

## Subject card

|                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                          |                                                                                     |                                     |                                                                                   |            |     |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------|------------|-----|
| Subject name and code                       | Monographic lecture - Advanced oxidation precesses, PG_00080877                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                          |                                                                                     |                                     |                                                                                   |            |     |
| Field of study                              | Chemistry                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                          |                                                                                     |                                     |                                                                                   |            |     |
| Date of commencement of studies             | October 2026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                          | Academic year of realisation of subject                                             |                                     | 2027/2028                                                                         |            |     |
| Education level                             | Master's studies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                          | Subject group                                                                       |                                     | Obligatory subject group in the field of study<br>Optional subject group          |            |     |
| Mode of study                               | full-time studies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                          | Mode of delivery                                                                    |                                     | at the university                                                                 |            |     |
| Year of study                               | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                          | Language of instruction                                                             |                                     | Polish                                                                            |            |     |
| Semester of study                           | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                          | ECTS credits                                                                        |                                     | 3.0                                                                               |            |     |
| Learning profile                            | academic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                          | Assessment form                                                                     |                                     | credit                                                                            |            |     |
| Conducting unit                             | Laboratory of Photocatalysis -> Department of Environmental Technology -> Faculty of Chemistry -> Rector                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                          |                                                                                     |                                     |                                                                                   |            |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                          | prof. dr hab. inż. Adriana Zaleska-Medynska                                         |                                     |                                                                                   |            |     |
|                                             | Teachers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                          |                                                                                     |                                     |                                                                                   |            |     |
| Lesson types                                | Lesson type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Lecture                                                  | Tutorial                                                                            | Laboratory                          | Project                                                                           | Seminar    | SUM |
|                                             | Number of study hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 30.0                                                     | 0.0                                                                                 | 0.0                                 | 0.0                                                                               | 0.0        | 30  |
|                                             | E-learning hours included: 0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                          |                                                                                     |                                     |                                                                                   |            |     |
| Learning activity and number of study hours | Learning activity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Participation in didactic classes included in study plan |                                                                                     | Participation in consultation hours |                                                                                   | Self-study | SUM |
|                                             | Number of study hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 30                                                       |                                                                                     | 5.0                                 |                                                                                   | 40.0       | 75  |
| Subject objectives                          | To familiarize students with the mechanisms of degradation of pollutants in selected modern oxidation processes                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                          |                                                                                     |                                     |                                                                                   |            |     |
|                                             | To familiarize students with selected devices used to purify liquid and gaseous streams using AOP                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                          |                                                                                     |                                     |                                                                                   |            |     |
| Learning outcomes                           | Course outcome                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                          | Subject outcome                                                                     |                                     | Method of verification                                                            |            |     |
|                                             | [CHEMMU2_K01] Knows the limitations of her/his own knowledge; understands the need for further education and can inspire other people to do so.                                                                                                                                                                                                                                                                                                                                                                                                          |                                                          | can independently search for additional literature and expand knowledge based on it |                                     | [SK5] implementation of a problem task                                            |            |     |
|                                             | [CHEMMU2_W05] Has extended knowledge in the field of the specialisation studied.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                          | uses knowledge when selecting appropriate techniques for oxidizing pollutants       |                                     | [SW5] implementation of a problem task                                            |            |     |
|                                             | [CHEMMU2_W11] Demonstrates general knowledge about the current trends in the development of chemistry as a science and the latest discoveries in this field.                                                                                                                                                                                                                                                                                                                                                                                             |                                                          | can apply the latest solutions in the field of advanced oxidation processes         |                                     | [SW2] presentation/project/paper/report<br>[SW5] implementation of a problem task |            |     |
|                                             | [CHEMMU2_W01] Uses knowledge of spectroscopic methods of chemical compound analysis.                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                          | is able to perform appropriate laboratory analyzes for specific problems            |                                     | [SW5] implementation of a problem task                                            |            |     |
| Subject contents                            | Characteristics and division of advanced oxidation methods (AOP). The mechanism of oxidation of pollutants in the wet air oxidation method and supercritical oxidation. Characteristics of chemical, photochemical and electrochemical processes for removing pollutants from water, soil and air. Production and use of modern materials with catalytic properties in AOP methods. The use of nanostructures in AOP methods. The use of ozonation for disinfection, removal of organic compounds from the water phase and deodorization of air streams. |                                                          |                                                                                     |                                     |                                                                                   |            |     |

|                                                                |                          |                                                                                                                                                                                                                                                                                                                                                     |                               |
|----------------------------------------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| Prerequisites and co-requisites                                |                          |                                                                                                                                                                                                                                                                                                                                                     |                               |
| Assessment methods and criteria                                | Subject passing criteria | Passing threshold                                                                                                                                                                                                                                                                                                                                   | Percentage of the final grade |
|                                                                | oral exam                | 51.0%                                                                                                                                                                                                                                                                                                                                               | 100.0%                        |
| Recommended reading                                            | Basic literature         | Barbusiński, Zaawansowane utlenianie ścieków przemysłowych, Politechnika Śląska, 2013r.<br>Burczyk B. Zielona Chemia, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2006<br>Lewandowski W.M. Proekologiczne źródła energii odnawialnej, WNT W-wa 2001<br>Zarzycki R., Zaawansowane metody utleniania, Politechnika Wrocławska, Wrocław 2002 |                               |
|                                                                | Supplementary literature | not required                                                                                                                                                                                                                                                                                                                                        |                               |
|                                                                | eResources addresses     |                                                                                                                                                                                                                                                                                                                                                     |                               |
| Example issues/<br>example questions/<br>tasks being completed | not required             |                                                                                                                                                                                                                                                                                                                                                     |                               |
| Work placement                                                 | Not applicable           |                                                                                                                                                                                                                                                                                                                                                     |                               |

Document generated electronically. Does not require a seal or signature.