



HIGHER EDUCATION TECHNICAL SCHOOL
OF PROFESSIONAL STUDIES
Novi Sad



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Knowledge **FO**r Resilient so**CI**Ety

*Higher Education Technical School of
Professional Studies in Novi Sad*

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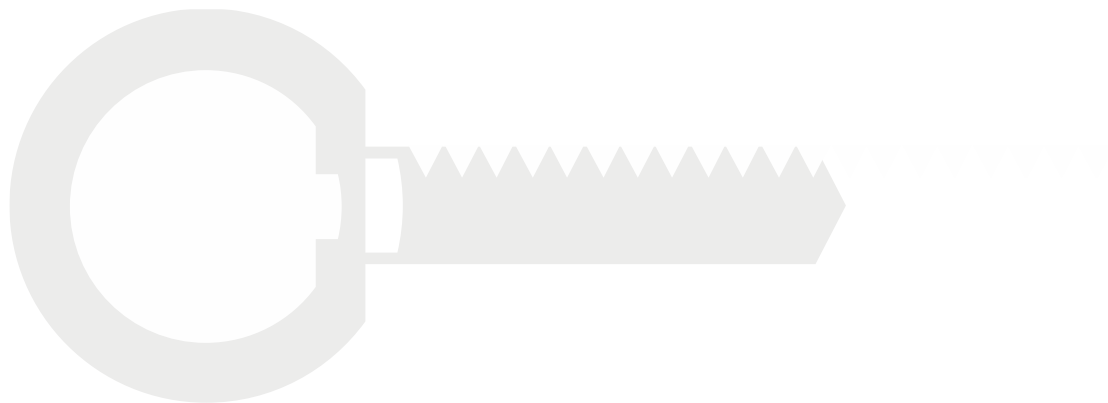
Presentation of plans and syllabi drafts for developed MP curricula



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Course schedule by semesters and years of study



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Table 5.1 Course schedule by semesters and years of study

No.	Code	Course title	Semester	Classes	ECTS
FIRST YEAR					
1	M1.01.0	Risk management in protection	I	4+3+0	10
2	M1.02.0	Applied risk modelling methods	I	4+2+1	10
3	M1.03.0	Monitoring and control in protection	I	4+2+1	10
4		Course from elective block 1	II	4+2+1	10
5	M1.06.0	Safety engineering in production processes	II	4+2+0	8
6	M1.07.0	Planning and management in disaster protection	II	4+2+0	8
7	M1.08.0	Professional master practice 1	II		4
Classes of active teaching in total				24+13+3	
ECTS in total					60



Table 5.1 Course schedule by semesters and years of study

SECOND YEAR					
8	M1.09.0	Renewable energy sources	III	4+1,5+0,5	8
9,10		Courses from elective block 2	III	8+4+0	16
11	M1.14.0	Protection in working and living environment	III	4+1,5+0,5	8
12	M1.15.0	Preliminary master thesis	IV	ARW 16	8
13	M1.16.0	Professional master practice 2	IV		4
14	M1.17.0	Final master thesis	IV		16
Classes of active teaching in total				16+7+1+16	
ECTS in total					60



5.1A Course schedule by semesters and years of study for master professional studies (MPS)

No.	Code	Course title	Semester	Course type	Course status	Active teaching				Other classes	ECTS
						L	Ex	ATF	ARW		
FIRST YEAR											
1	M1.01.0	Risk management in protection	I	SP	M	4	3				10
2	M1.02.0	Applied risk modelling methods	I	SP	M	4	2	1			10
3	M1.03.0	Monitoring and control in protection	I	SP	M	4	2	1			10
4		Course from elective block 1	II	PA	E	4	2	1			10
5	M1.06.0	Safety engineering in production processes	II	SP	M	4	2				8
6	M1.07.0	Planning and management in disaster protection	II	PA	M	4	2				8
7	M1.08.0	Professional master practice 1	II	PA	M						4
Total classes (lectures + exercises, ATF, ARW, other classes) and ECTS per year						24	13	3			60
Total classes of active teaching per year						40					60

Legend:

MPS – Master professional studies
 L – Lectures
 Ex – Exercises
 ATF – Additional teaching forms
 ARW – Applied research work
 M – Mandatory
 E – Elective
 SP – Scientific-professional
 PA – Professional-applicative
 AGE – Academic-general education



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5.1A Course schedule by semesters and years of study for master professional studies (MPS)

SECOND YEAR											
1	M1.09.0	Renewable energy sources	III	AGE	M	4	1.5	0.5			8
2, 3		Courses from elective block 2	III	PA	E	8	4				16
4	M1.14.0	Protection in working and living environment	III	SP	M	4	1.5	0.5			8
5	M1.15.0	Preliminary master thesis	IV	SP	M				16		8
6	M1.16.0	Professional master practice 2	IV	PA	M						4
7	M1.17.0	Final master thesis	IV	PA	E						16
Total classes (lectures + exercises, ATF, ARW, other classes) and ECTS per year						16	7	1	16		60
Total classes of active teaching per year						40					
Total classes of active teaching, other classes and credits for both study years						80					120

Legend:

MPS – Master professional studies

L – Lectures

Ex – Exercises

ATF – Additional teaching forms

ARW – Applied research work

M – Mandatory

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SP – Scientific-professional

PA – Professional-applicative

AGE – Academic-general education



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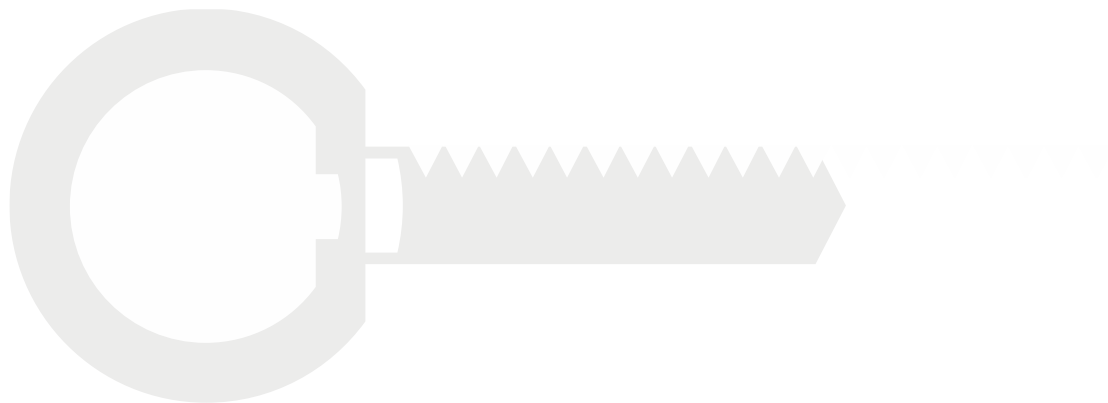
Table 5.1B – List of elective courses

No.	Elective block	Course title
1.	1	Prevention and control of water pollution
2.	1	Fire investigation
3.	2	Design of stationary systems
4.	2	Facilities and systems under pressure
5.	2	Automated transport and storage systems
6.	2	Waste management and recycling
7.	–	Final master thesis

The following two courses are included in the group of electives as a result of the cooperation among institutions included in this project:

- 1. Financial resilience to hazards**
- 2. Risk analysis in the decision making process**





DRM&FSE MPS CURRICULA MODEL AND COURSE SPECIFICATION



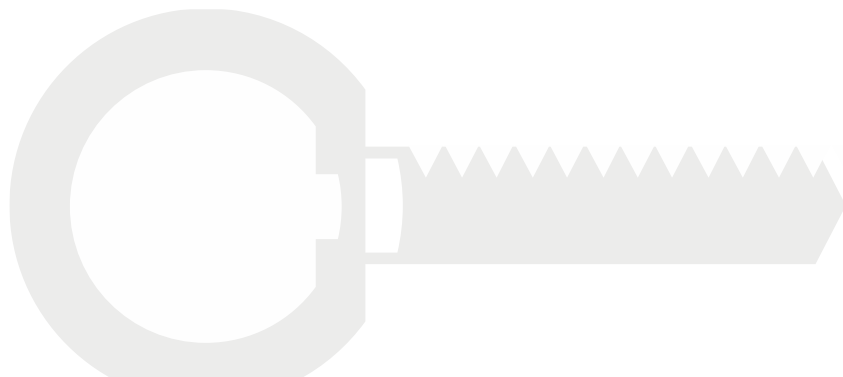
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Programme name	Protection engineering
Higher education institution where the programme is being executed (University/Faculty)	Higher Education Technical School of Professional Studies in Novi Sad, Serbia
Educational-scientific field	Technical and Technological Science - Environmental Engineering and Occupational Safety
Type of studies	Master professional studies
Study scope, expressed in ECTS	120
Academic degree, abbreviation	Master professional engineer of protection
Study length	2 years
Future course implementation starting year	2018
Planned number of students to be enrolled in this programme	32
Programme language	Serbian, English





Introduction

The master professional study programme of Protection Engineering has clearly defined goals that are in accordance with the goals of the Higher Education Technical School of Professional Studies in Novi Sad.

The purpose of the study programme is to educate students for recognizable and transparent professions and occupations.

The goals of the study programme include achieving competencies and academic skills as well as methods for their acquisition. The goals also include the development of creative abilities and mastering the specific practical skills needed to perform the profession.



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Programme Structure and Capacity

The master professional study programme of Protection Engineering is in the educational-scientific field of Environmental protection and safety at work.

The study programme ensures the acquisition of competences that are socially justified and useful, complements the knowledge gained in the basic studies and forms the basis for developing critical thinking and applying knowledge in practice. After completing the master studies, students are able to apply knowledge in solving problems in a new unknown environment in wider or multidisciplinary areas within the educational-scientific field of study, to communicate knowledge and method of conclusion to the expert public in a clear and unambiguous manner, and have the ability to continue studies in a way they will choose independently.



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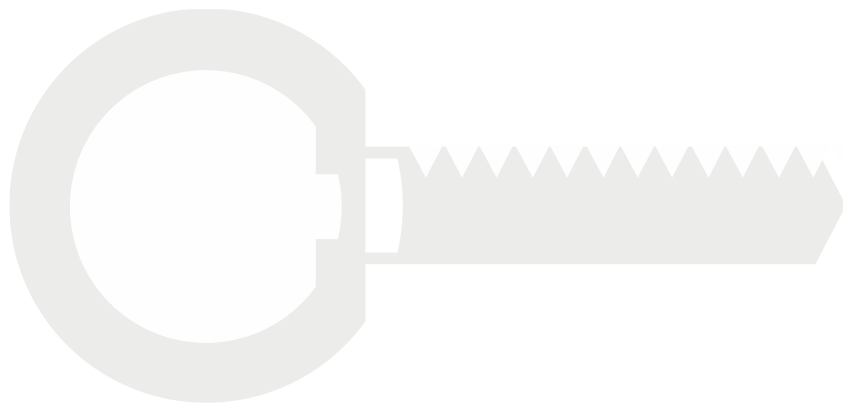
Programme Structure and Capacity

The professional master studies have 120 ECTS credits, and the precondition is that the first level of studies of 180 ECTS credits has been previously completed.

The studies last two years, or 4 semesters. The curriculum is realized through theoretical (mandatory and elective subjects) and practical teaching. Special emphasis is placed on professional master practice through the courses: *Professional Master Practice 1*, which is conducted in the second semester of the master professional studies, lasting 90 hours, and *Professional Master Practice 2*, completed in the fourth semester of the studies, and lasting also 90 hours. The practice is realized in working organizations dealing with production, service and other activities.

The credit value of each course is expressed in accordance with the rating of the European Credit Transfer System (ECTS), and the studies are completed when the student fulfills all the obligations anticipated by the study programme and collects at least 120 ECTS credits.





Programme Structure and Capacity

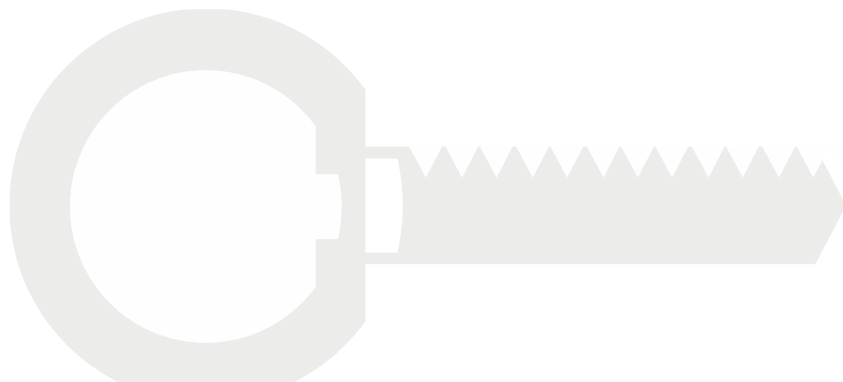
The school provides space and technical basis for modern and quality teaching, teaching laboratories for conducting professional and practical classes. The equipment purchased through ERASMUS+ is IT equipment for carrying out teaching activities of demonstration, simulation and information-communication character and should contribute to the improvement of the teaching process. Students will be provided with innovative activities, acquiring new knowledge and developing creative abilities by using advanced and contemporary software programs in solving problems in the field of protection, particularly regarding disasters and fire.



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Graduates` Competencies

By mastering this study programme, the student acquires general and subject-specific abilities that are in the function of quality performance of professional and scientific activities in the field of engineering protection.

General abilities:

- analysis, synthesis and forecasting of solutions and consequences;
- mastering of methods, procedures and research processes;
- development of critical and self-critical thinking and approach;
- application of knowledge in practice;
- development of communication skills, as well as cooperation with the social and international environment; and
- building of professional ethics.



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Graduates` Competencies

Subject-specific abilities:

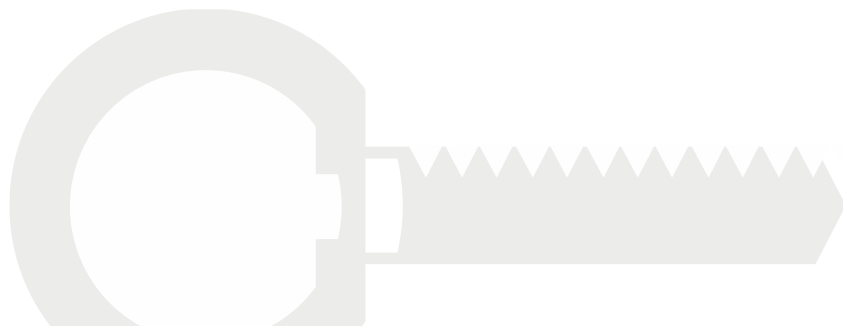
- basic knowledge and understanding of the discipline of engineering protection;
- solving concrete problems using scientific methods and procedures;
- linking basic knowledge from different fields of their application;
- monitoring and application of novelties in the field of engineering protection;
- development of skills in the use of knowledge in the field of protection engineering;
- use of information and communication technologies in mastering the knowledge of the relevant area;
- design, organization and control of production;
- independent experimentation, statistic processing of results, and conclusion formulation;
- writing papers and presenting results of the work;
- preservation of the environment; and
- economical use of natural resources of the Republic of Serbia, in accordance with the principles of sustainable development.



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Study Programme Structure

*S – Semester (1-winter/2-summer)

*CS – Course status (M- mandatory/ E- elective)

No.	Course Name	S 1/2	CS M/E	Teacher/s	ECTS
01.	Risk management in protection	1	M	Biljana D. Gemovic, Branko M. Savic	10
Course content/structure:					
Content:					
<i>Theoretical teaching</i>					
The course teaches the methods and procedures for identifying hazards, methods of hazard study, Hazop studies, risk assessment, risk matrix, risk ranking, practical risk assessment methods, and documented assessment, as well as legal bases for risk assessment; standards and their application (ISO 14001, OHSAS 18001).					
<i>Practical teaching</i>					
Exercises and seminar papers – practical risk assessment in occupational safety and health, environmental protection and fire protection using the discussed methods.					





Study Programme Structure

*S – Semester (1-winter/2-summer)

*CS – Course status (M- mandatory/ E- elective)

No.	Course Name	S 1/2	CS M/E	Teacher/s	ECTS
02.	Applied risk modelling methods	1	M	Borislav M. Simendic	10
Course content/structure:					
Content:					
<i>Theoretical teaching</i>					
Within the course, theoretical basics in mathematics in the field of probability, statistics and random variables are studied, which will help students use mathematical methods for presenting, processing and analyzing various data from the narrow expertise areas. Risk analysis and the role of modeling in the risk analysis process are also studied. Modeling and simulation of characteristic emergency situations are thought using current modeling and simulation software, with the aim of reducing risks with catastrophic consequences.					
<i>Practical teaching</i>					
Group and individual task preparation from the field of study. Setting up and solving specific tasks in the field of catastrophic events and fire using the programmes Pathfinder and PyroSim.					





Study Programme Structure

*S – Semester (1-winter/2-summer)

*CS – Course status (M- mandatory/ E- elective)

No.	Course Name	S 1/2	CS M/E	Teacher/s	ECTS
03.	Monitoring and control in protection	1	M	Dragan M. Karabasil, Vesna B. Petrovic	10

Course content/structure:

Content:

Theoretical teaching

The place, role and significance of monitoring in the field of protection are studied; Organization of monitoring systems at international, state and local level; Environmental monitoring and environmental monitoring system; Monitoring of phenomena and hazards that can have the characteristics of emergencies: hydrological monitoring (monitoring of water levels and flood forecasts), meteorological monitoring, seismological monitoring, epidemiological monitoring, and monitoring of radiation and chemical contamination.

Practical teaching

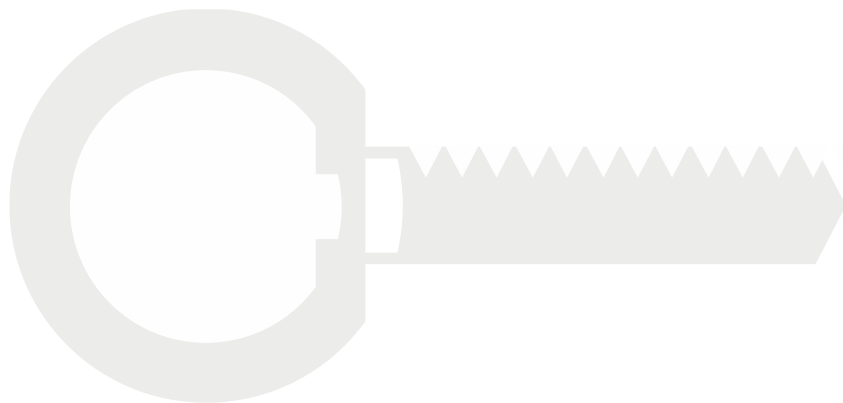
Development of theoretical areas on concrete examples through seminar papers. Measurement of individual characteristic parameters of environmental pollution (field work and in the laboratory).



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Study Programme Structure

***S – Semester (1-winter/2-summer)**

***CS – Course status (M- mandatory/ E- elective)**

No.	Course Name	S 1/2	CS M/E	Teacher/s	ECTS
04.	Course from elective block 1	2	E		10
Course content/structure:					
See the table below ELECTIVE BLOCK 1					





Study Programme Structure

*S – Semester (1-winter/2-summer)

*CS – Course status (M- mandatory/ E- elective)

No.	Course Name	S 1/2	CS M/E	Teacher/s	ECTS
05.	Safety engineering in production processes	2	M	Verica J. Milanko, Sasa B. Spaic	8

Course content/structure:

Content:

Theoretical teaching

Selection of elements of significance for hazard assessment, identification and assessment of risk levels. Hazard analysis and protection measures in the production, use, handling, transport and storage of gaseous, liquid and solid materials. Application of organizational and technical-technological measures for protection in production processes to reduce risk to an acceptable level. Methods and methodologies for assessing the effectiveness of applied protection measures. Initiation of the reengineering of technical and technological measures of protection.

Practical teaching

Developing a case study of catastrophic events. Creating plans for managing emergencies.



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Study Programme Structure

*S – Semester (1-winter/2-summer)

*CS – Course status (M- mandatory/ E- elective)

No.	Course Name	S 1/2	CS M/E	Teacher/s	ECTS
06.	Planning and management in disaster protection	2	M	Branko M. Babic	8
Course content/structure:					
Content:					
<i>Theoretical teaching</i>					
National Security Strategies, Management of the National Security System; The system of protection and rescue of the Republic of Serbia and the surrounding countries, normative and legal regulation; Methodology of assessment and management in disasters; Implementation of the IT system for disaster management; Organizing logistics in disasters; Psychological aspects of disaster – stress; International cooperation and disaster relief.					
<i>Practical teaching</i>					
Simulation of catastrophic events, selection of methods to resolve events and mitigate consequences – through group work.					



Study Programme Structure

*S – Semester (1-winter/2-summer)

*CS – Course status (M- mandatory/ E- elective)

No.	Course Name	S 1/2	CS M/E	Teacher/s	ECTS
07.	Professional master practice 1	2	M	All teachers in the study programme	4

Course content/structure:

Content:

Professional master practice 1 is conducted in the second semester of master professional studies, lasting 90 hours, and is realized in work organizations dealing with production, service and other activities, according to general and individual programme contents, agreed among the co-mentor from the organization, the course teacher-mentor and the student.

During the practice, the student performs general and specific tasks. General assignments mean that the student learns about the history of the company, the organizational structure, the production program, and the measures taken to protect it. Specific professional tasks to be done during the practice are defined by the company's co-mentor and teacher-mentor. These are the thematic units students have done and passed in professional courses, and now they apply the knowledge in practical conditions in the company.

On the completed practice, the student submits a report, which according to the content and form corresponds to the instructions of the mentor and the co-mentor defined at the beginning.



Study Programme Structure

*S – Semester (1-winter/2-summer)

*CS – Course status (M- mandatory/ E- elective)

No.	Course Name	S 1/2	CS M/E	Teacher/s	ECTS
08.	Renewable energy sources	1	M	Rade S. Ciric, Borislav M. Simendic	8

Course content/structure:

Content:

Theoretical teaching

Energy sources, geothermal energy, wind energy, water energy, solar energy, biomass, energy transformation, production plants. Estimates of reduction of general pollution by the installation of certain types of small power plants. Interdependence between rational use of energy and environmental protection. Economic aspects of the application of renewable energy sources. Business-legal and technical regulation of construction and connection to the small power plant network. Energy policy (SWOT analysis, vertical and horizontal activities according to the key assignments of energy policy in different sectors, incentive measures for wider application of renewable energy sources, Energy Development Strategy of the Republic of Serbia).

Practical teaching

Preparation of seminar papers from selected fields.



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Study Programme Structure

*S – Semester (1-winter/2-summer)

*CS – Course status (M- mandatory/ E- elective)

No.	Course Name	S 1/2	CS M/E	Teacher/s	ECTS
09.	Course from elective block 2	1	E		8
Course content/structure:					
See the table below ELECTIVE BLOCK 2					

No.	Course Name	S 1/2	CS M/E	Teacher/s	ECTS
10.	Course from elective block 2	1	E		8
Course content/structure:					
See the table below ELECTIVE BLOCK 2					





Study Programme Structure

*S – Semester (1-winter/2-summer)

*CS – Course status (M- mandatory/ E- elective)

No.	Course Name	S 1/2	CS M/E	Teacher/s	ECTS
11.	Protection in working and living environment	1	M	Dušan G. Gavanski, Anita D. Petrović Gegić	8

Course content/structure:

Content:

Theoretical teaching

Introduction to the basic principles of environmental protection. Environmental protection through legal frameworks. ISO standards and environmental protection. Mining, energy and industry from the aspect of sustainable development. Hazards and harms resulting from the working environment and catastrophic events as factors of environmental balance disorder. Preventive environmental protection measures (spatial and urban planning, strategic environmental impact assessment, environmental impact assessment of projects, and integrated prevention and control of pollution). Nature protection, national parks, protection of natural assets, flora and fauna.

Practical teaching

Seminar paper from the mentioned theoretical areas for concrete communal, industrial and other economic facilities.



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Study Programme Structure

*S – Semester (1-winter/2-summer)

*CS – Course status (M- mandatory/ E- elective)

No.	Course Name	S 1/2	CS M/E	Teacher/s	ECTS
12.	Preliminary master thesis	2	M	All teachers in the study programme and co-mentors from the industrial placement	8

Course content/structure:

Content:

Teaching on the course is performed through independent applied research. At the beginning of the semester, the coordinator of the study programme coordinates the students, the general themes of master thesis, mentors and company co-mentors. The mentor and co-mentor define the preliminary assignment of the professional master thesis.

By the end of the semester, the student submits the preliminary master thesis, which should contain the following sections: Introduction, Problem overview, Brief overview of literature data, Detailed elaboration of goals and assignments, Proposed methodology, Work and necessary resources plan, Preliminary results, Conclusion, References.

During the examination period, the student has a **viva defence** of the preliminary thesis before the three-member panel.



Study Programme Structure

*S – Semester (1-winter/2-summer)

*CS – Course status (M- mandatory/ E- elective)

No.	Course Name	S 1/2	CS M/E	Teacher/s	ECTS
13.	Professional master practice 2	2	M	All teachers in the study programme and co-mentors from the industrial placement	4

Course content/structure:

Content:

Professional master practice 2 is conducted in the fourth semester of master professional studies, lasting 90 hours, and is realized in work organizations dealing with production, service and other activities, according to general and individual programme contents, agreed among the co-mentor from the organization, the course teacher-mentor and the student.

In the selection of *Professional master practice 2*, the School attempts to ensure that work assignments during the period of practice provide adequate opportunities for the student to demonstrate the skills in several categories: application of professional and academic knowledge; practical skills; computer skills; analytical skills, skills to solve specific problems; innovation and originality; developmental skills; time management; written and oral expression.

During the practice, the student performs specific assignments, defined by the company's co-mentor and teacher-mentor, after submitting the seminar paper from the course *Preliminary master thesis*.



Study Programme Structure

*S – Semester (1-winter/2-summer)

*CS – Course status (M- mandatory/ E- elective)

No.	Course Name	S 1/2	CS M/E	Teacher/s	ECTS
14.	Final master thesis	2	E	Mentor	16

Course content/structure:

Content:

After passing all the exams, the student starts developing the master thesis. It is a research-methodological-practical work of the student in which he/she is acquainted with solving complex practical problems and methodology of developmental and practical research in one of the fields of the master study programme.

The master thesis is produced from any scientific-professional or professional-applicative course, but includes knowledge and skills from several courses.

The teacher of this selected course is the mentor of the student's master thesis.

After conducting the research, the student prepares the master thesis in the prescribed form containing the following chapters: Introduction, The goal of the thesis, Theoretical research, Experimental research (Practical work), Results and discussion, Conclusion and Review of the used literature.

Upon the completion of the thesis, the student submits a written version of the thesis, which the commission reviews and approves the oral defense. After checking the fulfillment of conditions according to the procedure of the School, the student has a public oral presentation and defence (viva) of the thesis.





Study Programme Structure

*S – Semester (1-winter/2-summer)

*CS – Course status (M- mandatory/ E- elective)

No.	Course Name	S 1/2	CS M/E	Teacher/s	ECTS
01.	Course from elective block 1 Prevention and control of water pollution	2	E	Anita D. Petrovic Gegic	10
Course content/structure:					
Content:					
<i>Theoretical teaching</i>					
Hydrological cycle of water. River basin as an ecosystem. Water pollution routes. Waste water parameters. Wastewater treatment: sedimentation, coagulation, flotation, filtration, aeration, degasification, membrane processes, biological wastewater treatment. Types of sludge, methods of sludge treatment. Ideas for cleaner technologies in different industries. Optimization of wastewater treatment processes.					
<i>Practical teaching</i>					
Concrete examples. Quality control for drinking water, ambient and wastewater. Examination of qualitative and quantitative composition of waste sludge.					



Study Programme Structure

*S – Semester (1-winter/2-summer)

*CS – Course status (M- mandatory/ E- elective)

No.	Course Name	S 1/2	CS M/E	Teacher/s	ECTS
02.	Course from elective block 1 Fire investigation	2	E	Dragan M. Karabasil, Verica J. Milanko	10

Course content/structure:

Content:

Theoretical teaching

Study of the characteristics of the fire according to the place of origin (fires in the open air, on the building), the cause of the fire, the behavior of the material in the fire. Determination of arson techniques. Analysis of the manifestation of fire through traces of fire. Methods and approaches to determining the causes of fire (surveys, methods of elimination, static and dynamic methods, reconstructions) and places of fire. Collecting, analyzing and reconstructing events and producing reports. Application of laboratory methods for fumigation.

Modeling fire threats to objects and territory.

Practical teaching

Concrete examples. Application of laboratory methods for determining the cause of fire. External visits and field work.



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Study Programme Structure

*S – Semester (1-winter/2-summer)

*CS – Course status (M- mandatory/ E- elective)

No.	Course Name	S 1/2	CS M/E	Teacher/s	ECTS
03.	Course from elective block 2 Design of stationary systems	1	E	Dragan M. Karabasil, Branko M. Milisavljevic	8
Course content/structure:					
Content: <i>Theoretical teaching</i> Stationary fire extinguishing systems (types and purposes). Water supply in fire extinguishing and protection of facilities and installations. Hydrant networks (types and design methods). Stationary fire extinguishers – division by type of fire extinguishing agent. Design of stationary automatic sprinkler systems (types and design method). Designing various types of stationary fire extinguishing systems (work principle, design method and calculation of elements). Design of stationary automatic systems for early detection of fire and alarm in case of exceeding of predetermined parameters incorporated into the system. <i>Practical teaching</i> Specific examples, seminar papers, external visits, fieldwork.					





Study Programme Structure

*S – Semester (1-winter/2-summer)

*CS – Course status (M- mandatory/ E- elective)

No.	Course Name	S 1/2	CS M/E	Teacher/s	ECTS
04.	Course from elective block 2 Facilities and systems under pressure	1	E	Branko M. Milisavljevic	8
Course content/structure:					
Content: <i>Theoretical teaching</i> Properties of fluids. Characteristics, classification and categorization of vessels. Construction and design, materials, filling and discharging, production (rolling and welding). Special quantitative requirements for pressure equipment (permissible stresses, welded coefficient, pressure limiting devices, hydrostatic test pressure). Commissioning. Labeling pressure vessels. Conformity assessment diagrams. Compliance assessments. Named bodies. Conformity sign. Declaration of Conformity. Regulations in this field. Hazards during use of pressure equipment. Preventive safety measures from injuries and health hazards. <i>Practical teaching</i> Specific examples and visits to enterprises.					





Study Programme Structure

*S – Semester (1-winter/2-summer)

*CS – Course status (M- mandatory/ E- elective)

No.	Course Name	S 1/2	CS M/E	Teacher/s	ECTS
05.	Course from elective block 2 Automated transport and storage systems	1	E	Dusan G. Gavanski	8

Course content/structure:

Content:

Theoretical teaching

Energy media for the transfer of mechanical power (electromotor drives, pneumatics, hydraulics, mechanical transmission circuits), advantages and disadvantages. Single-axis and multi-axis automatic power transmission and motion control systems, linear and rotary. Requirements regarding speed, power, precision management. Generally on production, automation, transport, transshipment and storage. Automated transport lines. Flexible transport systems. Flexible automated storage systems. Hazards and safety measures in automated transport and warehouse systems.

Practical teaching

Concrete examples. Presentation and analysis of work of concrete machines, devices and systems for storage, transshipment and transport. Analysis of hazardous sites and proposing measures to reduce risk. Seminar papers.



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Study Programme Structure

*S – Semester (1-winter/2-summer)

*CS – Course status (M- mandatory/ E- elective)

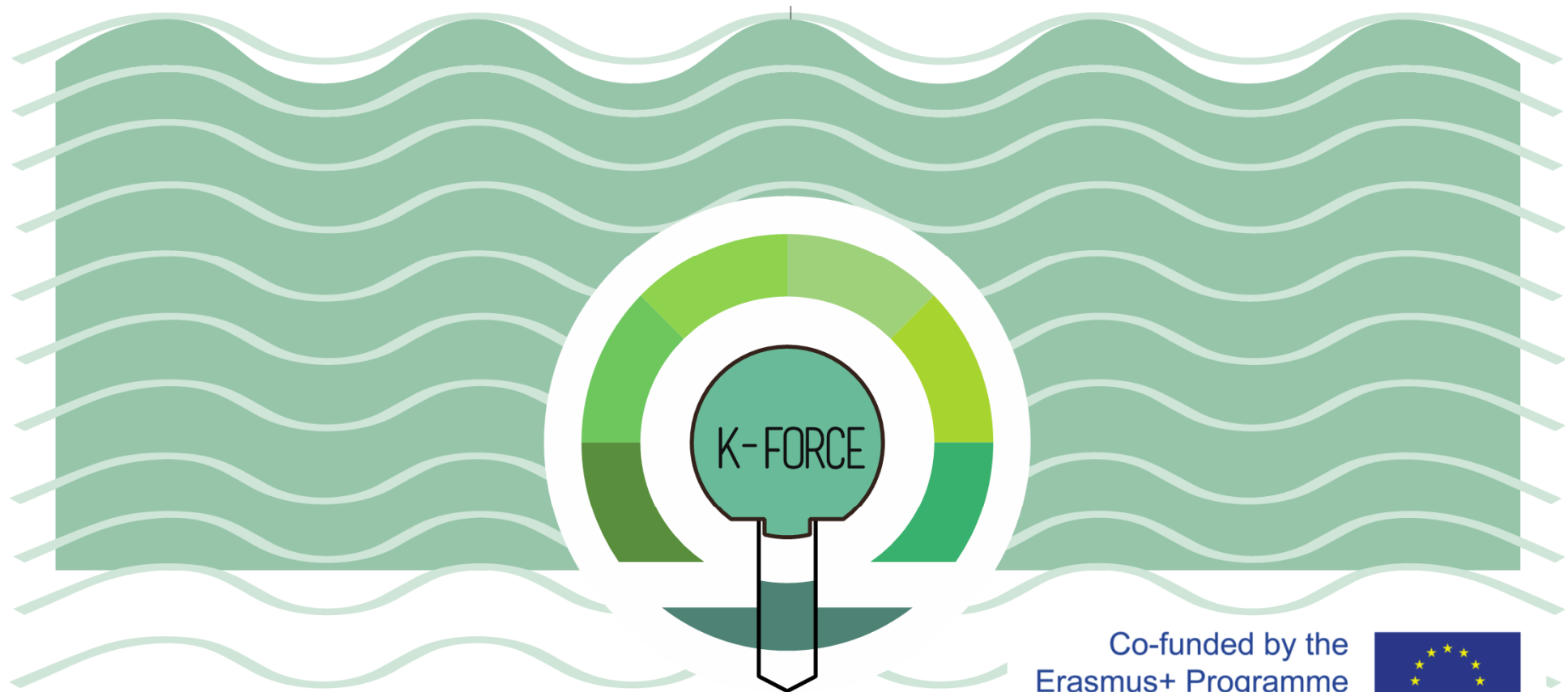
No.	Course Name	S 1/2	CS M/E	Teacher/s	ECTS
06.	Course from elective block 2 Waste management and recycling	1	E	Petra M. Tanovic	8
Course content/structure:					
Content:					
<i>Theoretical teaching</i>					
Sustainable development and waste management. Types of waste, collection, separation and reuse of waste. Hierarchy of waste management, preventive strategies. Measures for handling and managing hazardous waste. Categorization of waste according to the EU waste catalog. Waste disposal. Sanitary landfills. Remediation of closed (filled) landfills. Use of waste as energy source. Legislation of the EU and the Republic of Serbia in the field of waste management.					
<i>Practical teaching</i>					
Specific examples and preparation of seminar papers.					



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Thank you
for your attention

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