

<b>Name of the course</b> <i>Technics of phylogeny reconstruction – all-academic profile</i>	<b>ECTS code</b>										
<b>Name of the leading institution</b> <i>Department of Biosystematics</i>											
<b>Study description</b>											
<table border="1"> <thead> <tr> <th>faculty</th><th>level</th><th>type of study</th><th>specialty</th><th>specialisation</th></tr> </thead> <tbody> <tr> <td>Biology</td><td>II</td><td>stationary</td><td>palaеobiology</td><td>-</td></tr> </tbody> </table>		faculty	level	type of study	specialty	specialisation	Biology	II	stationary	palaеobiology	-
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Biology	II	stationary	palaеobiology	-							
*the name follows the accepted catalogue of faculties and specializations											
<b>Name/-s of a teacher/-s</b> <i>Prof. dr hab. Jerzy Lis</i>											
<b>Type of course, way of realization and amount of hours</b>	<b>ECTS credit points: 2</b>										
<b>A. type of course</b> <ul style="list-style-type: none"> <li>lecture (L)</li> <li>laboratory (Lab)</li> </ul>	<u>Contact hours</u> <ul style="list-style-type: none"> <li>lecture participation: <math>15 \times 1\text{hour} = 15\text{ hours}</math></li> <li>laboratory participation: <math>15 \times 1\text{hour} = 15\text{ hours}</math></li> <li>consultations&lt;: <math>2 \times 1\text{hour} = 2\text{ hours}</math></li> </ul> Altogether: $32\text{ hours} = 1\text{ ECTS credit point}$										
<b>B. way of realization</b> <ul style="list-style-type: none"> <li>laboratory and lecture room</li> </ul>	<u>Individual student work</u> <ul style="list-style-type: none"> <li>preparation to the laboratory: <math>15 \times 1\text{ hour} = 15\text{ hours}</math></li> <li>literature studies and preparation to the final credit: <math>15\text{ hours}</math></li> </ul> Altogether: $30\text{ hours} = 1\text{ ECTS credit point}$										
<b>C. amount of hours</b>  15L +15Lab	L (1cp ECTS) + Lab (1 cp ECTS)										
<b>Module</b> <ul style="list-style-type: none"> <li>optional module</li> </ul>	<b>Language</b> English										
<b>Didactic methods</b> <ul style="list-style-type: none"> <li>multimedial lecture</li> <li>laboratory: exercises involving computer programs and internet data, computer simulations, discussion, work in focus groups</li> </ul>	<b>Conditions to get credits for:</b> <p><b>A. Way of final evaluation:</b></p> <ul style="list-style-type: none"> <li>lectures: a grad</li> <li>laboratory: a grade</li> </ul> <p><b>B. Form of testing:</b></p> <ul style="list-style-type: none"> <li>lecture: final written test (including open and closed questions)</li> <li>laboratory oral presentation of results of computer analyses and simulations (accompanied by the electronic presentation):</li> </ul> <p><b>C. Basic criteria</b></p> <ul style="list-style-type: none"> <li>L: positive rating over 50% of points scored (in the final test)</li> <li>Lab: evaluation of results obtained during computer analyses</li> </ul>										
<b>Necessary knowledge from listed below subjects and the preliminary conditions</b>											
<p><b>A.</b> <u>Formal conditions:</u> none</p> <p><b>B.</b> <u>Preliminary conditions:</u> Computer skills and elementary knowledge of computer science, a basic knowledge on the principles of organisms systematics and classification, genetics and evolution, an ability to find and process biological information into knowledge, an ability to use the relevant published biological scientific literature and to know its practical application.</p>											

**Goal:** Knowing and understanding the basic scope and concepts relevant to organisms systematics, classification and taxonomy; knowing the methods of phylogeny reconstruction using morphological and molecular characters; acquiring the skill of evaluation and analysis of characters used for presenting phylogenetic hypotheses; acquiring the skill of computer software applications in the process of phylogeny reconstruction.

### Content:

**A. Lecture:** Systematics and classification. Typological, morphological, biological, evolutionary and molecular species concepts in the light of phylogeny reconstruction. Classic, genetic, evolutionary, phylogenetic and molecular taxonomy. Characters in classification; homology and homoplasy and their importance for phylogeny reconstruction. Techniques of phylogenetic analyses – algorithms, criteria, a consensus tree construction. Computer methods in phylogeny reconstruction.

**B. Laboratory:** Computer programs and bioinformatic databases in phylogenetic reconstruction. Phylogenetic analyses based on morphology and molecular characters. Using DNA sequences obtained from GenBank for phylogenetic analyses. Sequence alignments and analyses. Analysis of the phylogenetic signal and DNA saturation. Substitution model selection (Akaike information criterion, Bayesian information criterion, reversible jump Markov Chain Monte Carlo criterion). Tree construction using different algorithms and computer programs (MEGA, MrBAYES); tree topology and reliability of clades. Tree editing. Oral presentation of the results of computer analyses and simulations (accompanied by the electronic presentation).

### Literature

#### A. obligatory literature:

A.1. used during lectures and laboratory sessions

- Wägele J.-W. Foundations of Phylogenetic Systematics. Verlag Dr. Friedrich Pfeil, München, 2005.
- Xiong J. Essential bioinformatics. Cambridge University Press, 2006.
- Hall B.G. Phylogenetic trees made easy: A how-to manual. Third edition. Sinauer Associates Inc., 2008.
- specialised literature.

A.2. lectures for self-study – as above.

#### B. additional literature

- Salemi M., Vandamme A. M. The phylogenetic handbook. Cambridge University Press, 2003.
- Wheeler Q.D. (ed.). The New Taxonomy. CRC Press, Boca Raton – London – New York, 2008.
- specialised literature.

### Effects of education

**Knowledge**  
 K\_W01/\_P7S\_WG  
 K\_W02/\_P7S\_WG  
 K\_W07/\_P7S\_WG  
 K\_W12/\_P7S\_WG  
 K\_W15/\_P7S\_WG

**Skills**  
 K\_U02/\_P7S\_UK  
 K\_U03/\_P7S\_UW  
 K\_U07/\_P7S\_UW  
 K\_U08/\_P7S\_UK

**Social competencies**  
 K\_K01/\_P7S\_KK  
 K\_K04/\_P7S\_KK  
 K\_K10/\_P7S\_KK

### Contact

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