	Project	YES	<b>NO</b>	Written exam	<b>YES</b>	NO	ECTS credits (total)	4	
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>						<b>Number of copies in the library</b>	<b>Availability via other media</b>	
	T. Lazibat, Upravljanje kvalitetom, Znanstvena knjiga, Zagreb, 2009.						1		
	T. Baković, I. Dužević, Integrirani sustavi upravljanja, Ekonomski fakultet, Zagreb, 2014.						5		
2.11. Optional literature	Standards and regulations in the field of safety management systems.								
2.12. Other (as the proposer wishes to add)									

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Apply adequate safety management systems.	Written exam, oral exam, seminar paper
2	Apply rules in security management system.	Written exam, oral exam, seminar paper
3	Make the necessary documentation in security management systems.	Written exam, oral exam, seminar paper

1. GENERAL INFORMATION				
1.1. Course teacher	Assist.Prof. Mitja Robert Kožuh, PhD		1.6. Year of the study	2
1.2. Name of the course	HAZARDS AND RISKS IN WORK ENVIRONMENT		1.7. ECTS credits	4
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L+ E + S + e-learning)	30+15+0+0
1.4. Study programme (undergraduate, graduate, integrated)	Undergraduate		1.9. Expected enrolment in the course	10 full-time+40 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
2. COURSE DESCRIPTION				
2.1. Course objectives	<p>Students will be able to identify, define occupational hazards and use the collected data as a basis for raising the level of safety at work.</p> <p>The students obtain knowledge of the system to provide safety in the Republic of Croatia, met the basic legislation in this area and services, and institutions that watch over the implementation of the legislation.</p>			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	<p>Identify and analyze dangers, hazards and efforts in the workplace.</p> <p>Recognize the importance of human, socioeconomic and environmental factors on workers' health and working ability.</p>			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	<p>Define and identify hazards and risks in the workplace.</p> <p>Group data and predict a suitable data analysis model.</p> <p>Summarize the results of the risk analysis and possible consequences.</p> <p>Create prevention and improvement of the work process in order to increase safety at work.</p>			
2.5. Course content (syllabus)	<ol style="list-style-type: none"> <li>1. The concepts of safety and risk.</li> <li>2. Risk management and governance.</li> <li>3. Risk Acceptance Criteria.</li> <li>4. Probability and uncertainty, use in risk analysis and management.</li> <li>5. Decision theory.</li> <li>6. Theory of accidents and incidents.</li> <li>7. Socialview on risk.</li> <li>8. Risk perception.</li> <li>9. Ethics in Risk Management.</li> <li>10. Complexity (and resilience).</li> <li>11. Models and simulations.</li> </ol>			

	12. Theory of „Black swans“. 13. Areas of specific risks. 14. Analysis of key groups of occupational risks (characteristics, risk sources and possible consequences, vulnerable professions / industries, principles of prevention, legal framework): Physical risks incl. Mechanical risks - I .; Physical risks incl. Mechanical risks - II .; Chemical risks. 15. Analysis of key groups of occupational risks: Biological risks; Ergonomic risks; Psychosocial risks and work-related stress; Combined occupational risks; Emerging occupational risks.									
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work				<input type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.7. Comments:		
2.8. Student responsibilities	Class attendance min. 70 %.									
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	YES	<b>NO</b>	Oral exam	YES	<b>NO</b>	
	Experimental work	YES	<b>NO</b>	Report	<b>YES</b>	NO	(other)	YES	NO	
	Essay	YES	<b>NO</b>	Seminar paper	YES	<b>NO</b>	(other)	YES	NO	
	Preliminary	YES	<b>NO</b>	Practical work	<b>YES</b>	NO	(other)	YES	NO	
	Project	<b>YES</b>	NO	Written exam	YES	<b>NO</b>	ECTS credits (total)	4		
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>						<b>Number of copies in the library</b>	<b>Availability via other media</b>		
	C. Ray Asfahl, Industrial Safety and Health Management, Fifth edition, Pearson, Prentice Hall, 2003						1			
	J. Ridley, J. Channing, Safety at Work, Seventh Edition, Butterworth- Heinemann, 2008						1			
	Hollnagel, Woods, Leveson, Resilience Engineering, Ashgate, 2006						1			



	Hollnagel, Paries, Woods, Wreathhall, Resilience Engineering in Practice, 2011	1	
	Nancy Leveson, Engineering Safer World, MIT 2011	1	
	Karl Weick, Kathleen Sutcliffe, Managing the Unexpected, Second Edition, John Willey and Sons, 2007	1	
2.11. Optional literature	Nassim Nicholas Taleb, Black Swan, Random House, 2007 Jens Rasmussen, Inge Svedung, Proactive Risk Management in Dynamic Society, Kalstad, Sweden, 2000		
2.12. Other (as the proposer wishes to add)	Zakon o zaštiti na radu (NN 71/14, 118/14 i 154/14) Pravilnik o izradi procjene rizika (NN 112/14)		

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Define and identify hazards and risks in the workplace.	Project task, written exam
2	Group data and predict a suitable data analysis model.	Project task, written exam
3	Summarize the results of the risk analysis and possible consequences.	Project task, written exam
4	Create prevention and improvement of the work process in order to increase safety at work.	Auditory exercises, written exam

1. GENERAL INFORMATION				
1.1. Course teacher	Assoc.Prof. Milan Milošević, PhD		1.6. Year of the study	2
1.2. Name of the course	HEALTH AND SAFETY AT WORK PRINCIPLES		1.7. ECTS credits	4
1.3. Associate teachers	Assist.Prof. Hana Brborović, PhD Tajana Božić, MD, PhD		1.8. Type of instruction (number of hours L+ E + S + e-learning)	30+0+15+0
1.4. Study programme (undergraduate, graduate, integrated)	Undergraduate		1.9. Expected enrolment in the course	10 full-time+40 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
2. COURSE DESCRIPTION				
2.1. Course objectives	<p>The aim of this course are:</p> <ul style="list-style-type: none"> <li>- to inform students about the impact of the working environment on human health</li> <li>- to familiarize students with work factors that improve health aiming to protect the health of workers and to increase the level of safety at work</li> <li>- to provide insight into the organization of the Occupational Health Service and Safety at Work service</li> </ul>			

	- to introduce students with dangers, harms and strains at workplace
2.2. Enrolment requirements and/or entry competences required for the course	-
2.3. Learning outcomes at the level of the programme to which the course contributes	Define the impact of dangers, hazards and efforts on human health and / or the environment. Identify and analyze dangers, hazards and efforts in the workplace. Use applicable regulations and standards relevant to safety and health at work. Apply methods of health protection and measures to increase safety at work. Apply prevention programs to reduce the impact of danger, harmfulness and efforts in the workplace. Collect and analyze data and create risk assessment in the workplace.
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	After completing the course and completing all the duties student will be able to: <ul style="list-style-type: none"> <li>- define the role of occupational health and safety at work</li> <li>- distinguish terms of work injury, occupational diseases and work-related illnesses</li> <li>- analyse the factors that causes work injuries</li> <li>- apply an algorithm in case work injuries</li> <li>- apply the principles of fit for work assessment for workplaces with special working conditions and for other specific jobs</li> <li>- define the concepts of dangers, harms and strains at workplace</li> <li>- create anthropometric measurements of working population</li> <li>- analyse the impact of physical activity on worker health</li> <li>- provide first aid assistance at workplace</li> </ul>
2.5. Course content (syllabus)	<ol style="list-style-type: none"> <li>1. Conceptual framework and historical significance of occupational health and safety at work (2), Seminar: Development of occupational health medicine (1)</li> <li>2. Anatomy and functioning of human body (2), Seminar: Anthropometric measurements (1)</li> <li>3. Work physiology (2), Seminar: Increased atmospheric pressure (1)</li> <li>4. Workplace ergonomics (2), Seminar: An ergonomically correct designed workplace (1)</li> <li>5. Croatian and international legislation on health and safety at work (2), Seminar: Thermal environment and electricity (1)</li> <li>6. Workplace dangers, harms and strains (2), Seminar: Workplace noise (1)</li> <li>7. Work ability assessment in occupational health medicine practice for workplaces with special working conditions (2), Safety at work (1)</li> <li>8. Work ability assessment in occupational health medicine practice for other specific jobs (security officers, firefighters, seafarers, pilots, drivers) (2), Seminar: The role of occupational safety experts in the assessment of work ability (1)</li> <li>9. Health at work (2), Seminar: Health protection of health professionals (1)</li> <li>10. Workplace Mental Health (2), Seminar: The Role of Occupational Safety Experts in Risk Assessment (1)</li> <li>11. Health and safety for employees working with a computer (2), Seminar: Sedentary/non sedentary workplaces - physical loading (1)</li> <li>12. Preventive, periodic and control examinations of workers in occupational health medicine practice (2), Seminar: Medical examination algorithm in occupational health medicine practice (1)</li> <li>13. First aid assistance at workplace (2), Seminar: Reproductive health and the environment (1)</li> </ol>

	14. Work injuries/causes and consequences (2), Seminar: Work injury algorithm (1) 15. Physical activity and health of workers (2), Seminar: Work ability self-assessment and its correlations with health related fitness and physical activity level of security guards (1)								
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work			<input checked="" type="checkbox"/> independent assignments <input checked="" type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.7. Comments:		
2.8. Student responsibilities	70% attendance on lectures and seminars, active approach to teaching, created and presented seminar paper.								
2.9. Monitoring student work	Class attendance	YES	NO	Research	YES	NO	Oral exam	YES	NO
	Experimental work	YES	NO	Report	YES	NO	(other)	YES	NO
	Essay	YES	NO	Seminar paper	YES	NO	(other)	YES	NO
	Preliminary exam	YES	NO	Practical work	YES	NO	(other)	YES	NO
	Project	YES	NO	Written exam	YES	NO	ECTS credits (total)	4	
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>				<b>Number of copies in the library</b>		<b>Availability via other media</b>		
	J. Mustajbegović, M. Milošević, H. Brborović, Medicina rada i sporta, Medicinska naklada, Zagreb, 2018. (odabrana poglavlja)				8				
	Prezentacije i pisani materijali nastavnika				3				
	Pravilnik o poslovima s posebnim uvjetima rada – Narodne novine 5/1984.						<a href="https://www.pmf.unizg.hr/download/repository/Pravilnik_o_poslovima_s_posebnim_uvjetima_rada.pdf">https://www.pmf.unizg.hr/download/repository/Pravilnik_o_poslovima_s_posebnim_uvjetima_rada.pdf</a>		
	Pravilnik o izradi procjene rizika – Narodne novine 112/2014.						<a href="https://narodne-novine.nn.hr/clanci/sluzbeni/2014_09_112_2154.html">https://narodne-novine.nn.hr/clanci/sluzbeni/2014_09_112_2154.html</a>		
	Zakon o zaštiti na radu – Narodne novine 71/2014.						<a href="https://narodne-novine.nn.hr/clanci/sluzbeni/2014_06_71_1334.html">https://narodne-novine.nn.hr/clanci/sluzbeni/2014_06_71_1334.html</a>		
2.11. Optional literature	Pravilnik o zdravstvenim uvjetima za rad u s izvorima ionizirajućeg zračenja – Narodne novine 1/2005. Pravilnik o zdravstvenim pregledima vozača i kandidata za vozače – Narodne novine, 01/2011 i 137/2015.								

	<p>Pravilnik o utvrđivanju uvjeta zdravstvene sposobnosti članova posade, pomorskih brodova, brodica i jahti – Narodne novine 111/2002.</p> <p>Pravilnik o načinu utvrđivanja zdravstvene sposobnosti čuvara i zaštitara u privatnoj zaštiti – Narodne novine 38/2004 i 106/2004.</p> <p>Pravilnik o zdravstvenim pregledima za utvrđivanje zdravstvene sposobnosti za držanje i nošenje oružja – Narodne novine, 22/2013.</p> <p>Pravilnik o postupku utvrđivanja i priznavanja ozljede na radu i profesionalne bolesti - Narodne novine, 125/2007.</p> <p>Pravilnik o sigurnosti i zaštiti zdravlja pri radu s računalom – Narodne novine, 69/2005.</p> <p>Pravilnik o pružanju prve pomoći radnicima na radu – Narodne novine, 56/1983.</p>
2.12. Other (as the proposer wishes to add)	

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Define the role of occupational health and safety at work.	1st independent task, seminar paper; 2nd colloquium; 3 <sup>rd</sup> colloquium, written and oral exam
2	Distinguish terms of work injury, occupational diseases and work-related illnesses.	1st independent task, seminar paper; 2nd colloquium; 3 <sup>rd</sup> colloquium, written and oral exam
3	Analyse the factors that causes work injuries.	1st independent task, seminar paper; 2nd colloquium; 3 <sup>rd</sup> colloquium, written and oral exam
4	Apply an algorithm in case work injuries.	1st independent task, seminar paper; 2nd colloquium; 3 <sup>rd</sup> colloquium, written and oral exam
5	Apply the principles of fit for work assessment for workplaces with special working conditions and for other specific jobs.	1st independent task, seminar paper; 2nd colloquium; 3 <sup>rd</sup> colloquium, written and oral exam
6	Define the concepts of dangers, harms and strains at workplace.	1st independent task, seminar paper; 2nd colloquium; 3 <sup>rd</sup> colloquium, written and oral exam
7	Create anthropometric measurements of working population.	1st independent task, seminar paper; 2nd colloquium; 3 <sup>rd</sup> colloquium, written and oral exam
8	Analyse the impact of physical activity on worker health.	1st independent task, seminar paper; 2nd colloquium; 3 <sup>rd</sup> colloquium, written and oral exam
9	Provide first aid assistance at workplace.	1st independent task, seminar paper; 2nd colloquium; 3 <sup>rd</sup> colloquium, written and oral exam

1. GENERAL INFORMATION			
1.1. Course teacher	Assist.Prof. Ivan Jandrić, PhD Assoc.Prof. Natalija Dolić, PhD	1.6. Year of the study	2
1.2. Name of the course	TESTING AND CERTIFICATION	1.7. ECTS credits	4

1.3. Associate teachers	-	1.8. Type of instruction (number of hours L + E + S + e-learning)	30+0+30+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate	1.9. Expected enrolment in the course	10 full-time+40 part time students
1.5. Status of the course	<input type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)
<b>2. COURSE DESCRIPTION</b>			
2.1. Course objectives	Students will acquire knowledge on procedures for testing and certification in accordance with applicable standards and standards in Croatia and the EU. Students will be able to independently develop quality management systems and eventually assure to gain certification for the product and / or laboratory. Furthermore, they will be able to use modern methods of quality assurance in the conduct of business and ensure safety at work according to current standards in the EU and Croatia.		
2.2. Enrolment requirements and/or entry competences required for the course	-		
2.3. Learning outcomes at the level of the programme to which the course contributes	Use applicable regulations and standards relevant to safety and health at work. Analyse the present situation, identify problems, formulate and recommend an optimal technological solution. Manage safety at work systems in organizations and the local community. Apply logical conclusion and precision in data processing.		
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	Describe the procedures of testing and certification according to the applicable norms and standards in Croatia and the EU. Independently create and / or improve the quality management system. Create documentation of products compliance. Apply the current occupational safety standards.		
2.5. Course content (syllabus)	<p>LECTURES (30):</p> <p>1. INTRODUCTION: the basic quality determinants, quality definitions, quality management, quality control, quality of costs, quality assurance. (2)</p> <p>2. NORMIZATION, DEFINITIONS, OBJECTIVES, PRINCIPLES: Basic concepts of the standardization system: types of norms, norms hierarchy, standardization institutions (standards developing organization, technical committees), Croatian Standards Institute, international standardization. (4)</p> <p>3. QUALITY MANAGEMENT STANDARDS, ISO 9000 standards series, the basic requirements of the ISO 9000 standard series. (2)</p>		

	<p>4. LEGISLATIVE REGULATIONS, Standardization acts and other by-laws. The law regulated and unregulated areas. Obligations of manufacturers and / or suppliers. Import equipment and other accreditation and certification systems (EAL, EAC, Multilateral agreements, International agreements). (2)</p> <p>5. BUILDING QUALITY MANAGEMENT SYSTEMS: mission, vision, strategy and quality management policy (4)</p> <p>6. ACCREDITATION General terms in the system of proof of competence. Accreditation system. European approach to proving New Approach, Global Approach, removal of technical barriers. Procedures on legally regulated and legally unregulated area. Croatian standards and accreditation systems. (2)</p> <p>7. CERTIFICATION, General terms. Subject of certification. Procedures, institutions, system, independent institutions (third party). Domestic and European regulations. Documentation, testing, surveillance, documents, certificates and vendor statements. Labelling, certification marks, C and CE marks, classification marks. (2)</p> <p>8. LABORATORY TESTING AND ACCREDITATION, certification and accreditation procedure for independent laboratories for quality control of products, EN ISO / IEC 1 (4)</p> <p>9. TECHNICAL DOCUMENTATION OF THE PRODUCT - declaration of conformity, certificate, instructions (2)</p> <p>10. SYSTEMS AND STANDARDS FOR SAFETY MANAGEMENT AT WORK, HRN BS OHSAS 18001 - International standard for Health and Safety Management, (3)</p> <p>11. CONTINUOUS IMPROVEMENT OF SYSTEMS FOR HEALTH AND SAFETY AT WORK (3)</p> <p>SEMINARS (30):</p> <ol style="list-style-type: none"> <li>1. Building a quality management system, setting up a mission and vision, Development of strategy and documentation, and cost estimation for positive accreditation</li> <li>2. Application of Deming Circuits and Pareto Quality Assurance Analysis</li> <li>3. Testing and accreditation of independent testing laboratories</li> <li>4. Implementation of ISO 9000 norms in companies</li> </ol>
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2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures	<input checked="" type="checkbox"/> independent assignments	2.7. Comments:						
	<input checked="" type="checkbox"/> seminars and workshops	<input type="checkbox"/> multimedia and the internet							
	<input type="checkbox"/> exercises	<input type="checkbox"/> laboratory							
	<input type="checkbox"/> online in entirety	<input type="checkbox"/> work with mentor							
	<input type="checkbox"/> partial e-learning	<input type="checkbox"/> (other)							
	<input type="checkbox"/> field work								
2.8. Student responsibilities	Class attendance min. 70 %, given all seminars.								
2.9. Monitoring student work	Class attendance	<b>YES</b>	<b>NO</b>	Research	<b>YES</b>	<b>NO</b>	Oral exam	<b>YES</b>	<b>NO</b>
	Experimental work	<b>YES</b>	<b>NO</b>	Report	<b>YES</b>	<b>NO</b>	(other)	<b>YES</b>	<b>NO</b>
	Essay	<b>YES</b>	<b>NO</b>	Seminar paper	<b>YES</b>	<b>NO</b>	(other)	<b>YES</b>	<b>NO</b>
	Preliminary exam	<b>YES</b>	<b>NO</b>	Practical work	<b>YES</b>	<b>NO</b>	(other)	<b>YES</b>	<b>NO</b>
	Project	<b>YES</b>	<b>NO</b>	Written exam	<b>YES</b>	<b>NO</b>	ECTS credits (total)	4	
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>				<b>Number of copies in the library</b>		<b>Availability via other media</b>		
	S. Rešković, Upravljanje kvalitetom, Interna skripta, Sveučilište u Zagrebu Metalurški fakultet, Sisak, 2018., in procedure of reviewing and publishing at the internet page of Faculty of Metallurgy.						<a href="http://www.simet.hr">www.simet.hr</a>		
	B. Bilić, Kvaliteta: planiranje, analiza i upravljanje, Sveučilište u Splitu, Fakultet elektrotehnike, strojarstva i brodogradnje, Split, 2016.				1				
2.11. Optional literature	T. Lazibat, Upravljanje kvalitetom, Znanstvena knjiga, Zagreb, 2009. T. Topić, Hrvatska u sustavu europske infrastrukture kvalitete, Veleučilište Velika Gorica, 2014. ISO 9001:2015 Quality management systems: <a href="https://www.iso.org/standard/62085.html">https://www.iso.org/standard/62085.html</a>								
2.12. Other (as the proposer wishes to add)									

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Describe the procedures of testing and certification according to the applicable norms and standards in Croatia and the EU.	1st colloquium, 2nd colloquium, written and oral exam, seminar paper
2	Independently create and / or improve the quality management system.	1st colloquium, 2nd colloquium, written and oral exam, seminar paper, report
3	Create documentation of products compliance.	3rd colloquium, written and oral exam
4	Apply the current occupational safety standards.	3rd colloquium, written and oral exam

1. GENERAL INFORMATION			
1.1. Course teacher	Full Prof. Mirko Gojić, PhD Assoc. Prof. Ljerka Slokar, PhD		1.6. Year of the study 2
1.2. Name of the course	MATERIALS SCIENCE		1.7. ECTS credits 5
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L + E + S + e-learning) 30+15+15+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course 10 full-time+40 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%) 1., 5 %
2. COURSE DESCRIPTION			
2.1. Course objectives	Present the different types of materials and methods of obtaining them. Explain the linkage of structure and basic properties of different materials and highlight their impact on properties of materials.		
2.2. Enrolment requirements and/or entry competences required for the course	-		
2.3. Learning outcomes at the level of the programme to which the course contributes	Define the impact of dangers, hazards and efforts on human health and / or the environment. Identify and analyze dangers, hazards and efforts in the workplace. Recognize the relationship of health and environmental risks. Analyse the present situation, identify problems, formulate and recommend an optimal technological solution.		
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	Identify the types of materials, their structure and properties. Recognize the importance of the role of different materials in the contemporary world. Evaluate the usable properties of different materials. Apply the appropriate material with respect to the application conditions. Recognize the meaning of the recycling of the certain types of materials. Describe the modern methods of the materials investigations.		
2.5. Course content (syllabus)	LECTURES (30): <ol style="list-style-type: none"> <li>1. Atomic structure and microstructure of the material. (2)</li> <li>2. The basic classification of materials and their properties. (2)</li> <li>3. Defects in materials and the diffusion process. (2)</li> <li>4. Metallic materials: classic (steel, aluminum...) and contemporary (intermetallic, fiber, magnetic, metals, glass, shape memory materials, sponge materials, biomaterials ...). (6)</li> <li>5. Nonmetallic materials: inorganic (ceramic, concrete, glass ...) and organic (wood, plastic ...). (4)</li> </ol>		



	<p>6. Durability and degradation of materials. (2)  7. Materials that have a significant negative impact on the safety, health and the environment (hazardous materials). (4)  8. Recycling of the materials. (4)  9. Modern methods of the materials investigations. (4)</p> <p>SEMINARS (15):  Theoretical basics of the most important methods used to examine the structure of the material (metallographic analysis, XRD analysis, thermal analysis) and their properties (mechanical and technological tests). (10)  Presentation of seminar papers. (5)</p> <p>EXERCISES (15):  Auditory (10): Accounting Tasks: Crystal Structures, Diffusion, Phase Diagrams  Laboratory (5): Metallographic preparation of samples and their analysis by light and electron microscope.</p>								
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work				<input type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input checked="" type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)				2.7. Comments:
2.8. Student responsibilities	Class attendance min. 70%, created and presented seminar paper, given report from the laboratory exercise.								
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	<b>YES</b>	<b>NO</b>	Oral exam	<b>YES</b>	NO
	Experimental work	YES	<b>NO</b>	Report	<b>YES</b>	NO	(other)	YES	NO
	Essay	YES	<b>NO</b>	Seminar paper	<b>YES</b>	NO	(other)	YES	NO
	Preliminary exam	<b>YES</b>	NO	Practical	<b>YES</b>	NO	(other)	YES	NO
	Project	YES	<b>NO</b>	Written exam	<b>YES</b>	NO	ECTS credits (total)	5	
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>			<b>Number of copies in the library</b>		<b>Availability via other media</b>			
	T. Filetin, Materijali i tehnologijski razvoj, HDMT, Zagreb, 2002.					web			

	T. Matković, P. Matković, Lj. Slokar, Znanost o metalima-Zbirka riješenih zadataka, Metalurški fakultet, Sisak, 2010.	1	<a href="https://www.simet.unizg.hr/hr/nastava/predavanja/preddiplomski-sveucilisni-studij-metalurgija/2-godina-preddiplomskog/Zadaci%20iz%20FM%20re-TNR-Boja-1.pdf/view">https://www.simet.unizg.hr/hr/nastava/predavanja/preddiplomski-sveucilisni-studij-metalurgija/2-godina-preddiplomskog/Zadaci%20iz%20FM%20re-TNR-Boja-1.pdf/view</a>
	D. E. Laughlin, K. Hono, Physical Metallurgy, Volume I, 5th Edition, Elsevier, Amsterdam, 2014.	1	web
	D. E. Laughlin, K. Hono, Physical Metallurgy, Volume II, 5th Edition, Elsevier, Amsterdam, 2014.	1	web
	D. E. Laughlin, K. Hono, Physical Metallurgy, Volume III, 5th Edition, Elsevier, Amsterdam, 2014.	1	web
	T. Filetin i surad., Svojstva i karakteristike materijala, Sveučilišna tiskara, Zagreb, 1993.		web
2.11. Optional literature	W. D. Callister, Materials Science and Engineering, John Wiley & Sons, New York, 1994. M. Ashby, H. Shercliff, D. Cebon, Materials-Engineering, Science, Processing and Design, Elsevier, Amsterdam, 2007.		
2.12. Other (as the proposer wishes to add)	Articles about the materials.		

<b>outcomes at the level of the course (3-10)</b>		<b>Methods for monitoring of the achievement of learning outcomes</b>	
	materials, their structure and properties.	1st colloquium, 2nd colloquium, written and oral exam	
	importance of the role of different materials in the contemporary	1st colloquium, 2nd colloquium, oral exam, seminar paper	
	properties of different materials.	laboratory exercises, 1st colloquium	
	the material with respect to the application conditions.	1st colloquium, 2nd colloquium, laboratory exercises, written and oral exam, seminar paper	
	monitoring of the recycling of the certain types of materials.	2nd colloquium, oral exam, seminar paper	
6	Describe the modern methods of the materials investigations.	1st colloquium, 2nd colloquium, laboratory exercises, written and oral exam, seminar paper	

<b>1. GENERAL INFORMATION</b>			
1.1. Course teacher	Assoc.Prof. Anita Begić Hadžipašić, PhD	1.6. Year of the study	2
1.2. Name of the course	PHYSICAL DAMAGES	1.7. ECTS credits	4

1.3. Associate teachers	-	1.8. Type of instruction (number of hours L + E + S + e-learning)	30+15+0+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate	1.9. Expected enrolment in the course	10 full-time+40 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory <input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
<b>2. COURSE DESCRIPTION</b>			
2.1. Course objectives	<p>The aim of the course is to familiarize students with methods of testing and risk assessment of physical factors in the working environment (microclimate, noise, vibration, harmful radiations and inappropriate lighting) and procedures for their removal or reduction to the limits of the permissible values.</p> <p>In other words, the student's knowledge of this subject can be used to produce suggestions for protection measures at work in unfavourable conditions of microclimate and other physical factors.</p>		
2.2. Enrolment requirements and/or entry competences required for the course	-		
2.3. Learning outcomes at the level of the programme to which the course contributes	<p>Define the impact of dangers, hazards and efforts on human health and / or the environment.</p> <p>Identify and analyze dangers, hazards and efforts in the workplace.</p> <p>Use applicable regulations and standards relevant to safety and health at work.</p> <p>Recognize the relationship of health and environmental risks.</p> <p>Apply methods of health protection and measures to increase safety at work.</p> <p>Recognize the importance of human, socioeconomic and environmental factors on workers' health and working ability.</p>		
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	<p>Explain the basics of the theory of physical factors: heat, radiation, vibration, noise and light.</p> <p>Identify the working environment and recognize physical factors.</p> <p>Measure and interpret the results of measurements of vibration, noise, light, radiation and heat.</p> <p>Connect physical hazards with possible injuries and illnesses.</p> <p>Explain and apply legal regulations related to the protection of health at work and the environment related to vibration, noise, light, radiation and heat.</p>		
2.5. Course content (syllabus)	<p>LECTURES (30 h):</p> <ol style="list-style-type: none"> <li>1. Microclimate: the atmosphere and basic properties of air, climate, impact of climate on human and microclimatic factors (thermal, chemical and biological). 2</li> <li>2. Main sources and energy consumption in the body. Forms of heat exchange. Boundaries of durable temperatures.</li> <li>3. Protection measures: heating, ventilation, air conditioning, insulation of heat sources, personal protective equipment.</li> <li>4. Noise: basic terms, size and definitions. Physical properties of sound.</li> <li>5. Criteria and method of measurement and noise assessment and application of appropriate regulations and norms.</li> <li>6. Human ear and the effects of noise on human. Noise protection measures.</li> </ol>		

	<p>7. Basic principles of vibration generation and transmission and parameters describing them. Kinematics and vibration dynamics. Mass-spring system.</p> <p>8. Simple and muted harmonic motions. Forced vibrations and resonance.</p> <p>9. Ecological and health effects of vibration. Impact of vibration and impact on the human body system. Vibrating illnesses.</p> <p>10. Vibration and impact protection methods.</p> <p>11. Light: basic concepts, size and definitions. Wave length and frequency, light speed. The structure and function of the eye, vision field and its distribution.</p> <p>12. Sources of light and lighting system. Workplace lighting.</p> <p>13. Ionizing radiation: types and formation of ionizing radiation. Sources of radiation, application of ionizing radiation and handling with sources of radiation. Radioactivity and consequences of radiation.</p> <p>14. Non-ionizing radiation: electromagnetic radiation spectrum, frequency range and electromagnetic spectrum distribution. Sources of electromagnetic fields. Parameters and standardization of exposure to electromagnetic fields. The action of non-ionizing radiation on the organism and its limit values.</p> <p>15. Basic principles and measures for protection against ionizing and non-ionizing radiation. Standards, regulations, norms.</p> <p><b>EXERCISES (15):</b></p> <p>Exercises will take place within field work by visiting relevant institutions and business entities to measure the effects of noise, vibration, radiation, light and microclimatic factors safety and health on worker and the environment.</p>									
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input checked="" type="checkbox"/> field work				<input type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input checked="" type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.7. Comments:		
2.8. Student responsibilities	Class attendance > 70%, finished all exercises within the field work.									
2.9. Monitoring student work	Class attendance	YES	NO	Research	YES	NO	Oral exam	YES	NO	
	Experimental work	YES	NO	Report	YES	NO	(other)	YES	NO	
	Essay	YES	NO	Seminar paper	YES	NO	(other)	YES	NO	
	Preliminary	YES	NO	Practical work	YES	NO	(other)	YES	NO	
	Project	YES	NO	Written exam	YES	NO	ECTS credits (total)	4		
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>						<b>Number of copies in the library</b>	<b>Availability via other media</b>		

	S. Sever, Fizikalne štetnosti, IPROZ, Zagreb, 2009.	10	
	B. Radanović, Buka, IPROZ, Zagreb, 2003.	10	
	M. Fudurić, Mikroklima i radna okolina, IPROZ, Zagreb, 2010.	10	
	N. Bobanac, Utjecaj vibracija na ljude, IPROZ, Zagreb, 2002.	10	
	S. Sever, Rasvjeta, IPROZ, Zagreb, 2003.	10	
	Ž. Radalj, Štetna zračenja, IPROZ, Zagreb, 2002.	10	
2.11. Optional literature	J. M. Griffin, Handbook of human vibration, Academic Press, 2004. D. T. Blackstock, Fundamentals of physical acoustics, John Wiley&Sons, 2000. F. H. Attix, Introduction to radiological physics and radiation dosimetry, John Wiley&Sons, 1986. Zakon o zaštiti od buke (NN30/09) <a href="https://narodne-novine.nn.hr/clanci/sluzbeni/2009_03_30_648.html">https://narodne-novine.nn.hr/clanci/sluzbeni/2009_03_30_648.html</a> Pravilnik o zaštiti radnika od rizika zbog izloženosti vibracijama na radu (NN155/08) <a href="https://narodne-novine.nn.hr/clanci/sluzbeni/2008_12_155_4248.html">https://narodne-novine.nn.hr/clanci/sluzbeni/2008_12_155_4248.html</a>		
2.12. Other (as the proposer wishes to add)	-		
<b>Ordinal number</b>	<b>Expected learning outcomes at the level of the course (3-10)</b>	<b>Methods for monitoring of the achievement of learning outcomes</b>	
1	Explain the basics of the theory of physical factors: heat, radiation, vibration, noise and light.	1st colloquium, 2nd colloquium, written and oral exam	
2	Identify the working environment and recognize physical factors.	1st colloquium, 2nd colloquium, oral exam	
3	Measure and interpret the results of measurements of vibration, noise, light, radiation and heat.	Laboratory exercises, written exam	
4	Connect physical hazards with possible injuries and illnesses.	1st colloquium, 2nd colloquium, laboratory exercises, written exam	
5	Explain and apply legal regulations related to the protection of health at work and the environment related to vibration, noise, light, radiation and heat.	1st colloquium, 2nd colloquium, laboratory exercises, oral exam	

1. GENERAL INFORMATION			
1.1. Course teacher	Full Prof. Ladislav Lazić, PhD Assist. Prof. Ivan Jandrlić, PhD	1.6. Year of the study	2
1.2. Name of the course	MACHINES AND DEVICES WITH INCREASED DANGERS	1.7. ECTS credits	5
1.3. Associate teachers		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+15+15+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate	1.9. Expected enrolment in the course	10 full-time+40 part time students

1.5. Status of the course	<input checked="" type="checkbox"/> <b>mandatory</b>	<input type="checkbox"/> <b>elective</b>	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
<b>2. COURSE DESCRIPTION</b>				
2.1. Course objectives	Acquiring knowledge about technological processes, construction of various machines, and on devices for security systems. Students will acquire the necessary theoretical and practical knowledge on the use of technical solutions for the safe operation of machines with increased dangers, on the installation and requirements for security systems, principles of their design, and assessment of the risks on machine operators.			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	Define the impact of dangers, hazards and efforts on human health and / or the environment. Identify and analyze dangers, hazards and efforts in the workplace. Apply prevention programs to reduce the impact of danger, harmfulness and efforts in the workplace. Analyse the present situation, identify problems, formulate and recommend an optimal technological solution. Collect and analyze data and create risk assessment in the workplace.			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	<ol style="list-style-type: none"> <li>1. Identify machines and devices with increased dangers.</li> <li>2. To foresee and define the sources of dangers when working with machines.</li> <li>3. Test the safety of machines, apply measures and technical means for safe operation.</li> <li>4. Anticipate possible sources of dangers, assess the risk for machine operators, and choose or design technical solutions for safe operation.</li> </ol>			
2.5. Course content (syllabus)	<p>LECTURES (30):</p> <ol style="list-style-type: none"> <li>1. INTRODUCTION <ul style="list-style-type: none"> <li>- what are the machines with increased danger, types of dangers (electric shock, explosives, corrosive media, mechanical moving parts).</li> </ul> </li> <li>2. SOURCES OF HAZARD <ul style="list-style-type: none"> <li>- human factor, mechanical moving parts, heat sources, radiation and electromagnetic fields, pressurized vessels, risk of falling and slipping</li> </ul> </li> <li>3. DIRECTIVES ON MACHINES WITH INCREASED DANGER AT WORK <ul style="list-style-type: none"> <li>- essential requirements and conformity assessment for machines with increased danger at work</li> </ul> </li> <li>4. CHARACTERIZATION OF DANGER OF THE DEVICE <ul style="list-style-type: none"> <li>- hazard assessment, determination of hazardous zones, testing lifetime of the device</li> </ul> </li> <li>5. SYSTEMS AND TECHNICAL SOLUTIONS FOR SAFETY OF DEVICES <ul style="list-style-type: none"> <li>- safety devices, blockages, device construction, protective net</li> </ul> </li> <li>6. INSTRUCTIONS AND LABELLING OF DANGEROUS ZONES <ul style="list-style-type: none"> <li>- operating instructions, device test records, signs and special warnings for hazardous zones</li> </ul> </li> </ol>			

	<p>7. RISK ASSESSMENT FOR OPERATOR  - assessment of operator exposure to hazardous zones, impact of operator fatigue, human error prevention</p> <p>8. SOURCES OF ELECTRIC SHOCK AND PREVENTION  - sources of electricity, static electricity, electromagnetism, protection against electric shock</p> <p>9. ROTATING BODIES  - devices for cutting, drilling, grinding, sandblasting</p> <p>10. PRESSURE VESSELS  - definition, sources of danger, conformity control, directive</p> <p>11. MACHINERY AND DEVICES FOR PROCESSING AND THE PRODUCTION OF WOODEN MATERIAL  - cutting equipment, presses, transport system</p> <p>12. AGGREGATES AND MACHINES FOR PRODUCTION OF METALS AND ALLOYS  - melting furnaces, converters, casting ladles, transport systems, sand and ore preparation devices, cast iron cleaning devices</p> <p>13. MACHINES FOR PLASTIC PROCESSING OF METALS  - heating furnaces, rolling mills, forging machines, pressing, drawing, saw blades and cutting scissors, transport system</p> <p>14. MACHINERY AND DEVICES FOR PRODUCTION AND PROCESSING OF PLASTIC  - machines and tools for moulding, blow moulding and thermoforming, heat sources, transport system</p> <p>15 CHIPPING METALWORKING MACHINERY  - lathes, planers, CNC machines, sources of danger and methods of protection at work</p> <p>SEMINARS (15):</p> <ol style="list-style-type: none"> <li>1. Risk assessment and prevention of work injury during overhaul of the foundry.</li> <li>2. Planning of safety at work in the seamless tube rolling station.</li> <li>3. The system ensuring safety in machines for molding material particle separation.</li> </ol> <p>EXERCISES (15):</p> <ol style="list-style-type: none"> <li>1. Visit the foundry and introduction to manufacturing process.</li> <li>2. Visit the plant for drawing tubes and profiles.</li> <li>3. Visit the company for materials processing by separating the particles.</li> </ol>		
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning	<input checked="" type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)	2.7. Comments:

	<input checked="" type="checkbox"/> field work								
2.8. Student responsibilities	Class attendance min. 70%, given seminars and finished exercises.								
2.9. Monitoring student work	Class attendance	YES	NO	Research	YES	NO	Oral exam	YES	NO
	Experimental work	YES	NO	Report	YES	NO	(other)	YES	NO
	Essay	YES	NO	Seminar paper	YES	NO	(other)	YES	NO
	Preliminary exam	YES	NO	Practical work	YES	NO	(other)	YES	NO
	Project	YES	NO	Written exam	YES	NO	ECTS credits (total)	5	
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>		<b>Number of copies in the library</b>		<b>Availability via other media</b>				
	P. Hughes, E. Ferrett, Introduction to Health and Safety at Work, Fourth Edition, The Handbook for the NEBOSH National General Certificate, Elsevier 2009.		-		<a href="https://archive.org/details/IntroductionToHealthAndSafetyAtWorkFourthEdition">https://archive.org/details/IntroductionToHealthAndSafetyAtWorkFourthEdition</a>				
	ISO 12100:2010-Safety of machinery — General principles for design — Risk assessment and risk reduction		-		<a href="https://www.iso.org/standard/51528.html">https://www.iso.org/standard/51528.html</a>				
2.11. Optional literature	Z. Kardum, Osposobljavanje za rad na siguran način, Priručnik, HD usluge d.o.o., Zagreb, 2014. Pravilnik o pregledu i ispitivanju radne opreme (NN16/2016) <a href="https://narodne-novine.nn.hr/clanci/sluzbeni/2016_02_16_458.html">https://narodne-novine.nn.hr/clanci/sluzbeni/2016_02_16_458.html</a> Pravilnik o pregledima i ispitivanju opreme pod tlakom (NN27/17) <a href="https://narodne-novine.nn.hr/clanci/sluzbeni/2017_03_27_617.html">https://narodne-novine.nn.hr/clanci/sluzbeni/2017_03_27_617.html</a>								
2.12. Other (as the proposer wishes to add)	Sigurnost: časopis za sigurnost u radnoj i životnoj okolini <a href="https://hrcak.srce.hr/sigurnost">https://hrcak.srce.hr/sigurnost</a>								

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Identify machines and devices with increased dangers.	1st colloquium, 2nd colloquium, essay, seminar paper, written and oral exam
2	To foresee and define the sources of dangers when working with machines.	1st colloquium, 2nd colloquium, seminar paper, written and oral exam
3	Test the safety of machines, apply measures and technical means for safe operation.	2nd colloquium, auditory exercises, field work, essay, report, written and oral exam
4	Anticipate possible sources of dangers, assess the risk for machine operators, and choose or design technical solutions for safe operation.	1st colloquium, 2nd colloquium, seminar paper, written and oral exam



1. GENERAL INFORMATION				
1.1. Course teacher	Full Prof. Tanja Jurčević Lulić, PhD		1.6. Year of the study	2
1.2. Name of the course	ERGONOMICS AND SAFETY		1.7. ECTS credits	4
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L+ E + S + e-learning)	30+15+0+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course	10 full-time+40 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
2. COURSE DESCRIPTION				
2.1. Course objectives	Introducing students to principles of ergonomics and their application. Acquiring the knowledge necessary to assess loads and factors that affect safety and health of workers. Performing ergonomic analysis and redesign of work conditions, systems, environment and products.			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	<p>Define the impact of dangers, hazards and efforts on human health and / or the environment.  Identify and analyze dangers, hazards and efforts in the workplace.  Use applicable regulations and standards relevant to safety and health at work.  Apply methods of health protection and measures to increase safety at work.  Analyse the present situation, identify problems, formulate and recommend an optimal technological solution.  Apply logical conclusion and precision in data processing.</p>			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	<ul style="list-style-type: none"> <li>- use anthropometric variables in designing and analyzing the workplaces, systems and products</li> <li>- apply biomechanical methods, methods of ergonomic assessment and energetic and physiological approaches to assessing human effort in work</li> <li>- apply ergonomic principles in designing workplaces, tools, systems and products</li> <li>- ergonomically adapt environmental factors</li> <li>- provide from an ergonomic standpoint the analysis of existing workplaces, equipment and products of everyday use</li> <li>- identify ergonomic risk factors for health and safety</li> <li>- propose solutions for the elimination of ergonomic risk factors, considering the applicable laws</li> </ul>			
2.5. Course content (syllabus)	<p>LECTURES (30):</p> <ol style="list-style-type: none"> <li>1. Introduction. History and development of ergonomics. Definitions, goals and objectives of ergonomics.</li> <li>2. Mathematical statistics in ergonomics. Percentile groups.</li> </ol>			

3. Static, kinematic and dynamic anthropometry. Anthropometry measuring. Harmonic circle. Anthropometric variables in ergonomics.
4. Ergonomics in design; ergonomics and work science, work organization and work safety.
5. Biomechanics of the locomotion system. Biomechanical models in ergonomics, wire models. Stability and safety of body position.
6. Biomechanics of the spine.
7. Energy required for work, metabolism.
8. Sensory system in man.
9. The human-machine-environment system. Factors of environment: noise, lighting, vibration, thermal influence. Load due to factors of environment.
10. Psychological loads, information and communication.
11. Safety factors in work process analysis. Human effort during work. Energy and physiological approach in human effort assessment.
12. Biomechanical methods of human effort assessment. Intraabdominal pressure as a measure of work effort.
13. Methods of ergonomic assessment: OWAS, KIM, SMART, RULA. Legal framework and acts.
14. Principles of design of workplaces, machines and tools. Application of ergonomics in everyday life. Examples: seating, hand tools, lifting, ergonomics and child safety.
15. Examples of non-ergonomic product design.

**EXERCISES (15):**

1. Normal distribution – calculation of mean value and standard deviation.
2. Calculation of percentile groups.
3. Measuring static anthropometric measures.
4. Determination of anthropometric measures using the harmonic circle.
5. Determination of dynamic anthropometric measures.
6. Application of anthropometric variables in ergonomics – sitting.
7. Making a wire model of human body.
8. Biomechanical estimation of stability and safety of body position.
9. Estimation of load due to factors of environment.
10. Control devices and displays.
11. Determination of human effort during work.
12. Calculation of intraabdominal pressure. Biomechanical estimation of the spine load.
13. Application of ergonomic assessment methods: OWAS, KIM, SMART, RULA.
14. Ergonomic analysis of products, workplaces and factors of environment.

	15. Colloquium.								
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work			<input checked="" type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.7. Comments:		
2.8. Student responsibilities	Attending classes (a minimum of 70% attendance is required), active work on teaching, carry out the individual tasks.								
2.9. Monitoring student work	Class attendance	YES	NO	Research	YES	NO	Oral exam	YES	NO
	Experimental work	YES	NO	Report	YES	NO	Individual tasks	YES	NO
	Essay	YES	NO	Seminar paper	YES	NO	(other)	YES	NO
	Preliminary exam	YES	NO	Practical work	YES	NO	(other)	YES	NO
	Project	YES	NO	Written exam	YES	NO	ECTS credits (total)	4	
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>			<b>Number of copies in the library</b>		<b>Availability via other media</b>			
	O. Muftić, F. Veljović, T. Jurčević Lulić, D. Milčić, Osnove ergonomije, Mašinski fakultet, Univerzitet u Sarajevu, 2001.					<a href="https://www.fsb.unizg.hr/kbioerg/Preuzimanja/Biomehanicka_Ergonomija.pdf">https://www.fsb.unizg.hr/kbioerg/Preuzimanja/Biomehanicka_Ergonomija.pdf</a>			
	O. Muftić, Ergonomija u sigurnosti, 4. izdanje, IPROZ, Zagreb, 2001.			10					
2.11. Optional literature	D. Mikšić, Ergonomija, FSB, Zagreb, 2000. K. H. E. Kroemer et al, Ergonomics, Prentice-Hall Inc., UK, 2006. E. J. McCormick, M. S. Sandeers, Human Factors in Engineering and Design, International Student Edition, Singapur, McGraw Hill, 1983. K. H. E. Kroemer, E. Grandjean, Fitting the Task to the Human, A textbook of Occupational Ergonomics, Taylor&Francis, 1997. T. A. Hunter, Engineering Design for Safety, New York, McGraw Hill, 1996.								
2.12. Other (as the proposer wishes to add)									

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Use anthropometric variables in designing and analyzing the workplaces, systems and products.	Independent task, colloquium, written* and oral exam
2	Apply biomechanical methods, methods of ergonomic assessment and energetic and physiological approaches to assessing human effort in work.	Auditory exercises, colloquium, written* and oral exam

3	Apply ergonomic principles in designing workplaces, tools, systems and products.	Colloquium, written* and oral exam
4	Ergonomically adapt environmental factors.	Colloquium, written* and oral exam
5	Provide from an ergonomic standpoint the analysis of existing workplaces, equipment and products of everyday use.	Colloquium, written* and oral exam
6	Identify ergonomic risk factors for health and safety.	Colloquium, written* and oral exam
7	Propose solutions for the elimination of ergonomic risk factors, considering the applicable laws.	Colloquium, written* and oral exam

\* Successfully passed colloquium replaces written exam

1. GENERAL INFORMATION			
1.1. Course teacher	Full Prof. Ladislav Lazić, PhD Assist.Prof. Jakov Baleta, PhD		1.6. Year of the study 2
1.2. Name of the course	ENERGY SYSTEMS		1.7. ECTS credits 4
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L + E + S + e-learning) 30+30+0+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course 10 full-time+40 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%) 1., 5%
2. COURSE DESCRIPTION			
2.1. Course objectives	<p>Acquire knowledge about basic concepts from thermodynamics and energy.</p> <p>Acquire knowledge about basic components of energy facilities.</p> <p>Provide students with information on conventional and renewable energy systems.</p> <p>Acquire knowledge about the potential harms to which a worker is exposed in power facilities.</p> <p>Obtain the knowledge about security measures needed to ensure a safe workplace, or to protect a worker (operator).</p>		
2.2. Enrolment requirements and/or entry competences required for the course	-		
2.3. Learning outcomes at the level of the programme to which the course contributes	<p>Identify and analyze dangers, hazards and efforts in the workplace.</p> <p>Apply methods of health protection and measures to increase safety at work.</p> <p>Apply prevention programs to reduce the impact of danger, harmfulness and efforts in the workplace.</p> <p>Analyse the present situation, identify problems, formulate and recommend an optimal technological solution.</p> <p>Collect and analyze data and create risk assessment in the workplace.</p>		

2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	<p>Define the appearing forms of energy and describe the ways of converting them from one form to another.  Describe the basic components of energy systems individually and as a part of the facility.  Explain the working principles, the advantages and disadvantages of conventional and renewable energy plants.  Identify parts of energy facilities with increased danger.  Foresee and define sources of danger when working in an energy facility.  Apply prevention methods and remove all identified sources of danger so that they don't occur during operation.  Assess the risk for operators in energy facilities and select or construct technical solutions for safe operation.</p>									
2.5. Course content (syllabus)	<p>LECTURES (30):</p> <ol style="list-style-type: none"> <li>1. Basic thermodynamic concepts and energy forms (2)</li> <li>2. Auxiliary systems of energy facilities (heat exchangers, pumps, ventilators, compressors, turbines) (4)</li> <li>3. Steam and hot water boilers (2)</li> <li>4. Industrial furnaces (4)</li> <li>5. Internal combustion engines (2)</li> <li>6. Energy systems based on the steam cycle (2)</li> <li>7. Energy systems based on the gas cycle (2)</li> <li>8. Cogeneration energy systems (2)</li> <li>9. Hydro energy facilities (2)</li> <li>10. Solar energy facilities (2)</li> <li>11. Wind farms (2)</li> <li>12. Environmental protection in energy systems (4)</li> </ol> <p>EXERCISES (30):</p> <p>Exercises are composed of numerical examples, which make it easier to understand the material from the lectures. Examples are chosen to extend the theory or to illustrate the theory's application to actual problems.</p>									
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work					<input type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.7. Comments:	
2.8. Student responsibilities	Class attendance min. 70%.									
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	YES	<b>NO</b>	Oral exam	<b>YES</b>	NO	
	Experimental work	YES	<b>NO</b>	Report	YES	<b>NO</b>	(other)	YES	NO	
	Essay	YES	<b>NO</b>	Seminar paper	YES	<b>NO</b>	(other)	YES	NO	

	Preliminary	<b>YES</b>	NO	Practical work	YES	<b>NO</b>	(other)	YES	NO
	Project	YES	<b>NO</b>	Written exam	<b>YES</b>	NO	ECTS credits (total)	4	
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>						<b>Number of copies in the library</b>	<b>Availability via other media</b>	
	H. Požar, Osnove energetike, Školska Knjiga, Zagreb, 1992.						2		
	B. Udovičić, Energetika, Školska Knjiga, Zagreb, 1993.						3		
	P. Kulišić, Novi izvori energije, Školska knjiga, Zagreb, 1991.						1		
2.11. Optional literature	Zakon o zaštiti na radu (NN 71/14, 118/14, 154/14) Pravilnik o izradi procjene rizika (NN 71/14) Pravilnik o poslovima upravljanja i rukovanja energetskim postrojenjima i uređajima (NN88/2014, NN20/2015)								
2.12. Other (as the proposer wishes to add)									

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Define the appearing forms of energy and describe the ways of converting them from one form to another.	1st colloquium, written and oral exam
2	Describe the basic components of energy systems individually and as a part of the facility.	1st colloquium, written and oral exam
3	Explain the working principles, the advantages and disadvantages of conventional and renewable energy plants.	1st colloquium, written and oral exam
4	Identify parts of energy facilities with increased danger.	2nd colloquium, written and oral exam
5	Foresee and define sources of danger when working in an energy facility.	2nd colloquium, written and oral exam
6	Apply prevention methods and remove all identified sources of danger so that they don't occur during operation.	2nd colloquium, written and oral exam
7	Assess the risk for operators in energy facilities and select or construct technical solutions for safe operation.	2nd colloquium, written exam

1. GENERAL INFORMATION			
1.1. Course teacher	Assist.Prof. Jakov Baleta, PhD	1.6. Year of the study	2
1.2. Name of the course	FUNDAMENTALS OF COMBUSTION AND EXTINCTION PROCESSES	1.7. ECTS credits	4
1.3. Associate teachers	-	1.8. Type of instruction (number of hours L + E + S + e-learning)	30+30+0+0

1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course	10 full-time+40 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
<b>2. COURSE DESCRIPTION</b>				
2.1. Course objectives	<p>Understand fuel types and properties, basics of fuel combustion, including fuel combustion calculation, and apply the acquired knowledge in practice.</p> <p>Obtain knowledge for the detection of flammability and explosiveness and for the proper use of fire extinguishers.</p> <p>Obtain knowledge about safety measures that should be taken to ensure fire and explosion protection at the workplace.</p>			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	<p>Identify and analyze dangers, hazards and efforts in the workplace.</p> <p>Use applicable regulations and standards relevant to safety and health at work.</p> <p>Analyse the present situation, identify problems, formulate and recommend an optimal technological solution.</p> <p>Collect and analyze data and create risk assessment in the workplace.</p> <p>Use acquired theoretical knowledge in engineering practice.</p> <p>Use applicable regulations and standards relevant to the protection of the working environment.</p>			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	<p>Apply adopted theoretical knowledge on combustion, explosion and extinction processes.</p> <p>Recognize the possibilities and conditions of forming an explosive mixture.</p> <p>Use legal regulations for explosive atmospheres and those where explosive atmospheres may occur.</p> <p>Know fire protection and occupational safety legislation in the field of combustion and extinction.</p> <p>Choose or design solutions for safe operation in areas with an explosion risk.</p> <p>Properly select a fire extinguisher with regard to the nature of the fire.</p>			
2.5. Course content (syllabus)	<p>LECTURES (30):</p> <p>Definition and division of fuel. (2)</p> <p>Complete and incomplete fuel combustion, general principles. (2)</p> <p>Calculation of fuel combustion. (4)</p> <p>Combustion kinetics: homogeneous and heterogeneous systems. (4)</p> <p>Behaviour and properties of a mixture of flammable gases, liquids, vapours, dust and aerosols. (3)</p> <p>Explosion limits, physicochemical basis of explosion. Fire causes. (4)</p> <p>Explosion prevention and explosion protection design measures. (4)</p> <p>Physicochemical basis of the extinguishing process. (3)</p> <p>Types and characteristics of fire extinguishing agents. (4)</p>			

	EXERCISES (30): Exercises are composed of numerical examples, which make it easier to understand the material from the lectures. Examples are chosen to extend the theory or to illustrate the theory's application to actual problems.									
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work					<input type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.7. Comments:	
2.8. Student responsibilities	Class attendance min. 70%.									
2.9. Monitoring student work	Class attendance	YES	NO	Research	YES	NO	Oral exam	YES	NO	
	Experimental work	YES	NO	Report	YES	NO	(other)	YES	NO	
	Essay	YES	NO	Seminar paper	YES	NO	(other)	YES	NO	
	Preliminary exam	YES	NO	Practical work	YES	NO	(other)	YES	NO	
	Project	YES	NO	Written exam	YES	NO	ECTS credits (total)	4		
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>						<b>Number of copies in the library</b>	<b>Availability via other media</b>		
	M. Kundak, A. Rađenović, Goriva i izgaranje, Sveučilište u Zagrebu, Metalurški fakultet, Sisak, 2003.						12			
	P. W. Atkins, Physical Chemistry, Fourth Edition, Oxford University Press, Oxford, 1993.						1			
2.11. Optional literature	Fire Protection Handbook. - Boston: NFPA, 1978. Zakon o eksplozivnim tvarima (NN 178/04, 109/07, 67/08, 144/10) Zakon o zapaljivim tekućinama i plinovima (NN 108/95, 56/10) Pravilnik o zapaljivim tekućinama (NN 54/99) Zakon o zaštiti od požara (NN 92/10) Pravilnik o izradi procjene ugroženosti od požara i tehnološke eksplozije (NN 35/94, 110/05, 28/10)									
2.12. Other (as the proposer wishes to add)										

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Apply adopted theoretical knowledge on combustion, explosion and extinction processes.	1st colloquium, 2nd colloquium, written and oral exam
2	Recognize the possibilities and conditions of forming an explosive mixture.	1st colloquium, 2nd colloquium, written and oral exam



3	Use legal regulations for explosive atmospheres and those where explosive atmospheres may occur.	1st colloquium, 2nd colloquium, written and oral exam
4	Know fire protection and occupational safety legislation in the field of combustion and extinction.	Oral exam
5	Choose or design solutions for safe operation in areas with an explosion risk.	1st colloquium, 2nd colloquium, written exam
6	Properly select a fire extinguisher with regard to the nature of the fire.	Oral exam

1. GENERAL INFORMATION				
1.1. Course teacher	Ivana Krišto, PhD, lecturer		1.6. Year of the study	2
1.2. Name of the course	PERSONAL PROTECTIVE EQUIPMENT AND RESCUE EQUIPMENT		1.7. ECTS credits	4
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+15+15+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course	10 full-time+40 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1.,5%
2. COURSE DESCRIPTION				
2.1. Course objectives	The aim of the course is to present to students the importance of using personal protective equipment for the protection of workers when there is a need for protection. Students should overcome the proper way of selecting personal protective equipment in accordance with established dangers, hazards and efforts, and according to the applicable legislation and norms. Through practical assignments and visits to manufacturers and distributors of personal protective equipment, students will master the ways to properly select personal protective equipment tailored to their work processes.			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	Identify and analyze dangers, hazards and efforts in the workplace. Use applicable regulations and standards relevant to safety and health at work. Apply methods of health protection and measures to increase safety at work. Apply logical conclusion and precision in data processing.			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	Define the legislative framework in the area of occupational safety related to personal protective equipment. Self-design a safe working environment. Identify and analyze dangers, hazards and efforts at workplaces. Interpret standards and integrate recognized rules of profession into work systems. Identify the need for personal protective equipment.			

	<p>Appropriate to choose personal protective equipment according to the defined risks.          In accordance with the positive regulations of the Republic of Croatia, the European guidelines, Croatian and international norms elaborate or analyze the process of assessing the level of risk at work and in the working environment (danger, harm and effort) to determine the categories of personal protective equipment, the requirements for the certification, the type, the purpose and the form of the equipment, the hygienic and ecological aspects of the use of personal, special and specific personal protective equipment, materials for manufacturing and testing of equipment and other conditions which presuppose the use of personal protective equipment at work places and in the working environment.</p>										
2.5. Course content (syllabus)	<p>Lectures (30 h):</p> <ul style="list-style-type: none"> <li>• Personal Protective Equipment Legislation. 1h</li> <li>• Generally about personal protective equipment 1h</li> <li>• Division and characteristics of personal protective equipment according to standards. 2h</li> <li>• Head PPE, Eye and Face PPE, Breathing Protection System, PPE for Hand Protection, Foot and Foot Protection PPE, PPE for Body and Absorbent Protection, Full Body Protection Unit, PPE for Radiation Protection, PPE for the protection against falling and working in the depth, the PPE for drought protection. 16 h</li> <li>• Proper selection, combining, procuring, maintaining, storing and disposing of used equipment. 2h</li> <li>• Workshop with practical tasks for proper selection of appropriate personal protective equipment in accordance with their marking and the risks and requirements of different work processes. 6 h</li> <li>• Educational films and exercises of proper application of the OZO. 2 h</li> </ul> <p>Exercises on the field (15 h):          Visit to employers, manufacturers and distributors of personal protective equipment.          Group exercises for the selection of personal protective equipment according to the given features of the workplace.</p> <p>Seminar (15 h):          Creating and presenting a seminar work whereby a trainee demonstrates the ability to independently select and procure personal protective equipment according to the given risks.</p>										
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input checked="" type="checkbox"/> field work	<input checked="" type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)	2.7. Comments:								
2.8. Student responsibilities	Min. 70% attendance, min. 90% attendance in exercises, created and presented seminar work.										
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	<b>YES</b>	NO	Oral exam	<b>YES</b>	NO		

	Experimental work	YES	<b>NO</b>	Report	YES	<b>NO</b>	(other)	YES	NO	
	Essay	YES	<b>NO</b>	Seminar paper	<b>YES</b>	NO	(other)	YES	NO	
	Preliminary exam	YES	<b>NO</b>	Practical work	YES	<b>NO</b>	(other)	YES	NO	
	Project	YES	<b>NO</b>	Written exam	<b>YES</b>	NO	ECTS credits (total)			
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>							<b>Number of copies in the library</b>	<b>Availability via other media</b>	
	J. Horvat, A. Regent, Osobna zaštitna oprema, Veleučilište u Rijeci, Rijeka, 2009.							5		
	M. Dević, Osobna zaštitna sredstva, Centar za informacije i publicitet, Zagreb, 1983.							2		
	J. Horvat, Osobna zaštitna sredstva, IPROZ, Zagreb, 2002.							10		
	J. Vučinić, Osobna zaštitna sredstva i oprema, Veleučilište u Karlovcu, Karlovac, 2007.							5		
	Zakoni, pravilnici i norme								web	
2.11. Optional literature	<a href="http://www.hse.gov.uk">www.hse.gov.uk</a> Work with asbestos. - HSE-book, 2006. <a href="http://www.hse.gov.uk">www.hse.gov.uk</a> Safe use of work equipment. - HSE-book, 2008. <a href="http://www.clydesdale.net">www.clydesdale.net</a> Arc Flash. Miscellaneous Tools, CLYDESDALE, 2008. <a href="http://www.clydesdale.net">www.clydesdale.net</a> Miscellaneous Tools, PPE and Equipment. - CLYDESDALE, 200 <a href="http://www.3M.uk/ohnes">www.3M.uk/ohnes</a> Safety Directory. Putting Safety First (PPE). - 3M, 2009									
2.12. Other (as the proposer wishes to add)	Video materials									

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Define the legislative framework in the area of occupational safety related to personal protective equipment.	Written exam, oral exam, seminar paper
2	Self-design a safe working environment.	Written exam, oral exam, seminar paper
3	Identify and analyze dangers, hazards and efforts at workplaces.	Written exam, oral exam, seminar paper
4	Interpret standards and integrate recognized rules of profession into work systems.	Written exam, oral exam, seminar paper
5	Identify the need for personal protective equipment.	Written exam, oral exam, seminar paper
6	Appropriate to choose personal protective equipment according to the defined risks.	Written exam, oral exam, seminar paper
7	In accordance with the positive regulations of the Republic of Croatia, the European guidelines, Croatian and international norms elaborate or analyze	Written exam, oral exam, seminar paper

	the process of assessing the level of risk at work and in the working environment (danger, harm and effort) to determine the categories of personal protective equipment, the requirements for the certification, the type, the purpose and the form of the equipment, the hygienic and ecological aspects of the use of personal, special and specific personal protective equipment, materials for manufacturing and testing of equipment and other conditions which presuppose the use of personal protective equipment at work places and in the working environment.	
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1. GENERAL INFORMATION				
1.1. Course teacher	Assist.Prof. Tahir Sofilić, PhD		1.6. Year of the study	2
1.2. Name of the course	HAZARDOUS SUBSTANCES IN THE ENVIRONMENT		1.7. ECTS credits	4
1.3. Associate teachers	Assist.Prof. Vesna Ocelić Bulatović, PhD		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+15+15+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course	10 full-time+40 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
2. COURSE DESCRIPTION				
2.1. Course objectives	Acquaintance students with influence effects of hazardous substances which are coming as a result of human activities in environmental on life and health of people. Instruct students for need of applied protections and way for environmental protection from their harmful influences.			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	Define the impact of dangers, hazards and efforts on human health and / or the environment. Use applicable regulations and standards relevant to safety and health at work. Recognize the relationship of health and environmental risks. Recognize the importance of human, socioeconomic and environmental factors on workers' health and working ability. Manage safety at work systems in organizations and the local community. Predict methods and determine samples for the determination of contamination of environmental constituents.			

2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	<p>To define hazardous substances at the workplace atmosphere and in environment based on their characteristics.          To describe effects of hazardous substances on human health and environment.          To describe intervention in some industrial process in the case of workplace atmosphere contamination with hazardous substances.          To propose content of safety-technical sheet for any hazardous substances in workplace atmosphere and in environment.</p>		
2.5. Course content (syllabus)	<p>LECTURES (30):          Definition of Hazardous Substance. (2)          Hazardous Substance activity on humans and the environment. (2)          Toxicity, degradability and bioaccumulation of hazardous substances. (2)          Types and properties of dangerous substances by class (s). (2)          Classification, labelling and packaging of hazardous substances. (2)          Transportation of hazardous substances. (2)          Use of hazardous substances in technological processes. (2)          Dangerous substances in water. (2)          The most common causes of accidents with hazardous substances in peacetime and war conditions. (2)          Accident Hazard Indicators. (2)          Intervention in case of contamination of the environment with dangerous substances. (2)          Hazardous chemicals. (2)          European Inventory of Existing Commercial Chemical Substances (EINECS) and CAS Number. (3)          Safety Data Sheet according to HRN ISO 11014-1: 1997. (3)          SEMINARS (15):          Within the seminar papers, and on the basis of their own theme selection and discussion after the public presentation, students will learn about the forms of action of dangerous substances on man and the environment.          Instructions for the preparation of the seminar (2)          Topics presentation and selection (1)          Creating individual seminar work, supervision and corrections (6)          Making PPP of seminar work and preparing for presentation (1)          Presentation of seminar work (5)          EXERCISES (15):          Auditory Exercises (10)          Field exercises - visit National Protection and Rescue Directorate, Department Sisak (5)</p>		
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input checked="" type="checkbox"/> field work	<input checked="" type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)	2.7. Comments:
2.8. Student responsibilities	Class attendance min. 70%, created and presented seminar paper.		

2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	<b>YES</b>	NO	Oral exam	<b>YES</b>	NO
	Experimental work	YES	<b>NO</b>	Report	YES	<b>NO</b>	(other)	YES	NO
	Essay	YES	<b>NO</b>	Seminar paper	<b>YES</b>	NO	(other)	YES	NO
	Preliminary exam	<b>YES</b>	NO	Practical work	<b>YES</b>	NO	(other)	YES	NO
	Project	YES	<b>NO</b>	Written exam	<b>YES</b>	NO	ECTS credits (total)	4	
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>			<b>Number of copies in the library</b>	<b>Availability via other media</b>				
	T. Sofilić, Z. Špirić, OPASNE TVARI U OKOLIŠU, skripta, Sveučilište u Zagrebu, Metalurški fakultet, 2016.				<a href="https://www.simet.unizg.hr/hr/nastava/predavanja/preddiplomski-sveucilisni-studij-metalurgija/2-godina-preddiplomskog/dr-sc-tahir-sofilic-i-dr-sc-zdravko-spiric/view">https://www.simet.unizg.hr/hr/nastava/predavanja/preddiplomski-sveucilisni-studij-metalurgija/2-godina-preddiplomskog/dr-sc-tahir-sofilic-i-dr-sc-zdravko-spiric/view</a>				
2.11. Optional literature	Chemical Act (OG 18/2013) Ordinance on conditions for performing the activities of production, placing on the market and use of hazardous chemicals (OG 99/13, 157/13, 122/14) Ordinance on the manner of keeping a record of chemicals and on the manner and timing of delivery of data from the register (Official Gazette 99/13, 157/13) Ordinance on Conditions and Methods for Obtaining and Examining the Protection of Hazardous Chemicals (OG 99/13)								
2.12. Other (as the proposer wishes to add)									

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	To define hazardous substances at the workplace atmosphere and in environment based on their characteristics.	1st colloquium, 2nd colloquium, 3rd colloquium, written and oral exam
2	To describe effects of hazardous substances on human health and environment.	1st colloquium, 2nd colloquium, 3rd colloquium, auditory exercises, written and oral exam
3	To describe intervention in some industrial process in the case of workplace atmosphere contamination with hazardous substances.	1st colloquium, 2nd colloquium, 3rd colloquium, written and oral exam
4	To propose content of safety-technical sheet for any hazardous substances in workplace atmosphere and in environment.	1st colloquium, 2nd colloquium, 3rd colloquium, seminar, written and oral exam

1. GENERAL INFORMATION			
1.1. Course teacher	Assist.Prof. Tahir Sofilić, PhD	1.6. Year of the study	3
1.2. Name of the course	POLLUTION AND PROTECTION OF SOIL	1.7. ECTS credits	4

1.3. Associate teachers	Assist.Prof. Vesna Ocelić Bulatović, PhD		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+0+15+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course	10 full-time+40 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
<b>2. COURSE DESCRIPTION</b>				
2.1. Course objectives	Acquisition of knowledge about sources of soil pollution, relationship of air, soil and water pollution and protective measures. To define soil characteristics, methods of sustainable soil using and measurements for soil protection. To acquaint with legislative related to quality, planning and soil protection.			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	Define the impact of dangers, hazards and efforts on human health and / or the environment. Recognize the relationship of health and environmental risks. Apply prevention programs to reduce the impact of danger, harmfulness and efforts in the workplace. Analyse the present situation, identify problems, formulate and recommend an optimal technological solution. Apply teamwork-oriented, ethical principles and encourage the development of communication and social skills. Predict methods and determine samples for the determination of contamination of environmental constituents.			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	To define sources of soil pollution. To analyze industrial processes from point of possible soil pollution sources. To define soil characteristics, soil composition and transport mechanism for soil pollution. To analyze possibilities of toxicological impact of hazardous substances from soil on human health. To apply legislative about quality and protection of soil.			
2.5. Course content (syllabus)	LECTURES (30): Introduction. (1) Soil science, Earth structure, lithosphere and pedosphere. (2) The soil genesis and soil. (3) Pedogenic factors and processes. (2) Physical, chemical and biological properties of the soil. (2) Contamination of soil and soil types pollution. (3) Metals in the soil. (2) Radionuclides and polycyclic aromatic hydrocarbons in the soil. (2) Soil remediation. (4) Soil pollution from industrial processes. (6) Soil and soil protection strategy. (1) Measures to achieve the objectives of soil protection and ensuring sustainable use of soil. (2)			

	<b>SEMINAR (15):</b> Instructions for the preparation of the seminar (2) Topics presentation and selection (1) Creating individual seminar work, supervision and corrections (6) Making PPP of seminar work and preparing for presentation (1) Presentation of seminar work (5)									
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work				<input checked="" type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)				2.7. Comments:	
2.8. Student responsibilities	Class attendance min. 70 %, created and presented seminar paper.									
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	<b>YES</b>	NO	Oral exam	<b>YES</b>	N	
	Experimental work	YES	<b>NO</b>	Report	YES	<b>NO</b>	(other)	YES	NO	
	Essay	YES	<b>NO</b>	Seminar paper	<b>YES</b>	NO	(other)	YES	NO	
	Preliminary exam	<b>YES</b>	NO	Practical work	YES	<b>NO</b>	(other)	YES	NO	
	Project	YES	<b>NO</b>	Written exam	<b>YES</b>	NO	ECTS credits (total)	4		
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>			<b>Number of copies in the library</b>			<b>Availability via other media</b>			
	T. Sofilić, ONEČIŠĆENJE I ZAŠTITA TLA, skripta, Sveučilište u Zagrebu, Metalurški fakultet, 2014.						<a href="http://bib.irb.hr/datoteka/686398.T._Sofilic_ONECISCENJE_I_ZASTITA_TLA.pdf">http://bib.irb.hr/datoteka/686398.T._Sofilic_ONECISCENJE_I_ZASTITA_TLA.pdf</a>			
2.11. Optional literature	F. Bašić, Oštećenje i zaštita tla - skripta, 2. izdanje, Agronomski fakultet Sveučilišta u Zagrebu, Zagreb, 2009. I. Kisić, Sanacija onečišćenog tla, Agronomski fakultet Sveučilišta u Zagrebu, Zagreb, 2011.									
2.12. Other (as the proposer wishes to add)										

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	To define sources of soil pollution.	1st colloquium, 2nd colloquium, 3rd colloquium, written and oral exam
2	To analyze industrial processes from point of possible soil pollution sources.	1st colloquium, 2nd colloquium, 3rd colloquium, written and oral exam
3	To define soil characteristics, soil composition and transport mechanism for soil pollution.	1st colloquium, 2nd colloquium, 3rd colloquium, seminar, written and oral exam
4	To analyze possibilities of toxicological impact of hazardous substances from soil on human health.	1st colloquium, 2nd colloquium, 3rd colloquium, seminar, written and oral exam
5	To apply legislative about quality and protection of soil.	1st colloquium, 2nd colloquium, 3rd colloquium, written and oral exam



1. GENERAL INFORMATION			
2.1. Course teacher	Assoc.Prof. Tamara Holjevac Grgurić, PhD Assoc.Prof. Ivan Brnardić, PhD		2.6. Year of the study 3
2.2. Name of the course	AIR POLLUTION AND PROTECTION		2.7. ECTS credits 4
2.3. Associate teachers	-		2.8. Type of instruction (number of hours L + E + S + e-learning) 30+0+15+0
2.4. Study programme (undergraduate, graduate, integrated)	undergraduate		2.9. Expected enrolment in the course 10 full-time+40 part time students
2.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	2.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%) 2., 5%
2. COURSE DESCRIPTION			
2.1. Course objectives	Acquisition of knowledge about sources of air pollution. To define air characteristics and measurements for achieving aims for protection. To acquaint with legislative connected with organization and protection of environment and quality of air.		
2.2. Enrolment requirements and/or entry competences required for the course	-		
2.3. Learning outcomes at the level of the programme to which the course contributes	Define the impact of dangers, hazards and efforts on human health and / or the environment. Recognize the relationship of health and environmental risks. Recognize the importance of human, socioeconomic and environmental factors on workers' health and working ability. Apply prevention programs to reduce the impact of danger, harmfulness and efforts in the workplace. Predict methods and determine samples for the determination of contamination of environmental constituents. Use applicable regulations and standards relevant to the protection of the working environment. Predict solutions for efficient waste management.		
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	To define sources of air pollution. To analyze industrial processes from point of possible air pollution sources. To analyze possibilities of toxicological impact of polluted air on human health. To evaluate harmful impact of pollution on environment and to illustrate impact study for defined technical solution. To choose appropriate method of purification of waste gases. To apply legislative about quality and protection of air.		
2.5. Course content (syllabus)	LECTURES (30): The structure of the atmosphere, the atmospheric motion and climate. The composition of the air. (2) Types and sources of air pollution. Classification of the sources of pollution. (2) Analysis of industrial processes from point of possible pollution sources. (3) Agriculture, transport and public services as possible sources of air pollution. (2)		

	Emission, imission and transmission of pollution. (2) The influence of air pollution. Occurrence and influence of the smog. (2) Damage of the ozone layer. Test methods for air pollution. (2) Sampling of dust, smoke and smog. Measurement and characterization of air pollution. (2) Determination of aerosols, dust and aero sediments. (1) The procedures and methods of detection of the carcinogenic substances, radiation and ionizing radiation. (2) Technological procedures and processes for lowering emission of harmful substances in the environment. (2) Mechanical methods and physical-chemical methods for purification of waste gases. (2) Gravity separators. Centrifugal separators. Electrostatic separators. Filtration. (2) Adsorption. Absorption. Control of nitrogen and sulfur oxides. (2) Air quality monitoring. The legislation on air quality. Air protection. (2) SEMINAR (15): Field work. (15)									
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input checked="" type="checkbox"/> partial e-learning <input checked="" type="checkbox"/> field work				<input checked="" type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input checked="" type="checkbox"/> work with mentor <input type="checkbox"/> (other)				2.7. Comments:	
2.8. Student responsibilities	Regular attendance of lectures (70% of the lectures). Presented seminar paper. Attending to Field work.									
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	<b>YES</b>	NO	Oral exam	<b>YES</b>	NO	
	Experimental work	YES	<b>NO</b>	Report	YES	<b>NO</b>	(other)	YES	NO	
	Essay	YES	<b>NO</b>	Seminar paper	<b>YES</b>	NO	(other)	YES	NO	
	Preliminary exam	<b>YES</b>	NO	Practical work	<b>YES</b>	NO	(other)	YES	NO	
	Project	YES	<b>NO</b>	Written exam	<b>YES</b>	NO	ECTS credits (total)	4		
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>							<b>Number of copies in the library</b>	<b>Availability via other media</b>	
	S. M. Šerbula, Ž. B. Grbavčić, Zagađenje i zaštita zraka, Tehnički fakultet u Boru, Bor, 2011.							-	DA	
	V. Glavač, Uvod u globalnu ekologiju, II izdanje, Hrvatska sveučilišna naklada, Ministarstvo zaštite okoliša i prostornog uređenja, Pučko otvoreno učilište, Zagreb 2001.							1	DA	
	S. M. Šerbula, Ž. B. Grbavčić, Zagađenje i zaštita zraka, Tehnički fakultet u Boru, Bor, 2011.							-	DA	
2.11. Optional literature	Noel de Nevers, "Air Quality", Thad Godish, CRC Press LLC, 2004. K. B. Schnelle, C. A. Brown, "Air Pollution Control Technology Handbook", CRC Press LLC, 2000.									

	Zakon o zaštiti zraka (NN130/11, NN47/2014, NN61/17) Program mjerenja razine onečišćenosti zraka u državnoj mreži za trajno praćenje kvalitete zraka (NN73/2016)
2.12. Other (as the proposer wishes to add)	

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	To define sources of air pollution.	1st colloquium, written and oral exam
2	To analyze industrial processes from point of possible air pollution sources.	1st colloquium, seminar paper, written and oral exam
3	To analyze possibilities of toxicological impact of polluted air on human health.	1st colloquium, written and oral exam
4	To evaluate harmful impact of pollution on environment and to illustrate impact study for defined technical solution.	2nd colloquium, seminar paper, written and oral exam
5	To choose appropriate method of purification of waste gases.	2nd colloquium, seminar paper, written and oral exam
6	To apply legislative about quality and protection of air.	2nd colloquium, written and oral exam

1. GENERAL INFORMATION				
1.1. Course teacher	Assoc. Prof. Anita Štrkalj, PhD		1.6. Year of the study	3
1.2. Name of the course	WATER POLLUTION AND PROTECTION		1.7. ECTS credits	4
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+0+15+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course	10 full-time+40 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
2. COURSE DESCRIPTION				
2.1. Course objectives	Introducing students to the importance of protecting natural water resources and pollution. The study of different methods of treatment of polluted water.			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	Define the impact of dangers, hazards and efforts on human health and / or the environment. Identify and analyze dangers, hazards and efforts in the workplace. Recognize the relationship of health and environmental risks. Predict methods and determine samples for the determination of contamination of environmental constituents. Use applicable regulations and standards relevant to the protection of the working environment.			

	Predict solutions for efficient waste management.								
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	<p>Explain the basic concepts related to water protection.  Define the impact of water pollution on human health.  Connect the sources of water pollution with consequences on the environment and human health.  Consider the method for treatment of drinking, industrial and agricultural water.</p>								
2.5. Course content (syllabus)	<p>LECTURES (30):  Introduction (1). Water as an essential source of life (1). Introducing the legislation related to water as a component of ecosystems (3). Different types of water (3). Water protection measures (3). The study of various methods of drinking water treatment such as disinfection, removal of heavy metals... (4) Preparation of water for industry (2). Wastewater (4) Methods of wastewater treatment: mechanical-biological, biological, physical-chemical, chemical (4). Introduction to the Water law, the EU Water Framework Directive and the Industrial Emissions Directive (4). Health standards related to water (1).  SEMINAR (15):  Preparation of seminar tasks (10). Oral presentation of seminar papers (5).</p>								
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work			<input type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.7. Comments:		
2.8. Student responsibilities	Conditions for signature: class attendance min. 70 %, given seminar paper in written form and oral presented.								
2.9. Monitoring student work	Class attendance	YES	NO	Research	YES	NO	Oral exam	YES	NO
	Experimental work	YES	NO	Report	YES	NO	(other)	YES	NO
	Essay	YES	NO	Seminar paper	YES	NO	(other)	YES	NO
	Preliminary exam	YES	NO	Practical work	YES	NO	(other)	YES	NO
	Project	YES	NO	Written exam	YES	NO	ECTS credits (total)	4	
2.10. Required literature (available in the library and/or via other media)	Title			Number of copies in the library		Availability via other media			
	A. Štrkalj, Onečišćenje i zaštita voda, nastavni tekst predavanja postavljen na internet stranicu Metalurškog fakulteta, Metalurški fakultet, Sisak, 2014.					<a href="https://www.simet.unizg.hr/hr/nastava/predavanja/preddiplomski-sveucilisni-studij-metalurgija/3-godina-preddiplomskog-studija/oneciscenje-i-zastita-voda/view">https://www.simet.unizg.hr/hr/nastava/predavanja/preddiplomski-sveucilisni-studij-metalurgija/3-godina-preddiplomskog-studija/oneciscenje-i-zastita-voda/view</a>			

	B. Tušar, Pročišćavanje otpadnih voda, Kigen d.o.o., Zagreb, 2009.	1	
	N. P. Chermisnoff, Handbook of Water and Wastewater Treatment Technologies, Butterworth-Heinemann, Boston, 2002.		<a href="http://amac.md/Biblioteka/data/28/14/10/82.2.pdf">http://amac.md/Biblioteka/data/28/14/10/82.2.pdf</a>
2.11. Optional literature	T. J. Casey, Unit Treatment Processes in Water and Wastewater Engineering, John Wiley & Sons, New York, 1997. F. Valić, Zdravstvena ekologija, Medicinska naklada, Zagreb, 2001. Zakon o vodama (NN153/09) <a href="https://narodne-novine.nn.hr/clanci/sluzbeni/2009_12_153_3744.html">https://narodne-novine.nn.hr/clanci/sluzbeni/2009_12_153_3744.html</a>		
2.12. Other (as the proposer wishes to add)			

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Explain the basic concepts related to water protection.	1st colloquium, oral exam
2	Define the impact of water pollution on human health.	1st colloquium, oral exam
3	Connect the sources of water pollution with consequences on the environment and human health.	2nd colloquium, oral exam
4	Consider the method for treatment of drinking, industrial and agricultural water.	2nd colloquium, oral exam

1. GENERAL INFORMATION				
1.1. Course teacher	Full Prof. Stjepan Kožuh, PhD		1.6. Year of the study	3
1.2. Name of the course	INTRODUCTION TO ENTREPRENEURSHIP		1.7. ECTS credits	3
1.3. Associate teachers	Assist.Prof. Ivana Ivanić, PhD		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+0+15+0
1.4. Study programme (undergraduate, graduate, integrated)	Undergraduate		1.9. Expected enrolment in the course	10 full-time+40 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
2. COURSE DESCRIPTION				
2.1. Course objectives	To introduce the basic concepts of entrepreneurship. The ability to simplify the analysis of business. Get to know elements of business and develop the ability to solve examples of typical problems within the company.			
2.2. Enrolment requirements and/or entry competences required for the course	-			

2.3. Learning outcomes at the level of the programme to which the course contributes	Apply teamwork-oriented, ethical principles and encourage the development of communication and social skills. Apply acquired IT knowledge in engineering practice.		
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	Define the basic elements for the formation and organization of companies. Express the results of operations of enterprises. Describe the basic elements of entrepreneurship in selected successful and developed countries. Explain the basic legal forms of entrepreneurship.		
2.5. Course content (syllabus)	<p>LECTURES (30):</p> <p>Week 1: Definitions. Profile of entrepreneurs. Business-development phases (2)</p> <p>Week 2: The characteristics of successful entrepreneurs. Advantages and disadvantages of entering into entrepreneurship. The economic influence of the company. External influences on entrepreneurship. (2)</p> <p>Week 3 and 4: The entrepreneurial venture. The entrepreneurial process. The company, the company management. Start-up company. (4)</p> <p>Week 5: Fundamentals of corporate financing. The financial system (financial markets, financial instruments, financial institutions). (2)</p> <p>Week 6: The cost and calculations. The criteria of business efficiency. (2)</p> <p>Weeks 7 and 8: Business results of companies (income and expenses, profit and loss account, indicators of financial stability, the structure of product prices, profitability, reproducibility). (4)</p> <p>Week 9: Balance. Financial reports. (2)</p> <p>Week 10: Legal form of business organization (strengths and weaknesses). (2)</p> <p>Week 11: Small Business. Innovation and entrepreneurship. Family business. (2)</p> <p>Weeks 12 and 13: Entrepreneurs project (business plan) – term of business plan, the contents of the business plan, methodology and components (4)</p> <p>Week 14: Fundamentals of the tax system (2)</p> <p>Week 15: Introduction to entrepreneurship in the EU countries (2)</p> <p>SEMINARS (15):</p> <p>The selection of topics and seminar work in writing form by a mentor system (10 hours). Preparation and presentation of the seminar and discussions in relation to the topic of the present paper (5 hours).</p>		
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work	<input type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input checked="" type="checkbox"/> work with mentor <input type="checkbox"/> (other)	2.7. Comments:
2.8. Student responsibilities	Students must attend more than 70% of the lectures and are obliged to make a seminar paper in written form and present it orally.		

2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	YES	<b>NO</b>	Oral exam	<b>YES</b>	NO
	Experimental work	YES	<b>NO</b>	Report	YES	<b>NO</b>	(other)	YES	NO
	Essay	YES	<b>NO</b>	Seminar paper	<b>YES</b>	NO	(other)	YES	NO
	Preliminary exam	<b>YES</b>	NO	Practical work	YES	<b>NO</b>	(other)	YES	NO
	Project	YES	<b>NO</b>	Written exam	<b>YES</b>	NO	ECTS credits (total)		
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>						<b>Number of copies in the library</b>	<b>Availability via other media</b>	
	S. Dvorski, F. Ruža, V. Kovšca, Poslovna ekonomija, TIVA, Varaždin, 2007.						4		
	I. Vajić, Management i poduzetništvo, Centar za poduzetništvo Zagreb, 1994.						2		
	F. Ruža, V. Veselica, Ekonomika poduzeća, Varaždin, 2002.						3		
2.11. Optional literature	P. Skavica, M. Novak, Poslovna organizacija, Informator, Zagreb, 1999. V. Žanić, Vodič za poduzetnike, Ministarstvo gospodarstva RH, Zagreb, 1999. V. Brkanić i sur., Računovodstvo poduzetnika, Zagreb, 2008.								
2.12. Other (as the proposer wishes to add)									

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Define the basic elements for the formation and organization of company.	1st colloquium, written and oral exam
2	Express the results of operations of enterprise.	1st colloquium, seminar paper, written and oral exam
3	Describe the basic elements of entrepreneurship in selected successful and developed countries.	2nd colloquium, written and oral exam
4	Explain the basic legal forms of entrepreneurship.	2nd colloquium, seminar paper, written and oral exam

1. GENERAL INFORMATION			
1.1. Course teacher	Assist.Prof. Mitja Robert Kožuh, PhD	1.6. Year of the study	3
1.2. Name of the course	EMERGENCY PLANNING AND RESPONSE	1.7. ECTS credits	3
1.3. Associate teachers	-	1.8. Type of instruction (number of hours L+ E + S + e-learning)	30+15+0+0
1.4. Study programme (undergraduate, graduate, integrated)	Undergraduate	1.9. Expected enrolment in the course	10 full-time+40 part time students

1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
<b>2. COURSE DESCRIPTION</b>				
2.1. Course objectives	The aim of this course is to train students to meet the basic operations management and control interventions and bailouts during major incidents. The focus of the course will be on examining some practical examples and analysing crises.			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	Define the impact of dangers, hazards and efforts on human health and / or the environment. Use applicable regulations and standards relevant to safety and health at work. Apply prevention programs to reduce the impact of danger, harmfulness and efforts in the workplace. Manage safety at work systems in organizations and the local community.			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	Define basic concepts in the area of emergency planning and response. Identify and anticipate emergencies. Use theoretical and practical knowledge in solving practical and theoretical problems (study and practice).			
2.5. Course content (syllabus)	<ol style="list-style-type: none"> <li>1. The Use of the Term 'Emergency'. The Role of Emergency Planning.</li> <li>2. Introduction to Emergency Planning.</li> <li>3. The Emergency Planning Process.</li> <li>4. Patterned Human Behavior in Disasters.</li> <li>5. Fostering Successful Emergency Planning.</li> <li>6. Classes of Protective Action Recommendations.</li> <li>7. Analyzing and Selecting Protective Actions.</li> <li>8. The Content and Format of Emergency Plans.</li> <li>9. Continuity of Operations Plans.</li> <li>10. Milestones That Structure Emergency Planning.</li> <li>11. Population Warning.</li> <li>12. Planning for Hazard Adjustment.</li> <li>13. Structures for Managing Emergency Response.</li> <li>14. Emergency Planning, Professionalism and the Future.</li> <li>15. Emergency Planning Legislation in Croatia.</li> </ol>			
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures	<input type="checkbox"/> independent assignments	2.7. Comments:	



	<input type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work	<input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)							
2.8. Studentresponsibilities	Class attendance min. 70 %.								
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	YES	<b>NO</b>	Oral exam	<b>YES</b>	N O
	Experimental work	YES	<b>NO</b>	Report	<b>YES</b>	NO	(other)	YES	N O
	Essay	YES	<b>NO</b>	Seminar paper	YES	<b>NO</b>	(other)	YES	N O
	Preliminary exam	YES	<b>NO</b>	Practical work	YES	<b>NO</b>	(other)	YES	N
	Project	YES	<b>NO</b>	Written exam	<b>YES</b>	NO	ECTS credits (total)	3	
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>						<b>Number of copies in the library</b>	<b>Availability via other media</b>	
	London Borough of Havering, Emergency Planning Handbook						1		
	Emergency Preparedness & Response Handbook, Catholic Relief Services, November 2002						1		
	Amir Khorram-Manesh, Handbook of Disaster and Emergency Management, Printed in Gothenburg Sweden 2017 By Kompendiet						1		
	Emergency Planning, Hazardous Industry Planning Advisory Paper No 1, State of New South Wales through the Department of Planning 2011						1		
	Disaster response, Principles of preparation and coordination, Erik Auf der Heide, Atlanta 1989						1		
	H. B. F. GOW, R. W. KAY, EMERGENCY PLANNING FOR INDUSTRIAL HAZARDS, Taylor & Francis e-Library, 2005						1		
2.11. Optional literature	Zakon o sustavu civilne zaštite (Narodne novine br. 82/15) Pravilnik o smjernicama za izradu procjena rizika od katastrofa i velikih nesreća za područje Republike Hrvatske i jedinica lokalne i područne (regionalne) samouprave (Narodne novine br. 65/16) <a href="https://duzs.hr/dokumenti/pravilnici/">https://duzs.hr/dokumenti/pravilnici/</a>								
2.12. Other (as the proposer wishes to add)									

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Define basic concepts in the area of emergency planning and response.	1st colloquium, written exam
2	Identify and anticipate emergencies	1st colloquium, written exam
3	Use theoretical and practical knowledge in solving practical and theoretical problems (study and practice).	Auditory exercises, written exam

1. GENERAL INFORMATION				
1.1. Course teacher	Full Prof. Ivica Boko, PhD		1.6. Year of the study	3
1.2. Name of the course	FIRE SAFETY OF BUILDINGS		1.7. ECTS credits	4
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+15+0+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course	10 full-time+40 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.11. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
2. COURSE DESCRIPTION				
2.1. Course objectives	The aim of the course is to introduce students with a phenomenon of fire behaviour, valid European and Croatian regulations in the field of fire safety in the event of fire.			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	Apply teamwork-oriented, ethical principles and encourage the development of communication and social skills. Use acquired theoretical knowledge in engineering practice. Identify hazards and risks arising from the possibility of creating and spreading fire on buildings and use the applicable regulations and standards relevant to fire protection.			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	<ul style="list-style-type: none"> <li>- recognize the risks of creating and fire actions on buildings</li> <li>- evaluate objective dangers as a result of the fire performance of buildings</li> <li>- explain and apply statutory regulations related to protection against fire performance on buildings</li> </ul>			
2.5. Course content (syllabus)	LECTURES (30): <ol style="list-style-type: none"> <li>1. Generally of the actions of fire. (4)</li> <li>2. Fire actions in buildings - enclosed spaces. (4)</li> <li>3. Regulations in the field of civil engineering. (2)</li> <li>4. Fire protection regulations. (4)</li> <li>5. Fire protection measures. (2)</li> </ol>			

	6. Design of fire resistant structures. (6) 7. Fire protection project. (4) 8. Evacuation. (4)  EXERCISES (15): 1. Examples and simulations of real fire development in large indoor spaces. (10) 2. Seminar work. (5)								
2.3. Format of instruction:	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input checked="" type="checkbox"/> field work			<input type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.4. Comments:		
2.5. Student responsibilities	Attendance at the lectures > 70 %, all exercises are done								
2.6. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	YES	<b>NO</b>	Oral exam	<b>YES</b>	NO
	Experimental work	YES	<b>NO</b>	Report	YES	<b>NO</b>	(other)	YES	NO
	Essay	YES	<b>NO</b>	Seminar paper	<b>YES</b>	NO	(other)	YES	NO
	Preliminary exam	<b>YES</b>	NO	Practical work	YES	<b>NO</b>	(other)	YES	NO
	Project	YES	<b>NO</b>	Written exam	<b>YES</b>	NO	ECTS credits (total)	4	
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>						<b>Number of copies in the library</b>	<b>Availability via other media</b>	
	B. Peroš, I. Boko, Sigurnost konstrukcija u požaru, Sveučilište u Splitu Fakultet građevinarstva, arhitekture i geodezije, Split, 2015.						5		
	Croatian standards in the field of structures and fire							web	
2.11. Optional literature	A. H. Buchanan, Structural Design for Fire Safety, John Wiley & Sons Ltd, England, 2002. SFPE Handbook of Fire Protection Engineering, 2nd Edition, National Fire Protection Association, 1995.								
2.12. Other (as the proposer wishes to add)									
<b>Ordinal number</b>	<b>Expected learning outcomes at the level of the course (3-10)</b>				<b>Methods for monitoring of the achievement of learning outcomes</b>				
1	Identify the risks of fire occurrence and effects on buildings.				1st colloquium, 2nd colloquium, written and oral exam				
2	Assess objective hazards as a consequence of fire effects on buildings.				1st colloquium, 2nd colloquium, oral exam				
3	Explain and apply legal regulations related to fire protection on buildings.				Seminar paper, 1st colloquium, 2nd colloquium, oral exam				

1. GENERAL INFORMATION				
1.1. Course teacher	Assist.Prof. Elvira Lazić Mosler, MD, PhD		1.6. Year of the study	3
1.2. Name of the course	PROFESSIONAL DISEASES AND HUMAN HEALTH		1.7. ECTS credits	4
1.3. Associate teachers	Tajana Božić, MD, PhD		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+30+0+0
1.4. Study programme (undergraduate, graduate, integrated)	Undergraduate		1.9. Expected enrolment in the course	10 full-time+40 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
2. COURSE DESCRIPTION				
2.1. Course objectives	<p>The aims of this course are:</p> <ul style="list-style-type: none"> <li>- to inform the students about the dangers, harms, and strains, which are the factors leading to development of professional diseases and work-related diseases</li> <li>- to define the causal influence on human health and work ability.</li> <li>- to teach the methods of prevention and algorithms in cases of development of professional diseases and work-related diseases</li> </ul>			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	<p>Define the impact of dangers, hazards and efforts on human health and / or the environment.  Identify and analyze dangers, hazards and efforts in the workplace.  Use applicable regulations and standards relevant to safety and health at work.  Apply methods of health protection and measures to increase safety at work.  Recognize the importance of human, socioeconomic and environmental factors on workers' health and working ability.  Apply prevention programs to reduce the impact of danger, harmfulness and efforts in the workplace.</p>			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	<p>After the finished course, the student will be able to:</p> <ul style="list-style-type: none"> <li>- Recognize the differences between professional diseases and work-related diseases</li> <li>- Define the risk factors for development of professional diseases</li> <li>- Interpret the list of professional diseases</li> <li>- Apply the procedure for diagnosis of professional diseases</li> <li>- Suggest and conduct programs for prevention of development of professional diseases and work-related diseases</li> <li>- Analyze the influence of professional disease and work-related disease on work ability</li> </ul>			
2.5. Course content (syllabus)	1. Conceptual framework of professional disease, (2). Practical: List of professional diseases, (2).			

	<p>2. Conceptual framework of work-related disease, (2). Practical: Case report: work-related diseases, (2).</p> <p>3. Legal framework of professional diseases, (2). Practical: Comparison of the Croatian and international legislation related to professional diseases, (2).</p> <p>4. Diagnostic procedure for determining professional disease, (2). Practical: The role of occupational safety professional in diagnosing professional disease (2).</p> <p>5. Professional impairments caused by anorganic chemical adversities, (2). Practical: The role of occupational safety professional after recognition of professional disease, (2).</p> <p>6. Professional impairments caused by organic chemical adversities, (2). Practical: Prevention of development of professional diseases, (2).</p> <p>7. Professional impairments caused by plastic masses, (2). Practical: Prevention of work-related diseases. (2).</p> <p>8. Professional intoxications with gases, steams and aerosols, (2). Practical: Case report – professional impairments caused by chemical adversities, (2).</p> <p>9. Professional impairments caused by biologic adversities, (2). Practical: Case report: Professional impairments caused by biologic adversities, (2).</p> <p>10. Professional impairments caused by physical adversities, (2). Practical: Case report: Professional impairments caused by physical adversities, (2)</p> <p>11. Professional skin diseases, (2). Practical: Diagnostic approach in determination of professional of skin diseases, (2).</p> <p>12. Professional respiratory diseases, (2). Practical: Diagnostic approach in determination of professional respiratory diseases, (2).</p> <p>13. Professional diseases of locomotor system, (2). Practical: Diagnostic approach in determination of professional locomotor disease, (2).</p> <p>14. Professional diseases of other organs and organic systems, (2). Practical: professional malignancies, (2).</p> <p>15. Methods of protection of health at work after determination of a professional disease, (2). Practical: Prevention of overuse syndrome, (2).</p>									
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work	<input type="checkbox"/> independent assignments <input checked="" type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)	2.7. Comments:							
2.8. Student responsibilities	70% attendance on lectures and practicals, active participation									
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	YES	<b>NO</b>	Oral exam	YES	<b>NO</b>	
	Experimental work	YES	<b>NO</b>	Report	YES	<b>NO</b>	(other)	YES	NO	

	Essay	YES	<b>NO</b>	Seminar paper	YES	<b>NO</b>	(other)	YES	NO
	Preliminary exam	YES	<b>NO</b>	Practical work	<b>YES</b>	NO	(other)	YES	NO
	Project	YES	<b>NO</b>	Written exam	<b>YES</b>	NO	ECTS credits (total)	4	
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>			<b>Number of copies in the library</b>	<b>Availability via other media</b>				
	D. Beritić-Strahuljak, E. Žuškin, F. Valić, J. Mustajbegović, Medicina rada, Medicinska naklada, Zagreb, 1999.			3					
	M. Šarić, E. Žuškin, Medicina rada i okoliša, Odabrana poglavlja, Medicinska naklada, Zagreb, 2002.			3					
	Zakon o zaštiti na radu – Narodne novine, 71/2014.				<a href="https://narodne-novine.nn.hr/clanci/sluzbeni/2014_06_71_13_34.html">https://narodne-novine.nn.hr/clanci/sluzbeni/2014_06_71_13_34.html</a>				
	Zakon o listi profesionalnih bolesti – Narodne novine, 162/1998, 107/2007.				<a href="https://narodne-novine.nn.hr/clanci/sluzbeni/1998_12_162_1_994.html">https://narodne-novine.nn.hr/clanci/sluzbeni/1998_12_162_1_994.html</a>  <a href="https://narodne-novine.nn.hr/clanci/sluzbeni/2007_10_107_3_137.html">https://narodne-novine.nn.hr/clanci/sluzbeni/2007_10_107_3_137.html</a>				
2.11. Optional literature	Pravilnik o postupku utvrđivanja i priznavanja ozljede na radu i profesionalne bolesti – Narodne novine, 125/2007. Pravilnik o pravima, uvjetima i načinu ostvarivanja prava iz obaveznog zdravstvenog osiguranja u slučaju ozljede na radu i profesionalne bolesti – Narodne novine, 75/2014.								
2.12. Other (as the proposer wishes to add)									

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Recognize the differences between professional diseases and work-related diseases.	1st colloquium, exercises, independent task, written exam
2	Define the risk factors for development of professional diseases.	1st colloquium, exercises, independent task, written exam
3	Interpret the list of professional diseases.	1st colloquium, 2nd colloquium, exercises, independent task, written exam
4	Apply the procedure for diagnosis of professional diseases.	1st colloquium, 2nd colloquium, exercises, independent task, written exam
5	Suggest and conduct programs for prevention of development of professional diseases and work-related diseases.	2nd colloquium, exercises, independent task, written exam

6	Analyze the influence of professional disease and work-related disease on work ability.	1st colloquium, 2nd colloquium, exercises, independent task, written exam
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1. GENERAL INFORMATION				
1.1. Course teacher	Assist. Prof. Tahir Sofilić, PhD		1.6. Year of the study	3
1.2. Name of the course	SUSTAINABLE WASTE MANAGEMENT		1.7. ECTS credits	4
1.3. Associate teachers	Assist. Prof. Vesna Ocelić Bulatović, PhD		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+15+15+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course	10 full-time+40 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
2. COURSE DESCRIPTION				
2.1. Course objectives	Acquaintance students with national strategy of waste management for regulation of management different type of waste on territory of RH, from its occurrence, possibilities of recovery until the final disposal with the basic aim for creation and maintenance of whole sustainable waste management system.			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	<p>Recognize the relationship of health and environmental risks.</p> <p>Analyse the present situation, identify problems, formulate and recommend an optimal technological solution.</p> <p>Manage safety at work systems in organizations and the local community.</p> <p>Apply logical conclusion and precision in data processing.</p> <p>Predict methods and determine samples for the determination of contamination of environmental constituents.</p> <p>Use applicable regulations and standards relevant to the protection of the working environment.</p> <p>Predict solutions for efficient waste management.</p>			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	<p>To define terms related to waste.</p> <p>To classify types of waste by properties.</p> <p>To classify types of waste by originate.</p> <p>To describe effects of waste on environment.</p> <p>To enumerate actions for avoiding and reducing of waste and reducing its dangerous properties.</p> <p>To enumerate ways for waste treatment.</p> <p>To explain difference between recycling and recovery.</p> <p>To explain responsibility of waste producer.</p>			
2.5. Course content (syllabus)	LECTURES (30): Introduction, history of waste, definitions of terms related to waste, waste management history (2);			

	<p>A waste today, waste database on a global level, the EU and national regulatory framework (2);  The categories of waste, special waste categories and related regulations for the management of each separate waste category (2);  Waste / by-product, status of waste - not waste, definition of by-products, waste catalog, classification and labeling of waste (2);  Waste Management, Waste Management Strategy of the Republic Croatia, the priority ranking of waste management (2);  Recycling of waste, recovery procedures, examples of recycling of waste generated in metallurgical processes (2);  Management of special waste categories, definitions, keeping records and reporting, (1);  Waste disposal, biological treatment methods, mechanical-biological treatment methods, thermal treatment methods, conditioning disposal (3);  Import-export, cross-border transport of waste, Regulation 1013/2006/EC, the general requirements, notification procedure, supporting documents, (2);  Waste management information system, the obligation to keep the registration data on waste management, forms ONTO, ONTO, PL-A, PL-SPO, ... EPR, GOPO Plan, Plan GOOO (2);  Fees in the field of waste management, (2);  Waste management centres, schedule and construction of WMC, waste characterization, sampling and analysis, the criteria for the disposal of waste, landfills, (2);  The management of industrial waste in the Republic Croatia, annual reports, (2);  Slag-waste or by-product from the steel production by electric arc process, (2);  Electric arc furnace dust-waste or by-product from the steel production by electric arc process, (2).</p> <p>SEMINARS (15):  Instructions for the preparation of the seminar (2)  Topics presentation and selection (1)  Creating individual seminar work, supervision and corrections (6)  Making PPP of seminar work and preparing for presentation (1)  Presentation of seminar work (5)</p> <p>EXERCISES (15):  Auditory Exercises (10)  Field exercises - visit landfill industrial waste and industrial waste landfills (5)</p>										
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input checked="" type="checkbox"/> field work	<input checked="" type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)	2.7. Comments:								
2.8. Student responsibilities	Class attendance min. 70%, created and presented seminar paper.										
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	<b>YES</b>	NO	Oral exam	<b>YES</b>	NO		
	Experimental work	<b>YES</b>	NO	Report	YES	<b>NO</b>	(other)	YES	NO		



	Essay	YES	NO	Seminar paper	YES	NO	(other)	YES	NO
	Preliminary exam	YES	NO	Practical work	YES	NO	(other)	YES	NO
	Project	YES	NO	Written exam	YES	NO	ECTS credits (total)	4	
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>	<b>Number of copies in the library</b>		<b>Availability via other media</b>					
	T. Sofilić, I. Brnardić, ODRŽIVO GOSPODARENJE OTPADOM, skripta, Sveučilište u Zagrebu, Metalurški fakultet, 2015.			<a href="https://www.simet.unizg.hr/nastava/predavanja/preddiplomski-sveucilisni-studij-metalurgija">https://www.simet.unizg.hr/nastava/predavanja/preddiplomski-sveucilisni-studij-metalurgija</a>					
	T. Sofilić, Priručnik za polaznike „IZOBRAZBE O GOSPODARENJU OTPADOM“, Metroalfa d.o.o., Zagreb 2015.			<a href="https://bib.irb.hr/datoteka/817489.PRIRUNIK_IZOBRAZBA_O_GOSP_OTP.pdf">https://bib.irb.hr/datoteka/817489.PRIRUNIK_IZOBRAZBA_O_GOSP_OTP.pdf</a>					
2.11. Optional literature	Zakon o održivom gospodarenju otpadom (NN 94/13, 73/17) Pravilnik o gospodarenju otpadom ( NN 117/17)								
2.12. Other (as the proposer wishes to add)									

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	To define terms related to waste.	1st colloquium, 2nd colloquium, 3rd colloquium, written and oral exam
2	To classify types of waste by properties.	1st colloquium, 2nd colloquium, 3rd colloquium, written and oral exam
3	To classify types of waste by originate.	1st colloquium, 2nd colloquium, 3rd colloquium, auditory exercises, written and oral exam
4	To describe effects of waste on environment.	1st colloquium, 2nd colloquium, 3rd colloquium, field exercises, written and oral exam
5	To enumerate actions for avoiding and reducing of waste and reducing its dangerous properties.	1st colloquium, 2nd colloquium, 3rd colloquium, seminar, written and oral exam
6	To enumerate ways for waste treatment.	1st colloquium, 2nd colloquium, 3rd colloquium, field exercises, written and oral exam
7	To explain difference between recycling and recovery.	1st colloquium, 2nd colloquium, 3rd colloquium, written and oral exam
8	To explain responsibility of waste producer	1st colloquium, 2nd colloquium, 3rd colloquium, written and oral exam

1. GENERAL INFORMATION			
1.1. Course teacher	Full Prof. Ladislav Lazić, PhD Assist.Prof. Martina Lovrenić-Jugović, PhD	1.6. Year of the study	3
1.2. Name of the course	TECHNICAL AND BUSINESS SAFETY	1.7. ECTS credits	4

1.3. Associate teachers	-	1.8. Type of instruction (number of hours L + E + S + e-learning)	30+15+15+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate	1.9. Expected enrolment in the course	10 full-time+40 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)
<b>2. COURSE DESCRIPTION</b>			
2.1. Course objectives	<ol style="list-style-type: none"> <li>1. Acquire theoretical knowledge and practical skills to recognize different types of risk.</li> <li>2. Acquire knowledge to reduce the risk, i.e. what measures should be taken to enhance safety.</li> </ol>		
2.2. Enrolment requirements and/or entry competences required for the course	-		
2.2. Learning outcomes at the level of the programme to which the course contributes	<p>Use applicable regulations and standards relevant to safety and health at work.  Apply methods of health protection and measures to increase safety at work.  Collect and analyze data and create risk assessment in the workplace.  Apply teamwork-oriented, ethical principles and encourage the development of communication and social skills.  Manage safety at work systems in organizations and the local community.</p>		
2.3. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	<ol style="list-style-type: none"> <li>1. Define the basic elements related to technical safety.</li> <li>2. Define the conditions to be met by dedicated equipment and devices.</li> <li>3. Use the acquired knowledge to detect the potential dangers of a worker exposed during work.</li> <li>4. Apply prevention methods and remove all identified dangers as they do not occur during work.</li> <li>5. Apply the required type of analysis to make the risk assessment.</li> <li>6. Make a risk assessment in the workplace.</li> </ol>		
2.4. Course content (syllabus)	<p>LECTURES AND EXERCISES:</p> <ol style="list-style-type: none"> <li>1. Introduction. Principles of Technical and Business Safety (2)</li> <li>2. Legislation on the field of technical safety (2)</li> <li>3. Qualitative and quantitative methods for risk assessment (2)</li> <li>4. Dedicated equipment and device (2)</li> <li>5. Technical reliability and safety in operation (2)</li> <li>6. Work place risk and root cause analysis (2)</li> <li>7. Interpretation of the safety assessment results (2)</li> <li>8. 1st preliminary exam: includes the units 1-7 (1)</li> <li>9. Individual and societal risk (2)</li> <li>10. Corporate Safety (3)</li> <li>11. Business processes and the possibility of their endangerment (3)</li> <li>12. Strategy for the reduction and prevention of business threats (2)</li> <li>13. Education of managers, workers and representative of workers in the implementation of protection measures (2)</li> <li>14. Purpose and aims of business security planning (2)</li> </ol>		

	15. 2nd preliminary exam: includes the units 9-114 (1)								
	SEMINAR: Within the seminar papers, and on the basis of their own topic selection and discussion after the public presentation, students will learn about the application of technical and business security. 1. Seminar preparation instructions (2) 2. Display topics and selection (1) 3. Individual work, supervision and correction (6) 4. Making PPPs and preparing for presentation (1) 5. Presentation of works (5)								
2.5. Format of instruction:	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work			<input type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.6. Comments:		
2.7. Student responsibilities	Conditions for signature: - attendance on Lectures and Exercises > 70% Conditions for taking: - presented seminar paper - a dedicated written part of the seminar assignments								
2.8. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	YES	<b>NO</b>	Oral exam	<b>YES</b>	NO
	Experimental work	YES	<b>NO</b>	Report	YES	<b>NO</b>	(other)	YES	<b>NO</b>
	Essay	YES	<b>NO</b>	Seminar paper	<b>YES</b>	NO	(other)	YES	<b>NO</b>
	Preliminary exam	<b>YES</b>	NO	Practical work	YES	<b>NO</b>	(other)	YES	<b>NO</b>
	Project	YES	<b>NO</b>	Written exam	<b>YES</b>	NO	ECTS credits (total)	4	
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>				<b>Number of copies in the library</b>		<b>Availability via other media</b>		
	D. Blockey, Engeneering Safety, Mc Graw-Hill Book, 1992				-		<a href="https://www.bristol.ac.uk/civilengineering/bridges/Pages/Engineering%20Safety%20By%20David%20Blockley.pdf">https://www.bristol.ac.uk/civilengineering/bridges/Pages/Engineering%20Safety%20By%20David%20Blockley.pdf</a>		
	Guide of Application of the Machinery Directive 2006/42/EC, European Commission Enterprice and Industry, 2nd Edition, 2010				-		<a href="http://www.eurogip.fr/_normabase/docs/Guide_application_directive_2006_42_ec_2nd_edit_index_06_2010_en.pdf">http://www.eurogip.fr/_normabase/docs/Guide_application_directive_2006_42_ec_2nd_edit_index_06_2010_en.pdf</a>		

	Hiles Anrew: Business Continuity: Best Practices-Word Class Business Continuity Management, Second Edition, FBCI, Brookfiled, 2004	1	-
2.11. Optional literature	Pravilnik o izradi procjene rizika (NN 112/2014), Narodne Novine Zakon o zaštiti na radu (NN 71/14, 118/14, 154/14), Zakon.hr Procjena rizika, zuznr.hr		
2.12. Other (as the proposer wishes to add)			

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Define the basic elements related to technical safety.	1st colloquium, written and oral exam
2	Define the conditions to be met by dedicated equipment and devices.	1st colloquium, written and oral exam
3	Use the acquired knowledge to detect the potential dangers of a worker exposed during work.	2nd colloquium, written and oral exam
4	Apply prevention methods and remove all identified dangers as they do not occur during work.	2nd colloquium, written and oral exam
5	Apply the required type of analysis to make the risk assessment.	2nd colloquium, written and oral exam
6	Make a risk assessment in the workplace.	Seminar paper

1. GENERAL INFORMATION				
1.1. Course teacher	Ivana Krišto, PhD, lecturer		1.6. Year of the study	3
1.2. Name of the course	BUSINESS COMMUNICATION AND ANDRAGOGY		1.7. ECTS credits	3
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+0+15+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course	10 full-time+40 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
2. COUSE DESCRIPTION				

2.1. Course objectives	<p>The general aim of this course is to introduce students into the field of andragogy, the main determinants of its founding and the ability to define basic terminological definitions and the latest trends in adult education. The task of teaching is to familiarize students with the basics of adult education and develop their andragogical competence as a prerequisite for self-realization of basic and further training of workers to work in a safe manner.</p> <p>The aim of the course is to acquire the general knowledge needed for more successful interpersonal communication in the business environment and effective formatting of messages in public and written communication as well as in the presentation of information. Acquiring the necessary knowledge and skills from important applied areas of business communication such as presentation, communication, negotiation, conducting meetings, interviewing, electronically mediated communication etc.</p>
2.2. Enrolment requirements and/or entry competences required for the course	-
2.3. Learning outcomes at the level of the programme to which the course contributes	<p>Use acquired theoretical knowledge in engineering practice.</p> <p>Apply teamwork-oriented, ethical principles and encourage the development of communication and social skills.</p> <p>Recognize the importance of human, socioeconomic and environmental factors on workers' health and working ability.</p>
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	<p>Apply different approaches to adult education.</p> <p>Develop adult education programs on their own.</p> <p>Describe basic concepts related to interpersonal communication, communication competence and communication skills.</p> <p>Explain the different situations and forms of business communication such as presenting, selling, negotiating, conducting meetings.</p> <p>Use written and computer-mediated communication to format and exchange messages: better communicate verbally and non-verbally with associates and team members, business partners, clients, and customers, and more effectively develop collaborative relationships with them.</p>
2.5. Course content (syllabus)	<p>Andragogy - basic notion and historical development. 1h</p> <p>Theories of adult education. 1h</p> <p>Adult and adult learning. 2h</p> <p>System of Andragogy Institutions. 1h</p> <p>Experts for adult education. 1h</p> <p>Methods in adult education. 2h</p> <p>Educational Technology in Adult Education. 2h</p> <p>Distance learning. 1h</p> <p>Evaluation and assessment of knowledge in adult education. 1h</p> <p>The practice of adult education in Croatia. 2h</p> <p>Verbal and nonverbal communication. 4h</p> <p>Interpersonal communication competence. 4h</p> <p>Business Communication Skills. 4h</p>

	Elements of Effective Presentation Communication. 2h Negotiation, written business communication, business meetings. 2h								
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work			<input checked="" type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.7. Comments:		
2.8. Student responsibilities	Class attendance min. 70%, created and given essay.								
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	YES	<b>NO</b>	Oral exam	<b>YES</b>	NO
	Experimental work	YES	<b>NO</b>	Report	YES	<b>NO</b>	(other)	YES	NO
	Essay	<b>YES</b>	NO	Seminar paper	YES	<b>NO</b>	(other)	YES	NO
	Preliminary exam	YES	<b>NO</b>	Practical work	YES	<b>NO</b>	(other)	YES	NO
	Project	YES	<b>NO</b>	Written exam	YES	<b>NO</b>	ECTS credits (total)		
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>						<b>Number of copies in the library</b>	<b>Availability via other media</b>	
	R. Fox, Poslovna komunikacija, 2. dop. izd., Hrvatska sveučilišna naklada-Pučko Otvoreno Učilište, Zagreb, 2006.						2		
	M.J. Rouse, S. Rouse, Poslovne komunikacije: kulturološki i strateški pristup, Masmedia, Zagreb, 2005.						2		
	D. Petričević, Obrazovanje odraslih, IPROZ, Zagreb, 2012.						10		
	N. Pastuović, Andragogija, Visoka škola za sigurnost, Zagreb, 2004.						10		
2.11. Optional literature									
2.12. Other (as the proposer wishes to add)									

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Apply different approaches to adult education.	Written exam, oral exam, seminar paper
2	Develop adult education programs on their own.	Written exam, oral exam, seminar paper
3	Describe basic concepts related to interpersonal communication, communication competence and communication skills.	Written exam, oral exam, seminar paper
4	Explain the different situations and forms of business communication such as presenting, selling, negotiating, conducting meetings.	Written exam, oral exam, seminar paper

5	Use written and computer-mediated communication to format and exchange messages: better communicate verbally and non-verbally with associates and team members, business partners, clients, and customers, and more effectively develop collaborative relationships with them.	Written exam, oral exam, seminar paper
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1. GENERAL INFORMATION				
1.1. Course teacher	Assist.Prof. Mitja Robert Kožuh, PhD		1.6. Year of the study	3
1.2. Name of the course	RISK ASSESSMENT		1.7. ECTS credits	5
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L+ E + S + e-learning)	45+15+15+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course	10 full-time+40 part time students
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
2. COURSE DESCRIPTION				
2.1. Course objectives	<p>For the programme student will expand their knowledge from risk and safety philosophy towards the methods which will enabled them to make judgement regarding the safety level and necessary preventive actions.</p> <p>Aim of the course is to teach students with the use of risk assessment methods. Theoretically they will learn methods and practically during exercises. Students will learn how to use computer codes for risk analyses. During seminar work they will solve realistic problem.</p> <p>They will obtain critical judgement for use of different risk assessment methods.</p> <p>During the course student shall obtain intellectual skills, he will be able to use data from literature, he will be able to calculate data needed for analysis based on experimental data and to process them and interpret them soundly.</p>			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	<p>Identify and analyze dangers, hazards and efforts in the workplace.</p> <p>Use applicable regulations and standards relevant to safety and health at work.</p> <p>Analyse the present situation, identify problems, formulate and recommend an optimal technological solution.</p> <p>Collect and analyze data and create risk assessment in the workplace.</p>			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	<p>Use computer applications for risk analysis.</p> <p>Analyze and process collected data for the purposes of risk assessment.</p> <p>Use different methods for making risk assessments.</p> <p>Apply acquired theoretical knowledge of risk assessment to solve real problems.</p>			

2.5. Course content (syllabus)	<p>1. Basics of risk assessment. How to take decision to use qualitative risk analysis. Argument based decision to use risk analysis. Selection and use of risk assessment.</p> <p>2. Acquaintance with all qualitative and quantitative elements of risk assessment. Use of models for system components and data base collection for these models. Quantitative methods for reliability model parameter determination.</p> <p>3. Failure Mode and Effect Analysis (FMEA), Failure Mode Effect and Criticality Analysis (FMECA).</p> <p>4. Hazard and Operability Study (HAZOP).</p> <p>5. Event tree (accident scenario analysis and their logical modeling).</p> <p>6. Fault tree analysis (System logical modeling).</p> <p>7. Common Cause Failures.</p> <p>8. Human reliability analysis. External event analysis.</p> <p>9. Quantitative evaluation of models using computer codes and interpretation of the results. Importance measures definition and their role within evaluation of risk. Risk measures and representation of risk assessment.</p> <ul style="list-style-type: none"> <li>• Risk measures</li> <li>• Risk representation</li> <li>• Risk calculation</li> <li>• Uncertainties, sensitivity and importances within risk</li> </ul> <p>10. Use of the results of quantitative analysis for risk management. Interpretation of qualitative results in risk assessment and importance of assumptions. Methods for organizational factors assessment.</p> <p>11. Management Oversight and RiskTree (MORT).</p> <p>12. Work Process Analysis Model (WPAM).</p> <p>13. Layer of Protection Analysis (LOPA).</p> <p>14. System-Theoretic Accident Model and Processes (STAMP).</p> <p>15. Safety reports and their use in the framework of legislation in Croatia.</p>								
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work			<input type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.7. Comments:		
2.8. Student responsibilities	Class attendance min. 70 %.								
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	YES	<b>NO</b>	Oral exam	YES	<b>NO</b>
	Experimental work	YES	<b>NO</b>	Report	<b>YES</b>	NO	(other)	YES	NO



	Essay	YES	NO	Seminar paper	YES	NO	(other)	YES	NO	
	Preliminary exam	YES	NO	Practical work	YES	NO	(other)	YES	NO	
	Project	YES	NO	Written exam	YES	NO	ECTS credits (total)	5		
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>							<b>Number of copies in the library</b>	<b>Availability via other media</b>	
	T. Kletz: Hazop and Hazan							1		
	I. Sutton, Process Reliability and Risk Management, Van Nostrand Reinhold, New York, 1992							1		
	AIChE, Guidelines for Chemical Process Quantitative Risk Analysis, New York 1989							1		
	Red Book: Methods for determining and processing probabilities, Committee for Prevention of Disasters Second edition 1997, Ministry of Environment Netherlands							1		
	E. E. Lewis, Introduction to Reliability Engineering, Willey 1987							1		
	I. D. Gertman H. S. Blackman, Human Reliability and Safety Analysis Data Handbook, John Willey & Sons Inc., 1994							1		
2.11. Optional literature	C. Perrow: Normal Accidents, Basic Books, New York, 1985 J. Reason: Human Error, Cambridge University Press, Cambridge 1990 J. Reason: Managing the risks of organizational accidents, Ashgate, Aldershot UK, 1997									
2.12. Other (as the proposer wishes to add)	Zakon o zaštiti na radu (NN 71/14., 118/14. i 154/14) Pravilnik o izradi procjene rizika (NN 112/14)									

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Use computer applications for risk analysis.	Laboratory exercises, written exam
2	Analyze and process collected data for the purposes of risk assessment.	Laboratory exercises, written exam
3	Use different methods for making risk assessments.	Laboratory exercises, written exam
4	Apply acquired theoretical knowledge of risk assessment to solve real problems.	Auditory exercises, written exam

1. GENERAL INFORMATION			
1.1. Course teacher	Assoc.Prof. Ivan Brnardić, PhD Assoc.Prof. Tamara Holjevac Grgurić, PhD	1.6. Year of the study	3

1.2. Name of the course	THE BEST AVAILABLE TECHNIQUES IN ENVIRONMENT PROTECTION OF INDUSTRIAL AND OTHER INSTALLATIONS		1.7. ECTS credits	3
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+0+15+0
1.4. Study programme (undergraduate, graduate, integrated)	Undergraduate		1.9. Expected enrolment in the course	10
1.5. Status of the course	<input type="checkbox"/> mandatory	<input checked="" type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	2., 5 %
<b>2. COURSE DESCRIPTION</b>				
2.1. Course objectives	<p>To enable engineers for managing of the plants, effective control of industrial activities giving priority to intervention at source in the production plant, ensuring management of natural resources according to the economic situation and specific characteristics of the local area.</p> <p>To achieve this goal, it is necessary for professionals to be able to provide an integrated approach to the prevention and control of emissions into the environment, waste management and non-decommissioning as well as energy efficiency and accident prevention, and which is possible if students become acquainted with the content and meaning of the <i>Industrial Emission Directive 2010 / 75 / EU</i>.</p> <p>In order to master these skills, the European Reference Documents (RDNRT) will be presented to students, with systematic and very detailed representation of the best available techniques (BAT) so far adopted for metallurgical processes as example, in particular the processes of iron and steel production and some of the processes of non-ferrous metals production.</p>			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	<p>Analyse the present situation, identify problems, formulate and recommend an optimal technological solution.</p> <p>Use acquired theoretical knowledge in engineering practice.</p> <p>Use applicable regulations and standards relevant to the protection of the working environment.</p>			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	<p>Define and explain the concept of the best available techniques (BAT).</p> <p>Choose BAT.</p> <p>Use legal regulations and scientific-professional literature in the field of environmental protection.</p> <p>Understand and advocate the consistent application of the best available techniques for environmental protection and preservation.</p>			
2.5. Course content (syllabus)	<p>LECTURES (30):</p> <p>Directive 2010/75 / EU of the European Parliamentary Committee on Industrial Emissions. (2)</p> <p>Best Available Techniques (BAT) and Reference Documents on Best Available Techniques (BREF). (4)</p> <p>Getting acquainted with the best available techniques in environmental protection from the iron and steel production process. (8)</p> <p>Getting acquainted with the best available techniques for environmental protection from the process of manufacturing non-ferrous metals. (8)</p>			

	BREF according to student selection. (8) SEMINARS (15): An example of the seminar paper and the preparation and presentation of the seminar paper. (15)									
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input checked="" type="checkbox"/> partial e-learning <input type="checkbox"/> field work					<input checked="" type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input checked="" type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.7. Comments:	
2.8. Student responsibilities	Students must attend min. 70% of lectures and create seminar paper.									
2.9. Monitoring student work	Class attendance		YES	NO	Research		YES	NO	Oral exam	
	Experimental work		YES	NO	Report		YES	NO	(other)	
	Essay		YES	NO	Seminar paper		YES	NO	(other)	
	Preliminary exam		YES	NO	Practical work		YES	NO	(other)	
	Project		YES	NO	Written exam		YES	NO	ECTS credits (total)	
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>				<b>Number of copies in the library</b>	<b>Availability via other media</b>				
	Best Available Techniques (BAT) Reference Document for Iron and Steel Production					<a href="http://eippcb.jrc.ec.europa.eu/reference/BREF/IS_Adopted_03_2012.pdf">http://eippcb.jrc.ec.europa.eu/reference/BREF/IS_Adopted_03_2012.pdf</a>				
	Best Available Techniques (BAT) Reference Document for the Non-Ferrous Metals Industries					<a href="http://eippcb.jrc.ec.europa.eu/reference/BREF/NFM_Final_Draft_10_2014.pdf">http://eippcb.jrc.ec.europa.eu/reference/BREF/NFM_Final_Draft_10_2014.pdf</a>				
	DIREKTIVA 2010/75/EU EUROPSKOG PARLAMENTA I VIJEĆA od 24. studenoga 2010. o industrijskim emisijama (integrirano sprečavanje i kontrola onečišćenja)					<a href="http://eur-lex.europa.eu/legal-content/HR/TXT/?uri=celex:32010L0075">http://eur-lex.europa.eu/legal-content/HR/TXT/?uri=celex:32010L0075</a>				

2.11. Optional literature	Available scientific literature and other reference documents on best available techniques on the Internet.
2.11. Other (as the proposer wishes to add)	

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Define and explain the concept of the best available techniques (BAT).	1st colloquium, written and oral exam
2	To choose BAT.	1st colloquium, written and oral exam
3	Use legal regulations and scientific-professional literature in the field of environmental protection.	2nd colloquium, written and oral exam, seminar paper
4	Understand and advocate the consistent application of the best available techniques for environmental protection and preservation.	2nd colloquium, written and oral exam, seminar paper

1. GENERAL INFORMATION				
1.1. Course teacher	Assoc.Prof. Branko Petrinc, PhD		1.6. Year of the study	3
1.2. Name of the course	RADIATION PROTECTION		1.7. ECTS credits	3
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L+ E + S + e-learning)	30+15+0+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. enrolment in the course	10
1.5. Status of the course	<input type="checkbox"/> mandatory	<input checked="" type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
2. COURSE DESCRIPTION				
2.1. Course objectives	The aim of the course is to familiarise students with the basic notions of radioactivity, sources of radiation, measuring radioactivity, impact on humans, radiation protection. Students are theoretically and practically introduced to various approaches and methods of measuring ionising radiation.			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	Define the impact of dangers, hazards and efforts on human health and / or the environment. Apply methods of health protection and measures to increase safety at work. Apply prevention programs to reduce the impact of danger, harmfulness and efforts in the workplace. Use acquired theoretical knowledge in engineering practice.			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	Upon successfully passing the course, students will be able to: 1. Recognize sources of ionising radiation.			

	<ol style="list-style-type: none"> <li>2. Fully explain, applying theoretical knowledge, the phenomena and processes that take place during the interaction of matter and sources of ionising radiation.</li> <li>3. Use various instruments for measuring dose rates of ionising radiation.</li> <li>4. Approach the notion of radiation protection from an academic perspective.</li> <li>5. Apply basic knowledge from relevant radiation protection legislation.</li> </ol>									
2.5. Course content (syllabus)	<ol style="list-style-type: none"> <li>1. Lectures: Radioactivity, sources of ionising radiation. (3)</li> <li>2. Lectures: Interactions provoked by radiation in matter. (3)</li> <li>3. Lectures: Biological effects of radiation. Radiation dosimetry; irradiation (exposure), absorbed dose, dose equivalent, relative biological impact. (3)</li> <li>4. Lectures: Dosimeters; TL dosimeter; film dosimeter; semi-conductor dosimeter; chemical dosimeter. (3)</li> <li>5. Exercises: Dosimeters. (3)</li> <li>6. Lectures: Ionisation chamber, proportional counter, G-M counter; scintillation counter; nuclear trace detectors. (3)</li> <li>7. Exercises: Ionizing radiation measuring devices. (3)</li> <li>8. Lectures: Applications of ionising radiation. Radiation shields; distance, time, absorber. (3)</li> <li>9. Exercises: Ionizing radiation protection. (3)</li> <li>10. Lectures: The impact of radiation on human beings. (3)</li> <li>11. Lectures: Natural sources of radiation (radon), cosmic radiation. (3)</li> <li>12. Lectures: Non-ionising radiation in the human environment. (3)</li> <li>13. Lectures: Regulations regarding work involving ionising radiation. (3)</li> <li>14. Laboratory exercises: Dose rate measuring. (3)</li> <li>15. Laboratory exercises: Radiation contamination measuring and determining the type of radiation source. (3)</li> </ol>									
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work				<input type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input checked="" type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.7. Comments:		
2.8. Student responsibilities	Class attendance min. 70%.									
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	YES	<b>NO</b>	Oral exam	<b>YES</b>	NO	
	Experimental work	<b>YES</b>	NO	Report	YES	<b>NO</b>	(other)	YES	NO	
	Essay	YES	<b>NO</b>	Seminar paper	YES	<b>NO</b>	(other)	YES	NO	
	Preliminary exam	YES	<b>NO</b>	Practical work	<b>YES</b>	NO	(other)	YES	NO	
	Project	YES	<b>NO</b>	Written exam	<b>YES</b>	NO	ECTS credits (total)	3		

		Number of copies in the library	Availability via other media
2.10. Required literature (available in the library and/or via other media)	D. Poljak, Izloženost ljudi elektromagnetnom zračenju, Zagreb, 2006	5	
	Z. Jakobović, Ionizirajuće zračenje i čovjek, Školska knjiga, Zagreb, 1991.	5	
	V. Paar, Fizika 4, Školska knjiga, Zagreb, 2001.	5	
2.11. Optional literature	Internet site of the State Office for Radiological and Nuclear Safety		
2.12. Other (as the proposer wishes to add)	J. Lilley, Nuclear physics, Wiley, Chichester, 2001.		

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Recognize sources of ionising radiation.	Laboratory exercises, written exam
2	Fully explain, applying theoretical knowledge, the phenomena and processes that take place during the interaction of matter and sources of ionising radiation.	Seminar paper, written exam
3	Use various instruments for measuring dose rates of ionising radiation.	Laboratory exercises, written exam
4	Approach the notion of radiation protection from an academic perspective.	Seminar paper, laboratory exercises, written exam
5	Apply basic knowledge from relevant radiation protection legislation.	Seminar paper, laboratory exercises, written exam

1. GENERAL INFORMATION				
1.1. Course teacher	Full Prof. Dinko Puntarić, PhD		1.6. Year of the study	3
1.2. Name of the course	PUBLIC HEALTH		1.7. ECTS credits	3
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+0+15+0
1.4. Study programme (undergraduate, graduate, integrated)	Undergraduate		1.1. Expected enrolment in the course	10
1.5. Status of the course	<input type="checkbox"/> mandatory	<input checked="" type="checkbox"/> elective	1.2. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
2. COURSE DESCRIPTION				
2.1. Course objectives	The aim of the course is to present students with public health concepts and problems and to enable them to apply and analyze public health problems and to independently assess the causal and consequential factors. The aim of the course is to enable students to independently plan public health procedures and measures.			
2.2. Enrolment requirements and/or entry competences required for the course	-			

2.3. Learning outcomes at the level of the programme to which the course contributes	Define the impact of dangers, hazards and efforts on human health and / or the environment. Recognize the importance of human, socioeconomic and environmental factors on workers' health and working ability. Apply teamwork-oriented, ethical principles and encourage the development of communication and social skills. Manage safety at work systems in organizations and the local community. Apply the basic principles of working performance assessment.		
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	After completing the course and completing all the duties the student will: - Explain basic concepts in the area of public health (health, health care system, health care); - Identify and describe risk factors affecting health in all social groups and analyze and link the relationship between them; - Describe the methods of social intervention in the area of social security, unemployment and health; - Distinguish relationships between social and social protection, self-protection and self-protection.		
2.5. Course content (syllabus)	Defining health and health care systems, factors affecting health, promotion and promotion of health, health needs and health requirements, population health status, population dynamics and demographic characteristics, individual and community health, health risk factors, health economy, social intervention methods in the area of social security, unemployment and health, social and social protection, suza and self-protection, assessment of the health status of the population, chronic diseases intervention, health care planning and evaluation, standards and norms, quality assessment of work and professional supervision, medical documentation, screening programs, national programs for detecting malignant diseases. 1. Introduction lecture 2 hours; Seminar: Abortion as a public health problem 1 hour 2. International co-operation 2 hours of lectures; Seminar: Alcohol as a Public Health Problem 1 hour 3. Historical Public Health Development 2 hours of lectures; Seminar: Addiction to drugs 1 hour 4. Characteristics of social communities and impact on health 2 hours of lectures; Seminar: Poverty 1 hour 5. Economic aspect of functioning health care system 2 hours of lectures; Seminar: Health system in Croatia 1 hour 6. Public health in Croatia during the Homeland War 2 hours lectures; Seminar: 1 hour incident 7. Communication in public health 2 hours of lectures; Seminar: Verbal and nonverbal communication 1 hour 8. Chronic non-contagious disease 2 hours of lectures; Seminar: AIDS 1 hour 9. Mobbing 2 hours of lectures; Seminar: smoking for 1 hour 10. Eunatazija 2 sata predavanja; Seminar: Distinction 1 hour 11. Croatian Public Health Priorities 2 hours of lectures; Seminar: Meals 1 hour 12. Public Health Ethics 2 hours of lectures; Seminar: Medical Code of Ethics in History 1 Hour 13. Senior Learner 2 Hours; Seminar: Basics of Health Gerontology 1 hour 14. Some new challenges 2 hours lecture; Seminar: Violence increasing public health problem 1 hour 15. Health of selected population groups lecture 2 hours; Seminar: People with disabilities 1 hour		
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work	<input checked="" type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)	2.7. Comments:
2.8. Student responsibilities	Class attendance min. 70%, active approach to teaching, created and presented the seminar paper.		

2.9. Monitoring student work	Class attendance	YES	NO	Research	YES	NO	Oral exam	YES	NO
	Experimental work	YES	NO	Report	YES	NO	(other)	YES	NO
	Essay	YES	NO	Seminar paper	YES	NO	(other)	YES	NO
	Preliminary	YES	NO	Practical work	YES	NO	(other)	YES	NO
	Project	YES	NO	Written exam	YES	NO	ECTS credits (total)	3	
2.10. Required literature (available in the library and/or via other media)	Title						Number of copies in the library	Availability via other media	
	D. Puntarić, I. Stašević, D. Ropac, Javno zdravstvo, Hrvatsko katoličko sveučilište i Medicinska naklada, Zagreb, 2017.						3		
2.11. Optional literature	D. Puntarić, D. Ropac, A. Jurčev-Savičević, Javno zdravstvo, Medicinska naklada, Zagreb, 2014. (in Croatian)								
2.12. Other (as the proposer wishes to add)									

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Explain basic concepts in the area of public health (health, health care system, health care).	Written exam, seminar paper
2	Identify and describe risk factors affecting health in all social groups and analyze and link the relationship between them.	Written exam, seminar paper
3	Describe the methods of social intervention in the area of social security, unemployment and health.	Written exam, seminar paper
4	Distinguish relationships between social and social protection, self-protection and self-protection.	Written exam, seminar paper

1. GENERAL INFORMATION			
1.1. Course teacher	Assist.Prof. Natalija Uršulin-Trstenjak, PhD	1.6. Year of the study	3
1.2. Name of the course	HEALTH AND SAFETY IN FOOD PRODUCTION	1.7. ECTS credits	3
1.3. Associate teachers	-	1.8. Type of instruction (number of hours L+ E + S + e-learning)	30+0+15+0
1.4. Study programme (undergraduate, graduate, integrated)	Undergraduate	1.9. Expected enrolment in the course	10



1.5. Status of the course	<input type="checkbox"/> mandatory	<input checked="" type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
<b>2. COURSE DESCRIPTION</b>				
2.1. Course objectives	The objective of the course is to familiarize students with the importance of nutrition influence on health as well as how to ensure and achieve the production of health worthy food.			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	Use applicable regulations and standards relevant to safety and health at work. Recognize the importance of human, socioeconomic and environmental factors on workers' health and working ability. Apply teamwork-oriented, ethical principles and encourage the development of communication and social skills. Manage safety at work systems in organizations and the local community.			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	After completing the study programme and fulfilling all obligations, the students will be able to: <ul style="list-style-type: none"> <li>- Apply the knowledge on proper nutrition;</li> <li>- Identify nutrition trends on the level of food production;</li> <li>- Develop an HACCP plan in the domain of food production technology, as well as other food safety systems;</li> <li>- Distinguish types of raw materials (food) used in technological processing;</li> <li>- Describe technological procedures as well as the control of production management of a particular food group (production technology of milk, meat, wine, oil, etc.);</li> <li>- Classify the procedures of conditions for acquiring certain food labels (with regard to the properties, origin, production method, packaging);</li> </ul>			
2.5. Course content (syllabus)	<b>LECTURES AND SEMINARS:</b> <ol style="list-style-type: none"> <li>1. Lecture: Introductory lecture – 2 hours; Seminar: Nutrition through history – 1 hour</li> <li>2. Lecture: Science of nutrition – 2 hours; Seminar: Enteral and parenteral nutrition – 1 hour</li> <li>3. Lecture: Acquiring of proper nutrition habits – 2 hours; Seminar: Composition and properties of food – 1 hour</li> <li>4. Lecture: Consequences of improper nutrition – 2 hours; Seminar: Proper nutrition – prevention of the onset of cancerous diseases – 1 hour</li> <li>5. Lecture: Nutrition trends – 2 hours; Seminar: Vegetarianism and macrobiotics – 1 hour</li> <li>6. Lecture: Food safety legislation – Codex Alimentarius, HACCP – 2 hours; Seminar: Prerequisite programmes for setting up an HACCP system – 1 hour</li> <li>7. Lecture: Food safety legislation – HACCP – 2 hours; Seminar: HACCP plan – 1 hour</li> <li>8. Lecture: Food safety standards - ISO 22000; FSSC-2200; IFS; MSC; SQMS; BRC) – 2 hours; Application of HACCP system in the food production industry – 1 hour</li> <li>9. Lecture: Classification of food technologies – 2 hours; Technology of food processing and production of juices/jams – 1 hour</li> <li>10. Lecture: Raw materials of the food industry (of plant origin) – 2 hours; Technology of processing grapes and wine production – 1 hour</li> </ol>			

	11. Lecture: Raw materials of the food industry (of animal origin) – 2 hours; Technology of processing and production of fish – 1 hour 12. Lecture: Technological processes in food production – 2 hours; Technology of processing and production of meat and meat products – 1 hour 13. Lecture: Controlling and managing of production processes - 2 hours; Microbiological and chemical control of production processes – 1 hour 14. Lecture: Food labelling – 2 hours; Technology of processing and production of milk and dairy products - 1 hour 15. Lecture: Logo for quality – 2 hours; Technology and production of honey; Technology of processing and production of olive oil – 1 hour									
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input checked="" type="checkbox"/> field work			<input type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.7. Comments:			
2.8. Student responsibilities	70% attendance; active approach to classes; a prepared and presented seminar paper.									
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	YES	<b>NO</b>	Oral exam	YES	<b>NO</b>	
	Experimental work	YES	<b>NO</b>	Report	YES	<b>NO</b>	(other)	YES	NO	
	Essay	YES	<b>NO</b>	Seminar paper	<b>YES</b>	NO	(other)	YES	NO	
	Preliminary exam	YES	<b>NO</b>	Practical work	YES	<b>NO</b>	(other)	YES	NO	
	Project	YES	<b>NO</b>	Written exam	<b>YES</b>	NO	ECTS credits (total)	3		
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>						<b>Number of copies in the library</b>	<b>Availability via other media</b>		
	Čivljak, Marta; Bilić, Petar; Uršulin-Trstenjak, Natalija; Puntarić, Dinko; Čerkez-Habek, Jasna. <b>Životne navike i zdravlje u Hrvatskoj</b> // Javno zdravstvo / Puntarić, Dinko ; Stašević, Ina ; Ropac, Darko (ur.). Zagreb: Hrvatsko katoličko sveučilište i Medicinska naklada, 2017. Str. 95-149.						3			
	Uršulin-Trstenjak, Natalija; Puntarić, Dinko. <b>Hrana i zdravlje</b> // Higijena i epidemiologija / Puntarić, Dinko ; Ropac, Darko (ur.). Zagreb: Medicinska naklada i Hrvatsko katoličko sveučilište, 2017. Str. 24-52.						1			
	Havranek, Jasmina; Tudor Kalit, Milna. <b>Sigurnost hrane</b> . Udžbenik: M.E.P.-ova izdanja; 2014.						1			
	Greta Krešić. <b>Trendovi u prehrani</b> . Sveučilište u Rijeci. Fakultet za menadžment u turizmu i ugostiteljstvu, 2012.						1			

2.11. Optional literature	Teaching materials on Merlin system for e-learning.
2.12. Other (as the proposer wishes to add)	

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Apply knowledge of proper nutrition.	1st seminar paper, written exam
2	Identify food trends at the level of food production.	1st seminar paper, written exam
3	Develop a HACCP plan in the field of food production technology, as well as other food safety systems.	1st seminar paper, written exam
4	Distinguish the types of raw materials (food) used in the process of technological processing.	1st seminar paper, written exam
5	Describe technological procedures and control of production management of a particular food group (technology of milk, meat, wine, oil, etc.).	1st seminar paper, written exam
6	Classify the procedures for the conditions for acquiring individual food labels (with regard to properties, origin, method of production, packaging).	1st seminar paper, written exam

1. GENERAL INFORMATION				
1.1. Course teacher	Full Prof. Ivica Završki, PhD		1.6. Year of the study	3
1.2. Name of the course	SAFETY IN CONSTRUCTION		1.7. ECTS credits	3
1.3. Associate teachers	Matej Mihić, mag.eng.aedif.		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+15+0+0
1.4. Study programme (undergraduate, graduate, integrated)	Undergraduate		1.9. Expected enrolment in the course	10
1.5. Status of the course	<input type="checkbox"/> mandatory	<input checked="" type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%

2. COUSE DESCRIPTION	
2.1. Course objectives	Acquiring theoretical and practical knowledge in construction Health & Safety. To enable students to plan and to implement measures of Health & Safety and to supervise whether construction work is conducted according to plan.
2.2. Enrolment requirements and/or entry competences required for the course	-
2.3. Learning outcomes at the level of the programme to which the course contributes	Define the impact of dangers, hazards and efforts on human health and / or the environment. Identify and analyze dangers, hazards and efforts in the workplace. Use applicable regulations and standards relevant to safety and health at work.

	<p>Apply methods of health protection and measures to increase safety at work.  Apply prevention programs to reduce the impact of danger, harmfulness and efforts in the workplace.  Analyse the present situation, identify problems, formulate and recommend an optimal technological solution.</p>		
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	<p>Be familiar with construction Health &amp; Safety legislation and standards.  Identify and quantify potential hazards to the health and safety of construction workers.  Create a site safety plan.  Apply methods of improving construction site safety.  Conduct supervision whether site safety measures are followed.  Calculate costs of administering construction site safety measures.</p>		
2.5. Course content (syllabus)	<p>LECTURES (30):</p> <ul style="list-style-type: none"> <li>• Introduction, basics of construction site safety (2)</li> <li>• Construction site safety legislation (2)</li> <li>• Role of construction Health &amp; Safety Coordinators and Health &amp; Safety Experts (2)</li> <li>• Construction Health &amp; Safety in design phases (2)</li> <li>• Construction hazards (2)</li> <li>• Hazard identification and quantification (2)</li> <li>• 1<sup>st</sup> preliminary exam (2)</li> <li>• Safety measures on construction sites (2)</li> <li>• Planning and implementing safety measures on construction sites, Site safety plan (2)</li> <li>• Costs of construction site safety (2)</li> <li>• Health &amp; Safety in factory settings in construction (2)</li> <li>• Health &amp; Safety in the maintenance phase of the objects (2)</li> <li>• Innovative technologies in Health &amp; Safety (2)</li> <li>• 2<sup>nd</sup> preliminary exam (2)</li> <li>• Corrective preliminary exam (2)</li> </ul> <p>EXERCISES (15):  Auditory and constructive exercise related to lectures' syllabus.</p>		
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work	<input type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)	2.7. Comments:
2.8. Student responsibilities	To be able to attend the final exam:		

	Attendance, minimum of 70% Completed and presented project More than 25% of the total points on preliminary exams  To pass the course (beyond the previously mentioned requirements): More than 60% of the total points on the preliminary exams Or More than 60% of the total points on the written and oral exam									
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	YES	<b>NO</b>	Oral exam	<b>YES</b>	NO	
	Experimental work	YES	<b>NO</b>	Report	YES	<b>NO</b>	(other)	YES	NO	
	Essay	YES	<b>NO</b>	Seminar paper	YES	<b>NO</b>	(other)	YES	NO	
	Preliminary exam	<b>YES</b>	NO	Practical work	YES	<b>NO</b>	(other)	YES	NO	
	Project	<b>YES</b>	NO	Written exam	<b>YES</b>	NO	ECTS credits (total)	3		
2.1. Required literature (available in the library and/or via other media)	<b>Title</b>						<b>Number of copies in the library</b>	<b>Availability via other media</b>		
	Course lectures						-	Merlin system for e-learning		
	P. X. W. Zou, R. Y. Sunindijo, Strategic Safety Management in Construction and Engineering, 2015: John Wiley & Sons, Ltd. 253.						No	Yes		
	A. S. J. Holt, Principles of construction safety, 2001, Oxford, UK: Blackwell Publishing, 290.						No	Yes		
2.11. Optional literature										
2.12. Other (as the proposer wishes to add)										

<b>Ordinal number</b>	<b>Expected learning outcomes at the level of the course (3-10)</b>	<b>Methods for monitoring of the achievement of learning outcomes</b>
1	Be familiar with construction Health & Safety legislation and standards.	1st colloquium, 2nd colloquium, written and oral exam
2	Identify and quantify potential hazards to the health and safety of construction workers.	1st colloquium, 2nd colloquium, written and oral exam, project task
3	Create a site safety plan.	1st colloquium, 2nd colloquium, written and oral exam, project task
4	Apply methods of improving construction site safety.	1st colloquium, 2nd colloquium, written and oral exam
5	Conduct supervision whether site safety measures are followed.	1st colloquium, 2nd colloquium, written and oral exam
6	Calculate costs of administering construction site safety measures.	1st colloquium, 2nd colloquium, written and oral exam, project task

1. GENERAL INFORMATION				
1.1. Course teacher	Assist.Prof. Miodrag Drakulić, PhD		1.6. Year of the study	3
1.2. Name of the course	ACTIVE MEASURES FROM FIRE PROTECTION		1.7. ECTS credits	3
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+15+0+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course	10
1.5. Status of the course	<input type="checkbox"/> mandatory	<input checked="" type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
2. COUSE DESCRIPTION				
2.1. Course objectives	The aim of the course is to introduce students to active measures of fire protection, as manifested through the operation of technical systems that directly participate in preventing the occurrence and spread of fire on building, such as systems of natural and mechanical smoke extraction, stable fire extinguishing systems, fire alarm system and others. The student's knowledge of this subject can be use to create a fire protection concept and to evaluate the technical justification of the application of some active fire protection systems.			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	Apply teamwork-oriented, ethical principles and encourage the development of communication and social skills. Use acquired theoretical knowledge in engineering practice. Identify hazards and risks arising from the possibility of creating and spreading fire on buildings and use the applicable regulations and standards relevant to fire protection.			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	<ul style="list-style-type: none"> <li>- recognize the fundamental systems of active fire protection in buildings</li> <li>- recognize the connection of active and passive fire protection measures in defining the concept of fire protection</li> <li>- anticipate the interaction of some active protection systems and choose their technically justified combination</li> <li>- design a concept of fire protection of buildings in cooperation with other fire safety specialists</li> <li>- explain and apply the legal regulations related to fire protection in buildings</li> </ul>			
2.5. Course content (syllabus)	LECTURES (30): <ul style="list-style-type: none"> <li>1. Introduction - Objectives of fire protection in buildings (2)</li> <li>2. Passive and active fire protection - Basic characteristics (2)</li> <li>3. Analysis of active fire protection system (2)</li> <li>4. Fire alarm system (2)</li> <li>5. Stable Fire Extinguishing Systems - Analysis (2)</li> </ul>			

	6. Water Systems (Hydrant Network, Sprinkler Systems, Floods, High Pressure Waterjet Systems) (2) 7. Gas Systems (FM 200, Novec et al.) (2) 8. Combined water-foam systems (2) 9. The system of smoke and heat extraction (natural and mechanical smoke extraction) (3) 10. Basics of modeling fire development and smoke spreading (3) 11. Differential pressure systems (2) 12. Special systems - hypoxic atmosphere system (2) 13. Fire Protection in Air Conditioning and Ventilation Systems (2) 14. Standards, regulations and standards in the area concerned (2)  EXERCISES (15): Exercises will be carried out through the presentation of case studies of the application of an active fire protection system on reference structures (10). Visits to a complex structure with active fire protection systems (5) will also be conducted through field work.									
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input checked="" type="checkbox"/> field work					<input type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			2.7. Comments:	
2.8. Student responsibilities	Class attendance > 70%, finished all exercises and field work.									
2.9. Monitoring student work	Class attendance	YES	NO	Research	YES	NO	Oral exam	YES	NO	
	Experimental work	YES	NO	Report	YES	NO	(other)	YES	NO	
	Essay	YES	NO	Seminar paper	YES	NO	(other)	YES	NO	
	Preliminary exam	YES	NO	Practical work	YES	NO	(other)	YES	NO	
	Project	YES	NO	Written exam	YES	NO	ECTS credits (total)	3		
2.10. Required literature (available in the library and/or via other media)	Title						Number of copies in the library	Availability via other media		
	D. Drysdale, "AN INTRODUCTION TO FIRE DYNAMICS", 2 <sup>nd</sup> Edition, Wiley, 1998, ISBN 0-471-97290-8.						1			
	B. Karlsson, J. G. Quintiere, "ENCLOSURE FIRE DYNAMICS", CRC Press LLC 2000, ISBN 0-8493-1300-7.						1			
	F. Bošnjaković, "NAUKA O TOPINI II Dio", Tehnička knjiga, Zagreb, 1976.						5			
2.11. Optional literature	"Handbook of Smoke Control Engineering", ASHREA, 2012, ISBN 978-1-936504-24-4									

	H. P. Morgan, "Design methodologies for smoke and heat exhaust ventilation", BRE, 2012, ISBN 1860812899
2.12. Other (as the proposer wishes to add)	Written and video materials from web source NIST (National Institute for Standard and Technologies), USA.

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Recognize the fundamental systems of active fire protection in buildings.	1st colloquium, field work, written exam
2	Recognize the connection of active and passive fire protection measures in defining the concept of fire protection.	1st colloquium, field work, written and oral exam
3	Anticipate the interaction of some active protection systems and choose their technically justified combination.	2nd colloquium, written and oral exam
4	Design a concept of fire protection of buildings in cooperation with other fire safety specialists.	2nd colloquium, written and oral exam
5	Explain and apply the legal regulations related to fire protection in buildings.	2nd colloquium, written and oral exam

1. GENERAL INFORMATION				
1.1. Course teacher	Assoc.Prof. Zdenka Zovko Brodarac, PhD		1.6. Year of the study	3
1.2. Name of the course	SUSTAINABILITY OF FOUNDRY PROCESSES		1.7. ECTS credits	3
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+0+15+0
1.4. Study programme (undergraduate, graduate, integrated)	Undergraduate		1.9. Expected enrolment in the course	10
1.5. Status of the course	<input type="checkbox"/> mandatory	<input checked="" type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5 %
2. COURSE DESCRIPTION				
2.1. Course objectives	Introduction to the basic stages of the process and plant in foundries. Introduction to methods of preparation and handling of raw materials. Introduction to basic methods of metal recycling.			
2.2. Enrolment requirements and/or entry competences required for the course	-			
2.3. Learning outcomes at the level of the programme to which the course contributes	Use applicable regulations and standards relevant to safety and health at work. Recognize the relationship of health and environmental risks. Analyse the present situation, identify problems, formulate and recommend an optimal technological solution. Use acquired theoretical knowledge in engineering practice.			



2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	Describe the stages of production process in foundries. Identify potential dangers related to the environment and occupational safety. Describe ways of preparing, storing and handling raw materials in foundries. Choose the best available techniques for the process of producing the appropriate metal, taking into account environmental protection and occupational safety.									
2.5. Course content (syllabus)	<p>LECTURES (30):</p> Introduction to the subject curriculum and scheduling maintenance Colloquium (1). Overview of foundry practice. Parameters of production of ferrous and non-ferrous alloys (5). The phases of the production process (flow charts) in the foundries focusing on alloys and the corresponding technologies (9). Raw materials and resources in foundries (5). Best available techniques related to procedures (7):									
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input checked="" type="checkbox"/> field work	<input checked="" type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)	2.7. Comments:							
2.8. Student responsibilities	Attending the classes: 75%. Independent task-Report: continuous work. 1. Colloquium: After mastering the entire course material. Outcomes 1-4 at the level of the subject.									
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	YES	<b>NO</b>	Oral exam	YES	<b>NO</b>	
	Experimental work	YES	<b>NO</b>	Report	YES	<b>NO</b>	Field work	<b>YES</b>	NO	
	Essay	YES	<b>NO</b>	Seminar paper	<b>YES</b>	NO	(other)	YES	NO	

	Preliminary exam	<b>YES</b>	NO	Practical work	YES	<b>NO</b>	(other)	YES	NO
	Project	YES	<b>NO</b>	Written exam	YES	<b>NO</b>	ECTS credits (total)	3	
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>						<b>Number of copies in the library</b>	<b>Availability via other media</b>	
	Reference Document on Best Available Techniques in the Smitheries and Foundries Industry						-	web	
2.11. Optional literature									
2.12. Other (as the proposer wishes to add)									

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Describe the stages of production process in foundries.	1st colloquium, seminar paper, written and oral exam
2	Identify potential dangers related to the environment and occupational safety.	1st colloquium, seminar paper, written and oral exam
3	Describe ways of preparing, storing and handling raw materials in foundries.	1st colloquium, seminar paper, written and oral exam
4	Choose the best available techniques for the process of producing the appropriate metal, taking into account environmental protection and occupational safety.	1st colloquium, seminar paper, written and oral exam

1. GENERAL INFORMATION				
1.1. Course teacher	Full Prof. Ladislav Lazić, PhD		1.6. Year of the study	3
1.2. Name of the course	Low – emission combustion		1.7. ECTS credits	3
1.3. Associate teachers	-		1.8. Type of instruction (number of hours L + E + S + e-learning)	30+15+0+0
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate		1.9. Expected enrolment in the course	10
1.5. Status of the course	<input type="checkbox"/> mandatory	<input checked="" type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1., 5%
2. COUSE DESCRIPTION				
2.1. Course objectives	<ol style="list-style-type: none"> <li>1. Acquire knowledge about certain types of pollutant emissions into the environment as a result of the combustion process.</li> <li>2. Acquire knowledge on the mechanisms of formation of NO<sub>x</sub> and methods of their reduction during the combustion process.</li> <li>3. Acquire knowledge on the mechanisms of formation of SO<sub>2</sub> and methods of their reduction during the combustion process.</li> <li>4. Acquiring knowledge about the formation and reduction of CO<sub>2</sub> emissions.</li> <li>5. Acquiring knowledge about the formation and methods of reducing polycyclic aromatic hydrocarbons.</li> </ol>			

2.2. Enrolment requirements and/or entry competences required for the course	-		
2.3. Learning outcomes at the level of the programme to which the course contributes	<p>Apply methods of health protection and measures to increase safety at work.  Apply prevention programs to reduce the impact of danger, harmfulness and efforts in the workplace.  Analyse the present situation, identify problems, formulate and recommend an optimal technological solution.  Use acquired theoretical knowledge in engineering practice.</p>		
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	<ol style="list-style-type: none"> <li>1. Identify the type of pollutant emissions into the environment as a result of the combustion process.</li> <li>2. Analyse the causes of certain pollutant emissions.</li> <li>3. Suggest a method for reducing certain pollutant emission.</li> <li>4. Evaluate the effectiveness of applied method.</li> </ol>		
2.5. Course content (syllabus)	<p>LECTURES (30):</p> <ol style="list-style-type: none"> <li>1. Ecological noxiousness of combustion product. (2)</li> <li>2. Formation of the emission of nitrogen oxides in the course of combustion: Thermal nitrogen oxide, Prompt nitrogen oxide, Nitrogen oxide generated by N<sub>2</sub>O, Fuel nitrogen oxide generated by fuel, Mechanisms of the formation of fuel NO, Formation of NO<sub>2</sub>, Generalisation of the description of the mechanisms of NO<sub>x</sub> generation. (4)</li> <li>3. Abatement of the emission of nitrogen oxides in the course of combustion: Staged combustion, Supply of ammonia or urea to the combustion chamber, Decrease of temperature in the combustion zone, High Temperature Air Combustion (HITAC) technology of flameless combustion, The influence of the fundamental operation parameters on the emission of NO<sub>x</sub>. (6)</li> </ol> <p style="text-align: center;">1st colloquium</p> <ol style="list-style-type: none"> <li>4. Formation and reduction of SO<sub>2</sub> emission in the course of combustion (4): Sulphur compounds in fuels, Transformation of fuel sulphur in the course of rapid preheating, Oxidisation of sulphur compounds in the flame, High-temperature binding of SO<sub>2</sub> in the course of combustion with a shortage of oxygen, Influence of additives on the degree of binding of SO<sub>2</sub> in the combustion gases. (4)</li> <li>5. Emission of carbon oxide, Mechanisms of the formation and oxidation of CO. (2)</li> <li>6. Emission of carbon dioxide: Greenhouse effect, Formation and decrease of CO<sub>2</sub> emission. (2)</li> <li>7. Formation and emission of combustible solid particles. (2)</li> <li>8. Formation and emission of polycyclic aromatic hydrocarbons during the combustion. (2)</li> <li>9. Noxious substance occurring in minute quantities in combustion processes: Chlorine and fluorine compounds, Heavy metal compounds. (2)</li> </ol> <p style="text-align: center;">2nd colloquium</p> <p>EXERCISES (15): Solving the practical problems. The understanding of the material exposed in lectures is facilitated by solving the practical problems. The problems are selected so that they expand the presented theory and illustrate the application of theory to real problems.</p>		
2.6. Format of instruction:	<input checked="" type="checkbox"/> lectures	<input type="checkbox"/> independent assignments	2.7. Comments:

	<input type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work	<input type="checkbox"/> multimedia and the internet <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)							
2.8. Student responsibilities	Attendance on Lectures and Exercises > 70 %.								
2.9. Monitoring student work	Class attendance	<b>YES</b>	NO	Research	YES	<b>NO</b>	Oral exam	<b>YES</b>	NO
	Experimental work	YES	<b>NO</b>	Report	YES	<b>NO</b>	(other)	YES	NO
	Essay	YES	<b>NO</b>	Seminar paper	YES	<b>NO</b>	(other)	YES	NO
	Preliminary exam	<b>YES</b>	NO	Practical work	YES	<b>NO</b>	(other)	YES	NO
	Project	YES	<b>NO</b>	Written exam	<b>YES</b>	NO	ECTS credits (total)	3	
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>						<b>Number of copies in the library</b>	<b>Availability via other media</b>	
	R. Kazimierz, Low-emission combustion, Wydawnictwo Politechniki Slaskiej, Gliwice, 2002.						1		
2.11. Optional literature									
2.12. Other (as the proposer wishes to add)									

Ordinal number	Expected learning outcomes at the level of the course (3-10)	Methods for monitoring of the achievement of learning outcomes
1	Identify the type of pollutant emissions into the environment as a result of the combustion process.	1st colloquium and oral exam
2	Analyse the causes of certain pollutant emissions.	1st colloquium and oral exam
3	Suggest a method for reducing certain pollutant emission.	2nd colloquium and oral exam
4	Evaluate the effectiveness of applied method.	2nd colloquium, seminar paper and oral exam

1. GENERAL INFORMATION			
1.1. Course teacher	Faculty teacher with scientific-educational rank	1.6. Year of the study	3
1.2. Name of the course	STUDENT PRACTICE	1.7. ECTS credits	4
1.3. Associate teachers		1.8. Type of instruction (number of hours L + E + S + e-learning)	

1.4. Study programme (undergraduate, graduate, integrated)	Undergraduate		1.9. Expected enrolment in the course	
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
<b>2. COUSE DESCRIPTION</b>				
2.1. Course objectives	<p>The student practice objectives are as follows:</p> <ul style="list-style-type: none"> <li>- enable students to communicate with the actual industrial working environment,</li> <li>- acquiring additional knowledge and skills through practical work on real problems with the professional guidance of a mentor in the company,</li> <li>- connecting business entities with the best and most compatible staff and facilitating employment for graduates,</li> <li>- strengthening links between higher education institutions and the economy;</li> <li>- improving the teaching process based on feedback on the knowledge and skills that the present labor market expects.</li> </ul>			
2.2. Enrolment requirements and/or entry competences required for the course	<p>This is defined in the Student Practices Guide under the Appendix 1 to the Ordinance on Undergraduate Studies and Graduate Study of the Faculty of Metallurgy:</p> <p><a href="https://www.simet.unizg.hr/hr/dokumenti/pravilnici/Pravilnik%20o%20studiranju%20na%20preddiplomskim%20studijima%20i%20diplomskom%20studiju%20Metalurskog%20fakulteta%202018.pdf/view">https://www.simet.unizg.hr/hr/dokumenti/pravilnici/Pravilnik%20o%20studiranju%20na%20preddiplomskim%20studijima%20i%20diplomskom%20studiju%20Metalurskog%20fakulteta%202018.pdf/view</a></p>			
2.3. Learning outcomes at the level of the programme to which the course contributes	<p>Identify and analyze dangers, hazards and efforts in the workplace.          Use applicable regulations and standards relevant to safety and health at work.          Analyse the present situation, identify problems, formulate and recommend an optimal technological solution.          Apply teamwork-oriented, ethical principles and encourage the development of communication and social skills.          Apply logical conclusion and precision in data processing.          Use acquired theoretical knowledge in engineering practice.          Apply acquired IT knowledge in engineering practice.</p>			
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)				
2.5. Course content (syllabus)				
2.6. Format of instruction:	<input type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input type="checkbox"/> exercises <input type="checkbox"/> online in entirety	<input checked="" type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input checked="" type="checkbox"/> laboratory <input checked="" type="checkbox"/> work with mentor	2.7. Comments:	

	<input type="checkbox"/> partial e-learning <input checked="" type="checkbox"/> field work		<input type="checkbox"/> (other)						
2.8. Student responsibilities	Do 168 hours of student practice within 21 working days and submit report on the completed student work.								
2.9. Monitoring student work	Class attendance	YES	NO	Research	YES	NO	Oral exam	YES	NO
	Experimental work	YES	NO	Report	YES	NO	(other)	YES	NO
	Essay	YES	NO	Seminar paper	YES	NO	(other)	YES	NO
	Preliminary exam	YES	NO	Practical	YES	NO	(other)	YES	NO
	Project	YES	NO	Written exam	YES	NO	ECTS credits (total)		
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>						<b>Number of copies in the library</b>	<b>Availability via other media</b>	
2.11. Optional literature									
2.12. Other (as the proposer wishes to add)									

1. GENERAL INFORMATION				
1.1. Course teacher	Faculty teacher with scientific-educational rank		1.6. Year of the study	3
1.2. Name of the course	BACHELOR THESIS		1.7. ECTS credits	5
1.3. Associate teachers			1.8. Type of instruction (number of hours L + E + S + e-learning)	0+0+75+0
1.4. Study programme (undergraduate, graduate, integrated)	Undergraduate		1.9. Expected enrolment in the course	
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION				

2.1. Course objectives	<p><b>THE GENERAL OBJECTIVE</b> of the bachelor thesis is complete, comprehensively and deeper acquaintance with a particular problem or topic related to the study program and to solve this problem based on acquired theoretical knowledge. By completing the bachelor thesis, an undergraduate student demonstrates the ability to apply knowledge gained during undergraduate studies in the independent processing of the chosen topic or solving the chosen problem related to the area of safety, health at work and the environment. In addition, the aim of the bachelor thesis is to enable a student to independently find, analyze and synthesize relevant knowledge, attitudes and facts published in scientific or professional literature.</p> <p><b>SPECIFIC OBJECTIVE:</b> Since the Ordinance on Undergraduate Studies and Graduate Study of the Faculty of Metallurgy defines that bachelor thesis may or may not have an experimental part, the aim of each bachelor thesis containing the experimental part is specific and depends on the individual topic of bachelor thesis.</p>		
2.2. Enrolment requirements and/or entry competences required for the course	<p>The above is defined in the Instruction on the final paper and final exam in Annex 2 of the Rules on studying on undergraduate programs and graduate studies Faculty of Metallurgy:  <a href="https://www.simet.unizg.hr/hr/dokumenti/pravilnici/Pravilnik%20o%20studiranju%20na%20preddiplomskim%20studijima%20i%20diplomskom%20studiju%20Metalurskog%20fakulteta%202018.pdf/view">https://www.simet.unizg.hr/hr/dokumenti/pravilnici/Pravilnik%20o%20studiranju%20na%20preddiplomskim%20studijima%20i%20diplomskom%20studiju%20Metalurskog%20fakulteta%202018.pdf/view</a></p>		
2.3. Learning outcomes at the level of the programme to which the course contributes	<p>Identify and analyze dangers, hazards and efforts in the workplace.          Use applicable regulations and standards relevant to safety and health at work.          Analyse the present situation, identify problems, formulate and recommend an optimal technological solution.          Apply teamwork-oriented, ethical principles and encourage the development of communication and social skills.          Use acquired theoretical knowledge in engineering practice.          Apply acquired IT knowledge in engineering practice.</p>		
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)			
2.5. Course content (syllabus)			
2.6. Format of instruction:	<input type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input checked="" type="checkbox"/> field work	<input checked="" type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input checked="" type="checkbox"/> laboratory <input checked="" type="checkbox"/> work with mentor <input type="checkbox"/> (other)	2.7. Comments:
2.8. Student responsibilities	<p>Make the bachelor thesis and defend it a front of the professional commission. The topic of bachelor thesis, the composition of the expert commission for defending the bachelor thesis, as well as the mentor of the bachelor thesis, is appointed by the Faculty Council at the proposal of the Teaching Committee.</p>		

	The above is defined in the Instruction on the final paper and final exam in Annex 2 of the Rules on studying on undergraduate programs and graduate studies Faculty of Metallurgy: <a href="https://www.simet.unizg.hr/hr/dokumenti/pravilnici/Pravilnik%20o%20studiranju%20na%20preddiplomskim%20studijima%20i%20diplomskom%20studiju%20Metalurskog%20fakulteta%202018.pdf/view">https://www.simet.unizg.hr/hr/dokumenti/pravilnici/Pravilnik%20o%20studiranju%20na%20preddiplomskim%20studijima%20i%20diplomskom%20studiju%20Metalurskog%20fakulteta%202018.pdf/view</a>									
2.9. Monitoring student work	Class attendance	YES	<b>NO</b>	Research	YES	<b>NO</b>	Oral exam	<b>YES</b>	NO	
	Experimental work	YES	<b>NO</b>	Report	YES	<b>NO</b>	(other)	YES	NO	
	Essay	YES	<b>NO</b>	Seminar paper	<b>YES</b>	NO	(other)	YES	NO	
	Preliminary exam	YES	<b>NO</b>	Practical work	<b>YES</b>	NO	(other)	YES	NO	
	Project	YES	<b>NO</b>	Written exam	<b>YES</b>	NO	ECTS credits (total)			
2.10. Required literature (available in the library and/or via other media)	<b>Title</b>						<b>Number of copies in the library</b>		<b>Availability via other media</b>	
2.11. Optional literature										
2.12. Other (as the proposer wishes to add)										