

**(Table 5.2) Course unit description**

|  |                       |   |                       |
|--|-----------------------|---|-----------------------|
| Study program : Molecular biology  |                       |   |                       |
| Type and level of studies: Master academy study – II level of studies  |                       |   |                       |
| <b>Course unit: Molecular methods in entomology</b>  |                       |   |                       |
| <b>Teacher in charge : Ana Mitrovski Bogdanović, PhD</b>   |                       |   |                       |
| Language of instruction: English   |                       |   |                       |
| ECTS:6   |                       |   |                       |
| Prerequisites: /   |                       |   |                       |
| Semester: Summer Semester  |                       |   |                       |
| <b>Course unit objective</b>   |                       |   |                       |
| Introduction with fundamental methods of molecular systematics and their applying in entomology .  |                       |   |                       |
| <b>Learning outcomes of Course unit</b>  |                       |   |                       |
| Training of students to apply different methods of molecular analyses in entomological investigations.   |                       |   |                       |
| <b>Course unit contents</b>  |                       |   |                       |
| <i>Theoretical classes</i>   |                       |   |                       |
| Modern insect systematics. Importance of taxonomical informations. Molecular systematics in entomological investigations. Molecular versus traditional approaches to systematics. Applying of genetical markers in entomology. Insect molecular identification. Applying of molecular methods in the studies of taxonomy, phylogenetic relationships and genetic population of insects. Phylogenetic methods. Molecular identification of insect pest natural enemies and their applying in biological control programmes. Molecular methods – advantages and disadvantages. |                       |   |                       |
| <i>Practical classes</i>   |                       |   |                       |
| DNA extraction from insects. PCR amplification of mitochondrial and nuclear gene fragments. Purification and sequencing of amplified genetic markers. Analysis and comparing of DNA sequences (BLAST, Clustal W). Construction of phylogenetic tree by MEGA 5 program. Determination of phylogenetic relationships among species. Intra- and intergenetic species variability. Traditional systematics versus molecular systematics.   |                       |   |                       |
| <b>Literature</b>  |                       |   |                       |
| Avisé J. C. Molecular Markers, Natural History and Evolution. Chapman & Hall, 1994.  |                       |   |                       |
| Avisé J. C. Phylogeography: the history and formation of species. Harvard University Press, 2000.  |                       |   |                       |
| Hoy M. Insect Molecular Genetics: An Introduction to Principles and Applications. Academic press, 2003.  |                       |   |                       |
| <b>Number of active teaching hours</b>   |                       |   | <b>Other classes</b>  |
| Lectures:  | Practice:             | Other forms of classes:<br>Mentoring<br>(consultative) system | Independent work:     |
|  |                       |   |                       |
| <b>Teaching methods</b>  |                       |   |                       |
| Power point presentations, seminars, consultations, laboratory work.   |                       |   |                       |
| <b>Examination methods (maximum 100 points)</b>  |                       |   |                       |
| <b>Exam prerequisites</b>  | <b>No. of points:</b> | <b>Final exam</b>   | <b>No. of points:</b> |
| Student's activity during lectures   |                       | oral examination  | 30                    |
| practical classes/tests  |                       | written examination   | 30                    |
| Seminars/homework  | 40                    | .....   |                       |
| Project  |                       |   |                       |
| Other  |                       |   |                       |