



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Work ergonomics [S2Elmob1>PO1-EP]

### Course

Field of study

Electromobility

Year/Semester

1/1

Area of study (specialization)

–

Profile of study

general academic

Level of study

second-cycle

Course offered in

Polish

Form of study

full-time

Requirements

elective

### Number of hours

Lecture

30

Laboratory classes

0

Other

0

Tutorials

0

Projects/seminars

0

### Number of credit points

2,00

### Coordinators

dr inż. Kamil Wróbel

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### Lecturers

### Prerequisites

The student has basic knowledge about the processes and conditions prevailing at workstations, knows the basic production processes and principles of their organization, understands the basic concepts of organization and management sciences and the basics of efficient work performance.

### Course objective

Providing students with theoretical and practical knowledge in the field of shaping ergonomic and safe working conditions, especially related to the design, manufacturing and maintenance processes in the life cycle of electric vehicles.

### Course-related learning outcomes

Knowledge:

1. The student knows the general principles of creating and developing forms of individual entrepreneurship, the principles of industrial property protection and copyright, ergonomics and health and safety rules, especially protection against electric shock and first aid [K2\_W16]

Skills:

1. The student is able to obtain information (in Polish and English) from various sources, make their interpretation, critical evaluation, analysis and synthesis, as well as draw conclusions and formulate and justify opinions [K2\_U02]
2. The student is able to prepare and present a presentation (in Polish and English) on the implementation of a project or research task and lead a debate on a specialist issue on topics related to the current state and future of electromobility, taking into account a diverse group of recipients [K2\_U13]
3. The student is able to determine the directions of further learning, organize the process of self-education and indicate the directions of professional development of other people [K2\_U16]

Social competences:

1. The student is aware of the need to develop professional achievements, observe the rules of professional ethics [K2\_K04]

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Formative assessment:

The knowledge acquired during the lecture is verified on the basis of discussions on previous topics and attendance at the lecture.

Summative assessment:

The knowledge acquired during the lecture is verified on the basis of a final test consisting of 10 questions (7 closed questions and 3 open questions), scored in the same way. In open questions it is allowed to get 0; 0.25; 0.5; 0.75 or 100% of the score depending on the degree of correctness and completeness of the student's answers. Passing threshold: 51% of points.

Grading scale:

0 - 50 Unsatisfactory

51 - 59 Satisfactory

60 - 69 Satisfactory plus

70 - 79 good

80 - 89 good plus

90 - 100 very good

## Programme content

The genesis of ergonomics against the background of the development of technology and science.

Component sciences and the nature of ergonomics. Ergonomics and work safety - economic aspects.

Health effects of excessive and insufficient loads. System human-machine-environment (H-M-E system).

Contemporary trends in ergonomic research.

## Course topics

The genesis of ergonomics against the background of the development of technology and science.

Component sciences and the nature of ergonomics. Ergonomics and work safety - economic aspects.

Health effects of excessive and insufficient loads. System human-machine-environment (H-M-E system).

Interpretation of the system as a workplace. Purpose and scope of ergonomic activity. Contemporary trends in ergonomic research. Ergonomics activities in the life cycle of the H-M-E system. Methods of ergonomic diagnosis and load prediction. Analysis of physical and efficiency work loads and body heat management. Work-related mental stress analysis. Principles of load optimization. Information perception and processing processes. Principles of selection of signaling and control devices. Shaping the spatial parameters of the workplace as well as machines and hand tools using anthropometric and biomechanical data. Evaluation and shaping of the work environment (mechanical vibrations, noise, microclimate, lighting, harmful radiation, air pollution) in terms of impact on humans. Principles of ergonomic design. Examples of ergonomic design of workstations: machining, assembly, dispatching, computer.

## Teaching methods

A conventional lecture with elements of problem-based and conversational lectures, illustrated with multimedia presentations. Lecture conducted on-line with using synchronous access methods.

## Bibliography

### Basic:

1. Horst W. (red), Ergonomia z elementami bezpieczeństwa i ochrony zdrowia w pracy, Wyd. Politechniki Poznańskiej, Poznań, 2011
2. Olszewski J., Podstawy ergonomii i fizjologii pracy. Wyd. Akademii Ekonomicznej, Poznań, 1997
3. Tytyk E., Butlewski M. Ergonomia w technice. Wyd. Politechniki Poznańskiej, Poznań, 2011
4. Tytyk E., Projektowanie ergonomiczne, Wyd. PWN, Warszawa 2001
5. Wejman M., Diagnozowanie środowiska pracy, Wyd. Politechniki Poznańskiej, Poznań 2012

### Additional:

1. Standards and legal acts indicated in the lectures
2. Koradecka D., (red), Bezpieczeństwo pracy i ergonomia, Wyd. CIOP, Warszawa, 1999
3. Górka E., Ergonomia. Projektowanie, diagnoza, eksperymenty. Oficyna Wydawnicza Politechniki Warszawskiej, 2002
4. Rabenda A., Kowal E., Oddziaływanie szkodliwości przemysłowych na organizm człowieka. Oficyna Wydawnicza Uniwersytetu Zielonogórskiego, 2008
5. Jabłoński J. (red.), Ergonomia produktu. Ergonomiczne zasady projektowania produktów, Wydawnictwo Politechniki Poznańskiej, Poznań, 2006
6. Tytyk E., Drgania mechaniczne i hałas w ujęciu inżynierii ergonomicznej. Wyd. Politechniki Poznańskiej, Poznań 2021 (Open Access)
7. Butlewski M., Projektowanie ergonomiczne wobec dynamiki deficytu zasobów ludzkich, Politechnika Poznańska 2018, ISBN: 978-83-7775-506-8; 255 stron
8. Wróbel, K., & Sławińska, M. (2020). Ergonomics criteria for control devices used by the elderly working with a computer. Zeszyty Naukowe Politechniki Poznańskiej seria Organizacja i Zarządzanie, 80, 305-320
9. WRÓBEL, K. (2022). MANAGEMENT OF ERGONOMIC INTERVENTIONS IN INDUSTRY 4.0. Scientific Papers of Silesian University of Technology. Organization & Management/Zeszyty Naukowe Politechniki Śląskiej. Seria Organizacji i Zarządzanie, (164)
10. Dahlke, G., Wróbel, K., & Żamojtuć, B. (2014). Analiza ergonomiczności systemów informacyjnych w komunikacji publicznej. Logistyka, (6), 2993-3006

## Breakdown of average student's workload

	Hours	ECTS
Total workload	55	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	25	1,00