



UNIwersYTET  
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W POZNANIU

## Molecular ecology

### Educational subject description sheet

#### Basic information

<b>Study programme</b> Environmental Protection	<b>Didactic cycle</b> 2024/25	
<b>Speciality</b> -	<b>Subject code</b> 01EVPS.22.12958.24	
<b>Organizational unit</b> Faculty of Biology	<b>Lecture languages</b> English	
<b>Study level</b> Second-cycle programme	<b>Course type</b> Elective	
<b>Study form</b> Full-time	<b>Block</b> foreign languages	
<b>Education profile</b> General academic		
<b>Subject coordinator</b>	Witold Wachowiak	
<b>Lecturer</b>	Witold Wachowiak	
<b>Period</b> Semester 2	<b>Activities and hours</b> <ul style="list-style-type: none"><li>• Lecture: 6, Graded credit</li><li>• Conversatory classes: 8, Graded credit</li><li>• Classes: 16, Graded credit</li></ul>	<b>Number of ECTS points</b> 3

## Goals

Code	Goal
C1	Familiarize students with the application of molecular ecology in studies of genetic variation at the population level and genetic markers development.
C2	Familiarize students with the application of molecular ecology in evolutionary studies of species adaptive variation and population history.
C3	Familiarize students with the application of analytical methods and novel molecular biology approaches in molecular ecology.
C4	Familiarize students with theoretical assumptions and computational approaches used in molecular ecology research.
C5	Familiarize students with top examples of molecular ecology studies based on published research articles.

## Subject learning outcomes

Code	Outcomes in terms of	Learning outcomes	Examination methods
<b>Knowledge - Student:</b>			
W1	knows and understands the importance of molecular ecology for the assessment of genetic variability and distribution of populations across the species range.	EVP_K2_W01	Written colloquium, Multimedia presentation
W2	knows the basic research tools and techniques used in molecular ecology.	EVP_K2_W04, EVP_K2_W05	Written colloquium, Report
<b>Skills - Student:</b>			
U1	can explain the importance of research in the field of molecular ecology in terms of environmental protection and the management of genetic resources of living organisms.	EVP_K2_U01	Written colloquium, Multimedia presentation
U2	can explain the basic methodology and their application in molecular ecology research.	EVP_K2_U02, EVP_K2_U03	Written colloquium, Report, Multimedia presentation
U3	can explain the processes affecting the level of genetic variation of species in time and space.	EVP_K2_U04	Written colloquium, Multimedia presentation
U4	can explain the methods and importance of genetic analysis of adaptive and quantitative traits variation of living organisms following environmental changes and distribution of species.	EVP_K2_U01, EVP_K2_U04	Written colloquium, Multimedia presentation
U5	can critically evaluate published research in the field of the discussed subject.	EVP_K2_U02, EVP_K2_U04, EVP_K2_U06	Multimedia presentation
<b>Social competences - Student:</b>			
K1	can use knowledge and skills in the field of molecular ecology in environmental protection.	EVP_K2_K01, EVP_K2_K02, EVP_K2_K03, EVP_K2_K05	Written colloquium, Report, Multimedia presentation

## Study content

No.	Course content	Subject learning outcomes	Activities
1.	Application of molecular ecology in biodiversity and nature conservation research.	W1, U1, K1	Lecture, Conversatory classes, Classes
2.	Analysis of demographic and evolutionary processes in molecular ecology.	W1, U3, U4, K1	Lecture, Conversatory classes, Classes
3.	The use of laboratory methods and analysis of genetic data in ecology.	W2, U2, U4, K1	Lecture, Conversatory classes, Classes
4.	Molecular and adaptive variability in time and space.	W1, U4	Lecture, Conversatory classes
5.	Practical applications of research results in the field of molecular ecology.	W1, W2, U5, K1	Lecture, Conversatory classes

## Additional information

Activities	Teaching and learning methods and activities
Lecture	Lecture with a multimedia presentation of selected issues, Discussion, Case study
Conversatory classes	Discussion, Case study, Problem-based learning, Activating method - SWOT analysis, Work in groups
Classes	Solving tasks (e.g. computational, artistic, practical)

Activities	Credit conditions
Lecture	very good (5.0): 88-100% of points awarded for passing lectures in the form of a written colloquium good plus (4.5): 80-87.5% of points awarded for passing lectures in the form of a written colloquium good (4.0): 70-79.5% of points awarded for passing lectures in the form of a written colloquium satisfactory plus (3.5): 61-69.5% of points awarded for passing lectures in the form of a written colloquium satisfactory (3.0): 50-60.5% of points awarded for passing lectures in the form of a written colloquium unsatisfactory (2.0): <50% of points awarded for passing lectures in the form of a written colloquium
Conversatory classes	very good (5.0): 88-100% of points awarded for passing conversatory classes in the form of presentations good plus (4.5): 80-87.5% of points awarded for passing conversatory classes in the form of presentations good (4.0): 70-79.5% of points awarded for passing conversatory classes in the form of presentations satisfactory plus (3.5): 61-69.5% of points awarded for passing conversatory classes in the form of presentations satisfactory (3.0): 50-60.5% of points awarded for passing conversatory classes in the form of presentations unsatisfactory (2.0): <50% of points awarded for passing conversatory classes in the form of presentations

<b>Activities</b>	<b>Credit conditions</b>
Classes	very good (5.0): 88-100% of points awarded for passing exercises in the form of a developed class protocol good plus (4.5): 80-87.5% of points awarded for passing exercises in the form of a developed class protocol good (4.0): 70-79.5% of points awarded for passing exercises in the form of a developed class protocol satisfactory plus (3.5): 61-69.5% of points awarded for passing exercises in the form of a developed class protocol satisfactory (3.0): 50-60.5% of points awarded for passing exercises in the form of a developed class protocol unsatisfactory (2.0): <50% of points awarded for passing exercises in the form of a developed class protocol

## Literature

### Obligatory

1. Molecular Ecology. Autors: Joanna R. Freeland, Stephen D. Petersen, Heather Kirk. Publisher: Wiley-Blackwell
2. An Introduction to Molecular Ecology. Autors: Trevor Beebee, Graham Rowe. Publisher: Oxford

### Optional

1. Biogeography: An Ecological and Evolutionary Approach. Autors: C. Barry Cox, Peter D. Moore. Publisher: Wilay & Sons.

## Calculation of ECTS points

<b>Activities</b>	<b>Activity hours*</b>
Lecture	6
Conversatory classes	8
Classes	16
Reading the indicated literature	20
Preparation of a multimedia presentation	5
Report preparation	10
Preparation for the exam	25
<b>Student workload</b>	<b>Hours</b> 90
<b>Number of ECTS points</b>	<b>ECTS</b> 3

\* academic hour = 45 minutes

## Learning outcomes

Code	Content
EVP_K2_K01	The graduate is ready to critical assessment of received information on environmental protection as well as formulation of rational judgments on this subject
EVP_K2_K02	The graduate is ready to recognition of the importance of science in solving cognitive and practical problems as well as critical analysis of information functioning in non-scientific circulation in the field of environmental protection
EVP_K2_K03	The graduate is ready to correct identification and resolution of dilemmas related to scientific activity and its practical use in the field of environmental protection
EVP_K2_K05	The graduate is ready to developing professional achievements, targeted training and self-improvement in relation to new scientific trends in environmental protection
EVP_K2_U01	The graduate can creatively use his/her knowledge in the field of environmental protection, i.e. search for, formulate and solve complex problems, conduct a critical analysis of information from various sources
EVP_K2_U02	The graduate can independently plan and conduct research as well as analyse the correctness of tasks performed and the reliability of the results obtained, and draw conclusions useful in environmental protection
EVP_K2_U03	The graduate can use the tools, methods and research techniques applied in laboratory and field work, especially for monitoring and assessment of the state of the environment
EVP_K2_U04	The graduate can analyse, evaluate and - consequently - predict the direct or indirect impact of humans on other organisms and the environment
EVP_K2_U06	The graduate can evaluate the effectiveness of the measures taken to prevent or repair damage to natural resources
EVP_K2_W01	The graduate knows and understands theories, processes, facts, and objects related to general knowledge about environmental protection and related sciences
EVP_K2_W04	The graduate knows and understands rules of practical use of theoretical knowledge in assessing the condition of terrestrial environments and maintaining or restoring them to their proper condition
EVP_K2_W05	The graduate knows and understands principles of rational shaping of the environment and management of natural resources in accordance with the principles of sustainable development