



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Diagnosing the working environment [N2IBiJ1-JiEwBP>DSP]

### Course

Field of study

Safety and Quality Engineering

Year/Semester

1/2

Area of study (specialization)

Quality and Ergonomics in Work Safety

Profile of study

general academic

Level of study

second-cycle

Course offered in

Polish

Form of study

part-time

Requirements

elective

### Number of hours

Lecture

10

Laboratory classes

10

Other

0

Tutorials

0

Projects/seminars

10

### Number of credit points

4,00

### Coordinators

dr inż. Grzegorz Dahlke

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### Lecturers

### Prerequisites

The student has the knowledge to define the hazardous, harmful and nuisance factors in the work environment. He/she can distinguish physical, chemical and biological factors present in the human environment.

### Course objective

Practical knowledge of the methods of identification, measurement and analysis of hazardous and harmful factors listed in the Ordinance of the Minister of Labour for which the maximum permissible concentrations and intensities have been determined.

### Course-related learning outcomes

Knowledge:

1 The student has structured and theoretically based knowledge and knows the facts and phenomena characteristic of management and quality sciences, mechanical engineering and safety engineering in the context of diagnosing the work environment [K2\_W01].

2. The student knows in-depth the measurement methods used in solving the problems of modern safety engineering, ergonomics and occupational safety [K2\_W03].

3. The student knows in-depth development trends and good practices regarding safety management in organizations in local and global terms in the context of diagnosing the work environment [K2\_W04].

#### Skills:

1. The student is able to properly select sources, including literature and information derived from them, as well as to evaluate, critically analyze, synthesize and creatively interpret this information, formulate conclusions and comprehensively justify the opinion when presenting the results in terms of diagnosing the work environment. [K2\_U01].
2. The student is able to use methods and tools for solving complex and unusual problems related to diagnosing the work environment and advanced information and communication techniques characteristic of the professional environment related to safety management in organizations [K1\_U02].
3. The student is able to identify and recognize hazards in the work environment, assess their impact on the individual, organization and its stakeholders, and indicate methods of conduct aimed at minimizing the effects of hazards, also taking into account pro-ecological solutions [K2\_U10].

#### Social competences:

1. The student is critical of his knowledge, is ready to consult experts when solving cognitive and practical problems related to safety management in organizations in terms of diagnosing the work environment and its results [K2\_K01].
2. The student correctly identifies and resolves dilemmas related to broadly understood safety, understands the need to raise public awareness of the need to shape safety in various areas of the organization's functioning in the context of diagnosing the work environment [K2\_K02].
3. The student is ready to perform tasks related to safety management in the organization in an ethical manner, to persuade others to observe the principles of professional ethics and to develop professional values in this area [K2\_K05].

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

#### Formal evaluation:

- a) laboratories: ongoing assessment (on a scale of 2 to 5) of the theoretical preparation and implementation of laboratory exercises,
- b) projects: evaluation of the implementation of project tasks,
- c) lectures: assessment of responses during a written colloquium.

#### Summary evaluation:

- a) laboratories: Average grade for laboratory exercises; pass when a minimum grade of 3.0 is obtained,
- b) projects: assessment of the implementation of the project tasks carried out in the given chapters; a credit after obtaining at least a score of 3.0 (the condition is to prepare the main tasks),
- c) lectures: written examination (answers to 30 open and closed questions) from the content presented in the lecture; each answer is scored on a scale from 0 to 1; the score is calculated after summing up the points and recalculating according to the scale provided for in the study regulations.

### Programme content

#### Lecture:

Characteristics of the working environment. Measurement frequency requirements. Measuring apparatus in work environment diagnosis. Diagnosing the acoustic environment - audible and ultrasonic noise. Diagnosing exposure to general and local vibration. Diagnosing the thermal environment - cold and hot microclimates. Diagnosing exposure to non-ionising radiation (optical radiation (laser and non-laser), electromagnetic radiation. Determination of measurement uncertainties.

#### Laboratory:

Measurement of selected work environment factors.

#### Project:

1. Design of a methodology for the study of the worker's exposure at the workplace, taking into account selected criteria;
2. Development of the research methodology in the form of a flow chart;
3. Selection of apparatus and measuring tools used in the study of selected criteria;
4. Identify standards and legal documents that are the basis of the research (methods and requirements);
5. Development of the research schedule, determination of the size of the research team and division of

responsibilities taking into account the apparatus used;  
6. Development of samples of measurement protocols.

## Course topics

Lecture:

Characteristics of the working environment. Measurement frequency requirements. Measuring apparatus in work environment diagnosis. Diagnosing the acoustic environment - audible and ultrasonic noise. Diagnosing exposure to general and local vibration. Diagnosing the thermal environment - cold and hot microclimates. Diagnosing exposure to non-ionising radiation (optical radiation (laser and non-laser), electromagnetic radiation. Determination of measurement uncertainties.

Laboratory:

Measurement of selected work environment factors.

Project:

1. Design of a methodology for the study of the worker's exposure at the workplace, taking into account selected criteria;
2. Development of the research methodology in the form of a flow chart;
3. Selection of apparatus and measuring tools used in the study of selected criteria;
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5. Development of the research schedule, determination of the size of the research team and division of responsibilities taking into account the apparatus used;
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## Teaching methods

Lecture supported by multimedia presentation and performance of measurement experiments. The lecture is conducted using distance learning techniques in a synchronous mode. Acceptable platforms: eMeeting, Zoom, Microsoft Teams. During laboratory classes, students use instructions for tasks involving the preparation and execution of measurements in the environment and solve calculation tasks. During the project classes, students design a process of research and analysis of harmful factors at the work place for the given assessment criteria.

## Bibliography

Basic:

1. Horst W. M., Dahlke G., Górny A., Horst N., Horst W. F., Ergonomia z elementami bezpieczeństwa i ochrony zdrowia w pracy. Zasady i wymagania związane z materialnym środowiskiem pracy, Wydawnictwo Politechniki Poznańskiej, 2011
2. Koradecka D. (red.), Bezpieczeństwo i higiena pracy, Wyd. CIOP, Warszawa 2008
3. Polskie Normy z zakresu środowiska pracy
4. Rozporządzenie Ministra Pracy i Polityki Społecznej w sprawie najwyższych dopuszczalnych stężeń i natężeń czynników szkodliwych dla zdrowia w środowisku pracy (aktualne)
5. Rozporządzenie Rady Ministrów w sprawie wykazu prac uciążliwych, niebezpiecznych lub szkodliwych dla zdrowia kobiet w ciąży i kobiet karmiących dziecko piersią (aktualne)
6. Rozporządzenie Rady Ministrów w sprawie wykazu prac wzbronionych młodocianym i warunków ich zatrudniania przy niektórych z tych prac (aktualne)
7. Uzarczyk A., Czynniki szkodliwe i uciążliwe w środowisku pracy, Wyd. ODDK, Gdańsk 2009

Additional:

1. Engel Z., Ochrona środowiska przed drganiem i hałasem, Wydawnictwo Naukowe PWN, Warszawa 2001
2. Jan Paweł II, 1981, Encyklika Laborem Exercens, Wydawnictwo Pallotinum, Poznań
3. Koradecka D. (red.), Bezpieczeństwo pracy i ergonomia, Wyd. CIOP, Warszawa 1997
4. Pacholski L. (red.), Ergonomia, Wyd. Politechniki Poznańskiej, Poznań 198
5. Sławińska M., Ergonomic engineering of technological devices, Publishing House of Poznan University of Technology, 2019

## Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
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)	70	3,00