No. 14

Course syllabus for First cycle studies						
1.	**Course title**	Physics 1				
2.	**Code**	MDE1M3				
3.	**Study Program**	Metallurgical Digital Engineering				
4.	**Study program organizer (unit, institute, department, division)**	Faculty of Technology and Metallurgy				
5.	**Degree (first, second, third cycle)**	first				
6.	**Academic year / semester**	I/I	7.	**Number of ECTS**	6	
8.	**Instructors**	Margarita Ginovska, Hristina Spasevska, Lihnida Stojanovska-Georgievska, Ivana Fabijanikj Sandeva				
9.	**Prerequisites for course enrollment**	/				
10.	**Objectives of the course syllabus (competences):** Using the basic physical laws in solving the basic problems of engineering. **Acquired skills (competences):** • Defining kinematic quantities (displacement, velocity, acceleration) and their relationship. • Applying Newton's laws and the laws of conservation of momentum and energy of mechanical systems. • Applying basic mechanical principles in oscillations and waves. • Applying the equations of continuity of fluids and Bernoulli equation. • Explaining laws of an ideal gas and applying the first and second laws of thermodynamics in heat machines. • Explaining basic phenomena of geometric optics.					
11.	**Content of the course:** Introduction to Physics. Physical quantities and units of measure. Kinematics of the material point. Uniform linear and circular motion. Motion with uniform acceleration. Projectile motion. Dynamics. Newton's laws. Inertial and non-inertial reference frame. Interaction and laws for conservation of momentum and energy. Dynamics of rotational movement. Rigid body. Kinematics and dynamics of an absolutely rigid body. Fluids. Gravity, fluid statics. Dynamics of an ideal fluid. Viscosity. Oscillations. Simple harmonic periodic motion. Equation of periodic motion and its solution. Energy at periodic motion. Damped and forced oscillations. Resonance. Mechanical waves, wave equation and wave packet. Transverse and longitudinal waves (equation, propagation velocity and standing waves). Sound, ultrasound, vibration and noise. Doppler effect. State of matter. Energy Equity and Maxwell-Boltzmann Distribution. Ideal gas state equation. Heat, heat dissipation and heat transfer mechanisms (convection, thermal conductivity and radiation). Absolutely black body. Stefan-Boltzmann law. Thermodynamics. Work, heat and internal energy. First and second law of thermodynamics. Principle of operation and efficiency of heat machines and heat pumps. Entropy. Geometric optics. Fermat principle of light propagation. Basic laws in geometric optics. Optical instruments. Photometry. Photometric physical quantities, methods of their measurement and their application in modeling the illumination of surfaces and rooms. Modeling and simulation of physical phenomena.					
12.	**Study methods:** Lectures, presentations, numerical and laboratory exercises					
13.	**Total available time**		210 hours			
14.	**Allocation of available time**		3+3			
15.	**Teaching activities**	15.1.	Lectures-theoretical teaching	45 hours		
		15.2.	Exercises (laboratory, practice classes), seminars, teamwork	30 hours		

16.	**Other types of activities**	16.1.	Projects, seminar papers	30 hours
		16.2.	Individual tasks	30 hours
		16.3.	Homework and self-learning	75 hours

17.	**Grading system**		
	17.1.	Exams	10 points
	17.2.	Activity and participation	20 points
	17.3.	Final exam	70 points

18.	**Grading criteria (points/grade)**	Up to 61 points	5 (five) (F)
		From 61 to 69 points	6 (six) (E)
		From 70 to 79 points	7 (seven) (D)
		from 80 to 89 points	8 (eight) (S)
		From 90 to 95 points	9 (nine) (B)
		from 95 to 100 points	10 (ten) (A)

19.	**Prerequisites for taking the final exam**	Completed laboratory exercises
20.	**Language in which lectures are conducted**	Macedonian and English
21.	**Method for monitoring the quality of lectures**	Internal evaluation and surveys

22. **LITERATURE**

22.1. Compulsory literature

No.	Author	Title	Publisher	Year
1.	Margarita Ginovska, Hristina Spasevska, Lihnida Stojanovska-Georgievska , Ivana Sandeva	Lectures in Physics 1 – Classical Physics	UKIM-FEEIT	2023
2.				
3.				

22.2. Additional literature

No.	Author	Title	Publisher	Year
1.	J. Serway	Physics for scientists and engineers	Thomson Books	2004
2.	P. Tipler	Physics for scientists and engineers	Worth Publishers	1999
3.				