

**DOCTORAL SCHOOL OF WROCLAW UNIVERSITY OF SCIENCE AND  
TECHNOLOGY**

**SUPERVISOR DECLARING/CONDUCTING COURSE:** prof. dr hab. Katarzyna Weron  
**DEPARTMENT:** K64W11D11  
**SCIENTIFIC DISCIPLINE:** Physical sciences

**COURSE CARD**

**Course name in Polish:** Seminarium interdyscyplinarne: Fizyka statystyczna w układach złożonych

**Course name in English:** Statistical Physics in Complex Systems

**Course language:** English

**University-wide general course type\*:** YES

**The course is intended for all PhD students:** YES / ~~NO~~

- 1) BASIC COURSE
- 2) SPECIALIST COURSE
- 3) SEMINAR
- 4) HUMANISTIC COURSE
- 5) LANGUAGE

**Subject code:** NFQ100209S

\* delete as applicable

|  | Lecture | Foreign language course | Seminar           | Mixed forms                          |
|--|---------|-------------------------|-------------------|--------------------------------------|
| Number of hours of organized classes in university (ZZU) |         |                         | 15                |                                      |
| Grading  | Exam    | Exam                    | Oral presentation | Exam, inspection, evaluation classes |

**PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES**

1. Passing courses such as Theory of Probability, Stochastic Modeling, Monte Carlo simulations may be beneficial, however, it is not compulsory.

**COURSE OBJECTIVES**

- C1 Learning about the interdisciplinary applications of statistical, stochastic and numerical methods to study various types of complex systems, with particular focus on the social systems
- C2. Learning about the concepts and methods of statistical physics in the modeling and analysis of complex systems
- C3 Understanding the idea of agent modeling, agent modeling on complex networks, application of agent modeling in various complex systems
- C4. Developing communication skills with representatives of various scientific disciplines in the field of social, natural and computer sciences, as well as mathematics.
- C5 Developing the ability to prepare and deliver a scientific seminar in English
- C6 Developing the ability to conduct scientific discussions

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**PROGRAM CONTENTS**

| <b>Form of classes</b> |  | <b>Number of hours</b> |
|------------------------|--|------------------------|
|                        | Seminar presentations by invited guests and PhD students. Discussion | 15                     |
|                        | Total hours  | 15                     |

**TEACHING TOOLS USED**

N1. Audio-visual seminar  
N2. Independent study and preparation of a presentation  
N3. Discussions

**ACHIEVED SUBJECT LEARNING OUTCOMES**

| <b>Type of learning outcome</b> | <b>Code of learning outcome</b> | <b>Assessment of learning outcome</b>   |
|---------------------------------|---------------------------------|---|
| Universal                       |                                 | PhD student presents the selected subject in a transparent and logical manner and chooses visual tools properly, competently cites other authors. |
|                                 |                                 |   |

**PRIMARY AND SECONDARY LITERATURE**

**PRIMARY LITERATURE:**

[1] Publications in scientific journals in the field of complex systems and scientific interdisciplinary journals, such as Chaos, PLOS ONE, PNAS, Nature, Science etc.

**SECONDARY LITERATURE:**

[1] Textbooks and monographs on the statistical physics of complex systems, agent-based modeling and complex networks

**SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)**

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