

**Subject card**

<b>Subject name and code</b>	Molecular ecology, PG_00142409						
<b>Field of study</b>	Natural Resources Conservation						
<b>Date of commencement of studies</b>	October 2024	<b>Academic year of realisation of subject</b>			2025/2026		
<b>Education level</b>	undergraduate studies	<b>Subject group</b>			Obligatory subject group in the field of study		
<b>Mode of study</b>	full-time studies	<b>Mode of delivery</b>			at the university		
<b>Year of study</b>	2	<b>Language of instruction</b>			Polish The lectures can be delivered in English if needed.		
<b>Semester of study</b>	3	<b>ECTS credits</b>			1.0		
<b>Learning profile</b>	academic	<b>Assessment form</b>					
<b>Conducting unit</b>	Pracownia Genomiki Ewolucyjnej Ssaków -> Katedra Genetyki Ewolucyjnej i Biosystematyki -> Faculty of Biology						
<b>Name and surname of lecturer (lecturers)</b>	<b>Subject supervisor</b>		dr hab. Małgorzata Pilot				
	<b>Teachers</b>						
<b>Lesson types</b>	<b>Lesson type</b>	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	<b>Number of study hours</b>	15.0	0.0	0.0	0.0	0.0	15
	E-learning hours included: 0.0						
<b>Learning activity and number of study hours</b>	<b>Learning activity</b>	<b>Participation in didactic classes included in study plan</b>		<b>Participation in consultation hours</b>		<b>Self-study</b>	<b>SUM</b>
	<b>Number of study hours</b>	15		3.0		7.0	25
<b>Subject objectives</b>	<p>1. Introduction of new terms and research methods of molecular genetics related to multidisciplinary molecular ecology.</p> <p>2. Understanding the cognitive importance and practical application of molecular ecology.</p>						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[OZPL3_W09] The graduate possesses an advanced comprehension of the current state of knowledge and the latest trends in biology, as well as their relationship to other natural disciplines	- The graduate possess the current state of knowledge about trends in molecular ecology and indicates their relationship with other natural disciplines	[SW4] test/exam - oral or written
	[OZPL3_W13] The graduate has an advanced understanding of the fundamental rules, methods, and techniques of environmental research and their potential applications in nature conservation	- The graduate can present the basic rules, methods and techniques of conducting research on the natural environment and the possibilities of their use in nature conservation	[SW4] test/exam - oral or written
	[OZPL3_K01] The graduate is ready to recognise the limitations in his/her own knowledge and understands the need for continuous learning and development	- The graduate knows the limits of his own knowledge and understands the need for constant learning and development	[SK1] oral statement/conversation/discussion
	[OZPL3_U02] The graduate can read with comprehension scientific texts in the field of natural sciences in Polish and simple texts in English	- The graduate reads with understanding scientific texts in the field of molecular ecology in Polish and simple texts in English	[SU4] test/exam - oral or written
	[OZPL3_W02] The graduate possesses advanced knowledge and understanding of the mechanisms governing the flow of genetic information, its regulation, the principles of inheritance, and the origins of variation in organisms	- The graduate knows the tools and latest techniques of molecular genetics applied in ecological research	[SW4] test/exam - oral or written
[OZPL3_K08] The graduate is ready to systematically update his/her natural knowledge and to apply it in practice	- The graduate systematically updates the knowledge of nature and knows its practical applications	[SK1] oral statement/conversation/discussion	
Subject contents	<p>- History of molecular ecology; - Application of molecular genetics tools in ecological research: molecular markers and the latest molecular techniques; - Use of molecular data for genetic analysis of populations; - Application of the Next Generation Sequencing (NGS) in molecular ecology; - Application of the environmental DNA (eDNA) technique in the assessment of biodiversity; - Integrative taxonomy; - Basic aspects of phylogeography; - Molecular ecology in nature conservation; - Practical application of molecular ecology</p>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Test	51.0%	100.0%
Recommended reading	Basic literature	<p>- Freeland J.R. 2020. Molecular Ecology, Third Edition. ISBN: 978-1-119-42615-8; John Wiley &amp; Sons, Ltd; - Rowe G., Sweet M., Beebee T. 2017. An introduction to Molecular Ecology. ISBN: 9780198716990; Oxford University Press</p>	
	Supplementary literature	<p>Węgleński P. 2020. Genetyka molekularna. ISBN: 978-83-01-14744-0; PWN Warszawa</p>	

	eResources addresses	<p>Podstawowe</p> <p><a href="https://www.wiley.com/en-us/Molecular+Ecology%2C+3rd+Edition-p-9781119426158">https://www.wiley.com/en-us/Molecular+Ecology%2C+3rd+Edition-p-9781119426158</a> - Ekologia molekularna zajmuje się tym, w jaki sposób biologia molekularna i genetyka populacyjna mogą pomóc nam lepiej zrozumieć aspekty ekologii i ewolucji, w tym lokalną adaptację, rozproszenie w krajobrazach, filogeografię, ekologię behawioralną i biologię konserwatorską. Wraz z rozwojem technologii napędzającej genetykę rozwinęła się również ta szybko rozwijająca się i innowacyjna dyscyplina, dostarczając ważnych informacji na temat praktycznie wszystkich grup taksonomicznych. To trzecie wydanie Ekologii Molekularnej uwzględnia przełomowe odkrycia dokonane w ostatnich latach, aby dać czytelnikom dokładny i aktualny opis tej dziedziny w jej obecnym kształcie.</p> <p><a href="https://ksiegarnia.pwn.pl/Ekologia-molekularna,893292588,p.html">https://ksiegarnia.pwn.pl/Ekologia-molekularna,893292588,p.html</a> - The book shows how molecular biology and population genetics expand our knowledge of selected aspects of ecology and evolution, such as local adaptation, dispersal in landscape, phylogeography, behavioural ecology and conservation biology.</p> <p>Adresy na platformie eNauczanie:</p>
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> <li>- What are the potential sources of DNA for molecular research?;</li> <li>- What are the main applications of DNA barcoding?;</li> <li>- What are the causes of outbreeding depression?;</li>   <li>- What factor determines the rate of heterozygosity loss in a population due to genetic drift?;- What are the main consequences of the bottleneck effect?;- What is the founder effect?;- How does the rate of migration between populations affect the degree of genetic variation between them?;- What mechanisms lead to genetic differentiation of populations?;- How are Evolutionarily Significant Units determined?</li> </ul>	
Work placement	Not applicable	

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