# COURSE DESCRIPTION CARD - SYLLABUS

Course name
Surface engineering [S1MiTPM1>IP]

## Course

Field of study
Materials and technologies for automotive industry

Year/Semester
3/6

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
elective

## Number of hours

Lecture
15

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
0

## Number of credit points

3,00

## Coordinators

dr hab. inż. Adam Piasecki
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## Lecturers

## Prerequisites

Basic knowledge of chemistry, physics, materials science. Logical thinking, use of the information obtained from the library and the Internet. Understanding the need for learning and acquiring new knowledge

## Course objective

The importance of surface engineering, manufacturing methods, testing and properties.

## Course-related learning outcomes

Knowledge:
1. The student should characterize the types and structure of the surface layer of the product.
2. The student should characterize the methods of producing surface layers.
3.The student should know how to investigte the properties of surface layers.

Skills:
1. The student is able to select the material for the corrosive environment.
2. The student is able to assess the type and causes of the wear of the product's surface layer.
3. The student is able to test the surface layer of the product.

Social competences:
1. The student is able to work in a group.
2. The student is aware of the importance of surface treatment for society.

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: - credit on the basis of a test consisting of both open and test questions carried out at the end of the semester. Scale of estimate: 51-60% - dst(C), 61-70% - dst+(C+), 71-80% - db(B), 81-90% - db+(B+), 91-100% - bdb(A).
Laboratory classes: evaluation of student's knowledge necessary to prepare, and carry out tasks and evaluation of reports.

## Programme content

During the course student learn about the methods of producing surface layers and method of their research.

## Course topics

Lecture: Characteristics of the surface layer of the material. Potential and exploitation properties of surface layers. Methods and techniques of testing the properties of the surface layer of the material. Modern methods of producing surface layers and coatings. Methods using to produce surface layers for automotive industry: immersion metallized coatings, galvanic coatings, anti-wear layers and coatings, paint coatings.
Laboratory classes: 1. Hot dip metallized coatings. 2. Diffusion layers. 3. Galvanic coatings. 4. Sprayed and thermally welded coatings. 5. Paint coatings.

## Teaching methods

multimedia presentations

## Bibliography

Basic:
1. Burakowski T., Areologia. Podstawy teoretyczne, Instytut Technologii Eksploatacji - PIB / 2013.
2. Blicharski M., Inżynieria powierzchni, Wyd. PWN, 2021.
3. Młynarczak A. Jakubowski J.: Obróbka powierzchniowa i powłoki ochronne. Wyd. PP 1998.

Additional:
1. Klimpel A.: Napawanie i natryskiwanie cieplne. WNT Warszawa 2000.
2. Praca Zbiorowa. Poradnik Galwanotechnika. WNT Warszawa 2002.
3. Klimpel A.: Technologie laserowe. Wyd. Politechniki Śląskiej, Gliwice 2012.
4. Kula P.: Inżynieria Warstwy Wierzchniej. Wyd. Politechniki Łódzkiej, 2000
5. Burakowski T. Wierzchoń T.: Inżynieria powierzchni metali. WNT Warszawa 1995

## Breakdown of average student's workload

| | Hours | ECTS |
|---|---|---|
| Total workload | 75 | 3,00 |
| Classes requiring direct contact with the teacher | 32 | 1,50 |
| Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation) | 43 | 1,50 |