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| <b>Subject name</b>                      | <b>Molecular Biology</b>   |   |
| <b>Subject code</b>                      | <b>E.1.MBMB.SC.ECTIE.O</b>   |   |
| <b>Department</b>                        | <b>Department of Genetics, Plant Breeding and Seed Science</b>   |   |
| <b>Faculty</b>                           | <b>Faculty of Biotechnology and Horticulture</b>   |   |
| <b>Subject supervisor/Lecturer</b>       | <b>Dr. Marek Szklarczyk</b>  |   |
| <b>General information</b>               | <b>Teaching period</b>   | <b>1 semester / winter or summer semester</b> |
|  | <b>ECTS credit</b>   | <b>10</b>                                     |
|  | <b>Lectures total</b>  | <b>30 h</b>                                   |
|  | <b>Lab classes</b>   | <b>30 h</b>                                   |
| <b>Objective and general description</b> | The main goal of the course is to acknowledge students with molecular bases of biological processes with special focus on genetic phenomena.   |   |
| <b>Lectures<br/>15 x 2 hours</b>         | <ol style="list-style-type: none"> <li>1. Structure and properties of biological macromolecules.</li> <li>2. Genome organization.</li> <li>3. DNA replication.</li> <li>4. Transcription in Prokaryotes.</li> <li>5. Transcription in Eukaryotes.</li> <li>6. Translation.</li> <li>7. Posttranslational protein modifications and import.</li> <li>8. Mutagenesis and DNA repair.</li> <li>9. Recombination and mobile genetic elements.</li> <li>10. Organelle inheritance.</li> <li>11. Epigenetic phenomena.</li> <li>12. Genetic bases of selected developmental processes.</li> <li>13. Origin of life and molecular evolution.</li> <li>14. Practical use of molecular biology achievements.</li> <li>15. Selected methods of molecular biology.</li> </ol> |   |
| <b>Lab practicals<br/>6 x 5 hours</b>    | <ol style="list-style-type: none"> <li>1. <i>Escherichia coli</i> infection with the M13 phage.</li> <li>2. Isolation of single-stranded DNA from the M13 phage particles.</li> <li>3. DNA electrophoresis in agarose and polyacrylamide.</li> <li>4. Computer analysis of nucleotide sequence data.</li> <li>5. Isolation of total genomic DNA from plants and PCR amplification of microsatellite sequences.</li> <li>6. Southern hybridization with the use of mitochondrial gene probes.</li> </ol>  |   |
| <b>Literature</b>                        | <p>Alberts B, Johnson A, Lewis J, Raff M, Roberts K, Walter P (2007) <i>Molecular Biology of the Cell</i>. 5th Ed. Garland Science</p> <p>Krebs JE, Goldstein ES, Kilpatrick ST (2011) <i>Lewin's Genes X</i>. 10th Ed. Jones and Bartlett Publishers</p> <p>Primrose SB, Twyman RM (2003) <i>Principles of Genome Analysis and Genomics</i>. 3rd Ed. Blackwell Publishing</p> <p>Trends in Genetics – Elsevier</p> <p>Current Opinion in Genetics and Development – Elsevier</p>  |   |