

Name of the subject: MOLECULAR EVOLUTION AND PHYLOGENY OF MICROORGANISMS		
Teacher(s): Dr. Ivica Tamaš		
Status of the subject: Elective		
Number of ECTS points: 15		
Condition: A prior consultation with the subject teacher.		
Goal of the subject The latest trends in molecular evolution and phylogenetic analysis of microorganisms, in particular 16rRNA based. Application of a variety of bioinformatic tools for sequence analysis such as detection of evolutionary changes in sequences and software packages for phylogenetic reconstructions (phylogenetic trees).		
Outcome of the subject Gaining knowledge about the latest trends in molecular evolution. Performing independently phylogenetic reconstructions of individual microorganisms, as well as microbial communities: 1. selection of the adequate phylogenetic markers (16 rRNA, ribosomal proteins, house-keeping genes, etc.) 2. mining of the public data bases for the sequences of interest 3. multiple sequences alignments using available software tools 4. construction of phylogenetic trees, as well as interpretation of the obtained results		
Content of the subject <i>Theoretical lectures</i> The dynamics of the evolutionary changes that have been introduced into sequences, sequence evolution, mutations, genomics, comparative genomics, phylogenetic reconstructions, applicable software for sequence analysis. <i>Practical lectures</i> Phylogenetic analysis of the chosen sequences from the public data basis, either from individual microorganisms or metagenomes (https://www.ncbi.nlm.nih.gov/bioproject?term=metagenomes).		
Recommended literature De Bruijn F. J. (2011): Handbook of Molecular Microbial Ecology I. John Wiley & sons, Inc. Hoboken, New Jersey 2. De Bruijn F. J. (2011): Handbook of Molecular Microbial Ecology II Metagenomics in Different Habitats, Wiley-Blackwell 3. Ian L. Pepper, Charles P. Gerba, Terry J. Gentry (2014): Environmental Microbiology, third edition, Academic Press, San Diego		
Number of active classes	Theory: 5	Practice: 5
Methods of delivering lectures Consultations with the subject teacher, computer classes (a variety of bioinformatic tools currently used for sequence analysis), individual computer work from home.		
Evaluation of knowledge (maximum number of points 100) Assignment - up to 30, Seminar up to 30, Project Presentation of scientific work up to 10. Oral exam up to 30 points		