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| <b>Programme:</b> BIOTECHNOLOGY                                     |
| Level of studies: 1st degree studies                                |
| Polish Qualifications Framework PRK level: levels 6                 |
| Programme profile: general-academic profile                         |
| Field of science/arts: field of exact sciences and natural sciences |
| Discipline/Disciplines <sup>i</sup> : biological sciences           |
| Learning outcomes for the cycle: 2022/2023                          |

*Learning outcomes for general university courses (foreign language classes, physical education, entrepreneurship, university mission courses) are specified in the relevant resolutions of the Senate*

| Symbol of the programme learning outcome | <b>Programme learning outcomes</b>   | Reference to universal first stage descriptors – PRK levels 6-8 <sup>ii</sup> | Reference to second stage descriptors - PRK levels 6-8 <sup>iii</sup> |
|--|--|---|---|
|  | <b>Knowledge: Graduate knows and understands</b>   | <b>Descriptor symbol</b>  | <b>Descriptor symbol</b>  |
| K_W01                                    | presents terminology used in biotechnology, defines phenomena and biophysical, physiological and biochemical processes occurring in living organisms                       | P6U_W1  | P6S_WG1   |
| K_W02                                    | describes issues in the field of physics, mathematics and chemistry required to understand and interpret basic natural phenomena and processes important for biotechnology | P6U_W1  | P6S_WG1   |
| K_W03                                    | presents knowledge in terms of statistics and computer science giving the possibility to describe and interpret natural phenomena especially relevant for biotechnology    | P6U_W1  | P6S_WG1   |
| K_W04                                    | presents knowledge about the development of biotechnology and its relation to other scientific disciplines   | P6U_W1; P6U_W2  | P6S_WG1; P6S_WK1  |
| K_W05                                    | presents knowledge in the field of laboratory techniques and research tools used in biotechnology  | P6U_W1  | P6S_WG1   |

|       |  |                          |                          |
|-------|--|--------------------------|--------------------------|
| K_W06 | presents knowledge in the field of genetics and molecular techniques and describes their practical use, in particular in biotechnology   | P6U_W1                   | P6S_WG1                  |
| K_W07 | describes the metabolic processes of biological active substances  | P6U_W1                   | P6S_WG1                  |
| K_W08 | presents issues related biochemistry and biology required for practical use in biotechnological processes which are applied in food and pharmaceutical industry as well as in agriculture                              | P6U_W2                   | P6S_WK2                  |
| K_W09 | presents the principles of health, safety work and ergonomics, indicates the psychophysical possibilities of a human in the work environment   | P6U_W2                   | P6S_WK2                  |
| K_W10 | presents the concepts and principles of protection of industrial property and copyright as well as ethical and other conditionings related to biotechnology, indicates the ways of use of patent information resources | P6U_W2                   | P6S_WK2                  |
| K_W11 | presents principles of creating forms of individual entrepreneurship using knowledge in the field of biotechnology   | P6U_W2                   | P6S_WK3                  |
|       | <b>Skills: a graduate can</b>  | <b>Descriptor symbol</b> | <b>Descriptor symbol</b> |
| K_U01 | applies techniques and research tools in the field of biotechnology  | P6U_U1                   | P6S_UW1                  |
| K_U02 | carries out observations and performs physical, chemical and biological measurements   | P6U_U1                   | P6S_UW1                  |
| K_U03 | is able to use light microscope, independently prepares microscopic preparations; is able to carry out and document microscopic observations   | P6U_U1                   | P6S_UW1                  |
| K_U04 | conducts the cell and tissue cultures from plant and animal origin   | P6U_U1                   | P6S_UW1                  |
| K_U05 | performs analysis for the evaluation of parameters of cellular and humoral immune response   | P6U_U1                   | P6S_UW1                  |
| K_U06 | uses scientific literature and other sources of information, including electronic ones, in the language in which classes are conducted and other modern language   | P6U_U1                   | P6S_UW1                  |
| K_U07 | uses knowledge in the field of legal protection of intellectual property   | P6U_U1                   | P6S_UW1                  |
| K_U08 | describes, explains and interprets chemical and physicochemical phenomena at an advanced level   | P6U_U1                   | P6S_UW1                  |
| K_U09 | uses knowledge in the field of physical-chemical conditions of phase boundary in order to describe and interpret phenomena used in biotechnology   | P6U_U1                   | P6S_UW1                  |

|       |  |                          |                                    |
|-------|--|--------------------------|------------------------------------|
| K_U10 | performs qualitative and quantitative analyzes by using classical and instrumental method  | P6U_U1                   | P6S_UW1                            |
| K_U11 | participates in the debate on biotechnology issues using scientific language   | P6U_U3                   | P6S_UK2                            |
| K_U12 | prepares an oral presentation in the language in which the classes are conducted and in another modern language using specialized terminology  | P6U_U3                   | P6S_UK1                            |
| K_U13 | prepares a written study on issues related to biotechnology sciences in the language in which classes are conducted and in another modern language using the scientific language   | P6U_U3                   | P6S_UW1, P6S_UK1                   |
| K_U14 | uses statistical methods and information technology to describe biotechnological processes as well as to analyze and process experimental data   | P6U_U1                   | P6S_UW1                            |
| K_U15 | designs and performs research tasks or expertise in the field of chemistry, biochemistry and biology   | P6U_U1                   | P6S_UW1; P6S_UO1                   |
| K_U16 | initiates and implements the actions undertaken by him, working independently and in a team taking on various roles in it, properly defining priorities in the implementation of his or her tasks                        | P6U_U1                   | P6S_UO1; P6S_UO2                   |
| K_U17 | learns independently in a targeted manner in the field of biotechnology, updates his knowledge and skills, applies new research techniques and plans his professional development  | P6U_U2                   | P6S_UU1                            |
| K_U18 | correctly concludes on the basis of data from various sources  | P6U_U1                   | P6S_UW1                            |
|       | <b>Social competence: a graduate is ready to</b>   | <b>Descriptor symbol</b> | <b>Descriptor symbol</b>           |
| K_K01 | is prepared to evaluate his own knowledge and skills as well as obtained information, he complies ethical aspects in scientific research   | P6U_K1                   | P6S_KK1; P6S_KR1                   |
| K_K02 | identifies and explains the dilemmas associated with the development of biotechnology and the social and economic importance of biotechnology, makes use of expert opinions  | P6U_K2                   | P6S_KK2                            |
| K_K03 | follows professional ethics in dealing with people who are not specialists in the field of biotechnology   | P6U_K1                   | P6S_KR1                            |
| K_K04 | possesses appropriate habits required to the work in scientific laboratories especially in aseptic conditions, proceeds according to work safety regulations, knows how to react in states of danger                     | P6U_K1; P6U_K2           | P6S_KR1                            |
| K_K05 | actively participates in biotechnological projects including those implemented for the local community   | P6U_K2                   | P6S_KR1; P6S_KO1; P6S_KO2; P6S_KO3 |
| K_K06 | presents the importance of intellectual honesty in own and other people's activities, adheres to the principles of intellectual property protection in particular with regard to solutions in the field of biotechnology | P6U_K1                   | P6S_KR1                            |

<sup>i</sup>In the case of programmes assigned to more than one discipline a leading discipline should be indicated.

ii Universal first stage descriptors for PRK levels 6-8 – Act of 22 December 2015 on the Integrated Qualifications System (Journal of Law of 2016, item 64).

iii Second stage descriptors for PRK levels 6-8 typical for qualifications awarded by higher education institutions – Regulation of MNiSW of 14 November 2018 r. - part I.