



| General information                                     |   |
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| Academic subject  | <b>Plant breeding</b>   |
| Degree course   | <i>Master degree in Plant Medicine (LM69)</i>   |
| Academic Year   | 2022-2023   |
| European Credit Transfer and Accumulation System (ECTS) | 6   |
| Language  | <i>Italian (English will be used when required for foreign students into didactic material)</i> |
| Academic calendar (starting and ending date)            | <i>February 27-June 16 break from April 26 until 12 of May</i>                                  |
| Attendance  | <i>Not mandatory</i>  |

| Professor/ Lecturer     |  |
|-------------------------|--|
| Name and Surname        | Cinzia Montemurro  |
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| Telephone               | 3477220867   |
| Department and address  | DiSSPA   |
| Virtual headquarters    | <i>Teams platform and email</i>  |
| Tutoring (time and day) | Tuesday, Wednesday and Thursday from 11.30 to 13.30 It is preferable to arrange an appointment also via email. The reception can take place in the studio, on teams and on request on another platform |

| Syllabus               |  |
|------------------------|--|
| Learning Objectives    | <i>The teaching contents concern the study of methods of plant breeding with particular reference to the strategies applied to resistance to biotic and abiotic stresses. During the course you will participate in a path that starts from the origin of the cultivated species and ends with the new genetic breeding technologies such as genome editing and assisted evolution techniques.</i>   |
| Course prerequisites   | <i>Knowledge of general, inorganic and organic chemistry, plant biology and agricultural genetics</i>  |
| Contents               | <i>The course intends to provide adequate knowledge about:<br/>Genetic resources and origin of cultivated plants;<br/>Case studies and strategies for the use of genetic resources for the identification of resistance traits to biotic and abiotic stresses to be transferred to cultivated plants;<br/>Genetic structure of cultivated species and principles of selection for characters with simple and polygenic inheritance;<br/>Typology and application of molecular markers in plant breeding<br/>Chemical and physical mutagenesis, selection of mutagenized plants and their use in breeding programs;<br/>Classical and advanced plant breeding based on New breeding techniques (NBT) aimed at obtaining the main varietal constitutions;<br/>Case studies of plant breeding methods for productivity, quality and tolerance to biotic and abiotic stresses with particular reference to the transfer and management of resistances.</i> |
| Books and bibliography | ● <i>BIOTECNOLOGIE E GENOMICA DELLE PIANTE a cura di R. Rao e A. Leone 2014 Idelson-Gnocchi</i>  |



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|                             | <ul style="list-style-type: none"> <li>• <i>GENETICA E GENOMICA. G. Barcaccia, M. Falcinelli 2005 Liguori Ed. Scientific articles and reviews from sector literature</i></li> </ul> |
| <b>Additional materials</b> |   |

| <b>Work schedule</b>                            |   |                                    |   |
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| Total   | Lectures  | Hands on (Laboratory, field trips) | Out-of-class study hours/<br>Self-study hours |
| <b>Hours</b>                                    |   |                                    |   |
| 150   | 32  | 28                                 | 90  |
| <b>ECTS</b>                                     |   |                                    |   |
| 6   | 4   | 2                                  |   |
| <b>Teaching strategy</b>                        | <p><i>The topics of the course will be covered with the help of Power Point presentations, web searches, videos and shared readings of scientific and popular articles. The exercises will consist of practical laboratory activities and study visits.</i></p> <p><i>All the material used for the lessons will be made available to students on a specific Teams platform.</i></p>  |                                    |   |
| <b>Expected learning outcomes</b>               | .   |                                    |   |
| <b>Knowledge and understanding on:</b>          | <i>Know and understand the methodologies and techniques of plant breeding</i>   |                                    |   |
| <b>Applying knowledge and understanding on:</b> | <ul style="list-style-type: none"> <li>○ Know the origin and evolution of the main cultivated species.</li> <li>○ Possess an adequate technical-scientific language</li> <li>○ Develop a critical point of view on the use of NBT "new breeding techniques" in agriculture</li> <li>○ Know and appropriately choose the best plant breeding strategy</li> <li>○ Setting up a PCR reaction</li> </ul>  |                                    |   |
| <b>Soft skills</b>                              | <ul style="list-style-type: none"> <li>• <i>Making informed judgments and choices</i> <ul style="list-style-type: none"> <li>○ ability to express a critical thought on the use of plant breeding in agriculture</li> </ul> </li> <li>• <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> <li>○ Develop a critical awareness and independence of thought;</li> <li>○ Knowing how to interact with other students and argue one's thoughts;</li> <li>○ Express yourself with an appropriate scientific technical language</li> <li>○ Be able to communicate orally and in writing with specific reference to disciplinary vocabulary in Italian and English,</li> <li>○ Be able to communicate one's thoughts in multidisciplinary group activities</li> <li>○ Being able to communicate on a technical and economic level and on a human and ethical level</li> </ul> </li> <li>• <i>Capacities to continue learning</i> <ul style="list-style-type: none"> <li>○ Develop scientific curiosity, read up on scientific but also popular journals;</li> <li>○ Knowing how to recognize fake news in the genetic field</li> <li>○ Knowing how to reprocess the information learned during the course in a personal way.</li> </ul> </li> </ul> |                                    |   |

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| <b>Assessment and feedback</b>                            | The expected learning outcomes, in terms of knowledge and skills, are shown in Annex A of the Degree Course Academic Regulations (expressed using the European Degree Descriptors).  |
| Methods of assessment                                     | <i>For students enrolled in the year of the course in which the teaching is carried out, an intermediate assessment test (called exemption) is foreseen. The outcome of this test contributes to the assessment of the profit exam and is valid for one academic year. The exam consists of an oral test, on the topics developed during the hours of theoretical lessons in the classroom, in the field and in the laboratory. For foreign students, the mid-term evaluation and exams can be held in English.</i>  |
| Evaluation criteria                                       | <ul style="list-style-type: none"> <li>• <b>Knowledge and understanding</b> <ul style="list-style-type: none"> <li>○ Critically describe the main methods of plant breeding applied to agricultural plants.</li> </ul> </li> <li>• <b>Applying knowledge and understanding</b> <ul style="list-style-type: none"> <li>○ Describe both theoretical and laboratory techniques applied to plant breeding</li> </ul> </li> <li>• <b>Autonomy of judgment</b> <ul style="list-style-type: none"> <li>○ The ability to critically expose the topics covered during the course will be evaluated.</li> </ul> </li> <li>• <b>Communicating knowledge and understanding</b> <ul style="list-style-type: none"> <li>○ The ability to present the topics covered during the course orally and with appropriate language will be assessed.</li> </ul> </li> <li>• <b>Communication skills</b> <ul style="list-style-type: none"> <li>○ The ability to revise the concepts acquired and to make connections between different topics will be evaluated</li> </ul> </li> </ul> |
| Criteria for assessment and attribution of the final mark | <p><i>The evaluation of the student's preparation takes place on the basis of pre-established criteria, as detailed in Annex A of the Teaching Regulations of the Master's Degree Course.</i></p> <p><i>For students who have taken the so-called exemption test, the assessment of the profit exam is expressed taking into account the grade acquired with the exemption test, not as an arithmetic mean but as a weighted weight with respect to the program covered by the exemption test. The attribution of the final grade will take into account the theoretical and practical knowledge acquired, the ability to apply the aforementioned knowledge, independent judgment and communication skills.</i></p>   |
| <b>Additional information</b>                             |  |
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