Annex to the CMKP Resolution No. 102 of 24 April 2019

Curriculum
of the
JOINT DOCTORAL SCHOOL

Program:
DIAGNOSTICS, MODELING AND TREATMENT OF HUMAN DISEASES - FROM GENE TO CLINIC

ran by

Medical Center of Postgraduate Education,
Institute of Biochemistry and Biophysics of the Polish Academy of Sciences,
Institute of Biocybernetics and Biomedical Engineering of the Polish Academy of Sciences,
Institute of Experimental and Clinical Medicine of the Polish Academy of Sciences,
Institute of Hematology and Transfusion Medicine
Warsaw University of Life Sciences

in the following fields of study:

1: **Medical Sciences** (the field of medical sciences and health sciences); field symbol - **MS**
2: **Biological Sciences** (the field of exact sciences and natural sciences); field symbol - **BS**
3: **Biomedical Engineering** (the field of engineering and technical sciences); field symbol - **BE**
4. **Veterinary** (the field of agricultural sciences) - **VE**

Name of the course	Compulsory classes	Optional classes	Number of hours	Form of credit	ECTS	Educational outcome[1)]
Lectures compulsory for the field[2)]	**MS, BS, BE,VE**		**30**	**Exam**	**2**	**W01,W02,W05, U01,U03, K01,K02,K03, K9,K10, K11**
Optional lectures[2)]		**MS, BS, BE,VE**	**15**	**Credit**	**1**	
Workshops/laboratory classes[3)] *(presentations+practicals)*		**MS, BS, BE,VE**	**15**	**Credit**	**1**	**W03, W05 U01,U02,U03, K01,K02,K03, K04,K06,K08**
Statistical methods in experimental and medical sciences (*lectures+practicals)*	**MS, BS, BE,VE**		**30**	**Exam**	**2**	**W06, U04,U07, K03,K04,K05**
Didactic training (*lectures+practicals)*	**MS, BS, BE, VE**		**5**	**Exam**	**0.5**	**W11, U04,U06,U07, K03,K09, K10,K11**
Acquisition of funds for research[4)] *(lectures+preparing your own application)*	**MS, BS, BE,VE**		**30**	**Credit**	**2**	**W04, W07, U03, U05, K02,K07**
Ethical and legal aspects in research *(lectures)*	**MS, BS, BE,VE**		**5**	**Credit**	**0.5**	**W08, W09, W12 U04, U05, U07, K01,K04, K05, K06,K07**
Doctoral seminar[5)] *(presenting your research findings)*	**MS, BS, BE,VE**		**30**	**Credit**	**2**	**W01,W02, W03, U01,U03,U04, U06, U07 K01,K02,K03 K04,K09,K10,K11**
English	**MS, BS, BE,VE**		**30**	**Credit**	**1**	**W05, U04, K03,K09**
OSH training	**MS, BS, BE,VE**		**2**	**Credit**	**-**	**W10, K08**

[1)] Educational outcomes achieved as a result of completing a given course. A detailed description of the outcomes marked with symbols can be found in the *Annex to the Doctoral School Curriculum.*

[2)] Doctoral student are required to pass 30 hours of lectures (Exam), compulsory (from the School's offer) for the field of the doctoral thesis, and 15 hours of optional lectures (Credit) in the selected field, other than the one of the doctoral thesis, or interdisciplinary lectures. It is also possible to attend optional lectures offered by other doctoral schools, universities, institutes of the Polish Academy of Sciences, international institutes, research institutes, including foreign ones.

[3)] Workshops/laboratory classes for the acquisition and development of methodological skills necessary for research work in a given field or in interdisciplinary research. Every year, there will be a list of optional classes. It is also possible to complete classes offered by other doctoral schools, universities, institutes of the Polish Academy of Sciences, international institutes, research institutes, including foreign ones.

[4)] To receive the course credit you need to prepare an abbreviated description of the project, in the form required by grant institutions (e.g. National Science Centre, National Centre for Research and Development).

[5)] Every doctoral student is required to present the results of their research work after the mid-term evaluation at the doctoral students forum of the Doctoral School. Participation and discussion during presentations of other doctoral students is also compulsory.

The curriculum covers 162 hours of compulsory classes and 30 hours of optional classes. Total number of ECTS points: 12.

Implementation schedule for the curriculum:

OSH training must be completed prior to commencement of research work.
"Statistical methods in experimental and medical sciences" and *"Ethical and legal aspects in research"* courses are organized in Year 1 of education.
"Acquisition of funds for research" course can be done in Year 4 of education.
It is recommended to take the other courses in Years 1, 2 and 3 of education

The Doctoral School curriculum includes classes preparing doctoral students for their research and teaching work. It does not include the total time allocated for the doctoral thesis. The duration of the research and scientific work required to complete the doctoral thesis is agreed on between the doctoral student and their advisor.

Annex to the Doctoral School Curriculum

Educational outcomes
at the
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The curriculum of the Joint Doctoral School is aimed at preparing the students for research and teaching work by achieving the educational outcomes assigned to level 8 of the Polish Qualifications Framework *(Act of 22 December 2015 on the Integrated Qualifications System)* in the field of:

1. general knowledge in medical sciences, biological sciences and biomedical engineering;
2. advanced, detailed knowledge corresponding to the area of research carried out in a given field or in interdisciplinary research;
3. skills related to the methodology of conducting research in a given scientific field;
4. skills allowing students to become a higher education lecturer;
5. social competencies associated with scientific and educational activities and social role of the academic.

Description of the educational outcomes in terms of knowledge (W), skills (U) and social competencies (K) is provided in the table below:

EDUCATIONAL OUTCOMES	
Symbol	**Description**
KNOWLEDGE	
W01	The student has extensive general knowledge of a selected scientific field (medical sciences, biological sciences, and biomedical engineering).
W02	The student has detailed knowledge related to the area of conducted research, including the latest scientific reports.
W03	The student demonstrates detailed knowledge of research techniques and research methodology in a selected scientific field.
W04	The student demonstrates knowledge of how to obtain scientific data.
W05	The student demonstrates detailed knowledge of professional vocabulary in the area of conducted research in their native language and in English.
W06	The student demonstrates basic knowledge of the methods of statistical data analysis and detailed knowledge of the statistical tools used in the analysis of results.

W07	The student demonstrates knowledge of research fundraising.
W08	The student is familiar with the rules for research integrity, including publication of results.
W09	The student is familiar with ethical principles in medical research involving human participants and human tissues and the principles of humane treatment of laboratory animals.
W10	The student demonstrates knowledge of rules for workplace safety.
W11	The student demonstrates profound knowledge of academic teaching including the latest teaching methods and techniques.
W12	The student is familiar with the rules of conducting the process of writing a doctoral thesis at higher education institutions and research institutes.
SKILLS	
U01	The student can formulate the research problem and specify the research methods for solving it.
U02	The student demonstrates very good research skills in the area of their own scientific research.
U03	The student can obtain scientific data and assess significance of the latest scientific reports in the field of medical sciences, biological sciences and biomedical engineering in the context of their own research.
U04	The student can present the results of research in the form of publication, conference report or multimedia presentation, as well as subject them to analysis and critical discussion in Polish and in English.
U05	The student can write a good research funding application for young scientists.

U06	The student can conduct classes using current knowledge and teaching methods.
U07	Under the supervision of the advisor (or the advisor and the auxiliary advisor), the student can write a doctoral thesis and present its main assumptions during public defense.
SOCIAL COMPETENCIES	
K01	The student is aware of the important role of the scientist and researcher in the development of medical, biological and engineering sciences that benefit our societies and improve well-being.
K02	The student can think and act in a way that shows creative and entrepreneurial skills, they can come up with new ideas and seek innovative solutions and are aware of their responsibility for the consequences of their actions and decisions.
K03	The student understands the obligation to constantly broaden their knowledge and improve their research skills. They are ready to accept criticism of their scientific achievements in the field of medical sciences, biological sciences and biomedical engineering, as well as their contribution to the development of the field. The student is aware of their own limitations and understands the need for consultation and exchange of experiences within the scientific community.
K04	The student understands the rules of creative work in the process of conducting research in a research team, producing the results and working on scientific publications.
K05	The student understands and sticks to the ethical principles in scientific research, including research and publication integrity
K06	The student adheres to the ethical principles in scientific research, including data confidentiality. They stick to the principles of humane treatment of laboratory animals in scientific research and strictly adhere to the recommendations of supervising bodies.
	The student is aware that it is their ethical, legal and economic responsibility to spend the funds obtained for research in accordance with their

K07	intended purpose.
K08	The student is responsible for and is able to ensure the workplace safety of themselves and their colleagues.
K09	The student understands the significance and social importance of didactic activity in the field. They are committed to educating specialists in a given field, and to the responsible transfer of knowledge and opinions on scientific achievements to the public.
K10	The student is aware of the need to constantly improve their didactic skills, using the latest teaching methods and techniques.
K11	The student observes good academic practice, understands the importance and creative nature of the teacher-student relationship.