

**COURSE OFFERED**

|                           |         |                                     |
|---------------------------|---------|-------------------------------------|
| <b>Name of the course</b> | Polish  | Mechanizmy uszkodzeń i naprawy DNA  |
|                           | English | Mechanisms of DNA Damage and Repair |

**1. LOCATION OF THE COURSE OF STUDY WITHIN THE EDUCATION SYSTEM**

|   |                                       |
|---|---------------------------------------|
| <b>1.1. Section<sup>1</sup></b>                     | Section of Exact and Natural Sciences |
| <b>1.2. Discipline<sup>2</sup></b>                  | Biological Sciences                   |
| <b>1.3. Type of education</b>                       | Stationary                            |
| <b>1.4. Level of education</b>                      | Doctoral School                       |
| <b>1.5. Person preparing the course description</b> | prof. Michał Arabski                  |
| <b>1.6. Contact</b>                                 | arabski@ujk.edu.pl                    |

**2. GENERAL CHARACTERISTICS OF THE COURSE OF STUDY**

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|--|--|
| <b>2.1. Type of course<sup>3</sup></b> | specialized subjects in the discipline |
| <b>2.2. Language of the course</b>     | english                                |

**3. DETAILED CHARACTERISTICS OF THE COURSE OF STUDY**

|   |                      |   |
|---|----------------------|---|
| <b>3.1. Type of classes<sup>4</sup></b>     |                      | exercise, lecture   |
| <b>3.2. The number of hours<sup>5</sup></b> |                      | 15h (Exercise), 15h (lecture)   |
| <b>3.3. Location of classes</b>             |                      | classes in the UJK teaching room  |
| <b>3.4. Type of assessment</b>              |                      | pass with a grade (exercise), exam (lecture)  |
| <b>3.5. Didactic methods</b>                |                      | lecture, presentation   |
| <b>3.6. Literature</b>                      | <b>basic</b>         | Wilson Nas, DNA Repair: Mechanisms and Clinical Significance, States Academic Pr, 2022, ISBN: 9781639891580 |
|   | <b>supplementary</b> | scientific publications from the SCOPUS database  |

**4. OBJECTIVES, SYLLABUS CONTENT AND INTENDEND LEARNING OUTCOMES**

|   |
|---|
| <p><b>4.1. Course objectives (including the form of classes)</b></p> <p>C01 – Familiarization with the types of DNA damage and the systems dedicated to their repair (lecture)</p> <p>C02 – Techniques used in the study of DNA damage and repair (lecture) C03 – Principles of designing studies on cytotoxicity, DNA damage, and repair (exercises)</p> |
|---|

<sup>1</sup> Section of Humanities:, Social Sciences, Section of Exact and Natural Sciences, Section of Medical and Health Sciences, Section of Arts.

<sup>2</sup> History,Linguistics, Literary Studies, Medical Sciences, Health Sciences, Political and Administrative Sciences, Legal Sciences, Security Sciences, Pedagogy, Communication and Media Studies, Management and Quality Studies, Biological Sciences, Chemical Sciences, Physical Sciences, Earth and related Environmental Sciences, Visual Arts and Artwork Conservation, Musical Arts.

<sup>3</sup> General courses, domain specific subjects in the section, disciplinary subjects in the sections, specialized subjects in the discipline.

<sup>4</sup> Classes, lecture, seminar.

<sup>5</sup> Consistent with the education program at the Doctoral School  
Jan Kochanowski University in Kielce.

#### 4.2. Syllabus content

Types and mechanisms of DNA damage: base loss, intercalation, modifications of nitrogenous bases: alkylation, methylation, hydrolytic deamination, oxidation, single- and double-strand DNA breaks, DNA-DNA crosslinks, DNA-protein crosslinks. Mechanisms of DNA damage repair (systems): BER, NER, MMR, NHEJ, homologous recombination (HR), direct repair. DNA damage and its repair/apoptosis. Methods for studying DNA damage and repair: comet assay (alkaline and neutral versions), FISH, pulsed-field gel electrophoresis, chromosomal aberrations, micronucleus test, clonogenic assay, gamma-H2AX assay, analysis of plasmid conformational transitions, PCR techniques: RFLP-PCR, real-time PCR (TagMan), HRM-PCR, immunoserological methods: ELISA, confocal microscopy, flow cytometry.

|  |  |  |
|--|--|--|
| Learning<br>outcomes                     | A doctoral student who has passed the subject:   | Reference to<br>the learning<br>outcomes of<br>Doctoral School<br>(according to the<br>training program at<br>the Doctoral School) |
|  | in the area of <b>KNOWLEDGE:</b>   |  |
| W01                                      | The doctoral student possesses in-depth knowledge of the latest scientific achievements, encompassing theoretical foundations, general issues, and selected specific topics relevant to the scientific discipline in which the doctoral dissertation is being prepared | SD_W01   |
| in the area of <b>SKILLS:</b>            |  |  |
| U01                                      | The doctoral student is capable of utilizing knowledge from various disciplines to identify, formulate, and creatively solve complex problems or undertake research/ project tasks.  | SD_U03   |
| in the area of <b>SOCIAL COMPETENCE:</b> |  |  |
| K01                                      | The doctoral demonstrates entrepreneurial thinking and actively takes initiative.  | SD_K04   |

| SUBJECT<br>LEARNING<br>OUTCOMES | METHOD OF ASSESSMENT (+/-) |   |   |                            |   |   |                            |   |   |                            |   |   |                            |   |   |                            |   |   |                            |   |   |
|---------------------------------|----------------------------|---|---|----------------------------|---|---|----------------------------|---|---|----------------------------|---|---|----------------------------|---|---|----------------------------|---|---|----------------------------|---|---|
|                                 | Oral/written exam          |   |   | Kolokwium                  |   |   | Project                    |   |   | activity in class          |   |   | Own work                   |   |   | Group work                 |   |   | Others                     |   |   |
|                                 | <i>The type of classes</i> |   |   | <i>The type of classes</i> |   |   | <i>The type of classes</i> |   |   | <i>The type of classes</i> |   |   | <i>The type of classes</i> |   |   | <i>The type of classes</i> |   |   | <i>The type of classes</i> |   |   |
|                                 | L                          | E | S | L                          | E | S | L                          | E | S | L                          | E | S | L                          | E | S | L                          | E | S | L                          | E | S |
| W01                             | +                          |   |   |                            |   |   |                            |   |   |                            |   |   |                            |   |   |                            |   |   |                            |   |   |
| U01                             |                            |   |   |                            |   |   |                            |   |   |                            |   |   |                            | + |   |                            |   |   |                            |   |   |
| K01                             |                            |   |   |                            |   |   |                            |   |   |                            |   |   |                            | + |   |                            |   |   |                            |   |   |

## 7. CRITERIA OF ASSESSMENT OF THE INTENDED LEARNING OUTCOMES

| Form of classes          | Grade | Criterion of assessment   |
|--------------------------|-------|---|
| Lecture (L) <sup>6</sup> | 3,0   | 51-60% of tasks assigned to the doctoral student correctly completed  |
|                          | 3,5   | 61-70% of tasks assigned to the doctoral student correctly completed  |
|                          | 4,0   | 71-80% of tasks assigned to the doctoral student correctly completed  |
|                          | 4,5   | 81-90% of tasks assigned to the doctoral student correctly completed  |
|                          | 5,0   | 91-100% of tasks assigned to the doctoral student correctly completed |
| Exercises (E)            | 3,0   | 51-60% of tasks assigned to the doctoral student correctly completed  |
|                          | 3,5   | 61-70% of tasks assigned to the doctoral student correctly completed  |
|                          | 4,0   | 71-80% of tasks assigned to the doctoral student correctly completed  |
|                          | 4,5   | 81-90% of tasks assigned to the doctoral student correctly completed  |
|                          | 5,0   | 91-100% of tasks assigned to the doctoral student correctly completed |

Accepted for execution

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<sup>6</sup> Niepotrzebne usunąć.