



SYLLABUS PREDMETA

General information

Course title:	Engleski jezik I (1/2) and Engleski jezik I (2/2)
ISVU ¹ course code:	170165 (SZ108) / 170167(SZ208)
Studies in which the course is taught:	Safety and Protection
Course Instructor:	Mirjana Cibulka, mag.educ.angl.et ital., lecturer
Course Assistant:	/
ECTS credits:	3.0
Semester of the course execution:	1 and 2
Academic year:	2022/2023
Exam prerequisites:	/
Lectures are given in a foreign language:	English language
Aims:	Development of productive and receptive language skills (listening, speaking, reading and writing) and expansion of language and grammatical structures (vocabulary, communication samples, phonological and orthographic characteristics) as well as development of general vocabulary and phraseology related to Safety and Protection; learning competencies necessary for life-long learning, that is, learning to communicate in the conditions of increased international mobility and unstable labour market, motivating independent learning and raising awareness of intercultural aspects.

Course Structure

Course type	Number of contact hours per week:	Number of contact hours per semester:	Student's requirements by type of teaching:
Lectures:	1	15	Attendance – 80%
Tutorials:	1	15	Attendance – 80%
Practical (lab) sessions:	/	/	
Seminars:	/	/	
Field work:	/	/	
Other:	/	/	
TOTAL:	2	30	

Monitoring of students' work, knowledge evaluation and learning outcomes

Grade formation during course implementation: (Define 5-10 learning outcomes)	LEARNING OUTCOMES (upon completion of the course the student should be able to:)	FACTORS AFFECTING THE GRADE (e.g. term paper, practical work, presentation, ...)	MAXIMUM NUMBER OF POINTS PER FACTOR
	I1: Extract required information from written and/or listened speech of the related profession	Term paper I and II*	Term paper I – 30 points Term paper II – 30 points Oral examination – 40 points **
	I2: Form a simple text on the subject-matter related to the profession and/or personal interest on the basis of given information	Term paper I and II*	
	I3: Discuss on subject-matter related to the profession as well as personal interest	Term paper I and II*	
	I4: Distinguish word types and	Term paper I and II*	



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	grammatical structures in English		
	I5: Explain simpler terms and definitions related to the profession and language	Term paper I and II*	
	I6: Connect appropriate language and grammatical structures in mother tongue and in English	Term paper I and II*	
Alternative formation of the grade (I5 – I10)	or alternative formation of the grade Written exam 60 points Oral exam 30 points Cooperation** 10 points		Total: 100 points
Students' competencies	Being able to use the English language to communicate in a personal and professional environment; knowledge of specific terminology and its use in written and spoken language. Independent application of the source of knowledge for the purpose of further education and meeting one's personal and professional needs; independent use of professional literature in a foreign language and application of the acquired know-how in unfamiliar situations.		

***Note:** Due to the specific nature of the course the related learning outcome should be continuously monitored.

****Note:** The lecturer holds the right to, partially or in full, exempt certain students from the oral part of the examination if the students have shown a high level of motivation for the course; if they were always prepared, discussed content, brought or commented additional material.

Prerequisites for course approval (lecturer's signature):	Attendance 80%
Prerequisites for taking exams:	According to the Regulations on student assessment of Karlovac University of Applied Sciences, Article 9, Paragraph 5) 90-100 - excellent (5) (A) 80 to 89.9 - very good (4) (B) 65 to 79.9 - good (3) (C) 60 to 64.9 - sufficient (2) (D) 50 to 59.9 sufficient (2) (E) 0 to 49.9 – fail (1) (F)

ECTS structure

ECTS credits allocated to the course reflect total student load during course implementation. Total contact hours, relative difficulty of the content, effort required for exam preparation, as well as, every other possible load is taken in account:

Attendance (active participation)	Term paper	Essay	Presentation	Continuous assessment and evaluation (Blitz tests)	Practical Work
0.50					0.50
Independent work	Project	Written Exam	Oral Exam	Other	
		1	1		

Review of topics/units per week associated with learning outcomes



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Week	Lectures topics/units and learning outcomes:	Tutorials topics/units and learning outcomes:
1)	Safety (I1, I3)	<u>S</u> afety – introduction, course presentation, definitions of safety, measures and risks I2, I5
2)	Safety at Work (I1, I2, I3)	<u>S</u> afety at Work – reading and translating, analysis of unfamiliar words, Word Families I2, I5, I6
3)	Machine Safety (I1, I4)	<u>M</u> achine Safety – asking questions, answering questions, reading and analysis, synonyms and antonyms, I5, I6
4)	Noise Protection, Tenses II – active (I1, I4)	<u>N</u> oise Protection – translation, highlighting language structures in professional texts, forming dialogues, tense revision, I2, I3, I5, I6
5)	Vibration (I1, I2)	<u>V</u> ibration – vocabulary, reading new words and expressions, explaining their meaning, I4, I5
6)	Heating (I1, I2)	<u>H</u> eating – reading and translating, possessives', I4, I5, I6
7)	Heating II, Plural (I1, I4)	<u>H</u> eating II - Outdoor and Indoor Heating, noun plural, I2, I3, I6
8)	Lighting (I1, I3)	<u>L</u> ighting – reading and translating, types of lighting systems, discussion on the importance of good lighting, I2, I6
9)	Ventilation (I1, I2)	<u>V</u> entilation – vocabulary, explaining words and expressions, I3, I5
10)	Electricity Safety, Tenses II – active(I1, I4)	<u>E</u> lectricity Safety – reading and translating, introducing a dialogue on protection against electric shock, tense revision, I2, I3, I5, I6
11)	Explosions I (I1, I3)	<u>E</u> xplosions – reading and translating, vocabulary, I4, I5, I6
12)	Explosions II (I1)	<u>E</u> xplosions II – questions and answers in oral and written form I2
13)	Safety in Transportation I, Tenses II – active (1)	<u>S</u> afety in Transportation – discussion on safety in transportation, types of car accidents, tense revision, I2, I3, I4
14)	Safety in Transportation II (I1, I3)	<u>S</u> afety in Transportation II – analysing traffic signs, developing a dialogue on pedestrian and cyclists safety in traffic, I2, I5
15)	<i>Preliminary Exam 1(I, I2, I3,I4, I5, I6)</i>	
16)	Safety at Home (I1, I3)	<u>R</u> evision of the covered chapters and content, I4, I5, I6 Safety at Home –reading, asking and answering questions in written and spoken form, I2, I4
17)	Passive (I2, I3, I4)	E-mail, revision of the passive form I1 I3, I4
18)	Safety in the Bathroom (I1, I3)	Safety in the Bathroom – reading and translating, passive form revision, I2, I4, I6
19)	Safety at School (I1, I5)	Safety at School – text elaboration, analysis of unfamiliar words, discussion on safety at school and possible sources of hazards, I2, I3



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20)	Safety in the Yard (I1, I6)	Safety in the Yard – reading and translating, analysis of unfamiliar words, introducing various types of tools, I3, I5
21)	Special Workplace Safety Rules, Tenses III – passive (I1, I4, I5)	Special Workplace Safety Rules
22)	Chemical and Biological Hazards I (I1, I2)	Chemical and Biological Hazards I – reading and translating – asking questions to initiate a discussion, I3, I6
23)	Chemical and Biological Hazards I (I1, I2)	Chemical and Biological Hazards II – analysis of danger signs, vocabulary, I3, I5
24)	Properties of Harmful Substances (I1)	Properties of Harmful Substances – categorising harmful substances, translating unfamiliar terminology, comprehension check I2, I6
25)	Effects of Harmful Substances, Comparison (I1, I3)	Effects of Harmful Substances, Comparative – discussion on text, reading and vocabulary analysis, comparison exercises, I2, I5, I6
26)	Nuclear Hazards and Safety	Nuclear Hazards and Safety – vocabulary, reading new words and expressions, explaining their meaning
27)	Nuclear Accidents (I1, I4)	Nuclear Accidents – informing on nuclear accidents, I3
28)	Sewage I (I1, I2)	Sewage – reading and translating, explaining new terminology, I3, I5, I6
29)	Sewage II (I1, I3)	Sewage II – practical use of the acquired vocabulary, discussion on environmental impact, I2, I5
30)	<i>Preliminary Exam Analysis (I6)</i>	Revision of the covered chapters and grammar I4, I5, I6

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REFERENCES (compulsory/optional):

Compulsory: Horvatić, Miroslav, English for Safety Engineers, Karlovac University of Applied Sciences, 2008
Optional: Eastwood, Oxford Guide to English Grammar, 1994.;
<https://www.perfect-english-grammar.com/grammar-exercises.html>
Safety and Health Magazine (online)
<https://www.safetyandhealthmagazine.com/>

Exams for the academic year: 2022/2023

Exam dates:	According to the schedule of exams for academic year
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Contact info:

1. Course instructor/lecturer	Mirjana Cibulka, mag. educ., lecturer
e-mail:	mirjana.cibulka@vuka.hr
Office hours:	Kabinet 212, Trg J. J. Strossmayera 9 According to schedule of the Department of Safety and Protection



SYLLABUS PREDMETA

General information

Course title:	Engleski jezik I (1/2) and Engleski jezik I (2/2)
ISVU ¹ course code:	170225 (SZ105) / 170226 (SZ207)
Studies in which the course is taught:	Safety and Protection
Course Instructor:	Mirjana Cibulka, mag.educ.angl.et ital., lecturer
Course Assistant:	/
ECTS credits:	3.0
Semester of the course execution:	1 and 2
Academic year:	2022/2023
Exam prerequisites:	/
Lectures are given in a foreign language:	English language
Aims:	Development of productive and receptive language skills (listening, speaking, reading and writing) and expansion of language and grammatical structures (vocabulary, communication samples, phonological and orthographic characteristics) as well as development of general vocabulary and phraseology related to Safety and Protection; learning competencies necessary for life-long learning, that is, learning to communicate in the conditions of increased international mobility and unstable labour market, motivating independent learning and raising awareness of intercultural aspects.

Course Structure

Course type	Number of contact hours per week:	Number of contact hours per semester:	Student's requirements by type of teaching:
Lectures:	1	15	Attendance – 60%
Tutorials:	1	15	Attendance – 60%
Practical (lab) sessions:	/	/	
Seminars:	/	/	
Field work:	/	/	
Other:	/	/	
TOTAL:	2	30	

Monitoring of students' work, knowledge evaluation and learning outcomes

Grade formation during course implementation: (Define 5-10 learning outcomes)	LEARNING OUTCOMES (upon completion of the course the student should be able to:)	FACTORS AFFECTING THE GRADE (e.g. term paper, practical work, presentation, ...)	MAXIMUM NUMBER OF POINTS PER FACTOR
	I1: Extract required information from written and/or listened speech of the related profession	Final Exam*	Final Exam – 60 points Oral examination – 40 points **
	I2: Form a simple text on the subject-matter related to the profession and/or personal interest on the basis of given information	Final Exam*	
	I3: Discuss on subject-matter related to the profession as well as personal interest	Final Exam*	
	I4: Distinguish word types and	Final Exam*	



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	grammatical structures in English		
	I5: Explain simpler terms and definitions related to the profession and language	Final Exam*	
	I6: Connect appropriate language and grammatical structures in mother tongue and in English	Final Exam*	
Alternative formation of the grade (I5 – I10)	or alternative formation of the grade Written exam 60 points Oral exam 30 points Cooperation** 10 points		Total: 100 points
Students' competencies	Being able to use the English language to communicate in a personal and professional environment; knowledge of specific terminology and its use in written and spoken language. Independent application of the source of knowledge for the purpose of further education and meeting one's personal and professional needs; independent use of professional literature in a foreign language and application of the acquired know-how in unfamiliar situations.		

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ECTS credits allocated to the course reflect total student load during course implementation. Total contact hours, relative difficulty of the content, effort required for exam preparation, as well as, every other possible load is taken in account:

Attendance (active participation)	Term paper	Essay	Presentation	Continuous assessment and evaluation (Blitz tests)	Practical Work
0.50					0.50
Independent work	Project	Written Exam	Oral Exam	Other	
		1	1		



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Review of topics/units per week associated with learning outcomes

Week	Lectures topics/units and learning outcomes:	Tutorials topics/units and learning outcomes:
31)	Safety (I1, I3)	<u>S</u> afety – introduction, course presentation, definitions of safety, measures and risks I2, I5
32)	Safety at Work (I1, I2, I3)	<u>S</u> afety at Work – reading and translating, analysis of unfamiliar words, Word Families I2, I5, I6
33)	Machine Safety (I1, I4)	<u>M</u> achine Safety – asking questions, answering questions, reading and analysis, synonyms and antonyms, I5, I6
34)	Noise Protection, Tenses II – active (I1, I4)	<u>N</u> oise Protection – translation, highlighting language structures in professional texts, forming dialogues, tense revision, I2, I3, I5, I6
35)	Vibration (I1, I2)	<u>V</u> ibration – vocabulary, reading new words and expressions, explaining their meaning, I4, I5
36)	Heating (I1, I2)	<u>H</u> eating – reading and translating, possessives', I4, I5, I6
37)	Heating II, Plural (I1, I4)	<u>H</u> eating II - Outdoor and Indoor Heating, noun plural, I2, I3, I6
38)	Lighting (I1, I3)	<u>L</u> ighting – reading and translating, types of lighting systems, discussion on the importance of good lighting, I2, I6
39)	Ventilation (I1, I2)	<u>V</u> entilation – vocabulary, explaining words and expressions, I3, I5
40)	Electricity Safety, Tenses II – active(I1, I4)	<u>E</u> lectricity Safety – reading and translating, introducing a dialogue on protection against electric shock, tense revision, I2, I3, I5, I6
41)	Explosions I (I1, I3)	<u>E</u> xplosions – reading and translating, vocabulary, I4, I5, I6
42)	Explosions II (I1)	<u>E</u> xplosions II – questions and answers in oral and written form I2
43)	Safety in Transportation I, Tenses II – active (1)	<u>S</u> afety in Transportation – discussion on safety in transportation, types of car accidents, tense revision, I2, I3, I4
44)	Safety in Transportation II (I1, I3)	<u>S</u> afety in Transportation II – analysing traffic signs, developing a dialogue on pedestrian and cyclists safety in traffic, I2, I5
45)	<i>Preliminary Exam 1(I, I2, I3,I4, I5, I6)</i>	
46)	Safety at Home (I1, I3)	<u>R</u> evision of the covered chapters and content, I4, I5, I6 Safety at Home –reading, asking and answering questions in written and spoken form, I2, I4
47)	Passive (I2, I3, I4)	E-mail, revision of the passive form I1 I3, I4
48)	Safety in the Bathroom (I1, I3)	<u>S</u> afety in the Bathroom – reading and translating, passive form revision, I2, I4, I6



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49)	Safety at School (I1, I5)	Safety at School – text elaboration, analysis of unfamiliar words, discussion on safety at school and possible sources of hazards, I2, I3
50)	Safety in the Yard (I1, I6)	Safety in the Yard – reading and translating, analysis of unfamiliar words, introducing various types of tools, I3, I5
51)	Special Workplace Safety Rules, Tenses III – passive (I1, I4, I5)	Special Workplace Safety Rules
52)	Chemical and Biological Hazards I (I1, I2)	Chemical and Biological Hazards I – reading and translating – asking questions to initiate a discussion, I3, I6
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54)	Properties of Harmful Substances (I1)	Properties of Harmful Substances – categorising harmful substances, translating unfamiliar terminology, comprehension check I2, I6
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56)	Nuclear Hazards and Safety	Nuclear Hazards and Safety – vocabulary, reading new words and expressions, explaining their meaning
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58)	Sewage I (I1, I2)	Sewage – reading and translating, explaining new terminology, I3, I5, I6
59)	Sewage II (I1, I3)	Sewage II – practical use of the acquired vocabulary, discussion on environmental impact, I2, I5
60)	<i>Preliminary Exam Analysis (I6)</i>	Revision of the covered chapters and grammar I4, I5, I6

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REFERENCES (compulsory/optional):

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Safety and Health Magazine (online)

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Exams for the academic year: 2022/2023

Exam dates:	According to the schedule of exams for academic year
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Karlovac University of Applied Sciences

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According to schedule of the Department of
Safety and Protection



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General information

Course title:	Engleski jezik I (1/2) i Engleski jezik I (2/2)
ISVU ¹ course code:	170168 (SZ107) / 170170 (SZ107)
Studies in which the course is taught:	Safety and Protection
Course Instructor:	Mirjana Cibulka, mag.educ.angl.et ital., lecturer
Course Assistant:	/
ECTS credits:	3.0
Semester of the course execution:	1 and 2
Academic year:	2022/2023
Exam prerequisites:	/
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	grammatical structures in English		
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Attendance (active participation)	Term paper	Essay	Presentation	Continuous assessment and evaluation (Blitz tests)	Practical Work
0.50					0.50
Independent work	Project	Written Exam	Oral Exam	Other	
		1	1		



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Review of topics/units per week associated with learning outcomes

Week	Lectures topics/units and learning outcomes:	Tutorials topics/units and learning outcomes:
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2)	Safety at Work (I1, I2, I3)	<u>S</u> afety at Work – reading and translating, analysis of unfamiliar words, Word Families I2, I5, I6
3)	Machine Safety (I1, I4)	<u>M</u> achine Safety – asking questions, answering questions, reading and analysis, synonyms and antonyms, I5, I6
4)	Noise Protection, Tenses II – active (I1, I4)	<u>N</u> oise Protection – translation, highlighting language structures in professional texts, forming dialogues, tense revision, I2, I3, I5, I6
5)	Vibration (I1, I2)	<u>V</u> ibration – vocabulary, reading new words and expressions, explaining their meaning, I4, I5
6)	Heating (I1, I2)	<u>H</u> eating – reading and translating, possessives', I4, I5, I6
7)	Heating II, Plural (I1, I4)	<u>H</u> eating II - Outdoor and Indoor Heating, noun plural, I2, I3, I6
8)	Lighting (I1, I3)	<u>L</u> ighting – reading and translating, types of lighting systems, discussion on the importance of good lighting, I2, I6
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10)	Electricity Safety, Tenses II – active(I1, I4)	<u>E</u> lectricity Safety – reading and translating, introducing a dialogue on protection against electric shock, tense revision, I2, I3, I5, I6
11)	Explosions I (I1, I3)	<u>E</u> xplosions – reading and translating, vocabulary, I4, I5, I6
12)	Explosions II (I1)	<u>E</u> xplosions II – questions and answers in oral and written form I2
13)	Safety in Transportation I, Tenses II – active (1)	<u>S</u> afety in Transportation – discussion on safety in transportation, types of car accidents, tense revision, I2, I3, I4
14)	Safety in Transportation II (I1, I3)	<u>S</u> afety in Transportation II – analysing traffic signs, developing a dialogue on pedestrian and cyclists safety in traffic, I2, I5
15)	<i>Preliminary Exam 1(I, I2, I3,I4, I5, I6)</i>	
16)	Safety at Home (I1, I3)	<u>R</u> evision of the covered chapters and content, I4, I5, I6 Safety at Home –reading, asking and answering questions in written and spoken form, I2, I4
17)	Passive (I2, I3, I4)	E-mail, revision of the passive form I1 I3, I4
18)	Safety in the Bathroom (I1, I3)	<u>S</u> afety in the Bathroom – reading and translating, passive form revision, I2, I4, I6



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19)	Safety at School (I1, I5)	Safety at School – text elaboration, analysis of unfamiliar words, discussion on safety at school and possible sources of hazards, I2, I3
20)	Safety in the Yard (I1, I6)	Safety in the Yard – reading and translating, analysis of unfamiliar words, introducing various types of tools, I3, I5
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22)	Chemical and Biological Hazards I (I1, I2)	Chemical and Biological Hazards I – reading and translating – asking questions to initiate a discussion, I3, I6
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29)	Sewage II (I1, I3)	Sewage II – practical use of the acquired vocabulary, discussion on environmental impact, I2, I5
30)	<i>Preliminary Exam Analysis (I6)</i>	Revision of the covered chapters and grammar I4, I5, I6

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REFERENCES (compulsory/optional):

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Contact info:

1. Course instructor/lecturer	Mirjana Cibulka, mag. educ., lecturer
e-mail:	mirjana.cibulka@vuka.hr
Office hours:	Kabinet 212, Trg J. J. Strossmayera 9



VELEUČILIŠTE U KARLOVCU
Karlovac University of Applied Sciences

SYLLABUS PREDMETA

	According to schedule of the Department of Safety and Protection
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SYLLABUS PREDMETA

General information

Course title:	Engleski jezik II (1/2) and Engleski jezik II (2/2)
ISVU ¹ course code:	170227 (SZ107) / 170228 (SZ107)
Studies in which the course is taught:	Safety and Protection
Course Instructor:	Mirjana Cibulka, mag.educ.angl.et ital., lecturer
Course Assistant:	/
ECTS credits:	3.0
Semester of the course execution:	1 and 2
Academic year:	2022/2023
Exam prerequisites:	/
Lectures are given in a foreign language:	English language
Aims:	Development of productive and receptive language skills (listening, speaking, reading and writing) and expansion of language and grammatical structures (vocabulary, communication samples, phonological and orthographic characteristics) as well as development of general vocabulary and phraseology related to Safety and Protection; learning competencies necessary for life-long learning, that is, learning to communicate in the conditions of increased international mobility and unstable labour market, motivating independent learning and raising awareness of intercultural aspects.

Course Structure

Course type	Number of contact hours per week:	Number of contact hours per semester:	Student's requirements by type of teaching:
Lectures:	1	15	Attendance – 60%
Tutorials:	1	15	Attendance – 60%
Practical (lab) sessions:	/	/	
Seminars:	/	/	
Field work:	/	/	
Other:	/	/	
TOTAL:	2	30	

Monitoring of students' work, knowledge evaluation and learning outcomes

Grade formation during course implementation: (Define 5-10 learning outcomes)	LEARNING OUTCOMES (upon completion of the course the student should be able to:)	FACTORS AFFECTING THE GRADE (e.g. term paper, practical work, presentation, ...)	MAXIMUM NUMBER OF POINTS PER FACTOR
	I1: Extract required information from written and/or listened speech of the related profession	Final Exam*	Final Exam – 60 points Oral examination – 40 points **
	I2: Form a simple text on the subject-matter related to the profession and/or personal interest on the basis of given information	Final Exam*	
	I3: Discuss on subject-matter related to the profession as well as personal interest	Final Exam*	
	I4: Distinguish word types and	Final Exam*	



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	grammatical structures in English		
	I5: Explain simpler terms and definitions related to the profession and language	Final Exam*	
	I6: Connect appropriate language and grammatical structures in mother tongue and in English	Final Exam*	
Alternative formation of the grade (I5 – I10)	or alternative formation of the grade Written exam 60 points Oral exam 30 points Cooperation** 10 points		Total: 100 points
Students' competencies	Being able to use the English language to communicate in a personal and professional environment; knowledge of specific terminology and its use in written and spoken language. Independent application of the source of knowledge for the purpose of further education and meeting one's personal and professional needs; independent use of professional literature in a foreign language and application of the acquired know-how in unfamiliar situations.		

***Note:** Due to the specific nature of the course the related learning outcome should be continuously monitored.

****Note:** The lecturer holds the right to, partially or in full, exempt certain students from the oral part of the examination if the students have shown a high level of motivation for the course; if they were always prepared, discussed content, brought or commented additional material.

Prerequisites for course approval (lecturer's signature):	Attendance 80%
Prerequisites for taking exams:	According to the Regulations on student assessment of Karlovac University of Applied Sciences, Article 9, Paragraph 5) 90-100 - excellent (5) (A) 80 to 89.9 - very good (4) (B) 65 to 79.9 - good (3) (C) 60 to 64.9 - sufficient (2) (D) 50 to 59.9 sufficient (2) (E) 0 to 49.9 – fail (1) (F)

ECTS structure

ECTS credits allocated to the course reflect total student load during course implementation. Total contact hours, relative difficulty of the content, effort required for exam preparation, as well as, every other possible load is taken in account:

Attendance (active participation)	Term paper	Essay	Presentation	Continuous assessment and evaluation (Blitz tests)	Practical Work
0.50					0.50
Independent work	Project	Written Exam	Oral Exam	Other	
		1	1		



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Review of topics/units per week associated with learning outcomes

Week	Lectures topics/units and learning outcomes:	Tutorials topics/units and learning outcomes:
1)	Safety (I1, I3)	<u>S</u> afety – introduction, course presentation, definitions of safety, measures and risks I2, I5
2)	Safety at Work (I1, I2, I3)	<u>S</u> afety at Work – reading and translating, analysis of unfamiliar words, Word Families I2, I5, I6
3)	Machine Safety (I1, I4)	<u>M</u> achine Safety – asking questions, answering questions, reading and analysis, synonyms and antonyms, I5, I6
4)	Noise Protection, Tenses II – active (I1, I4)	<u>N</u> oise Protection – translation, highlighting language structures in professional texts, forming dialogues, tense revision, I2, I3, I5, I6
5)	Vibration (I1, I2)	<u>V</u> ibration – vocabulary, reading new words and expressions, explaining their meaning, I4, I5
6)	Heating (I1, I2)	<u>H</u> eating – reading and translating, possessives', I4, I5, I6
7)	Heating II, Plural (I1, I4)	<u>H</u> eating II - Outdoor and Indoor Heating, noun plural, I2, I3, I6
8)	Lighting (I1, I3)	<u>L</u> ighting – reading and translating, types of lighting systems, discussion on the importance of good lighting, I2, I6
9)	Ventilation (I1, I2)	<u>V</u> entilation – vocabulary, explaining words and expressions, I3, I5
10)	Electricity Safety, Tenses II – active(I1, I4)	<u>E</u> lectricity Safety – reading and translating, introducing a dialogue on protection against electric shock, tense revision, I2, I3, I5, I6
11)	Explosions I (I1, I3)	<u>E</u> xplosions – reading and translating, vocabulary, I4, I5, I6
12)	Explosions II (I1)	<u>E</u> xplosions II – questions and answers in oral and written form I2
13)	Safety in Transportation I, Tenses II – active (1)	<u>S</u> afety in Transportation – discussion on safety in transportation, types of car accidents, tense revision, I2, I3, I4
14)	Safety in Transportation II (I1, I3)	<u>S</u> afety in Transportation II – analysing traffic signs, developing a dialogue on pedestrian and cyclists safety in traffic, I2, I5
15)	<i>Preliminary Exam 1(I, I2, I3,I4, I5, I6)</i>	
16)	Safety at Home (I1, I3)	<u>R</u> evision of the covered chapters and content, I4, I5, I6 Safety at Home –reading, asking and answering questions in written and spoken form, I2, I4
17)	Passive (I2, I3, I4)	E-mail, revision of the passive form I1 I3, I4
18)	Safety in the Bathroom (I1, I3)	<u>S</u> afety in the Bathroom – reading and translating, passive form revision, I2, I4, I6



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19)	Safety at School (I1, I5)	Safety at School – text elaboration, analysis of unfamiliar words, discussion on safety at school and possible sources of hazards, I2, I3
20)	Safety in the Yard (I1, I6)	Safety in the Yard – reading and translating, analysis of unfamiliar words, introducing various types of tools, I3, I5
21)	Special Workplace Safety Rules, Tenses III – passive (I1, I4, I5)	Special Workplace Safety Rules
22)	Chemical and Biological Hazards I (I1, I2)	Chemical and Biological Hazards I – reading and translating – asking questions to initiate a discussion, I3, I6
23)	Chemical and Biological Hazards I (I1, I2)	Chemical and Biological Hazards II – analysis of danger signs, vocabulary, I3, I5
24)	Properties of Harmful Substances (I1)	Properties of Harmful Substances – categorising harmful substances, translating unfamiliar terminology, comprehension check I2, I6
25)	Effects of Harmful Substances, Comparison (I1, I3)	Effects of Harmful Substances, Comparative – discussion on text, reading and vocabulary analysis, comparison exercises, I2, I5, I6
26)	Nuclear Hazards and Safety	Nuclear Hazards and Safety – vocabulary, reading new words and expressions, explaining their meaning
27)	Nuclear Accidents (I1, I4)	Nuclear Accidents – informing on nuclear accidents, I3
28)	Sewage I (I1, I2)	Sewage – reading and translating, explaining new terminology, I3, I5, I6
29)	Sewage II (I1, I3)	Sewage II – practical use of the acquired vocabulary, discussion on environmental impact, I2, I5
30)	<i>Preliminary Exam Analysis (I6)</i>	Revision of the covered chapters and grammar I4, I5, I6

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REFERENCES (compulsory/optional):

Compulsory: Horvatić, Miroslav, English for Safety Engineers, Karlovac University of Applied Sciences, 2008

Optional: Eastwood, Oxford Guide to English Grammar, 1994.;

<https://www.perfect-english-grammar.com/grammar-exercises.html>

Safety and Health Magazine (online)

<https://www.safetyandhealthmagazine.com/>

Exams for the academic year: 2022/2023

Exam dates:	According to the schedule of exams for academic year
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Contact info:

1. Course instructor/lecturer	Mirjana Cibulka, mag. educ., lecturer
e-mail:	mirjana.cibulka@vuka.hr
Office hours:	Kabinet 212, Trg J. J. Strossmayera 9



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Karlovac University of Applied Sciences

SYLLABUS PREDMETA

According to schedule of the Department of
Safety and Protection



SYLLABUS PREDMETA

General information

Course title:	Application of computers
ISVU ¹ course code:	38438, 115147
Studies in which the course is taught:	Professional study: Safety and protection
Course Instructor:	Damir Kralj, PhD, college professor
Course Assistant:	-
ECTS credits:	5
Semester of the course execution:	II. semester
Academic year:	2022/2023
Exam prerequisites:	no
Lectures are given in a foreign language:	yes
Aims:	The aim of the course is to train students that thru the analysis of the development of information and communication technology appreciate and understand the importance of the use of computers as a necessary and unavoidable means of work as generally in various fields of human activities, but also for their own business and personal use.

Course

Course structure	Number of contact hours per week:	Number of contact hours per semester:	Student's requirements by type of teaching:
Lectures:	2	30	attendance 80%
Tutorials:			attendance 80%
Practical (lab) sessions:	3	45	
Seminars:			
Field work:			
Other:			
TOTAL:	5	75	

Monitoring of students' work, knowledge evaluation and learning outcomes

Formation of the grade during the implementation of teaching: (Define from minimum 5 to maximum 10 learning outcomes)	LEARNING OUTCOMES (upon completion of the course the student should be able to:)	FACTORS AFFECTING THE GRADE (e.g. term paper, practical work, presentation, ...)	MAXIMUM NUMBER OF POINTS PER FACTOR
	I1: Explain the historical and technological development of computers, and its impact on modern computer systems	Short tests/Exam	Coloquium of exercises I&II – 30 points
	I2: Describe the functional concept of the personal computer, and the type and purpose of peripheral devices	Short tests/Exam	Class att.and activity – 10 points
	I3: Present the classification and organization of modern computer networks	Short tests/Exam	Term paper- 30 points
	I4: Distinguish types of software and their application areas	Term paper	Exam/Short test - 30 points
	I5: Distinguish the types of harmful effects and the ways of their prevention	Term paper	

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	I6: Demonstrate acquired knowledge, to independently operate the office and graphics software support	Colloquium	
Alternative formation of the grade (I1 – I10)	or alternative formation of the grade: I1 - I6 Oral exam in the case of no accession or unsuccessfully solved the short tests – up to 30% of the final grade		TOTAL: 100 points
Students' competencies	Students will be able to successfully apply the acquired knowledge in their future work environments ranging from the use of computers and program support in their daily work, to the active participation and independent decision-making during the introduction of new or expansion of existing forms of computer support. Based on the knowledge acquired in class and successfully worked out laboratory exercises tasks, students will gain general and professional competencies for independent use of office software tools (word processing, spreadsheet, presentation material production), use of basic tools for engineering graphics (MS Visio), and the use of Internet services and data exchange computer networks in a secure manner.		

Prerequisites for course approval (lecturer's signature):	Class attendance a minimum of 80%, passed the colloquium of exercises and rated term paper.
Prerequisites for taking exams:	Passed colloquium of exercises and rated term paper
Grading scale:	(According to the Regulations on student assessment of Karlovac University of Applied Sciences, Article 9, Paragraph 5) 90-100 - excellent (5) (A) 80 to 89.9 - very good (4) (B) 65 to 79.9 - good (3) (C) 60 to 64.9 - sufficient (2) (D) 50 to 59.9 - sufficient (2) (E) 0 to 49.9 – fail (1) (F) Students are graded during class, what forms 70% of final exam. Students who achieve 50% (35 points) and more are allowed to take the final exam. The score on final exam makes 30% of the final grade.

ECTS structure

ECTS credits allocated to the course reflect the total burden to the student during adoption of the course content. Total contact hours, relative gravity of the content, effort required for exam preparation, as well as, every other possible burden are taken in account:

Attendance (active participation)	Term paper	Composition	Presentation	Continuous assessment and evaluation	Practical work
0.5	1.5			1.5	
Independent work	Project	Written exam	Oral exam	Other	
		1.5	(1.5)		

Review of topics/units per week associated with learning outcomes

Week	Lectures topics/units and learning outcomes:	Tutorials topics/units and learning outcomes:
1.	Introduction to the course, definitions of basic terms: I1	Introduction to equipment in the computer cabinet and the rules of behavior while performing the exercises, content analysis exercises, the basics of using the available



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		hardware and software support: I1, I2
2.	Technological development of the computers: calculative machines, the beginnings of computers, computer systems: I1	Microsoft Word: presentation of the operating environment, formatting pages, text formatting: I4
3.	Characteristics of modern computer systems: the properties of the 5th generation of computers: I2	Microsoft Word: inserting and formatting of tables, figures, symbols and formulas: I4
4.	Stages of development of the computer systems on the Croatian territory: I1	Microsoft Word: advanced text formatting, mail merge, print design: I4
5.	Classification of modern computers according to: processor type, operation purpose: I3	Microsoft Excel: presentation of the working environment, constant arrays, formatting of tables: I4
6.	Structure of the personal computer and the types of peripheral devices: I2	Microsoft Excel: addressing cells, insertion and relocation, formulas and functions: I4
7.	Basics of computer networks and open systems: I3	Microsoft Excel: conditional formatting of the cells, types and formatting of the charts, printing: I4
8.	Software support: types, classification, rights and conditions of use, education, certification: I4	Repetition of the first unit of exercises: I6
9.	Operating systems: OS based on command prompt, OS with GUI: I4	Microsoft PowerPoint: introduction, slide master, design and animation: I4
10.	The integrated office packages: types, content and possibilities: I4	Microsoft Access: The presentation of the working environment, organization and review of development tools: I4
11.	Computer graphics: software support for design and engineering graphics: I4	Microsoft Access: creating database tables, keys and relationships, referential integrity, import data from Excel and text files: I4
12.	Data compression on digital media: types and file formats: I4	Microsoft Access: designing queries, relationships, reports, printouts: I4
13.	Internet services, use of email, data exchange via computer networks: I4	Microsoft Visio: presentation of the working environment, introduction to templates, design the work area (page): I4
14.	Protection of the computer data against loss and external harmful influences: I5	Microsoft Visio: organizational diagrams, engineering drawings, construction and architectural drawings, electrical and electronic schemes, printouts: I4
15.	Ergonomic considerations and possibilities of improving the human-computer communication: I1	Continuous knowledge assessment: Preliminary exam (colloquium): I6

References

REFERENCES (compulsory/additional):

Compulsory:

Kralj, D., Primjena računala, Veleučilište u Karlovcu, Karlovac, 2018.

Roller, D., Informatički priručnik, Informator, Zagreb, 1996.

Smiljanić, G., Osnove digitalnih računala, Šolska knjiga, Zagreb, 1990.

ITdesk.Info, Microsoft Office 2010, ODRAZI, Zagreb, 2011.

ITdesk.Info, Računalna sigurnost, CARNET, Zagreb, 2011.

Additional:

Grbavac, V., Informatika, kompjuteri i primjena, HDZP, Zagreb, 1995.

Ribarić, S., Arhitektura računala pete generacije, Tehnička knjiga, Zagreb, 1986



SYLLABUS PREDMETA

Exams for the academic year: 2022./ 2023.

Exam dates:

According to the schedule of exams for academic year.

Contact information

1. Course Instructor/Lecturer:	Damir Kralj, PhD, college professor
e-mail:	damir.kralj@vuka.hr
Office hours / Consultations:	after classes, with email announcement
2. Course Instructor/Lecturer:	-
e-mail:	-
Office hours / Consultations:	-



SYLLABUS PREDMETA

General information

Course title:	Safety in Using Electric Energy
ISVU ² course code:	171332, 83286
Studies in which the course is taught:	Professional study: Safety and protection
Course Instructor:	Damir Kralj, PhD, college professor
Course Assistant:	-
ECTS credits:	5
Semester of the course execution:	V. semester
Academic year:	2022/2023
Exam prerequisites:	no
Lectures are given in a foreign language:	yes
Aims:	Acquaint students with the properties and specifics of electricity and electrical systems, electrical installations and plants, regulations in the application of electrical energy, procedures for performing work on EE plants, protection against electric shock and providing first aid to victims of effects of electricity.

Course

Course structure	Number of contact hours per week:	Number of contact hours per semester:	Student's requirements by type of teaching:
Lectures:	2	30	attendance 80%
Tutorials:	2	30	attendance 80%
Practical (lab) sessions:			
Seminars:			
Field work:			
Other:			
TOTAL:	4	60	

Monitoring of students' work, knowledge evaluation and learning outcomes

Formation of the grade during the implementation of teaching: (Define from minimum 5 to maximum 10 learning outcomes)	LEARNING OUTCOMES (upon completion of the course the student should be able to:)	FACTORS AFFECTING THE GRADE (e.g. term paper, practical work, presentation, ...)	MAXIMUM NUMBER OF POINTS PER FACTOR
	I1: describe basic terms in electrical engineering		Colloquium of exercises – 30 points
	I2: distinguish between direct current and alternating electrical systems		
	I3: learn and describe what is magnetism		Class attend activity – 10 points
	I4: distinguish between single-phase and three-phase AC systems and their application		
	I5: get to know and describe basic terms in electrical installations		Term paper- 30 points
	I6: become familiar with protective measures against overvoltage and touch voltage		
	I7: recognize and describe documents for work on EE plants		Oral exam - 30 points
	I8: distinguish and describe danger zones in EE plants		

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	I9: describe and apply first aid procedures for electric shock	
	I10: become familiar with OZS when working on electrical systems	
Alternative formation of the grade (I 1 – I 10)	Successfully written midterm exam – up to 30% of the final grade (alternative for oral exam)	TOTAL: 100 points
Students' competencies	Apply acquired knowledge in the performance of security and protection specialist jobs.	

Prerequisites for course approval (lecturer's signature):	Class and exercises attendance a minimum of 80%, passed the colloquium of exercises and rated term paper.
Prerequisites for taking exams:	Passed colloquium of exercises and rated term paper
Grading scale:	<p>(According to the Regulations on student assessment of Karlovac University of Applied Sciences, Article 9, Paragraph 5)</p> <p>90-100 - excellent (5) (A) 80 to 89.9 - very good (4) (B) 65 to 79.9 - good (3) (C) 60 to 64.9 - sufficient (2) (D) 50 to 59.9 - sufficient (2) (E) 0 to 49.9 – fail (1) (F)</p> <p>Students are graded during class, what forms 70% of final exam. Students who achieve 50% (35 points) and more are allowed to take the final exam. The score on final exam makes 30% of the final grade.</p>

ECTS structure

ECTS credits allocated to the course reflect the total burden to the student during adoption of the course content. Total contact hours, relative gravity of the content, effort required for exam preparation, as well as, every other possible burden are taken in account:					
Attendance (active participation)	Term paper	Composition	Presentation	Continuous assessment and evaluation	Practical work
0.4	1.2				
Independent work	Project	Written exam (colloquium)	Oral exam (midterm exam)	Other	
		1.2	1.2		

Review of topics/units per week associated with learning outcomes

Week	Lectures topics/units and learning outcomes:	Tutorials topics/units and learning outcomes:
1.	Basics of electrical engineering - structure of atoms, electrostatics, direct currents I1	Tutorials
2.	Basics of electrical engineering - electromagnetism, alternating currents I2, I3	Tutorials
3.	Basics of electrical engineering - three-phase system I4	Tutorials
4.	Protection against static electricity I1	Tutorials
5.	Classification of electrical devices with regard to protection against electric shock I5, I6	Tutorials
6.	Norms for the construction of overhead EE lines with nominal voltages 1 - 400 kV I5, I6	Tutorials
7.	Grounding devices I5, I6	Tutorials



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8.	Safety measures when making electrical installations in buildings I5, I6	Presentations of term papers
9.	Safety measures when working on electric power systems I6, I7	Presentations of term papers
10.	High-voltage electrical power plants I8	Presentations of term papers
11.	Documents for work on electric power plants I7	Presentations of term papers
12.	Lightning rods and surge protection I6, I8	Presentations of term papers
13.	Electrical devices and installations in areas endangered by explosive atmospheres I5, I6	Presentations of term papers
14.	Freeing the victim from the electrical circuit and first aid I9	Presentations of term papers
15.	Acquaintance with regulations in the handling of electricity I6, I7, I10	Presentations of term papers

References

REFERENCES (compulsory/additional):

Compulsory:

Kralj, Damir (2022.), SUPEE - prezentacije s predavanja.

Ožanić, Boris (2016.), Sigurnost u primjeni el. energije - skripta, Veleučilište u Karlovcu

Kacian, Nenad (1988.), Osnove zaštite na radu, IPROZ, Zagreb

Additional:

Bego, Vojislav (2003.), Mjerenja u elektrotehnici - 9. izdanje, Graphis, Zagreb

HEP (2001.), Bilten 94: Pravila i mjere sigurnosti na radu, HEP - INTERNO

ETD (1994), Zbirka propisa iz elektrotehničke struke, EDZ

Exams for the academic year: 2022./ 2023.

Exam dates:	According to the schedule of exams for academic year.
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Contact information

1. Course Instructor/Lecturer:	Damir Kralj, PhD, college professor
e-mail:	damir.kralj@vuka.hr
Office hours / Consultations:	after classes, with email announcement
2. Course Instructor/Lecturer:	-
e-mail:	-
Office hours / Consultations:	-



SYLLABUS PREDMETA

General information

Course title:	Computational Ergonomics
ISVU ³ course code:	238475; 238476
Studies in which the course is taught:	Professional study: Safety and protection
Course Instructor:	Damir Kralj, PhD, college professor
Course Assistant:	-
ECTS credits:	5
Semester of the course execution:	V. semester
Academic year:	2022/2023
Exam prerequisites:	no
Lectures are given in a foreign language:	yes
Aims:	Familiarize students with computer ergonomics, computer peripherals and software support. Updating knowledge on the existing basics of ergonomics in the context of workplaces at the computer, both in everyday and in specific areas of computer application. Analysis of human-machine interactions, especially human-computer interactions. Analysis of users' abilities, limitations and health risks. Historical and technological development of computer user interfaces. Definition and understanding of the concept of universal design in everyday life and its application for the development of a digital inclusive society. Definition and analysis of the accessibility of software solutions for web and mobile platforms. Definition and specific examples of assistive technologies and analysis of the possibilities of new technologies (augmented and virtual reality, holographic technologies, haptic interfaces, BCI) as assistive technologies. Introduction to the concept of assisted communication for people with complex communication needs and examples of program solutions for its implementation. Presentation of multidisciplinary research in this field.

Course

Course structure	Number of contact hours per week:	Number of contact hours per semester:	Student's requirements by type of teaching:
Lectures:	2	30	attendance 80%
Tutorials:	2	30	attendance 80%
Practical (lab) sessions:			
Seminars:			
Field work:			
Other:			
TOTAL:	4	60	

Monitoring of students' work, knowledge evaluation and learning outcomes

Formation of the grade during the implementation of teaching: (Define from minimum 5 to maximum 10 learning outcomes)	LEARNING OUTCOMES (upon completion of the course the student should be able to:)	FACTORS AFFECTING THE GRADE (e.g. term paper, practical work, presentation, ...)	MAXIMUM NUMBER OF POINTS PER FACTOR
	I1: recognize the importance of norms and legal solutions in the field of ergonomics	Exam	Colloquium of exercises – 30 points
	I2: explain the basic principles of human-computer communication	Exam	

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	and the usability of elements of computer systems		Class attend activity – 10 points
	I3: analyze possible health risks in the workplace with computers	Exam	
	I4: recognize the importance and need for universal design and the diversity of ICT system users	Exam	Term paper- 30 points Oral exam - 30 points
	I5: recognize the needs of users with disabilities and recognize adequate assistive technology for interacting with the computer	Exam	
	I6: independently design ergonomically acceptable screen forms	Colloquium	
	I7: independently analyze the properties and quality of assistive solutions and elements for improving digital accessibility and inclusiveness	Term paper	
Alternative formation of the grade (I1 – I10)	or alternative formation of the grade: I1 – I5 Successfully written midterm exam – up to 30% of the final grade (alternative for oral exam)		TOTAL: 100 points
Students' competencies	Apply acquired knowledge about ergonomics in the application of computers, computer peripherals and software support in the design of existing and future computer workplaces. Apply the acquired knowledge and contribute to the application of assistive technologies and the design of workplaces based on the principles of universality and inclusiveness.		

Prerequisites for course approval (lecturer's signature):	Class and exercises attendance a minimum of 80%, passed the colloquium of exercises and rated term paper.
Prerequisites for taking exams:	Passed colloquium of exercises and rated term paper
Grading scale:	(According to the Regulations on student assessment of Karlovac University of Applied Sciences, Article 9, Paragraph 5) 90-100 - excellent (5) (A) 80 to 89.9 - very good (4) (B) 65 to 79.9 - good (3) (C) 60 to 64.9 - sufficient (2) (D) 50 to 59.9 - sufficient (2) (E) 0 to 49.9 – fail (1) (F) Students are graded during class, what forms 70% of final exam. Students who achieve 50% (35 points) and more are allowed to take the final exam. The score on final exam makes 30% of the final grade.

ECTS structure

ECTS credits allocated to the course reflect the total burden to the student during adoption of the course content. Total contact hours, relative gravity of the content, effort required for exam preparation, as well as, every other possible burden are taken in account:

Attendance (active participation)	Term paper	Composition	Presentation	Continuous assessment and evaluation	Practical work
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0.5	1.5				
Independent work	Project	Written exam (colloquium)	Oral exam (midterm exam)	Other	
		1.5	1.5		

Review of topics/units per week associated with learning outcomes

Week	Lectures topics/units and learning outcomes:	Tutorials topics/units and learning outcomes:
1.	Introduction to the field of ergonomics. Definition, types and fields of application of ergonomics. I1	Introduction to the subject area and organization of exercises. Description of topics for workshops. I1, I2
2.	Traditional and modern approach to the ergonomics of the workplace at the computer. I1, I2	Workplace at the computer. Possibilities of improvement. Aids. Methods of preserving health. I2, I3, I4
3.	Man-machine system. Ergonomics of computer equipment. I2	Processing examples in the command line application. Interactive and default single-task (batch) mode of operation. Real-time processing. Examples of improving working shells. I2, I6
4.	Health risks at the workplace with computer equipment and how to prevent them I3	Processing of examples in the application of graphic and visual user interfaces. Direct manipulation. I2, I6
5.	Human-computer interaction. User capabilities and limitations. I2, I3	Practical examples of improving human-computer communication by adjusting visual and sound parameters of program interfaces. Elements of contextual help. I2, I6
6.	Usability: definitions and standardization (ISO / NIST), measurement methods I1, I2	Examples of methods of evaluating and measuring the usability of software support. I1, I2, I6
7.	Human senses and practical application of the principles of the psychological approach in the design of user interfaces. I2, I4	Creating an example of an ergonomically acceptable program support interface (MS Access) and evaluating the results. I4, I6
8.	Development and application of user interfaces. Command line (CLI). Interactive systems. I2, I4	Workshop: Mobile and classic computer graphic interfaces. Advantages and disadvantages of natural user interfaces. Acceptability and accessibility of websites. I7
9.	Graphical and visual user interfaces (GUI, VUI) and direct manipulation (DM) I2, I4	Workshop: Advanced User Interfaces. Application of haptic interfaces and holograms. Virtual and augmented reality. Brain-computer interface. I7
10.	Haptic and natural user interfaces (HUI, NUI), brain-computer interface (BCI) I2, I4	Workshop: Intelligent user interfaces. Application of digital assistants (agents). Machine learning and artificial intelligence I7
11.	Basics of intelligent user interfaces (IUI) and application of artificial intelligence (AI) I2, I4	Workshop: Assistive technologies to help deaf and hard-of-hearing people work. I7
12.	Application of holographic elements in the context of virtual and augmented reality (VR, AR) I2, I4	Workshop: Assistive technologies to help blind and partially sighted people in life and work. I7
13.	Assistive technologies and assisted communication based on modern technological solutions. I4, I5	Workshop: Assistive technologies to help children and adults with dyslexia in life and work. I7
14.	Digital accessibility and inclusiveness of society. User demographics in the context of digital technologies. I4, I5	Workshop: Methods of improving digital accessibility and inclusiveness of society. Contemporary factors of acceleration of digital transformation. I7
15.	Mid-term exam I1-I5	Colloquium I6

References



SYLLABUS PREDMETA

REFERENCES (compulsory/additional):

Compulsory:

Kralj, Damir (2021.), Računalna ergonomija - prezentacije s predavanja.
Shneiderman, Ben; Plaisant, Catherine; Cohen, Maxine; Jacobs, Steven (2009.), Designing the User Interface: Strategies for Effective Human-Computer Interaction, Addison-Wesley.
Kirin, Snježana (2019), Uvod u ergonomiju, Veleučilište u Karlovcu.

Additional:

Kralj, Damir (2018), Primjena računala, Veleučilište u Karlovcu.
Nielsen, Jakob (1993), Usability Engineering, Morgan Kaufman.
ICT-AAC (2014.), Katalog znanja o potpomognutoj komunikaciji, Sveučilište u Zagrebu, Fakultet elektrotehnike i računarstva.

Exams for the academic year: 2022./ 2023.

Exam dates:	According to the schedule of exams for academic year.
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Contact information

1. Course Instructor/Lecturer:	Damir Kralj, PhD, college professor
e-mail:	damir.kralj@vuka.hr
Office hours / Consultations:	after classes, with email announcement
2. Course Instructor/Lecturer:	-
e-mail:	-
Office hours / Consultations:	-



SYLLABUS PREDMETA

General information

Course title:	Fire and explosion protection technology		
ISVU ⁴ course code:	39245, 115364		
Studies in which the course is taught:	Professional Study of Safety and Protection		
Course Instructor:	Zvonimir Matusinović, PhD, senior lecturer		
Course Assistant:	-		
ECTS credits:	5.0		
Semester of the course execution:	IV.		
Academic year:	2022/2023		
Exam prerequisites:	No		
Lectures are given in a foreign language:	English		
Aims:	The aim of the course is to give students basic knowledge and skills to identify possible emergent types and shapes of risks of fire and explosion in the areas of economic and social activities for the sake of enabling effecting planning, programming, monitoring, coordination and executive management assignments and tasks to ensure the safety and protection from fire and explosion including from the (malicious) dangerous actions endangering the internal technological, procedural, technical, operational and commercial fire and explosion safety and security. Students will be able to independently recognize typical threatening fire and explosion risk of internal and external nature and to estimate, explain and suggest the need to change/introduce the necessary procedural, operational and technical measures and actions in the field of engineering SiZoPiE. They will be able, as well, to plan and manage simple jobs and tasks of the SiZoPiE in accordance with general and special regulations governing the area of safety and security, including the necessary cooperation with companies authorized for diagnostics and maintenance of technical systems of SiZoPiE, with the competent inspection services, the fire department, with the police and with other national and internal security services and protection.		

Course

Course structure	Number of contact hours per week:	Number of contact hours per semester:	Student's requirements by type of teaching:
Lectures:	2	30	Attendance 80%
Tutorials:	2	30	Attendance 100%
Practical (lab) sessions:	-	-	
Seminars:	-	-	
Field work:	-	-	
Other:	-	-	
TOTAL:	4	60	

Monitoring of students' work, knowledge evaluation and learning outcomes

(Define exactly six learning outcomes)	LEARNING OUTCOMES (upon completion of the course the student should be able to:)	FACTORS AFFECTING THE GRADE (e.g. term paper, practical work, presentation, ...)	MAXIMUM NUMBER OF POINTS PER FACTOR
	II: Enumerate and describe the main characteristics of the basics features of each	Preliminary exam I	

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	<p>of the possible manifestations of types and forms of fire and explosion in closed and open spaces depending on the typical characteristic of the space/activities/processes.</p>		
	<p>I2: Explain the characterizing types and forms of appearance of the risk of fire and explosion in the most vulnerable economic and assorted activities and possibilities (places, conditions and circumstances) of their realisation.</p>	[Preliminary exam I]	
	<p>I3: Distinguish prescribed systems of general and special safety and protection from fire and explosions (SiZoPiE) at national, regional and local level and in the framework of individual fire and/or explosion especially vulnerable activities/company/production of work processes (their indicative structure and content).</p>	[Preliminary exam II]	
	<p>I4: Classify and describe the characteristics of the general and specific regulations and activities of SiZoPiE in companies that handle the large quantities of fire and explosion hazardous substances.</p>	[Preliminary exam II]	
	<p>I5: Enumerate and describe how it works and compare the effectiveness of modern technical systems and available technical solutions in the field of engineering SiZoPiE.</p>	[Preliminary exam III]	
	<p>I6: Propose optimal types of technical systems of fire and explosion safety and security and the regulations established appropriate operational measures, activities and actions of SiZoPiE, depending on the types and forms of the present fire and/or explosion hazards and characteristics of available system.</p>	[Preliminary exam III]	
Alternative formation of the grade (I1 – I6)	<p>or alternative formation of the grade: I1 – I6</p> <p>Three (3) preliminary exams will be held during the course so students will have possibility to become free of the written exam. In order to become free of the written exam, student should access to all three preliminary exams and get positive grade (sufficient to excellent). If student does not access to only one preliminary exam or one of them is graded insufficient, student is obligated to attend the written exam.</p> <p>3 Preliminary exams/written exam 60 points Oral exam 40 points Total: 100 points</p>		TOTAL: 100 points
Students' competencies	<p>Students will be given basic knowledge and skills to identify possible emergent types and shapes of risks of fire and explosion in the areas of economic and social activities for the sake of enabling effecting planning, programming, monitoring, coordination and executive management assignments and tasks to ensure the safety and protection from fire and explosion including from the (malicious) dangerous actions endangering the internal technological, procedural, technical, operational and commercial fire and explosion safety and security. Students will be able to independently recognize typical threatening fire and explosion risk of internal and external nature and to estimate, explain and suggest the need to change/introduce the necessary procedural,</p>		



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	operational and technical measures and actions in the field of engineering SiZoPiE. They will be able, as well, to plan and manage simple jobs and tasks of the SiZoPiE in accordance with general and special regulations governing the area of safety and security, including the necessary cooperation with companies authorized for diagnostics and maintenance of technical systems of SiZoPiE, with the competent inspection services, the fire department, with the police and with other national and internal security services and protection.
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Prerequisites for course approval (lecturer's signature):	Lecture and tutorials attendance.
Prerequisites for taking exams:	Lecturer signature.
Grading scale:	<p>(According to the Regulations on student assessment of Karlovac University of Applied Sciences, Article 9, Paragraph 5)</p> <p>90-100 - excellent (5) (A) 80 to 89.9 - very good (4) (B) 65 to 79.9 - good (3) (C) 50 to 64.9 - sufficient (2) (D) 0 to 49.9 – fail (1) (F)</p> <p>Students are graded during class, what forms 70% of final exam. Students who achieve 50% (35 points) and more are allowed to take the final exam. The score on final exam makes 30% of the final grade.</p>

ECTS structure

ECTS credits allocated to the course reflect the total burden to the student during adoption of the course content. Total contact hours, relative gravity of the content, effort required for exam preparation, as well as, every other possible burden are taken in account:					
Attendance (active participation)	Term paper	Composition	Presentation	Continuous assessment and evaluation	Practical work
0,5					
Independent work	Project	Written exam	Oral exam	Other	
0.5		2.5	1,5		

Review of topics/units per week associated with learning outcomes

Week	Lectures topics/units and learning outcomes:	Tutorials topics/units and learning outcomes:
1.	Definition and classification of fire and explosion and fire and explosion hazards.	Determination of the possible height of the flame of initial fire.
2.	The terms and classification of the conditions, manners and causes of fire and explosion and the factors that affecting their formation.	Determination of the possible rate of heat release of initial fire.
3.	Properties, effects and possible consequences of the fire depending on the type and place of origin.	Determinaton of possible fire hazardous levels of radiation of the flame and overheated areas..
4.	Properties, effects and possible consequences of the explosion depending on type and place of origin.	Determination of the possible release rate of initial fire smoke.
5.	The components, structure and contents of modern systems of security and protection from fire and explosions (SiZoPiE) at the national, regional and local level.	Determination of opportunities of developement of initial fire into „flame attack“.



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6.	The components, structure and contents of modern systems of SiZoPiE within individual fire and/or explosion especially vulnerable activities/companies.	Determination of possible impacts, consequences and prevention measures in case of a „fireball“.
7.	The basics of effective technological fire and explosion prevention.	Determination of the possible impacts and consequences in the case of a physical explosion.
8.	The process, procedural and technological solutions to control fuel and explosives.	Determination of the zones of possible impacts and consequences in the case of a chemical explosion substance in condensed phase.
9.	The process, procedural and technological solutions to control strong oxidizing agents.	Determination of the zones of possible impacts and consequences in the case of a chemical explosion substance in dilute phase.
10.	The process, procedural and technological solutions to control possible sources of ignition.	Determination of the insurance and evacuation zones around the possible danger of explosion..
11.	Systems for fire detection and for evacuation of toxic fire gases, heat and for the prevention of smoking through confined spaces.	Determination of fire and explosive hazards and appropriate technical and operational measures of SiZoPiE in the example of storage of large quantities of flammable fluids.
12.	Systems for danger detection and for the prevention, damping and venting explosions.	Determination of fire and explosive hazards and appropriate technical and operational measures of SiZoPiE in the example of storage of large quantities of explosives.
13.	Systems for protection and to mitigate the effects and consequences of fire and explosion.	The case and the ways of checking the validity of different types of technical systems for fire alarm.
14.	Methods, techniques and procedures for certification, testing, control and monitoring components of the SiZoPiE system.	The case and the ways of checking the validity of different types of technical systems for reporting the occurrence of flammable gas/vapor in the atmosphere.
15.	The basic components of the plan and program of technological and fire and explosion prevention.	The case and the ways of checking the validity of different types of technical systems for automatic fire fighting or the prevention/development of physical or chemical explosion.

References

REFERENCES (compulsory/additional):

Compulsory:

Kulišić, D. (1998). Uzroci nezgoda, nesreća, požara, eksplozija i havarija, *Sigurnost*, **4**, 2: 95.-121.

Gulan, I. (1997). *Protupožarna tehnološka preventiva*, Biblioteka NADING, Zagreb.

Kulišić, D. (>2011). *Tehnologija zaštite od požara i eksplozija*, Course materials..

Additional (only parts, according to subject):

Currently applicable laws, regulations, decisions and technical standards in the field of active engineering of SiZoPiE, *Narodne novine*, >1991. g.

EN/CFPA-E (>2002). *European standards for fire safety and protection/CFPA-E Guidelines*, European standards/Confederation of Fire Protection Associations Europe (CFPAE), Brussels/Zurich.

NFPA (>2007). *NFPA Codes & Standards Handbook*, National Fire Protection Association, Quincy (MA).

Exams for the academic year: 2022/2023

Exam dates:	According to the schedule of exams for academic year
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SYLLABUS PREDMETA

Contact information

1. Course Instructor/Lecturer:	Zvonimir Matusinović, PhD, senior lecturer
e-mail:	zvonimir.matusinovic@vuka.hr
Office hours / Consultations:	According to schedule of the Department of Safety and Protection
2. Course Instructor/Lecturer:	
e-mail:	
Office hours / Consultations:	



SYLLABUS PREDMETA

General information

Course title:	Construction and fire prevention		
ISVU ⁵ course code:	40191, 115378		
Studies in which the course is taught:	Professional Study of Safety and Protection		
Course Instructor:	Zvonimir Matusinović, PhD, senior lecturer		
Course Assistant:	-		
ECTS credits:	4.0		
Semester of the course execution:	V.		
Academic year:	2022/2023		
Exam prerequisites:	No		
Lectures are given in a foreign language:	English		
Aims:	The course objective is to give students basics knowledge and skills to recognize key features of buildings, constructions, construction components and constructive materials of concern for the safety and protection of internal and external fire or explosion. Students will be able to independently recognize and estimate the possible fire and explosion hazards for the buildings, people, material goods in the buildings and for environment. They will also be able to estimate if any necessary technical and operational steps and activities for their removal should be taken. Aswell, they will be able to plan and manage simple tasks and tasks of construction of fire and explosion prevention in accordance with general and special regulations for that area of protection and safety, including the necessary cooperation with authorized companies for the technical maintenance of the buildings and their installations with the competent inspection and utilites, with the fire department, the police and other state, local and internal security services for protection and rescue.		

Course

Course structure	Number of contact hours per week:	Number of contact hours per semester:	Student's requirements by type of teaching:
Lectures:	2	30	Attendance 80%
Tutorials:	1	15	Attendance 100%
Practical (lab) sessions:	-	-	
Seminars:	-	-	
Field work:	-	-	
Other:	-	-	
TOTAL:	3	45	

Monitoring of students' work, knowledge evaluation and learning outcomes

(Define exactly six learning outcomes)	LEARNING OUTCOMES (upon completion of the course the student should be able to:)	FACTORS AFFECTING THE GRADE (e.g. term paper, practical work, presentation, ...)	MAXIMUM NUMBER OF POINTS PER FACTOR
	II: Enumerate and describe the main characteristics of: the place of accomodation of buildings, types of constructions, construction components and construction materials of importance	Preliminary exam I	3 Preliminary exams/Written exam 60 points.

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	for passive fire and explosion safety and protection.		Oral exam 40 points.
	I2: Explain indicative types and forms of fire and explosion hazards to bearing constructions and necessary steps to conserve capacity until a certain time required by special regulations.	Preliminary exam I	
	I3: Distinguish types, explain policies and propose optimal passive fire protection systems to prevent the spread of fire, heat, and smoke fire gases inside the building and fire spread to neighboring buildings.	Preliminary exam II	
	I4: Distinguish types, explain policies and propose optimal passive explosion systems to prevent and to moderate explosion effects inside the building and domino effects of explosion to the neighboring buildings.	Preliminary exam II	
	I5: Integrate PP and PE prevention with process, technology, building and construction projects.	Preliminary exam III	
	I6: Propose optimal types of construction and other technical solutions that enable: safe evacuation, rescue people, valuable property and protect rescuers in case of fire or the direct danger of explosion.	Preliminary exam III	
Alternative formation of the grade (I1 – I6)	<u>Exam score obtained during the course:</u> Three (3) preliminary exams will be held during the course so students will have possibility to become free of the written exam. In order to become free of the written exam, student should access to all three preliminary exams and get positive grade (sufficient to excellent). If student does not access to only one preliminary exam or one of them is graded insufficient, student is obligated to attend the written exam. 3 Preliminary exams/written exam 60 points Oral exam 40 points Total: 100 points		TOTAL: 100 points
Students' competencies	Students will be given basic knowledge and skills to recognize key features of buildings, constructions, construction components and constructive materials of concern for the safety and protection of internal and external fire or explosion. Students will be able to independently recognize and estimate the possible fire and explosion hazards for the buildings, people, material goods in the buildings and for environment. They will also be able to estimate if any necessary technical and operational steps and activities for their removal should be taken. As well, they will be able to plan and manage simple tasks and tasks of construction of fire and explosion prevention in accordance with general and special regulations for that area of protection and safety, including the necessary cooperation with authorized companies for the technical maintenance of the buildings and their installations with the competent inspection and utilities, with the fire department, the police and other state, local and internal security services for protection and rescue.		

Prerequisites for course approval (lecturer's signature):	Lecture and tutorials attendance.
Prerequisites for taking exams:	Lecturer signature.



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Grading scale:	<p>(According to the Regulations on student assessment of Karlovac University of Applied Sciences, Article 9, Paragraph 5)</p> <p>90-100 - excellent (5) (A) 80 to 89.9 - very good (4) (B) 65 to 79.9 - good (3) (C) 50 to 64.9 - sufficient (2) (D) 0 to 49.9 – fail (1) (F)</p> <p>Students are graded during class, what forms 70% of final exam. Students who achieve 50% (35 points) and more are allowed to take the final exam. The score on final exam makes 30% of the final grade.</p>
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ECTS structure

ECTS credits allocated to the course reflect the total burden to the student during adoption of the course content. Total contact hours, relative gravity of the content, effort required for exam preparation, as well as, every other possible burden are taken in account:

Attendance (active participation)	Term paper	Composition	Presentation	Continuous assessment and evaluation	Practical work
0,5					
Independent work	Project	Written exam	Oral exam	Other	
		2	1,5		

Review of topics/units per week associated with learning outcomes

Week	Lectures topics/units and learning outcomes:	Tutorials topics/units and learning outcomes:
1.	The concepts, types and general characteristics of buildings, construction components and construction materials.	Determination of the net calorific values of fuel contents/interiors of residential, commercial, industrial or warehouse buildings.
2.	The concept, contents, role and special tasks of the passive fire and explosion prevention.	Determination of the possible density of the fire load of the building and its benchmark level of fire risk.
3.	Basic principles, types and forms of the fire and explosion safety and security of the buildings and the constructions depending on application and use.	Determination of thermal conductivity of certain types of construction materials based on the known parameters of their species, density and temperature.
4.	Constructural and technical solutions of protecting people, buildings and constructions, premises and their contents from fire and explosion impacts.	Determination of the impact of moisture on the thermal conductivity of construction materials non resistant to moisture.
5.	Regulatory methods of classification, labeling and testing of construction materials and construction elements for the sake of determining their behaviour and quality in terms of fire or explosion.	Determination of specific heat capacity of certain types of construction materials at elevated temperatures based on the known parameters of their species and density..
6.	Regulatory criteria of conditions of performance, maintenance, technical and administrative supervision as well as regulatory check of construction materials and construction components.	Determination of thermal diffusivity for certain types of building materials on the basis of known relevant parameters of influence.
7.	Types and characteristics of fire resistance and conditions of use certain types of construction materials.	Determining the thermal inertia of certain types of constructive materials on the basis of known relevant parameters of influence..



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8.	Types and characteristics of fire resistance and conditions of use certain types of construction components.	Determination of fire development and creation of direct fire attack within closed interior with known density of the fire load and its partitions.
9.	Types, characteristics, conditions and application of fire blocking agents.	Determining the size of the hazardous thermal expansion (dilatation) for demolition of construction for certain types of construction materials which are components of the supporting structures under the fire heat.
10.	Types, characteristics, conditions and application of construction solutions for abduct smoke and heat of the fire.	Determination of optimum size of fire sections and the position and necessary parameters of fire resistance of fire walls and barriers on examples of special types of constructions.
11.	Types, characteristics, conditions and application of zoning and construction solutions for protection and moderation of impact of air shock wave of explosion.	Interpretation of types and time of fire resistance of individual component of constructions based on the combination of prescribed label properties of their fire resistance. Evaluation of possible types and levels of resistance and protective action of some construction components to the effects of air shock wave and debris predictable power technological explosion.
12.	Types, characteristics, conditions and application of zoning and construction solutions for the protection of the explosion debris.	Determination of the length of evacuation, the width of the exit, (temporary) safe location and the time of execution of evacuation in accordance with the nature and purpose of the construction and the characteristics of its users.
13.	Types and characteristics construction measures for safe evacuation of buildings in case of fire or explosion.	The content and method of verifying validity of components of provided evacuation routes and their necessary technical equipment.
14.	The key features of fire and explosion safety of acceptable paths, exits and safe zones for evacuation of buildings of different types and purposes.	Identifying types of threats that can protract/prevent the execution of evacuation plan of certain types of construction.
15.	The Basics components of the evacuation plan in case of fire or explosion.	The applicability analysis of the evacuation plan of one type of building in case of fire and explosion.

References

REFERENCES (compulsory/additional):

Compulsory:

Matusinović, Z. (2016). *Konstruktivna protupožarna i protueksplozijska preventiva* (Prezentacija gradiva).
Fišter, S., Kopričanec-Matijevac, Lj. (2001). *Zaštita od požara u graditeljstvu*, Centar za stručno obrazovanje vatrogasnih kadrova, Zagreb.

Kopričanec-Matijevac, Lj. (2001). *Zaštita od požara i zaštita na radu: Vatrootpornost građevnih elemenata i konstrukcija na požar, ispitivanje vatrootpornosti, protupožarna zaštita konstrukcija*. U: *Program stručnog usavršavanja ovlaštenih inženjera arhitekture i građevinarstva*, D. Arbutina (ur.) Tehničko Veleučilište u Zagrebu – Graditeljski odjel, Zagreb, 2008., str. 9-44.

Additional (samo parcijalno, sukladno temi kolegija):

Kopričanec-Matijevac, Lj., *Zatvaranje otvora u protupožarnim konstrukcijama koje omeđuju požarne sektore*. (Internet PDF dokument).

Propisi RH (>1991). Aktualno važeći zakoni, pravilnici, uredbе, odluke i tehničke norme iz područja pasivnog inženjerstva sigurnosti i zaštite od požara i eksplozija (SiZoPiE), *Narodne novine*, Zagreb.



SYLLABUS PREDMETA

Exams for the academic year: 2021/2022

Exam dates:	According to the schedule of exams for academic year
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Contact information

1. Course Instructor/Lecturer:	Zvonimir Matusinović, PhD, senior lecturer
e-mail:	zvonimir.matusinovic@vuka.hr
Office hours / Consultations:	According to schedule of the Department of Safety and Protection
2. Course Instructor/Lecturer:	
e-mail:	
Office hours / Consultations:	



SYLLABUS PREDMETA

General information

Course title:	Flammable and explosive materials
ISVU ⁶ course code:	40190, 115380
Studies in which the course is taught:	Professional Study of Safety and Protection
Course Instructor:	Zvonimir Matusinović, PhD, senior lecturer
Course Assistant:	-
ECTS credits:	4.5
Semester of the course execution:	V.
Academic year:	2022/2023
Exam prerequisites:	No
Lectures are given in a foreign language:	English
Aims:	To familiarize students with the procedures of dealing with explosive and flammable substances. Division of explosives and the ADR Convention on Explosive Substances. Terms and conditions of storage of explosive materials. The mechanisms of detonation, deflagration and detonation thermodynamic theory. Chain reactions and mechanisms.

Course

Course structure	Number of contact hours per week:	Number of contact hours per semester:	Student's requirements by type of teaching:
Lectures:	2	30	attendance 80%
Tutorials:	2	30	attendance 100%
Practical (lab) sessions:			
Seminars:			
Field work:			
Other:			
TOTAL:	4	60	

Monitoring of students' work, knowledge evaluation and learning outcomes

(Define exactly six learning outcomes)	LEARNING OUTCOMES (upon completion of the course the student should be able to:)	FACTORS AFFECTING THE GRADE (e.g. term paper, practical work, presentation, ...)	MAXIMUM NUMBER OF POINTS PER FACTOR
	I1: Being able to define flammable and explosive substances. Know the difference between explosives and explosive agents.	[]	Written exam 55 points. Oral exam 30 bodova
	I2: Understand the concept and basics of explosion as a special type of oxidation.	[]	
	I3: Classify certain types of explosives and get acquainted with their properties and application.	[]	
	I4: Distinguish chain reactions and mechanisms of action of certain types of explosives.	[]	
	I5: Compare the intensity explosion and learn to determine the necessary amount of explosives for destruction in the construction industry.	[]	

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	I6: Recognize hazards and precautions for handling explosive substances.		
Alternative formation of the grade (I1 – I6)	or alternative formation of the grade: I1 - I6 Seminar 10 points Written exam 55 points Oral exam 35 points Total: 100 points		TOTAL: 100 points
Students' competencies	Students will be familiar with the procedures of dealing with explosive and flammable substances. They will know the difference between explosives and explosive agents Terms and conditions of storage of explosive materials. They will be able to classify certain types of explosives and get acquainted with their properties and application. They will know mechanisms of detonation, deflagration and detonation thermodynamic theory, chain reactions and mechanisms.		

Prerequisites for course approval (lecturer's signature):	Lecture and field work attendance
Prerequisites for taking exams:	Lecturer signature
Grading scale:	(According to the Regulations on student assessment of Karlovac University of Applied Sciences, Article 9, Paragraph 5) 90-100 - excellent (5) (A) 80 to 89.9 - very good (4) (B) 65 to 79.9 - good (3) (C) 50 to 64.9 - sufficient (2) (D) 0 to 49.9 – fail (1) (F) Students are graded during class, what forms 70% of final exam. Students who achieve 50% (35 points) and more are allowed to take the final exam. The score on final exam makes 30% of the final grade.

ECTS structure

ECTS credits allocated to the course reflect the total burden to the student during adoption of the course content. Total contact hours, relative gravity of the content, effort required for exam preparation, as well as, every other possible burden are taken in account:

Attendance (active participation)	Term paper	Composition	Presentation	Continuous assessment and evaluation	Practical work
0,5					
Independent work	Project	Written exam	Oral exam	Other	
0,5		2	1,5		

Review of topics/units per week associated with learning outcomes

Week	Lectures topics/units and learning outcomes:	Tutorials topics/units and learning outcomes:
1.	Introduction to explosives	Calculation of explosives to demolish a residential building (size 100 x 40)
2.	Division of explosives	Calculation of explosives to demolish the chimney (100m)
3.	ADR - Convention of explosive substances	Calculation of explosives to demolish the basement (60x20)
4.	Terms and conditions for storing explosive substances	Tour of the Fire Services Association of Karlovac
5.	The mechanism of deflagration	Professional visit Mirnovec pyrotechnics



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6.	The mechanism of detonation	Presentation of seminar papers Group 1
7.	Thermodynamics - the theory of detonation	
8.	Chain Reaction and mechanism	
9.	Explosives (types and obtaining)	
10.	Safety when handling the initial explosives	
11.	Transportation of explosives (road, sea and rail through)	
12.	Detonation parameters and budget for explosives	
13.	Determination of explosives for destruction	
14.	Gunpowders.	
15.	Fireworks and firework equipment.	

References

REFERENCES (compulsory/additional):

Compulsory:

M. Sućeska, *Eksplozije i eksplozivi*, Brod.institut, Zagreb, 2001.

V. Pavelić, *Zapaljive i eksplozivne tvari*, Zagreb,

P.V. Maksimović, *Tehnologija eksplozivnih materija*, GZH, Zagreb, 1972.

Exams for the academic year: 2022/2023

Exam dates:	According to the schedule of exams for academic year 2022/2023
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Contact information

1. Course Instructor/Lecturer:	Zvonimir Matusinović, PhD, senior lecturer
e-mail:	zvonimir.matusinovic@vuka.hr
Office hours / Consultations:	According to schedule of the Department of Safety and Protection
2. Course Instructor/Lecturer:	
e-mail:	
Office hours / Consultations:	