

| General information | |
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| Academic subject | Plant Genetics |
| Degree course | Degree course Environmental and forest Sciences |
| Academic Year | 2021/2022 |
| European Credit Transfer and Accumulation System (ECTS) | 6 |
| Language | Italian |
| Academic calendar (starting and ending date) | II semester |
| Attendance | No |

| Professor/ Lecturer | |
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| Name and Surname | Ilaria Marcotuli |
| E-mail | Ilaria.marcotuli@uniba.it |
| Telephone | 080/5442996 |
| Department and address | Disaat |
| Virtual headquarters | Teams |
| Tutoring (time and day) | From Monday to Thursday from 12:00 (Define the appointment by e-mail) |

| Syllabus | |
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| Learning Objectives | |
| Course prerequisites | Knowledge of inorganic and organic chemistry and biology |
| Contents | <p><i>Genetics and the organism. Chromosomes in prokaryotes and in eukaryotes. Mitosis. Meiosis. Life cycles in organisms of interest for genetic studies.</i></p> <p><i>Mendelian analysis. Mendel's experiments. Genotype and phenotype. The chromosome theory of heredity. Multiple alleles. Epistatic genes. Statistical analyses.</i></p> <p><i>Linkage and eukaryotic chromosome mapping. Crossingover and recombination. Linkage maps. Two point test-crosses.</i></p> <p><i>The genetic material. The structure of DNA and RNA. Replication of DNA. The chromosome structure. Gene-protein relationships. Gene function.</i></p> <p><i>Transcription and translation. Transcription. Eukaryotic RNA. Mechanism of gene splicing. The genetic code.</i></p> <p><i>Translation.</i></p> <p><i>Mutations. Origin of mutations. Gene mutations. Changes in chromosome structure. Aneuploidy. Auto- and allo-polyploidy. Interspecific hybridization in forest trees.</i></p> <p><i>Quantitative genetics and Population genetics. Qualitative and quantitative characters; Hardy-Weinberg equilibrium. Introduction to plant breeding. Racial selection. Selection of plus trees. Half-sib and full-sib selection. Clonal selection. Phenotypic selection. Seed orchard. Seedling seed orchard.</i></p> |
| Books and bibliography | <p>Russel P.J., Wolfe S.L., Hertz P.E., Starr C., McMillan B. 2016. <i>Genetica Agraria</i>. EdISES S.r.l. Ed.</p> <ul style="list-style-type: none"> • Lorenzetti F., Ceccarelli S., Rosellini D., Veronesi F. 2011. <i>Genetica agraria</i>. Patron Ed. • Barcaccia G., Falcinelli M. 2005. <i>Genetica e Genomica</i>. Liguori Ed. |

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| | <ul style="list-style-type: none"> • <i>Figliuolo G. 2012. Genetica vegetale. Favia Ed.</i> <i>Further readings:</i> • <i>Griffiths A.J. F., Gelbart W. M., Miller J. H., Lewontin R. C. 2004. Genetica moderna. Zanichelli, Vol. I-II.</i> • <i>Chrispeels M. J., Sadava D. E. 2005. Genetica, Biotecnologie e agricoltura sostenibile. Idelson-Gnocchi</i> • <i>Notes from classes</i> |
| Additional materials | |

| Work schedule | | | |
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| Total | Lectures | Hands on (Laboratory, working groups, seminars, field trips) | Out-of-class study hours/ Self-study hours |
| Hours | | | |
| <i>150</i> | <i>32</i> | <i>28</i> | <i>90</i> |
| ECTS | | | |
| <i>6</i> | <i>4</i> | <i>2</i> | |
| Teaching strategy | | | |
| | | <i>Lectures will be presented through PowerPoint and overhead</i> | |
| Expected learning outcomes | | | |
| Knowledge and understanding on: | | <ul style="list-style-type: none"> ○ Knowledge on the principal genetic methodologies | |
| Applying knowledge and understanding on: | | <ul style="list-style-type: none"> ○ Applying and understanding the principal genetic methodologies for agro-forestry species. | |
| Soft skills | | <ul style="list-style-type: none"> • <i>Making informed judgments and choices</i> <ul style="list-style-type: none"> ○ Capacity of applying the principal genetic methodologies for agro-forestry species. • <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> ○ Capacity of identifying the principal genetic methodologies for agro-forestry species. • <i>Capacities to continue learning</i> <ul style="list-style-type: none"> ○ Capacity of communicate and continue learning the principal genetic methodologies for agro-forestry species. | |

| Assessment and feedback | |
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| Methods of assessment | <i>At the end of the course, the students will have acquired the basis of Mendelian genetics, of quantitative and population genetics, and the main principles of biotechnological applications to plant breeding. Students will also learn the most important methods for qualitative and quantitative (ie. productivity) improvement of crop varieties and will be able to appreciate the economical and social importance and potential of plant breeding, in a perspective of sustainable agricultural systems.</i> |
| Evaluation criteria | <ul style="list-style-type: none"> • <i>Knowledge and understanding</i> <ul style="list-style-type: none"> ○ Knowledge on the principal genetic methodologies • <i>Applying knowledge and understanding</i> <ul style="list-style-type: none"> ○ Applying and understanding the principal genetic methodologies for agro-forestry production • <i>Autonomy of judgment</i> <ul style="list-style-type: none"> ○ Capacity of apply the principal genetic methodologies for agroforestry production • <i>Communicating knowledge and understanding</i> |

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| | <ul style="list-style-type: none"> ○ Capacity of identify the principal genetic methodologies for agro-forestry production ● <i>Capacities to continue learning</i> <ul style="list-style-type: none"> ○ Capacity of communicate and continue learning the ○ principal genetic methodologies for agro-forestry production |
| Criteria for assessment and attribution of the final mark | <p><i>A midterm write exam is scheduled for students enrolled to the Course. This exam will test the first half of the course's information in the middle of the semester and the rest of the course's information at the final exam.</i></p> <p><i>The final exam will consist on an oral test, as reported in the Guidelines of the Degree of Environmental and Forest Sciences. (art.10) and in the Annex A.</i></p> <p><i>The evaluation of the student will be based on established criteria, as explained in the Annex A of the Degree of Environmental and Forest Sciences. The final grade will be an average of both the midterm and final exam</i></p> |
| Additional information | |