

Undergraduate study Metallurgy

COURSE DESCRIPTION – GENERAL INFORMATION			
Name of the course	Materials Testing	Credit value (ECTS)	5
Course teachers	Assoc. Prof. Ivan Jandrlić, PhD	Type of instruction (number of hours L+S+E)	30+0+30
COURSE DESCRIPTION			
<p>The Materials Testing course provides students with both theoretical and practical knowledge of testing methods for metallic materials, including mechanical testing and modern non-destructive testing (NDT) techniques. Students learn how to select appropriate test methods, prepare specimens, and analyze and compare the results of static and dynamic tests.</p> <p>Course topics include the organization of control in metallurgical practice, sampling, determination of elastic and plastic deformation, hardness testing (Brinell, Vickers, Rockwell), toughness, fatigue of materials, and fracture mechanics. Special attention is given to non-destructive testing methods, including optical, radiographic, ultrasonic, magnetic, and indentation testing.</p> <p>In laboratory exercises, students apply their knowledge to specific cases, analyze test results, and compare them to relevant standards.</p> <p>The course prepares students for the professional evaluation of materials at different stages of use and for decision making based on test results.</p>			
COURSE DESCRIPTION – GENERAL INFORMATION			
Name of the course	Metal Forming Technologies	Credit value (ECTS)	5
Course teachers	Assoc. Prof. Ivan Jandrlić, PhD	Type of instruction (number of hours L+S+E)	30+15+30
COURSE DESCRIPTION			
<p>The course covers metal forming processes with an emphasis on the plastic deformation of metals and alloys. Students are introduced to technologies such as forging, pressing, extrusion, drawing, and rolling (of sheets, strips, profiles, and tubes), including material preparation, heating procedures, and typical process defects with methods for their detection and elimination.</p> <p>Special attention is given to the analysis and comparison of individual processes and their influence on product quality. Through seminars, calculation exercises, and project assignments, students develop the ability to optimize technological processes and solve problems in metallurgical production.</p>			

Graduate study Metallurgy

COURSE DESCRIPTION – GENERAL INFORMATION			
Name of the course	Hydrometallurgy	Credit value (ECTS)	3
Course teachers	Prof. Damir Hršak, PhD	Type of instruction (number of hours L+S+E)	30+0+15
COURSE DESCRIPTION			

Hydrometallurgy is an integral part of process metallurgy. In recent decades, it is gaining more and more importance because it is environmentally more friendly than pyrometallurgy, as well as poorer ores can be easily used in hydrometallurgical processes.

The course consists of lectures and experimental exercises taking place in a chemical laboratory. The course covers the classification of leaching agents, the main hydrometallurgical technologies, the division of mineral raw materials suitable for hydrometallurgical processing, as well as methods of purifying and concentrating leaching products.

COURSE DESCRIPTION – GENERAL INFORMATION

Name of the course	Light Pollution	Credit value (ECTS)	4
Course teachers	Full Prof. Anita Begić Hadžipašić, PhD	Type of instruction (number of hours L+S+E)	30+15+0

COURSE DESCRIPTION

This course explains the key concepts of light pollution, with particular emphasis on light pollution originating from industrial facilities and urban environments. Students are introduced to light as a source of environmental pollution and to the mechanisms through which excessive or improperly designed lighting affects ecosystems, wildlife, and human health, including the health and well-being of workers in industrial settings.

The course also introduces the principles of protection from light pollution and the roles and responsibilities of entities involved in environmental protection and resource conservation. Topics include legal frameworks, illumination standards, mandatory lighting methods, and protection measures, as well as planning, construction, maintenance, and reconstruction of lighting systems. Special attention is given to regulatory oversight, inspection procedures, and the responsibilities of manufacturers and operators in ensuring compliance with light pollution protection requirements.

COURSE DESCRIPTION – GENERAL INFORMATION

Name of the course	Metal Corrosion and Protection	Credit value (ECTS)	5
Course teachers	Full Prof. Anita Begić Hadžipašić, PhD Assist. Prof. Sandra Brajčinović, PhD	Type of instruction (number of hours L+S+E)	30+0+30

COURSE DESCRIPTION

This course introduces students to the fundamental principles of chemical and electrochemical degradation of structural metals. It provides a detailed understanding of the mechanisms of different types of corrosion affecting engineering metallic materials under real operating conditions, including atmospheric, soil, high-temperature, and electrochemical corrosion. The course also introduces the basic principles of corrosion protection, covering inhibitors, electrochemical protection methods, protective coatings, and corrosion testing standards. Through lectures and laboratory exercises, students gain both theoretical knowledge and practical experience in corrosion processes, kinetics, testing methods, and modern strategies for the prevention and control of metal degradation.

Undergraduate study Occupational Safety, Health and Environment

COURSE DESCRIPTION – GENERAL INFORMATION			
Name of the course	Machinery and Equipment with Increased Hazards	Credit value (ECTS)	5
Course teachers	Assoc. Prof. Ivan Jandrlić, PhD	Type of instruction (number of hours L+S+E)	30+15+15
COURSE DESCRIPTION			
<p>The course provides knowledge of technological processes, machine design, and safety system devices related to machinery and equipment with increased hazards. Students acquire theoretical and practical knowledge on technical solutions for safe operation, requirements for the installation of safety systems, principles of safety design, and risk assessment for machine operators.</p> <p>The course covers sources of hazards (mechanical, electrical, thermal, radiation-related, pressure-related, and human factors), relevant machinery directives and conformity assessment procedures, hazard characterization, and safety devices such as guards, interlocks, and protective systems. Special attention is given to operator safety, prevention of human error, and risk assessment in industrial environments, including machinery used in metal production, metal forming, plastics processing, woodworking, and machining processes.</p>			
COURSE DESCRIPTION – GENERAL INFORMATION			
Name of the course	Physical Hazards	Credit value (ECTS)	4
Course teachers	Full Prof. Anita Begić Hadžipašić	Type of instruction (number of hours L+S+E)	30+0+15
COURSE DESCRIPTION			
<p>The aim of this course is to acquaint students with methods for testing and risk assessment of physical hazards in the working environment, including microclimate, noise, vibrations, harmful radiation, and inadequate lighting, as well as with procedures for their elimination or reduction to permitted limit values. The knowledge gained in this course enables students to propose appropriate occupational safety measures for work performed under unfavorable microclimatic conditions and exposure to other physical hazards.</p> <p>The course covers the fundamentals of microclimate, climate effects on humans, energy balance and heat exchange, and protective measures such as heating, ventilation, air conditioning, and personal protective equipment. It also addresses noise and vibrations, including their physical principles, measurement and evaluation methods, health and environmental effects, legal requirements, and protection strategies. In addition, students are introduced to lighting principles and workplace illumination, as well as ionizing and non-ionizing radiation, their sources, health effects, exposure limits, and protective measures. Emphasis is placed on the application of standards, regulations, and norms to ensure safe working conditions and effective risk management.</p>			

Graduate study Occupational Safety, Health and Environment

COURSE DESCRIPTION – GENERAL INFORMATION			
Name of the course	Light in the Working Environment	Credit value (ECTS)	4
Course teachers	Full Prof. Anita Begić Hadžipašić, PhD	Type of instruction (number of hours L+S+E)	30+15+0
COURSE DESCRIPTION			
<p>This course introduces students to the importance of assessing the working environment, with a particular focus on illumination levels at individual workplaces. It emphasizes that, depending on the work process, each workplace must meet minimum prescribed requirements for all components of working environment assessment, including lighting, which plays a crucial role in shaping a safe and efficient work environment. Properly designed lighting positively affects employee efficiency, optimizes productivity, and improves the quality of work.</p> <p>The course highlights that adequately illuminated working environments enhance human well-being and that scientific research has demonstrated how appropriate lighting improves concentration, increases motivation, and ensures higher productivity. Students are also introduced to the potential health impacts of artificial light sources, which people are exposed to for many hours daily both at home and at work. Special attention is given to the fact that artificial light often has wavelengths significantly different from natural light and, under certain conditions, may be harmful to human health.</p> <p>Through lectures, students gain theoretical knowledge about the nature of light, natural and artificial light sources, workplace lighting requirements, lighting standards and regulations, measurement methods, risk assessment procedures, and light pollution, with a strong emphasis on its effects on human health and the working environment.</p>			
COURSE DESCRIPTION – GENERAL INFORMATION			
Name of the course	Microclimate and Working Environment	Credit value (ECTS)	4
Course teachers	Full Prof. Anita Begić Hadžipašić	Type of instruction (number of hours L+S+E)	30+15+0
COURSE DESCRIPTION			
<p>The aim of this course is to acquaint students with the microclimatic factors of the working environment and the methods used for their testing, as well as with the possible harmful effects of microclimatic conditions on workers' health and the measures for their protection. The course covers key microclimatic factors, including thermal, chemical, and biological influences, with particular emphasis on thermal conditions such as air temperature, humidity, pressure, and air flow speed.</p> <p>Students gain knowledge about the measurement and evaluation of microclimate parameters, thermal radiation, and environmental heat stress using relevant thermal indices. The course also addresses body temperature regulation, comfort zones, heat production, metabolism, and energy and heat balance, as well as the mechanisms of heat exchange between the human body and the environment. Special attention is given to heat-related disorders caused by unfavorable working conditions and to preventive measures, including technical and organizational solutions and the use of personal protective equipment, in accordance with applicable standards, regulations, and norms.</p>			

COURSE DESCRIPTION – GENERAL INFORMATION			
Name of the course	Noise and Vibrations	Credit value (ECTS)	5
Course teachers	Full Prof. Anita Begić Hadžipašić, PhD	Type of instruction (number of hours L+S+E)	30+15+0
COURSE DESCRIPTION			
<p>The aim of this course is to acquaint students with the effects of noise and vibrations on humans and to train them to identify and characterize sources of noise and vibration, enabling them to independently perform tasks related to noise and vibration protection in industrial environments. The course provides fundamental knowledge of sound and vibration, including the physical properties of sound, sound intensity and pressure, types of noise, and sound propagation in open and enclosed spaces.</p> <p>Students learn about the impact of noise and vibrations on human health, permissible exposure levels, and methods of noise and vibration isolation. Particular emphasis is placed on hand–arm vibrations and whole-body vibrations, their sources, transmission paths, health effects, and exposure limits.</p> <p>The course also covers vibration fundamentals, vibration generation and transmission, dynamics and kinematics of vibrations, impact loads, and their effects on machines and humans. Special emphasis is placed on measurement techniques, assessment of exposure limits, and the selection and use of protective equipment for effective noise and vibration control in production facilities.</p>			
COURSE DESCRIPTION – GENERAL INFORMATION			
Name of the course	Sustainable Business	Credit value (ECTS)	4
Course teachers	Assoc. Prof. Jakov Baleta, PhD	Type of instruction (number of hours L+S+E)	30+0+15
COURSE DESCRIPTION			
<p>Introduce students to the basic principles of sustainable business, with special emphasis on occupational safety, health and environment. Apply the principles of sustainability to the company business.</p>			