COURSE DESCRIPTION CARD - SYLLABUS

Course name
COMPOSTABLE POLYMERIC MATERIALS

Course

Proposed by Discipline
Chemical Sciences
Type of studies
Doctoral School
Form of study
full-time

Year/Semester
II/4, III/6
Course offered in
English
Requirements
elective

Number of hours

Lecture
4

Tutorials

Projects/seminars

Number of credit points

1

Lecturers

Responsible for the course/lecturer:
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Responsible for the course/lecturer:

Prerequisites

Knowledge: The student has knowledge of basic issues of organic chemistry and polymer chemistry and technology. The student knows the principles of environmental protection related to the chemical production of polymers and polymer waste management.

Skills: The student can obtain information from literature, databases and other sources of chemical and environmental sciences, he/she can interpret them, draw conclusions, and formulate opinions.

Social competencies: The student understands the need for further education and improvement of his/her professional and personal competences.

Course objective

The aim of the course is to provide PhD students with knowledge on compostable polymeric materials, methods of their production and processing, factors influencing their biodegradation, as well as on the biodegradation mechanism, biodegradation methods and standards that should be met by both compostable polymeric materials and the compost resulting from their decomposition, and to familiarize PhD students with research methods used to assess the biodegradation process.

Course-related learning outcomes

Knowledge

A PhD student who graduated from doctoral school knows and understands:

1) global achievements, covering theoretical foundations as well as general and selected specific issues that are relevant to scientific disciplines studied at the Doctoral School, to the extent that enables revision of existing paradigms, [P8S_WG/SzD_W01]
2) key developmental trends of disciplines of science in which education at the Doctoral School takes place, [P8S_WG/SzD_W02]
3) fundamental dilemmas of the contemporary civilization, [P8S_WG/SzD_W05].

Skills

A PhD student who graduated from doctoral school can: The student is able to use information obtained from the literature to solve existing problems related to biodegradation and compostability of plastics.

1) critically analyze and assess scientific research results, work of experts and other creative activities together with their contribution into knowledge development, [P8S_UW/SzD_U02]
2) take part in scientific discourse, [P8S_UW/SzD_U07]

Social competencies

A PhD student who graduated from doctoral school is ready to:

1) critically assess achievements within a given scientific discipline, [P8S_KK/SzD_K01]
2) acknowledge the importance of knowledge in solving cognitive and practical problems, [P8S_KK/SzD_K03]
3) fulfilling the social obligations of researchers and creators, [P8S_KO/SzD_K04]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

PQF code	Methods for verification of learning outcomes	Assessment criteria
W01, W02, W05	Test - exam (colloquium) in writing	3 - 50.1%-70.0%, 4 - 70.1%-90.0%, 5 - from 90.1%
U02, U07	Test - exam (colloquium) in writing	3 - 50.1%-70.0%, 4 - 70.1%-90.0%, 5 - from 90.1%
K01, K03, K04,	Test - exam (colloquium) in writing	3 - 50.1%-70.0%, 4 - 70.1%-90.0%, 5 - from 90.1%

Programme content

This course will provide a comprehensive overview of biodegradable polymers (natural and synthetic), such as synthesis, properties, and application areas - especially where they can replace nondegradable polymeric materials. This course will also cover topics related to the processing of these materials. The main part will be dedicated to the biodegradation processes, such as biodegradation mechanisms, factors influencing the process, and methods for their study.

Course topics

1. Selected issues on biopolymers, environmental degradation of polymeric materials, biodegradation.
2. Mechanisms of degradation of polymeric materials: microbiological, aerobic, anaerobic.
3. Factors influencing and accelerating biodegradation of polymeric materials.
4. Methods, conditions, composting standards, markings of compostable materials, compost quality standards, compost use.

Teaching methods

Lecture: multimedia presentation including illustrations and examples.

Bibliography

Basic

1. Emo Chiellini, Roberto Solaro (Eds), Biodegradable polymers and plastics, Springer Science + Business Media New York, 2003
2. G. J. L. Griffin (Ed), Chemistry and Technology of Biodegradable Polymers, Chapman & Hall, London, 1994,
3. Catia Bastioli, Handbook of Biodegradable Polymers, 2nd Edition, Smithers Rapra technology Ltd, 2014
4. Ewa Rudnik, Compostable polymer materials, Elsevier Ltd, 2008

Additional

1. Gerald Scott (Ed), Degradable Polymers, Principles and Applications, 2nd Edition, Springer Science+Business Media, B.V., 2002
2. Sayed Ali Ashter, Introiduction to bioplastics engineering, Elsevier Inc., 2016

Breakdown of average student's workload

	Hours	ECTS
Total workload	25	1.0
Classes requiring direct contact with the teacher	4	0
Doctoral student's own work (literature studies, preparation for tutorials, project preparation) [1]	21	1.0

[1] delete or add other activities as appropriate