**Doctoral School at Wrocław University of Environmental and Life Sciences**

1. **The Doctoral School at Wrocław University of Environmental and Life Sciences provides education in scientific fields and disciplines in which the University is allowed to grant the doctoral degree.**
2. **The main educational goals, including competences acquired by the graduate:**

The main goal of education at the Doctoral School of Wrocław University of Environmental and Life Sciences is the acquisition by graduates of competences connected with formulating new, previously unknown scientific problems and solving them in an original way based on modern research tools, using analytical methods and techniques at the highest global level. The Doctoral School will enable the graduate to acquire state-of-the-art specialist knowledge in the thematic field of the doctoral dissertation, in the relevant discipline within the exact and natural sciences, agricultural sciences, or engineering and technical sciences, along with an interdisciplinary understanding of functioning in modern society. The preparation of the doctoral dissertation in accordance with the guidelines set by the Doctoral School will enable wide dissemination of the research results in the academic environment and beyond, as well as the transfer of knowledge to the economy. This will help the Doctoral School graduates to enter the international world of science and improve their position in the dynamic market of new technologies connected with a more innovative and competitive economy.

1. **Definition of learning modules, including the expected learning outcomes and reference to the characteristics of the 8th level of the Polish Qualifications Framework**

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| **Learning outcomes for the Doctoral School at Wrocław University of Environmental and Life Sciences** | | | | | |
| **No.** | **Competences of a graduate of the Doctoral School at Wrocław University of Environmental and Life Sciences** | | | | **Reference to characteristics of level 8 of the Polish Qualifications Framework** |
| **Knowledge – the graduate knows and understands:** | | | | | |
| SDUPWr\_W01 | current problems discussed in the scientific literature and worldwide scientific and creative output in selected disciplines of exact and life sciences, agricultural sciences, engineering and technical sciences, veterinary sciences and social sciences | | | | P8S\_WG |
| SDUPWr\_W02 | theoretical foundations, general issues and selected specific issues in selected disciplines in exact and life sciences, agricultural sciences, engineering and technical sciences, veterinary sciences and social sciences to the extent that the existing state of knowledge can be verified | | | | P8S\_WG |
| SDUPWr\_W03 | complex aspects of selected disciplines in exact and life sciences, agricultural sciences, engineering and technical sciences, veterinary sciences and social sciences, and mathematical, statistical or qualitative tools for explaining, modelling and predicting processes concerning the selected scientific discipline | | | | P8S\_WG |
| SDUPWr\_W04 | principles of selecting scientific tools and methods, planning and conducting research using advanced techniques and research tools in selected disciplines of exact and life sciences, agricultural sciences, engineering and technical sciences, veterinary sciences and social sciences | | | | P8S\_WG |
| SDUPWr\_W05 | in an in-depth manner, scientific databases and their resources, with particular emphasis on life and social science databases | | | | P8S\_WG |
| SDUPWr\_W06 | principles of writing and reviewing scientific papers based on own research and literature data | | | | P8S\_WG |
| SDUPWr\_W07 | occupational health and safety rules, particularly with regard to laboratory and field tests and other tests posing health hazards | | | | P8S\_WK |
| SDUPWr\_W08 | Of establishing and developing forms of individual entrepreneurship in selected disciplines of exact and life sciences, agricultural sciences, engineering and technical sciences, veterinary sciences and social sciences | | | | P8S\_WK |
| SDUPWr\_W09 | legal determinants in selected disciplines in exact and natural sciences, agricultural sciences, engineering and technical sciences, veterinary sciences and social sciences, as well as the general concepts and principles within the scope of industrial property and copyright protection | | | | P8S\_WK |
| **Skills – the graduate is able to:** | | | | | |
| SDUPWr\_U01 | | proficiently use and critically analyse scientific literature and materials from a variety of sources | | P8S\_UW | |
| SDUPWr\_U02 | | creatively develop existing theoretical models and concepts, and create their own research concepts | | P8S\_UW | |
| SDUPWr\_U03 | | use knowledge from a variety of fields to creatively identify, formulate and innovatively solve complex problems or carry out research tasks, and in particular: define the purpose and object of research, formulate a research hypothesis, develop research methods, techniques and tools, and apply them creatively and draw conclusions from research findings | | P8S\_UW | |
| SDUPWr\_U04 | | use advanced research techniques and tools to solve complex scientific problems in selected disciplines of exact and natural sciences, agricultural sciences, engineering and technical sciences, veterinary sciences and social sciences | | P8S\_UW | |
| SDUPWr\_U05 | | use methodological skills (theoretical and practical) to plan and conduct independent scientific research and prepare expert opinions | | P8S\_UW | |
| SDUPWr\_U06 | | comprehensively analyse the causes and course of social and economic processes connected with exact and natural sciences, agricultural sciences, engineering and technical sciences, veterinary sciences and social sciences, and to forecast and model complex social and economic and related processes, using advanced research methods and tools | | P8S\_UW | |
| SDUPWr\_U07 | | obtain the relevant materials and information from various sources, including from own research, process the collected material and formulate conclusions | | P8S\_UW | |
| SDUPWr\_U08 | | write an extended scientific thesis (dissertation) and various smaller scientific papers (articles, polemics, abstracts, reports, reviews), including in English, in a form appropriate to the scientific discipline | | P8S\_UW | |
| SDUPWr\_U09 | | teach classes, prepare various forms of presentations and talks in Polish and English in the disciplines of exact and natural sciences, agricultural sciences, engineering and technical sciences, veterinary sciences and social sciences | | P8S\_UK | |
| SDUPWr\_U010 | | express their own opinions about them, formulate hypotheses and verify them, including in a foreign language, in an international scientific and professional environment | | P8S\_UK | |
| SDUPWr\_U011 | | plan and carry out an individual and team research or creative project, also in an international environment | | P8S\_UO | |
| SDUPWr\_U012 | | manage their own professional or scientific career | | P8S\_UU | |
| **Social competences – the graduate is prepared to:** | | | | | |
| SDUPWr\_K01 | | | critically evaluate the scientific output in the discipline in which he/she is pursuing his/her education, as well as recognise its usefulness in the solution of professional problems | P8S\_KK | |
| SDUPWr\_K02 | | | identify and resolve professional dilemmas and fulfil the social obligations of researchers and creators | P8S\_KO | |
| SDUPWr\_K03 | | | demonstrate responsibility for assessing the risks arising from the research techniques and tools; bear professional ethical responsibility for interference with the living organism | P8S\_KO | |
| SDUPWr\_K04 | | | conduct independent research and take up challenges in the professional and public sphere, taking into account: their ethical dimension, responsibility for their consequences and the formulation of good practices in such situations | P8S\_KO | |
| SDUPWr\_K05 | | | conduct research with due diligence, respecting the public ownership of research results, taking into account the principles of intellectual property protection | P8S\_KR | |

**Characteristics of PQF levels typical of qualifications obtained in the framework of higher education**

**P** = PQF level (8)

**S** = a characteristic typical of qualifications obtained in the framework of higher education

**W** = **knowledge**

**G** = depth and scope

**K** = context

**U = skills**

**W** = use of knowledge

**K** = communication

**O** = work organisation

**U** = learning

**K = social competences**

**K** = critical assessment

**O** = responsibility

**R** = professional role

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| **Learning modules and the expected learning outcomes** | | | | | | | | | | |
| **Learning modules** | | | **ECTS** | | **Reference to expected**  **learning outcomes** | | | **Expected learning outcomes** | | **Means of verifying the expected learning outcomes achieved by the doctoral student** |
|  |  | |  | | SDUPWr\_W01;  SDUPWr\_W02  SDUPWr\_W04 | | | The graduate is familiar with current problems discussed in the literature, understands the need for systematic reading of scientific journals to improve general and specialist knowledge in the scientific discipline and in related disciplines.  The graduate is able to publicly present the latest developments in the relevant scientific discipline and the obtained results of own research in relation to the literature data, as well as the thematic scope, hypotheses and objectives, methodology and results of own research.  The graduate can initiate scientific debate and participate in scientific discourse, disseminate research results, including in popular forums. | |  |
|  |  | |  | | SDUPWr\_U01;  SDUPWr\_U02; | | |  |
|  | PhD seminar | | 6 | | SDUPWr\_U03;  SDUPWr\_U07; | | | credit |
|  |  | |  | | SDUPWr\_U09; SDUPWr\_U010; | | |  |
|  |  | |  | | SDUPWr\_W01;  SDUPWr\_U01;  SDUPWr\_U08; | | | He/she knows and understands current problems discussed in the scientific literature as well as international scientific and creative achievement in the discipline in which he/she pursues his/her education.  He/she is able to expertly use scientific literature in English, to analyse it critically, and to write extended scientific papers and various smaller scientific texts in English, in a form appropriate to the scientific field.  He/she is able to lead a scientific discussion in English. | |  |
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| **Basic** | English for special purposes | | 6 | |  | | | exam |
|  | Teaching methodology | | 1 | | SDUPWr\_U09;  SDUPWr\_U12; | | | He/she knows and understands the methodology of teaching. He/she is able to conduct classes using methods of self-presentation and voice emission, as well as prepare various forms of presentations and speeches in English. He/she is also able to manage their own professional or academic career. | | credit |
|  | Psychology | | 1 | |
|  | Self-presentation | | 2 | |
|  | Voice emission | | 1 | |
| **Development of the**  **discipline and related**  **disciplines** |  | |  | | SDUPWr\_W01;  SDUPWr\_W02;  SDUPWr\_W03; SDUPWr\_W04;~~;~~  SDUPWr\_U02;  SDUPWr\_U03; | | | He/she knows and understands current research problems, major development trends and the latest developments relevant to the scientific discipline in the exact and natural sciences, agricultural sciences, engineering and technical sciences, veterinary sciences and social sciences.  He/she is familiar with current trends and innovations in the disciplines of exact and natural sciences, agricultural sciences, engineering and technical sciences, veterinary sciences and social sciences.  He/she demonstrates the need for and systematically updates knowledge of natural or social sciences for practical use.  He/she is able to update knowledge of natural sciences and use it to identify research problems and disseminate results, fulfilling social obligations in maintaining relationships in an international professional environment.  He/she is able to solve the most complex problems, create innovative solutions based on research work results.  He/she knows and understands new trends and analytical techniques and is able to use them in his/her own research. | |  |
| New trends in the discipline and related disciplines | | 3 | | credit |
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|  | |  | |  | | SDUPWr\_W01; | He/she knows and understands current issues in exact and natural sciences, agricultural sciences, engineering and technical sciences, veterinary sciences and social sciences within a given scientific discipline and related disciplines. He/she is able to apply appropriate advanced research techniques and tools to solve complex scientific problems in the context of solving research problems within a given scientific discipline and from an interdisciplinary perspective.  He/she is able to identify directions and opportunities for solving research problems, both within and outside his/her field of specialisation.  He/she can relate and embed their research problems and research in the context of conducting interdisciplinary research.  He/she is able to use knowledge from different disciplines to creatively identify, formulate and innovatively solve complex problems or carry out tasks of a research nature, in particular define the purpose and object of research and formulate a research hypothesis.  He/she knows and understands the economic, legal and other relevant determinants of research activities. | |  | | |
|  | |  | |  | | SDUPWr\_W02; |  | | |
| **Interdisciplinary seminar** | | Interdisciplinary problem solving | | 6 | | SDUPWr\_U03; SDUPWr\_U04; SDUPWr\_U05;  SDUPWr\_U07; | credit | | |
|  | |  | |  | | SDUPWr\_K04; |  | | |
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|  | |  | |  | | SDUPWr\_W04;  SDUPWr\_W05;  SDUPWr\_U04;  SDUPWr\_U05;  SDUPWr\_U07;  SDUPWr\_U011; | He/she is familiar with current research programmes of national and international scope.  He/she is familiar with the principles of health and safety at work especially in relation to field research and experiments posing a risk to health (laboratories). He/she has the ability to apply advanced research techniques and tools to solve complex scientific problems in his/her field of research.  He/she is able to define the purpose and object of research, correctly formulate the research hypothesis, develop research methods and techniques, and apply them creatively.  He/she can make correct inferences on the basis of research results. He/she can transfer research results to the economic and social sphere. | |  | | |
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| **Scientific research methodology** | | Design of experiments | | 1 | | exam | | |
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|  | Data analysis techniques | 4 | SDUPWr\_W04; SDUPWr\_W05; SDUPWr\_U04; SDUPWr\_U05; SDUPWr\_U07; SDUPWr\_K04 | He/she knows the basics of the theory of statistical hypothesis testing or interpretation of qualitative data for the verification of research hypotheses. He/she knows the main tools used in data analysis.  He/she is able to plan research experiments correctly, identify key research hypotheses in a scientific discipline, determine methods for their verification and correctly formulate the research and interpretation process.  He/she knows and can apply in practice the basic and fundamental concepts of mathematical statistics or qualitative analysis.  He/she is able to use the basic and advanced functions of statistical software to conduct a wide range of statistical analyses or qualitative analysis tools and techniques. | exam |
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|  | Ethics and law in scientific research | 1 | SDUPWr\_W09; SDUPWr\_K02; SDUPWr\_K03; SDUPWr\_K05 | He/she knows and understands the need for ethical and legal aspects of conducting research.  He/she is ready to conduct research to increase existing scientific and creative output, to address professional and publishing challenges taking into account their ethical dimension and responsibility for their consequences, and to develop good practices in such situations.  He/she is ready to co-create the rules in their discipline concerning the quality of the conducted scientific activity, the culture of cooperation and fair competition. He/she is able to co-create a culture of quality research in the given scientific discipline and related disciplines. | exam |
|  | Academic writing |  |  | He/she is familiar with the tools of scientific writing, in particular with techniques for writing and presenting the results of scientific papers.  He/she knows and understands the social and legal issues connected with conducting and commercialising research.  He/she knows and understands the general principles of research funding and knowledge transfer on a national and international scale, including the understanding of databases (bibliographical and citation indexes), project competitions and copyright issues. He/she can efficiently use scientific literature, critically analyse the literature and materials from electronic sources.  He/she is able to correctly identify the key research hypotheses in a given scientific discipline, determine methods of their verification and correctly formulate the research and interpretation process. He/she has the ability to collect materials and information from various sources (including from their own research), process the collected material and formulate conclusions.  He/she is ready to systematically update their knowledge in natural or social sciences in order to use it in practice to formulate new research hypotheses and obtain external research funding. |  |
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|  | Writing research proposals | 3 | SDUPWr\_W03; SDUPWr\_W04; SDUPWr\_W08; SDUPWr\_W09; |  |
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| **Workshops** | Practical and legal considerations of scientific research commercialisation |  | SDUPWr\_U04; SDUPWr\_U06;  SDUPWr\_U07;  SDUPWr\_U08; | credit |
|  |  | SDUPWr\_U010; SDUPWr\_K01 |  |
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|  | 1. training courses outside WUELS – must be accepted by the supervisor and doctoral school board (1 ECTS credit per course) – no more than two courses | - | SDUPWr\_W02; SDUPWr\_U12; SDUPWr\_K01; | He/she understands the need for lifelong self-improvement.  He/she is willing to uphold and develop the ethos of the research and creative communities. He/she understands the need for scientific self-improvement in order to expand general and specialist knowledge in their scientific discipline.  He-she is ready to acquire the ability to better understand the determinants of a research career and its independent planning. |  |
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|  | credit |
| 2. scientific meetings in institutions referred to in Article 7(1) of the Act of 20 July 2018 – Law on Higher Education and Science, excluding WUELS scientific societies (1 ECTS credit per one scientific meeting) – no more than four scientific meetings |  |
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| **Scientific self-development** |  |
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|  | 3. multi-day specialist training ending with certification, aim – to learn new research techniques and calculation methods (1 ECTS credit per training course training) – no more than two specialist courses |  |  |  |  |
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|  | 4. active participation in international conferences abroad (2 ECTS credits per conference) – no more than two conferences |  |  |
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|  | Teaching practice – in accordance with the Regulations of the Doctoral School at Wrocław University of Environmental and Life Sciences |  |  | He/she knows and understands teaching methodology and techniques. He/she is able to conduct teaching activities in a methodologically correct manner. |  |
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| **Teaching practice** | 12 | SDUPWr\_W03 SDUPWr\_U09 | credit |

1. **Curriculum of the Doctoral School**

**Framework curriculum of the Doctoral School of Wrocław University of Environmental and Life Sciences**

**Year I – compulsory coursework**

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| **No.** | **Learning module** | **Name of course** | **USOS course code** | **Form of study** | **Form of course completion** | **Number of face-to-face hours** | | **ECTS1** |
| **term 1** | **term 2** |
| **1.** | **Basic** | PhD seminar | SD>P-SEM | seminar | credit | 10 | - | 2 |
| English for special purposes | SD>P-ANG | classes | credit | - | 30 | 2 |
| Teaching methodology | SD>P-MPZ | classes | credit | - | 5 | 1 |
| Psychology | SD>P-PSYCH | classes | credit | - | 5 | 1 |
| Self-presentation | SD>P-AUTOPR | classes | credit | 10 | - | 2 |
| Voice emission | SD>P-EG | classes | credit | 5 | - | 1 |
| **2.** | **Interdisciplinary seminar** | Interdisciplinary problem solving | SD>KI-INTERRP | seminar | credit | - | 20 | 6 |
| **3.** | **Scientific research methodology** | Design of experiments | SD>MPBN-PD | classes | credit | 10 | - | 1 |
| Data analysis techniques | SD>MPBN-TAD | classes | credit | - | 20 | 2 |
| Ethics and law in scientific research | SD>MPBN-EP | lecture | exam | 10 | - | 1 |
| **4.** | **Workshops** | Academic writing | SD>W-ARTN | classes | credit | 10 | - | 1 |
| Writing research proposals | SD>W-PROJ | classes | credit | 5 | - | 1 |
| **5.** | **Scientific self-development2** | 1. training courses outside WUELS – must  be accepted by the supervisor and doctoral school board (1 ECTS credit per course) – no more than two courses | SD>SD-KKSZ | - | credit | - | - | - |
|  |  | 2. scientific meetings in institutions referred to in Article 7(1) of the Act of 20 July 2018 – Law on Higher Education and Science, excluding WUELS scientific societies (1 ECTS credit per one scientific meeting) – no more than four scientific meetings | SD>SD-SN | - | credit | - | - | - |
|  |  | 3. multi-day specialist training ending with certification, aim – to learn new research techniques and calculation methods (1 ECTS credit per training course training) – no more than two specialist courses | SD>SD-SZSPEC | - | credit | - | - | - |
|  |  | 4. active participation in international conferences abroad (2 ECTS credits per conference) – no more than two conferences | SD>SD-MKONF | - | credit | - | - | - |
| **6.** | **Teaching practice** | Teaching practice – in accordance with the Regulations of the Doctoral School at Wrocław University of Environmental and Life Sciences | SD>PZ-PZ |  | credit | 15  (co-teaching) | | 4 |

1 ECTS – 25-30 hours of doctoral student’s work, including: participation in classes, independent preparation for classes as part of the course.

2 The module should be done at a time chosen by the doctoral student, between semesters 1–7. In order to pass the entire module, the student has to earn min. 6 ECTS by participating in courses, training, conferences and scientific meetings.

3 Teaching practice - subject taught throughout the academic year. Credit obtained in the summer semester.

**Year II – compulsory coursework**

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| **No.** | **Learning module** | **Name of course** | **USOS course code** | **Form of study** | **Form of course completion** | **Number of face-to-face hours** | | **ECTS1** |
| **term 3** | **term4** |
| **1.** | **Basic** | PhD seminar | SD>P-SEM | seminar | credit | 10 | - | 2 |
| English for special purposes | SD>P-ANG(3) | exercises | credit/  exam3 | 30 |  | 2 |
| English for special purposes | SD>P-ANG(4) | exercises | credit/  exam3 |  | 30 | 2 |
| **2.** | **Development of the discipline and**  **related disciplines** | New trends in the discipline and related disciplines | SD>RDY- DISCIPLINES(3) | lecture | credit | 5 |  | 1.5 |
| New trends in the discipline and related disciplines | SD>RDY- DISCIPLINES(4) | lecture | credit |  | 5 | 1.5 |
| **3.** | **Scientific research methodology** | Data analysis techniques | SD>MPBN- TAD | exercises | exam | - | 20 | 2 |
| **4.** | **Workshops** | Academic writing | SD>W-ARTN(3) | exercises | credit | 15 |  | 1 |
| Academic writing | SD>W-ARTN(4) | exercises | credit |  | 5 | 1 |
| Writing research proposals | SD>W-PROJ | exercises | credit | 15 | - | 2 |
| Practical and legal considerations of scientific research commercialisation | SD>W- PRKOMERC | lecture | credit | 10 | - | 1 |
| **5.** | **Scientific self-development2** | 1. training courses outside WUELS – must be accepted by the supervisor and doctoral school board (1 ECTS credit per course) – no more than two courses | SD>SD-KKSZ | - | credit | - | - | - |
| 2. scientific meetings in institutions referred to in Article 7(1) of the Act of 20 July 2018 – Law on Higher Education and Science, excluding WUELS scientific societies (1 ECTS credit per one scientific meeting) – no more than four scientific meetings | SD>SD-SN | - | credit | - | - | - |
| 3. multi-day specialist training ending with certification, aim – to learn new research techniques and calculation methods (1 ECTS credit per training course training) – no more than two specialist courses | SD>SD- SZSPEC | - | credit | - | - | - |
| 4. active participation in international conferences abroad (2 ECTS credits per conference) – no more than two conferences | SD>SD- MKONF | - | credit | - | - | - |
| **6.** | **Teaching practice** | Teaching practice – in accordance with the Regulations of the Doctoral School at Wrocław University of Environmental and Life Sciences | SD>PZ-PZ | - | credit | 15  (co-teaching) | | 4 |

1 ECTS – 25-30 hours of doctoral student’s work, including: participation in classes, independent preparation for classes as part of the course.

2 The module should be done at a time chosen by the doctoral student, between semesters 1–7. In order to pass the entire module, the student has to earn min. 6 ECTS by participating in courses, training, conferences and scientific meetings.

3 An exam is administered inthe last semester of the subject entitled “Specialist English.”

**Year III – compulsory coursework**

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| **No.** | **Learning module** | **Name of course** | **USOS course code** | **Form of study** | **Form of course completion** | **Number of face-to-face hours** | | **ECTS1** |
| **term 5** | **term 6** |
| **1.** | **Basic** | PhD seminar | SD>P-SEM | seminar | credit | 10 | - | 2 |
| **2.** | **Scientific self-development2** | 1. training courses outside WUELS – must be accepted by the supervisor and doctoral school board (1 ECTS credit per course) – no more than two courses | SD>SD-KKSZ | - | credit | - | - | - |
|  |  | 2. scientific meetings in institutions referred to in Article 7(1) of the Act of 20 July 2018 – Law on Higher Education and Science, excluding WUELS scientific societies (1 ECTS credit per one scientific meeting) – no more than four scientific meetings | SD>SD-SN | - | credit | - | - | - |
|  |  | 3. multi-day specialist training ending with certification, aim – to learn new research techniques and calculation methods (1 ECTS credit per training course training) – no more than two specialist courses | SD>SD-SZSPEC | - | credit | - | - | - |
|  |  | 4. active participation in international conferences abroad (2 ECTS credits per conference) – no more than two conferences | SD>SD-MKONF | - | credit | - | - | - |
| **3.** | **Teaching practice** | Teaching practice in accordance with the Regulations of the Doctoral School of Wrocław University of Environmental and Life Sciences | SD>PZ-PZ |  | credit | 15  (co-teaching) | | 4 |

1 ECTS – 25-30 hours of doctoral student’s work, including: participation in classes, independent preparation for classes as part of the course.

2 The module should be done at a time chosen by the doctoral student, between semesters 1–7. In order to pass the entire module, the student has to earn min. 6 ECTS by participating in courses, training, conferences and scientific meetings.

1. **Duration of education at the Doctoral School: 3 years.**
2. **Academic degree obtained by the graduate:**

doctor in scientific fields and disciplines in which the University is allowed to grant the doctoral degree

1. **Education at the Doctoral School ends after:**
2. completion of the doctoral school curriculum,
3. completion of the individual research plan,
4. publication of JCR-indexed papers,
5. submission of the doctoral dissertation.