**Subject Area:** Advanced Methods in Biotechnology and Biodiversity  
**Subject:** Advanced Molecular Cytogenetics  
**Level:** III-PhD  
**Year:** I-IV  
**Semester:** 1-2  
**Speciality:** N/A  
**Status:** Facultative  
**ECTS:** 3  
**Department:** Plant Anatomy and Cytology  
**Cooperating Department:** N/A

**Form of teaching (Number of hours; Form of assessment: Exam or Credit)**

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Seminars/Conversatoria</th>
<th>Practicals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>26</td>
<td>3</td>
<td>30</td>
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**Staff:**

**SUBJECT COORDINATOR:** Prof. Robert Hasterok Ph.D.  
**LECTURE/CONVERSATORIA:** Prof. Robert Hasterok Ph.D.

**Contents:**

**LECTURES:**
Application of various molecular cytogenetic methods (FISH, GFP, CGH) in plant breeding and medicine.

**PRACTICALS:**
During the practicals the following molecular cytogenetics techniques will be introduced to the students:

- fluorescence *in situ* hybridisation (FISH) with various repetitive DNA (rDNA, centromeric, telomeric, retrotransposon etc.) sequences as a tool to study plant nuclear genome structure.
- genomic *in situ* hybridisation (GISH) as a tool to study phylogeny of natural and resynthesized allopolyploids.
- FISH with BAC clones as a tool to obtain chromosome-specific markers and study fine scale evolution of nuclear genomes.
- flow and imaging cytometry.
- digital image acquisition and analysis, interpretation of results and their preparation for publication in research paper.

**Methods and forms of teaching:**
Lectures illustrated by computer presentations and video projector.

**Requirements:** Knowledge of cytogenetics and molecular biology at the basic level.

**Literature (maximum 5 sources, all in English):**


**Remarks (if necessary):** the practicals will require one week. The maximal number of students in the practical group is six.