POLYTECHNIC OF MEĐIMURJE IN ČAKOVEC

COURSE SYLLABUS

ACADEMIC YEAR: 2020/2021

1. GENERAL COURSE INFORMATION				
1.1 Course name	**Construction modeling**			
1.2 Study program/s	Undergraduate professional study Sustainable Development			
1.3 Course status (O,E)	Obligation	**1.6 Mode of instruction (number of hours)**	**Lectures**	15
1.4 Course code			**Exercises**	30
1.5 Course abbreviation	KM - TTS		**Seminars**	
1.6 Semester	II		**E-learning**	
1.7 ECTS	4	**1.7 Place and time of instruction**	Premises of the Polytechnic of Međimurje in Čakovec, according to the schedule published on the website	
2. TEACHING STAFF				
2.1 Course leader/s-title	prof. Sarajko Baksa, Ph.D.	**contact**	sbaksa@mev.hr	
	- - -	**contact**	- - -	
2.2 Assistant/s- title	- - -	**contact**	- - -	
	- - -	**contact**	- - -	
2.3 Instruction held by- title	- - -	**contact**	- - -	
3. COURSE DESCRIPTION				
3.1 Course goals	The aim of the course is to develop spatial dawn in students, with the development of creative thinking and solving spatial 3D problems with constructive methods. Furthermore, the goal is to develop the ability of spatial perception and dimensional object manipulation. Acquisition of knowledge of descriptive geometry as a basis of engineering and graphic communication. Acquisition of skills required in solving 2D and 3D design and graphics problems, using CAD technologies and application software solutions. Introduction to geometric laws as well as constructive methods, necessary for solving spatial problems of BIM concept.			
3.2 Prerequisites	Passed the course Technical Drawing			
3.3 Course outcomes	After successfully passing the course, the student will be able to: 1. Recognize the rules of spatial dawn, with the selection of the most efficient spatial 2D / 3D object display. 2. Use and distinguish the effects of individual techniques of constructive methods in sketching within 2D and 3D representation of shapes. 3. Determine the optimal and analyze the derived spatial perception of 2D / 3D display technology. 4. Recognize and select the optimal principles of descriptive geometry as a basis for engineering and graphical communication in order to solve 3D problems, using promising CAD software solutions. 5. Recognize the application of geometric laws as well as constructive methods, necessary for solving spatial representations. 6. Offer appropriate projections of geometric regularity as well as constructive methods, necessary for solving spatial representations.			

3.4 Course content

The course presents contents related to the concept, possibilities and role of dimensioned object manipulation of the model within the technical construction. Special emphasis is placed on CAD technologies and application software solutions.

3.5 Types of coursework

x	Lectures	x	Exercises	x	Blended e-learning	x	Individual activities		Laboratory
x	Seminars and workshops	x	Distant learning	x	Field classes	x	Multimedia and network	x	Mentorship
	Other								

3.6 Language of instruction

Croatian / English

3.7 Monitoring students' work (enter the number of ECTS credits for each activity so that the total number of ECTS credits is equal to the total ECTS value of the course, 1 ECTS = 30 hours)

1,5	Class attendance	0,2	Seminars		Essay
	Class activity	0,2	Project		Report/paper
0,2	Midterm exams	0,2	Practical task	0,2	Continuous knowledge check
1,0	Written exam		Experimental work		
0,5	Oral exam		Research		

3.8 Assessment and evaluation of students' work during classes and at the final exam

Activity specification	Percent %	Points
Assessment during instruction		
Attendance	5%	5
Class activity	5%	5
Project / Practical work	20%	20
Seminar / Colloquium I	20%	20
Seminar / Colloquium II	20%	20
Oral exam	30%	30
Exam assessment for the students who failed to fullfil all the obligatory requirements during the semester		
Written exam	*60%*	*60*
Total:	**100%**	**100**

3.9 Assessment criteria – analysis per learning outcomes

Ways of evaluating learning outcomes							
	Atten-dance	**Activity**	**Project**	**Mid-term exam 1**	**Mid-term exam 2**	**Practic work**	**Total**
Outcome 1			3	6		5	14
Outcome 2			3	6		5	14
Outcome 3			3	8		5	16
Outcome 4			3		6	5	14
Outcome 5			4		6	5	15
Outcome 6			4		8	5	17
Outcome not-related	5	5					10
Total	**5**	**5**	**20**	**20**	**20**	**30**	**100**

The course has defined 6 learning outcomes, a system of scoring outcomes, in order to pass the exam the student must achieve at least 50% points for each learning outcome.

	The grade is calculated as follows: • 87.51-100.00 points: rating Excellent (5) • 75.01- 87.5 points: rating Very good (4) • 62.51 -75.00 points: rating Good (3) • 50.01- 62.5 points: rating Pass (2) • 00.00- 50.00 points: rating Fail (1)	
3.10 Specific features related with taking the course	If the student collects 50% of the points of each outcome, he / she directly takes the exam, provided that he / she has done practical work (seminars / project). During the exam, it is possible to orally check the knowledge from practical work (seminars / project). Once earned points for each learning outcome are no longer deleted unless the student, with the express approval of the course leader, decides to correct the result for each learning outcome, whereby the points won are deleted and newly earned points for that learning outcome are entered. The final grade is obtained on the exam period and is the sum of points earned during classes. Students who did not take the colloquium access the written part of the exam where all learning outcomes are checked, and are required to have completed practical work (seminars / project) before taking the exam.	
3.11 Students obligations	Full-time students are required to attend at least 70% of the total number of hours of lectures and exercises in order to exercise the right to take the exam. Part-time students are required to attend at least 30% of the total number of hours of lectures and exercises in order to exercise the right to take the exam. If the student has not fulfilled all the obligations set by the course, he is obliged to attend the lectures again and meet the conditions for taking the exam. Attendance can be offset by online tuition, organised webinars and added assignments given by teachers. One lesson lasts 45 minutes, and several hours form a teaching unit. Absence from one teaching unit is counted as one absence. Delays and apologies are recorded separately. In that case, if the student missed more than 50% of classes, and has a justifiable reason/apology, the request should be submitted to the Department Council, which then decides on the justification of student absences with the obligatory opinion of the course leader.	
3.12 Written assignments	Seminars / Projects	
3.13 Required reading	1.	K. Horvatić-Baltasar, I. Babić: "Nacrtna geometrija", SAND d.o.o., Zagreb, 1997.
	2.	I. Babić, S. Gorjanc, A. Sliepčević, V. Szirovicza: "Nacrtna geometrija-zadaci", HDKGIKG, Zagreb, 2002.
	3.	S. Baksa: Konstrukcijske metode računalnog 3D modeliranja, MEV 2018.
3.14 Additional reading	1.	V. Szirovicza, E. Jurkin: "Deskriptivna geometrija", Compakt Disc., u tisku, Zagreb, 2005.

4 ADDITIONAL COURSE INFORMATION	
4.1 Quality control	The quality of the program, teaching process, teaching skills and level of mastery of the material will be established by conducting a written evaluation based on questionnaires, and in other standardised ways and in accordance with the by-laws of the Polytechnic of Međimurje in Čakovec.
4.2 Contact the teacher	Students can contact the teacher during the office hours and during classes, while for short questions and explanations they can contact him/her any day during working hours by coming in person or by landline. It is possible to ask questions and e-mail which will be answered as soon as possible.
4.3 Information about the course	It is the obligation of each student to be regularly informed about the course. All relevant information and notices related to classes and exams, maintenance or any year, will be reported in a timely manner on the bulletin board and on the website of the Polytechnic of Međimurje in Čakovec.
4.4 Course contribution to the study program	Course contribution to the study program in generic learning outcomes; I1 - Interpret information, ideas, problems and solutions to professional and General public, I2 - Use new technologies and techniques as part of a lifelong process Learning, I3 - Use foreign languages in professional communication and use of professional literature, I4 - Advocate an ethical approach to work and to project associates teams, I5 - Critically evaluate arguments, assumptions and data in order to create opinions and contributing to the solution of the problem. The contribution of the course to the study program in specific learning outcomes; I11 - Apply basics of thermoenergetics, thermodynamics and hydromechanics in spatial design of thermodynamic systems, I12 - Develop a technical plan in the field of design of Mechanical Thermotechnical System, I17 - Create an architectural and urban solution by applying basic principles Design of low-energy buildings with the use of modern computer systems.

5. ANALYSIS OF COURSE TOPICS (the number of hours is equal to the number of lectures and exercises of the course)

LECTURES

Hours	Topic and description	Method • Direct teaching (lecture, instruction, pp presentation) • Discovery learning (individual, lead, discussion) • Group learning • Case study • Field classes…	Learning outcomes	Course outcome

1.	Graphic engineering communication	Lecture, Discovery learning, Presentation	Use graphic engineering communication	I1
2.	Descriptive geometry as information technology and its basic mechanisms of technical construction communication	Lecture, Discovery learning, Presentation	Use descriptive geometry methods	I1
3.	Monge projection and metric 2D and 3D object display problems, with basic geometric 2D and 3D CAD constructions	Lecture, Discovery learning, Presentation	Distinguish basic geometric 2D and 3D CAD constructions	I1
4.	Application within CAD development environment	Lecture, Discovery learning, Presentation	Use CAD development environment	I2
5.	Computer mathematical construction of various 2D and 3D objects	Lecture, Discovery learning, Presentation	Apply methods of mathematical computer 3D construction	I3
6.	Computer models and algorithms for translation, rotation, character projection	Lecture, Discovery learning, Presentation	Use knowledge of spatial 3D modeling	I3
7.	Geometric bodies and their CAD models	Lecture, Discovery learning, Presentation	Use basic CAD construction models	I4
8.	Axonometry and application within the CAD environment	Lecture, Discovery learning, Presentation	Apply axonometry within a CAD environment	I4
9.	Perspective collineation	Lecture, Discovery learning, Presentation	Use knowledge of technical perspective collineation positions	I4
10.	Conic theory - parabola and hyperbola	Lecture, Discovery learning, Presentation	Apply the basic syntax of conic theory	I5
11.	Curves in a CAD environment	Lecture, Discovery learning, Presentation	Apply the concept of curves in a CAD environment	I5
12.	Second order curves - spatial planes	Lecture, Discovery learning, Presentation	Explain second order curves	I5
13.	Second-order curves - curved surfaces with body penetrations	Lecture, Discovery learning, Presentation	Explain second-order curves with body penetrations	I5
14.	Sections of rotating surfaces (cones, rollers and spheres) by planes	Lecture, Discovery learning, Presentation	Apply rotational spatial planes	I6
15.	Design and modeling of complex assemblies of various machine mechanisms	Lecture, Discovery learning, Presentation	Apply computer design and modeling of complex assemblies	I6

EXERCISES/ SEMINARS				
Hours	**Topic and description**	**Method** • Direct teaching (lecture, instruction, pp presentation) • Discovery learning (individual, lead, discussion) • Group learning • Case study • Field classes…	**Learning outcomes**	**Course outcome**
1.	Graphic engineering communication	Lecture, Discovery learning, Presentation	Use graphic engineering communication	I1
2.	Descriptive geometry as information technology and its basic mechanisms of technical construction communication	Lecture, Discovery learning, Presentation	Use descriptive geometry methods	I1
3.	Monge projection and metric 2D and 3D object display problems, with basic geometric 2D and 3D CAD constructions	Lecture, Discovery learning, Presentation	Distinguish basic geometric 2D and 3D CAD constructions	I1
4.	Application within CAD development environment	Lecture, Discovery learning, Presentation	Use CAD development environment	I2
5.	Computer mathematical construction of various 2D and 3D objects	Lecture, Discovery learning, Presentation	Apply methods of mathematical computer 3D construction	I3
6.	Computer models and algorithms for translation, rotation, character projection	Lecture, Discovery learning, Presentation	Use knowledge of spatial 3D modeling	I3
7.	Geometric bodies and their CAD models	Lecture, Discovery learning, Presentation	Use basic CAD construction models	I4
8.	Axonometry and application within the CAD environment	Lecture, Discovery learning, Presentation	Apply axonometry within a CAD environment	I4
9.	Perspective collineation	Lecture, Discovery learning, Presentation	Use knowledge of technical perspective collineation positions	I4
10.	Conic theory - parabola and hyperbola	Lecture, Discovery learning, Presentation	Apply the basic syntax of conic theory	I5
11.	Curves in a CAD environment	Lecture, Discovery learning, Presentation	Apply the concept of curves in a CAD environment	I5
12.	Second order curves - spatial planes	Lecture, Discovery learning, Presentation	Explain second order curves	I5

13.	Second-order curves - curved surfaces with body penetrations	Lecture, Discovery learning, Presentation	Explain second-order curves with body penetrations	I5
14.	Sections of rotating surfaces (cones, rollers and spheres) by planes	Lecture, Discovery learning, Presentation	Apply rotational spatial planes	I6
15.	Design and modeling of complex assemblies of various machine mechanisms	Lecture, Discovery learning, Presentation	Apply computer design and modeling of complex assemblies	I6