



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Technology of road materials

### Course

Field of study

Civil Construction

Area of study (specialization)

Level of study

First-cycle studies

Form of study

part-time

Year/Semester

2/4

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

### Number of hours

Lecture

10

Laboratory classes

10

Other (e.g. online)

Tutorials

Projects/seminars

### Number of credit points

3

### Lecturers

Responsible for the course/lecturer:

dr inż. Marcin Bilski

Responsible for the course/lecturer:

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### Prerequisites

A student should:

- know at an advanced level basic building materials and their properties and technologies for their production,
- know the basics of geology and soil mechanics,
- be able to obtain information from literature, databases and other properly selected sources,
- be able to plan and conduct simple laboratory experiments leading to the assessment of the quality of building materials and engineering structures, including the ability to clearly present and interpret the obtained results and draw conclusions



### Course objective

To acquaint students with the basic materials used in road construction, the technology of their production and incorporation into the road surface, as well as laboratory methods of their research.

### Course-related learning outcomes

#### Knowledge

1. Knows the national standards in the field of materials used in road construction and legal acts necessary for the proper construction of the road surface.
2. Knows the rules of constructing road surfaces according to catalogs
3. Knows the materials used in road construction and their properties, research methods, basic technologies of their production, specialist terminology

#### Skills

1. Can perform basic laboratory tests of asphalts, fillers, mineral aggregates and asphalt mixtures, including presenting and interpreting the obtained results and drawing conclusions
2. Is able to dimension road surface structures according to catalogs

#### Social competences

1. Is responsible for the reliability of the obtained results and their interpretation
2. Understands the need for teamwork, is responsible for the safety of own and team work
3. Is ready to independently supplement and expand knowledge in the field of modern processes and technologies in road construction

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Students' knowledge of the tactics of lectures and laboratory exercises is assessed with a written test, carried out at the last lecture in the semester. The writing test consists of 16 multiple-choice questions. The pass mark is 50%. Students' skills are also checked during the last laboratory exercises by assessing individually prepared reports containing reports on laboratory tests.

### Programme content

The lectures cover the following topics:

- Stone products in road construction
- Precast concrete products in road construction
- Classification and arrangement of road surface layers
- Principles of dimensioning road surface structures according to catalogs



- Base materials for road surfaces
- Hot mix asphalt for road surfaces
- Road bitumen
- Bitumen emulsions
- Cement concrete for road surfaces
- Geosynthetics used in road construction

The scope of laboratory exercises includes:

- Laboratory tests of basic properties of asphalt binders: penetration and softening point
- Determination of elastic recovery of polymer modified bitumens
- Research on mineral fillers used for hot mix asphalt
- Research on the geometric features and physical properties of aggregates used in hot mix asphalt
- Determination of the stability and deformation of hot mix asphalt samples

### Teaching methods

Lecture: multimedia presentation

Laboratory exercises: multimedia presentation, examples given on the blackboard and laboratory tests - practical exercises.

### Bibliography

Basic

1. Piłat J., Radziszewski P., Król J., Technologia materiałów i nawierzchni asfaltowych, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2015
2. Piłat J., Radziszewski P., Nawierzchnie asfaltowe, WKŁ, Warszawa 2010
3. Gawęł I., Kalabińska M., Piłat J., Asfalty drogowe, WKŁ, Warszawa 2014
4. Stefańczyk B., Mieczkowski P., Mieszanki mineralno-asfaltowe. Wykonawstwo i badania, WKŁ, Warszawa 2008
5. Szydło A., Nawierzchnie z betonu cementowego. Teoria, wymiarowanie, realizacja, Polski Cement, Kraków 2004



6. Stefańczyk B. (red.), Budownictwo ogólne. Tom 1. Materiały i wyroby budowlane, Arkady, Warszawa 2009

7. Bugajski M., Grabowski W., Geosyntetyki w budownictwie drogowym, Wydawnictwo Politechniki Poznańskiej, Poznań 1999

Additional

1. Stefańczyk B., Mieczkowski P., Dodatki, katalizatory i emulgatory w mieszankach mineralno-asfaltowych, WKŁ, Warszawa 2010

2. Błażejowski K., Styk S., Technologia warstw asfaltowych, WKŁ, Warszawa 2009

3. Arendarski J., Niepewność pomiarów, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2003

4. Wymagania Techniczne WT-1 2014, Kruszywa do mieszanek mineralno-asfaltowych i powierzchniowych utwaleń na drogach krajowych, GDDKiA Warszawa 2014

5. Wymagania Techniczne WT-2 2014 część I, Nawierzchnie asfaltowe na drogach krajowych - Mieszanki mineralno-asfaltowe, GDDKiA Warszawa 2014

6. Wymagania Techniczne WT-2 2016 część II, Nawierzchnie asfaltowe na drogach krajowych - Wykonanie warstw nawierzchni asfaltowych, GDDKiA Warszawa 2016

7. Wymagania Techniczne WT-4 2010, Mieszanki niezwiązane do dróg krajowych, GDDKiA Warszawa 2010

8. Wymagania Techniczne WT-5 2010, Mieszanki związane spoiwem hydraulicznym do dróg krajowych, GDDKiA Warszawa 2010

9. Rozporządzenie Ministra Transportu i Gospodarki Morskiej w sprawie warunków technicznych, jakim powinny odpowiadać drogi publiczne i ich usytuowanie, Dz.U. 2016 poz. 124

**Breakdown of average student's workload**

	Hours	ECTS
Total workload	80	3,0
Classes requiring direct contact with the teacher	20	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	60	2,0

<sup>1</sup> delete or add other activities as appropriate