



Module name: Chemistry and technology of cementitious materials

Academic year: 2019/2020 Code: CCER-2-316-WC-s ECTS credits: 3

Faculty of: Materials Science and Ceramics

Field of study: Ceramics Specialty: —

Study level: Second-cycle studies Form and type of study: Full-time studies

Lecture language: English Profile of education: Academic (A) Semester: 3

Course homepage: —

Responsible teacher: dr inż. Kotwica Łukasz (lkotwica@agh.edu.pl)

### Module summary

Students receive information about basic physical and chemical phenomena important from the point of view of technological processes of mineral binders manufacturing as well as their design and utilization. The acquired knowledge allows to understand main technological operations in mineral binders industry. Special emphasis is also put on the hydration process and its connection with properties of final cement-based materials.

### Description of learning outcomes for module

MLO code	Student after module completion has the knowledge/ knows how to/is able to	Connections with FLO	Method of learning outcomes verification (form of completion)
Social competence: is able to			
M_K001	Student has knowledge and consciousness of the importance of mineral binders industry for the mankind and for environment.	CER2A_K02	Presentation, Activity during classes
Skills: he can			
M_U001	Student will be able to understand the basic mechanisms deciding on the course of technological process and based on this will be able to make proper actions in order to direct and maintain technological facilities.	CER2A_U05, CER2A_U06	Presentation
Knowledge: he knows and understands			
M_W001	Student will have a knowledge about the basic chemical and physical phenomena governing technological processes in mineral binders technology.	CER2A_W01, CER2A_W04	Presentation, Activity during classes

M_W002	The student will know the connections between basic chemical and physical phenomena and production as well as hydration of mineral binders. This knowledge will allow to understand the influence of different parameters both material as well as technological on the final properties of cement-based materials like mortars, grouts, concretes.	CER2A_W01, CER2A_W04	Presentation, Activity during classes
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## Number of hours for each form of classes

Suma	Form of classes										
	Lectures	Auditorium classes	Laboratory classes	Project classes	Conversation seminar	Seminar classes	Practical classes	Fieldwork classes	Workshops	Prace kontrolne i przejściowe	Lektorat
30	0	0	0	0	0	30	0	0	0	0	0

## FLO matrix in relation to forms of classes

MLO code	Student after module completion has the knowledge/ knows how to/is able to	Form of classes										
		Lectures	Auditorium classes	Laboratory classes	Project classes	Conversation seminar	Seminar classes	Practical classes	Fieldwork classes	Workshops	Prace kontrolne i przejściowe	Lektorat
Social competence: is able to												
M_K001	Student has knowledge and consciousness of the importance of mineral binders industry for the mankind and for environment.	-	-	-	-	-	+	-	-	-	-	-
Skills: he can												
M_U001	Student will be able to understand the basic mechanisms deciding on the course of technological process and based on this will be able to make proper actions in order to direct and maintain technological facilities.	-	-	-	-	-	+	-	-	-	-	-
Knowledge: he knows and understands												
M_W001	Student will have a knowledge about the basic chemical and physical phenomena governing technological processes in mineral binders technology.	-	-	-	-	-	+	-	-	-	-	-

M_W002	The student will know the connections between basic chemical and physical phenomena and production as well as hydration of mineral binders. This knowledge will allow to understand the influence of different parameters both material as well as technological on the final properties of cement-based materials like mortars, grouts, concretes.	-	-	-	-	-	+	-	-	-	-	-
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## Student workload (ECTS credits balance)

Student activity form	Student workload
Udział w zajęciach dydaktycznych/praktyka	30 h
przygotowanie projektu, prezentacji, pracy pisemnej, sprawozdania	5 h
Realization of independently performed tasks	40 h
Summary student workload	75 h
Module ECTS credits	3 ECTS

## Additional information

### Module content

#### Seminar classes

During the classes teacher presents a series of lectures on following topics:

- basic physical and chemical phenomena important from the point of view of cementitious materials science and technology
  - selected mineral binders manufacturing process
  - hydration of selected mineral binders
  - supplementary cementitious materials
  - influence of manufacturing conditions on the properties of cement based materials
- Voluntary students presents oral presentations on the topic given by teacher.

#### Teaching methods and techniques:

Seminar classes: Lectures, discussions, oral presentations of students

#### Warunki i sposób zaliczenia poszczególnych form zajęć, w tym zasady zaliczeń poprawkowych, a także warunki dopuszczenia do egzaminu:

No exam. The final mark is resulted by the attendance of the student and voluntary oral presentation.

#### Zasady udziału w poszczególnych zajęciach, ze wskazaniem, czy obecność studenta na zajęciach jest obowiązkowa:

Seminar classes:

- Attendance is mandatory: Yes

- Participation rules in classes: Teacher presents a series of lectures describing the chemistry and technology of cementitious materials. Students are encouraged to take a part in the discussion. Students may give an oral presentation in order to get a higher mark.

### **Method of calculating the final grade**

Final grade is calculated on the basis of students attendance and activity during the classes, as well as oral presentation mark. Oral presentation is not obligatory, but for those who will make it the final grade is better.

### **Sposób i tryb wyrównywania zaległości powstałych wskutek nieobecności studenta na zajęciach:**

Students who are in arrears should contact the teacher to determine the details of the pass. Most usually it is final test or oral presentation.

### **Prerequisites and additional requirements**

The student should speak English at the Intermediate or higher level.

### **Recommended literature and teaching resources**

H.F.W. Taylor, Chemistry of cement, Taylor Francis, London, 1997

W. Kurdowski, Cement and Concrete Chemistry, Springer, 2013

J. Bensted, Calcium Aluminate Cement, in J. Bensted, P. Barnes (ed.), Structure and Performance of Cements, Spoon Press, London, New York, 2002

### **Scientific publications of module course instructors related to the topic of the module**

Additional scientific publications not specified

### **Additional information**

None