Course code: **Course item:** **D.1.2**

1. INFORMATION ABOUT THE COURSE

a. Basic information

Course title	***Computational Methods in Machinery***
Field of study	*Mechanical Engineering*
Cycle	*first degree*
Study profile	*general academic*
Study mode	*full-time*
Specialisation	*Machine technology*
Unit responsible for the field of study	*Faculty of Mechanical Engineering*
Lecturer	*Sylwester Borowski, PhD*
Introductory courses	*The basics of Mechanics and Machine Design.*
Prerequisites	*The scope of knowledge / skills / social competences resulting from the introductory subjects*

b. Semester/ weekly timetable

Semester	Lectures (W)	Classes (C)	Laboratories (L)	Project classes (P)	Seminars (S)	Fieldwork (T)	ECTS credits ECTS*
VI	30		15				3

C. Assumed outcomes and aims - aims bind the course programme with the study programme and are referred to in learning outcomes point 2

2. LEARNING OUTCOMES (acc. to National Qualifications Framework)

No.	Description of learning outcomes	Reference to learning outcomes for the field of study	Reference to learning outcomes for the area of study
KNOWLEDGE			
K1	has knowledge of manufacturing engineering: techniques, processes and machines.	K_W10	P6S_WG
SKILLS			
S1	is able to plan the production process of simple machines and devices and to initially estimate its costs	K_U06	P6S_UW
S2	has the ability to self-study, inter alia, to improve professional competences	K_U12	P6S_UU
SOCIAL COMPETENCES			
SC1	is aware of the importance and understands the non-technical aspects and effects of a mechanical engineer's activity, including its impact on the	K_K04	P6S_KO

	environment, and the related responsibility for decisions		

3. TEACHING METHODS

multimedia lecture, laboratory and other methods, e.g. videos, books, catalogues, diagrams, blackboard, on-line techniques, exercise workbook classes, lectures, brainstorming, discussion, show, situational methods, mind maps, drama, etc.

4. METHODS OF EXAMINATION

class attendance, final lecture written exam, partial or final report after the laboratory

5. COURSE CONTENT

Specify the content separately for each type of classes in accordance with point I.B. Lecture	Problems related to solving beams. Issues of the modelling of under construction machines. Numerical analyses used in the mechanical engineering. Using computer methods to solve equations. Accuracy of the numerical solution - mistake of the discretization. Algorithm of the calculation program for beams. Irregularities in the design of algorithms. Techniques of the presentation of results of analyses. Final summary.
Laboratory	Solving an engineering problem with an Excel sheet, with a script in the Matlab environment (programs in other programming languages) and an engineering mobile application. Summary of the course cycle.

6. VALIDATION OF LEARNING OUTCOMES

(Each learning outcome from the list requires validation methods to ensure that it was achieved by a student.)

Learning outcome	Form of assessment (for example:)					
	Oral examination	Written examination	Test	Project	Report	Class attendance
W1	x				x	x
U1 – U2	x				x	x
K1	x				x	x

7. LITERATURE

Basic literature	1. Hibbeler R. C. Engineering Mechanics: Statics and Dynamics Pearson, 2015 ISBN 0133915425, 9780133915426 2. James L. Meriam, L. G. Kraige, J. N. Bolton Engineering Mechanics: Statics, John Wiley & Sons, 2020 ISBN 1119723515, 97811197235168
Supplementary literature	1. Abdulmajeed A Mohamad, Adel M Benselama, Numerical Methods For Engineers: A Practical Approach, World Scientific, 2022, ISBN: 978-981-125-525-0

8. TOTAL STUDENT WORKLOAD REQUIRED TO ACHIEVE EXPECTED LEARNING OUTCOMES EXPRESSED IN TIME AND ECTS CREDITS

Student's activity		Student workload– number of hours (for example:)
Classes conducted under a direct supervision of an academic teacher or other persons responsible for classes	Participation in classes indicated in point 2.2	45
	Supervision hours	4
Student's own work	Preparation for classes	10
	Reading assignments	15

	Other (preparation for exams, tests, carrying out a project etc)	16
Total student workload		90
	Final number of ECTS credits	3