Study program: Occupational Safety Engineering

Type and level of studies: Undergraduate Academic Studies

Course unit: Fundamentals of Fire Protection

Teacher in charge: Dr Goran Bošković

Language of instruction: English

ECTS: 8

Prerequisites: None

Semester: Summer semester

Course unit objective:

The educational objective of the course is to acquire knowledge of fire-extinguishing mechanisms, the types of extinguishing agents used and their properties, and application methods depending on the type of combustible material. It also aims to provide knowledge concerning fire-extinguishing equipment and devices, including their selection, use, and maintenance.

Learning outcomes of the course unit

Acquiring knowledge for the correct selection and use of means and equipment for extinguishing fires depending on the type of fuel which was affected by the fire, the type of fire, and the location where the fire occurred.

Course unit contents

Theoretical Part: Fire extinguishing agents. Fire extinguishing processes. Extinguishing by cooling. Extinguishing by smothering. Classification of fire extinguishing agents according to their aggregate state, extinguishing mechanism, purpose and fire class, and method of production. Water as a fire extinguishing agent. Foam as a fire extinguishing agent. Dry chemical powder as a fire extinguishing agent. Carbon dioxide as a fire extinguishing agent. Halons as fire extinguishing agents. New fire extinguishing agents. Fire extinguishing equipment. Water firefighting fittings and equipment. Fire hoses. Couplings, nozzles, branch pipes, and other fittings. Fire pumps. Reciprocating pumps. Centrifugal pumps. Water tanks. Hydrant network equipment. Foam firefighting equipment. Water-foam proportioners. Foam nozzles. Foam generators. Other foam equipment. Powder firefighting equipment. Carbon dioxide firefighting equipment. Mobile firefighting equipment. Personal and collective firefighting equipment. Portable and wheeled fire extinguishers. Types of fire extinguishers. Intervention and rescue equipment. Firefighting tools and appliances: firefighting vehicles, aircraft, helicopters, and other equipment. Fixed firefighting equipment. Fire extinguishing systems, including water-based systems (sprinkler and deluge systems), foam, powder, gas, carbon dioxide, halon, and other systems.

Practical Part: Practical instruction is conducted through classroom exercises. During these exercises, practical examples of fire protection are studied, including basic engineering calculations. An integral part of the practical instruction is a graphical project related to fire protection measures design.

Literature

Mihajlović, E., Mlađan, D., Janković, Ž. Processes and Firefighting Agents. Faculty of Occupational Safety, Niš (Serbia), 2009.

Kleut, N. Fire Safety Installations and Equipment. AGM Knjiga, Belgrade (Serbia), 2016.

Čepić, Z., Bošković, G. Fire Protection in Industrial Facilities – Internal Script. Faculty of Technical Sciences, Novi Sad; Faculty of Mechanical Engineering and Civil Engineering in Kraljevo (Serbia), 2024.

Petrović, V., Babić, B., Petrović-Gegić, A., Tanović, P., Todorović, D., Božović, T. Practicum: Study Programs in Environmental Protection, Occupational Safety, and Protection from Catastrophic Events and Fires. Higher School of Professional Technical Studies, Novi Sad (Serbia), 2022.

Lange, C. Preventive Fire Protection in Building Planning. Springer Vieweg, Wiesbaden (Germany), 2021.

Number of active teaching hours				**Other classes**
Lectures:	Practice:	Other forms of classes:	Independent work:	
3	2	0	0	**0**

Teaching methods

Lectures, tutorial sessions, consultations, and interactive work with students.

Examination methods (maximum 100 points)

Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
Student's activity during lectures	5	Written part of the exam - combined tasks and	50

		theory	
Student's activity during exercises	5		
Test 1	10		
Test 2	10		
Project work	20		
Midterm exam 1 (substitute for the written part of the exam)	25		
Midterm exam 2 (substitute for the written part of the exam)	25		

Grading system		
Grade	**No. of points**	**Description**
10	**91-100**	Excellent
9	**81-90**	Exceptionally good
8	**71-80**	Very good
7	**61-70**	Good
6	**51-60**	Passing
5	**Less than 51**	Failing