

**AGH**AGH UNIVERSITY OF SCIENCE
AND TECHNOLOGY

Module name: New anticorrosion protection of metallic construction

Academic year: 2019/2020 Code: ZSDA-3-0223-s ECTS credits: 2

Faculty of: Szkoła Doktorska AGH

Field of study: Szkoła Doktorska AGH Specialty: —

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

Lecture language: English Profile of education: Academic (A) Semester: 0

Course homepage: —

Responsible teacher: prof. nadzw. dr hab. Krawiec Halina (krawiec@agh.edu.pl)

Module summary

Characteristic of corrosion protection methods will be presented. The chemical and electrochemical methods of corrosion protection, anticorrosion design of engineering structures, application of anticorrosion coatings will be presented.

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	The student is aware of the threats caused by the destruction of metal structures due to corrosion.	SDA3A_K02	Presentation
Skills: he can			
M_U001	The students is able to choose the appropriate methods of corrosion protection for different metallic materials and corrosion environments.	SDA3A_U01	Presentation
Knowledge: he knows and understands			
M_W001	The students will know how to design the metallic construction to avoid or limit the corrosion.	SDA3A_W07, SDA3A_W01	Examination
M_W002	The student knows the electrochemical methods of corrosion protection and characteristic and classification of protective coatings.	SDA3A_W03, SDA3A_W07, SDA3A_W01	Examination

M_W003	The students knows the classification of inhibitors and the mechanism of inhibition of corrosion process by using the inhibitors.	SDA3A_W03, SDA3A_W01	Examination
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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
20	20	0	0	0	0	0	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	The student is aware of the threats caused by the destruction of metal structures due to corrosion.	+	-	-	-	-	-	-	-	-	-	-
Skills: he can												
M_U001	The students is able to choose the appropriate methods of corrosion protection for different metallic materials and corrosion environments.	+	-	-	-	-	-	-	-	-	-	-
Knowledge: he knows and understands												
M_W001	The students will know how to design the metallic construction to avoid or limit the corrosion.	+	-	-	-	-	-	-	-	-	-	-
M_W002	The student knows the electrochemical methods of corrosion protection and characteristic and classification of protective coatings.	+	-	-	-	-	-	-	-	-	-	-
M_W003	The students knows the classification of inhibitors and the mechanism of inhibition of corrosion process by using the inhibitors.	+	-	-	-	-	-	-	-	-	-	-

Student workload (ECTS credits balance)

Student activity form	Student workload
Udział w zajęciach dydaktycznych/praktyka	20 h
Preparation for classes	5 h
przygotowanie projektu, prezentacji, pracy pisemnej, sprawozdania	4 h
Realization of independently performed tasks	10 h
Examination or Final test	2 h
Contact hours	2 h
Summary student workload	43 h
Module ECTS credits	2 ECTS

Additional information

Module content

Lectures

New anticorrosion protection of metallic construction

The lecture covers the following topics:

- 1) Kinetics of corrosion process
- 2) Corrosion preventive design
 - selection of suitable material
 - anticorrosion design
- 3) Application of protective coatings
 - classification of coatings
 - metal plating and its technology
 - organic and inorganic coatings and its technology
- 4) Electrochemical protection
 - cathodic protection
 - anodic protection
- 5) Corrosion inhibitor protection
 - classification of corrosion inhibitors
 - green corrosion inhibitors

Teaching methods and techniques:

Lectures: Multimedia presentation

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

60% lecture attendance is required for admission to the exam

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

Lectures:

- Attendance is mandatory: Yes
- Participation rules in classes: Nie określono

Method of calculating the final grade

The final grade is the average of the exam and presentation grades

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

The student, in consultation with the teacher, prepares a presentation on the given topic

Prerequisites and additional requirements

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Recommended literature and teaching resources

1. Landolt, D., Corrosion and Surface Chemistry of Metals, EPFL Press, 2007
2. Revie, R. W., Uhlig, H. H., Corrosion and Corrosion Control, A John Wiley & Sons, INC., Publication, 2008
3. Ahmad, Z., Principles. Corrosion Engineering and Corrosion Control, Elsevier 2006.

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

1. H. KRAWIEC, V. Vignal, A. Krystianiak, O. Heintz, M. LATKIEWICZ, Growth mechanisms of Co-Mo/TiO₂ nano-composite coatings for long-term electrodeposition on disk electrodes, Surface and Coatings Technology, vol. 363 (2019) 128-134
2. H. KRAWIEC, V. Vignal, A. Krystianiak, Y. Gaillard, S. ZIMOWSKI, Mechanical properties and corrosion behaviour after scratch and tribological tests of electrodeposited Co-Mo/TiO₂ nano-composite coatings, Applied Surface Science vol. 475 (2019) 162-174

Additional information

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