



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

SUSTAINABLE DEVELOPMENT IN TECHNICAL SCIENCES [S5SD1>ZRNT]

### Course

Proposed by Discipline

–

Year/Semester

1/2

Level of study

Doctoral School

Course offered in

English

Form of study

full-time

Requirements

compulsory

### Number of hours

Lecture

4

Laboratory classes

0

Other

0

Tutorials

0

Projects/seminars

0

### Number of credit points

1,00

### Coordinators

dr inż. Marlena Kucz prof. PP  
marlena.kucz@put.poznan.pl

### Lecturers

dr inż. Marlena Kucz prof. PP  
marlena.kucz@put.poznan.pl

### Prerequisites

Knowledge Basic knowledge of technical sciences and engineering. General understanding of environmental issues and contemporary economic challenges. Skills: Ability to analyze scientific literature in Polish and English. Social competences: Readiness for interdisciplinary work and critical evaluation of technical solutions in terms of their social and environmental impact.

### Course objective

The objective of the module “Sustainable Development in Technical Sciences” is to deepen doctoral students’ knowledge and enhance their competencies in the principles of sustainable development, as well as their ability to apply these principles in conducting scientific research and developing technological innovations. The module is aimed at educating conscious researchers and future leaders in the scientific community who are capable of integrating technological advancement with social and environmental responsibility, while addressing the challenges of the contemporary knowledge-based economy, the low-emission economy, and the circular economy.

### Course-related learning outcomes

Knowledge:

- Student acquires knowledge of global challenges and sustainable development, covering theoretical foundations as well as general and selected specific issues relevant to integrating sustainable development

principles into technical research and innovation P8S\_WG/SzD\_W01

- The student is familiar with key developmental trends in scientific research and technological innovation and is able to assess their significance for implementing sustainable development principles P8S\_WG/SzD\_W02

- A PhD student knows and understands: economic, legal, ethical and other vital conditions related to scientific activity related to sustainable development P8S\_WK/SzD\_W05

Skills:

A doctoral student can:

- communicate on specialist issues on the level that allows active participation in - the international scientific community, P8S\_UK/SzD\_U04,
- initiate debates, P8S\_UK/SzD\_U06

Social competences:

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

- critically assess achievements within a given scientific discipline, P8S\_KK/SzD\_K01,
- initiate actions in the public interests, P8S\_K0/SzD\_K05,
- acknowledge the importance of knowledge in solving cognitive and practical problems, P8S\_KK/ SzD\_K03

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Active participation in class (discussions, group work, debate) (50%)

Presentation of problem analysis (20%)

Written reflection (brief, e.g., 1–2 paragraphs) on the role of sustainable development in scientific research and technological innovation (30%)

### Programme content

Introduction to Sustainable Development in Technical Sciences

Global Challenges and Sustainable Development Goals (UN Agenda 2030)

Ethics and Social Responsibility in Technical Sciences

Methods for Assessing the Impact of Technology on the Environment and Society

### Course topics

Introduction to Sustainable Development in Technical Sciences

Environmental, Social, and Economic Aspects

Assessment Methods and Interdisciplinary Approaches Selected "Six Thinking Hats" method – analysis of a selected technical problem or short debate

### Teaching methods

Multimedia presentations using illustrations and examples.

Selected methods: e.g. moderated discussions and debates, the "Six Thinking Hats" method (E. de Bono) supporting a multi-perspective approach to problem analysis. Group work and interdisciplinary analysis.

### Bibliography

1. Brundtland G., "Our Common Future", 1987 – classic definition and concept of sustainable development.
2. Sustainable Development Goals and the Agenda2030 link [https://ec.europa.eu/commission/presscorner/detail/en/memo\\_15\\_5709](https://ec.europa.eu/commission/presscorner/detail/en/memo_15_5709) or <https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>
3. "Sustainability" in higher education: From doublethink and newspeak to critical thinking and meaningful learning, link <https://www.researchgate.net/publication/237152910>

### Breakdown of average student's workload

|                                                                                                                                                 | Hours | ECTS |
|-------------------------------------------------------------------------------------------------------------------------------------------------|-------|------|
| Total workload                                                                                                                                  | 25    | 1,00 |
| Classes requiring direct contact with the teacher                                                                                               | 4     | 0,00 |
| Doctoral student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) | 21    | 1,00 |