

## Syllabus

### Beschreibung der Lehrveranstaltung

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| <b>Titel der Lehrveranstaltung</b>                                  | Analytische Chemie                                   |
| <b>Code der Lehrveranstaltung</b>                                   | 41051                                                |
| <b>Wissenschaftlich-disziplinärer Bereich der Lehrveranstaltung</b> | AGR/13                                               |
| <b>Studiengang</b>                                                  | Bachelor in Agrarwissenschaften und Umweltmanagement |
| <b>Semester</b>                                                     | II                                                   |
| <b>Studienjahr</b>                                                  | II                                                   |
| <b>Jahr</b>                                                         | 2017/2018                                            |
| <b>Kreditpunkte</b>                                                 | 6                                                    |
| <b>Modular</b>                                                      | nein                                                 |

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| <b>Gesamtanzahl der Vorlesungsstunden</b>  | 40                                                                                                    |
| <b>Gesamtzahl der Laboratoriumsstunden</b> | 20                                                                                                    |
| <b>Gesamtzahl der Übungsstunden</b>        |                                                                                                       |
| <b>Anwesenheit</b>                         |                                                                                                       |
| <b>Voraussetzungen</b>                     | Die Studierenden sollten die allgemeine anorganische Chemie, sowie organische Chemie bestanden haben. |
| <b>Link zur Lehrveranstaltung</b>          |                                                                                                       |

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| <b>Spezifische Bildungsziele</b> | Der Kurs ist ein Wahlfach des Bachelorstudienganges Agrarwissenschaften und Umweltmanagement. Ziel des Kurses ist es, den Studierenden ein angemessenes Wissen über allgemeine wissenschaftliche Grundlagen und Methoden sowie spezifische Fachkenntnisse zu vermitteln. Die Lehrveranstaltung vermittelt die Grundlagen der qualitativen analytischen und instrumentellen Chemie. Der Studierende sollte dementsprechend in der Lage sein, je nach Problemstellung, die korrekte und passende Methode zu wählen. Der Studierende sollte außerdem in der Lage sein – dank der Kenntnisse der analytischen Prozesse, der Probenvorbereitung und der wesentlichsten Analysemethoden, das Anwendungspotential moderner analytischer Verfahren beurteilen zu können. |
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| <b>Dozent</b>                                              | Prof. Tanja Mimmo, K. Gebäude, Raum 1.03, e-mail: <a href="mailto:tanja.mimmo@unibz.it">tanja.mimmo@unibz.it</a> , tel 0471 017161 |
| <b>Wissenschaftlich-disziplinärer Bereich des Dozenten</b> | AGR/13                                                                                                                             |
| <b>Unterrichtssprache</b>                                  | Deutsch                                                                                                                            |

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| <b>Sprechzeiten</b>                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Wissenschaftlicher Mitarbeiter (wenn vorgesehen)</b> | Plasinger Bruno, bruno.plasinger@unibz.it                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Sprechzeiten</b>                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Auflistung der behandelten Themen</b>                | <p>Die Lehrveranstaltung behandelt folgende Themen:</p> <ul style="list-style-type: none"> <li>• Einleitung in die analytische Chemie: analytische Chemie und der analytische Prozess</li> <li>• Statistik und Wahrscheinlichkeiten, Vorhergehensweisen in der analytischen Chemie</li> <li>• Probenvorbereitung</li> <li>• Grundlagen der Chromatographie</li> <li>• Flüssigchromatographie (LC)</li> <li>• Gaschromatographie (GC)</li> <li>• Massenspektrometrie (MS)</li> <li>• Infrarotspektroskopie (IR)</li> <li>• Elektronen UV/VIS Spektroskopie</li> <li>• Kopplungstechniken (LC/MS, GC/MS)</li> </ul> |
| <b>Unterrichtsform</b>                                  | <p>Die Lehrveranstaltung kombiniert Vorlesungsstunden und Übungen. Der praktische Teil bzw die Laboraktivitäten werden von den Dozenten und/oder Teaching Assistants erklärt. PowerPoint-Präsentationen werden in der „Reserve-Collection“ Datenbank zur Verfügung gestellt. Zusätzliches Material wird vom Dozenten zur Verfügung gestellt.</p>                                                                                                                                                                                                                                                                  |

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| <b>Erwartete Lernergebnisse</b> | <p><b>Wissen und Verstehen</b> eines analytischen Prozesses, der Probenvorbereitung und der wesentlichsten Analysemethoden.</p> <p><b>Anwenden von Wissen und Verstehen</b> durch erworbene Erfahrungen während der Laborübungen und die Fähigkeit, Informationen aus der Praxis (Laborübungen) mit den theoretischen Kenntnissen zu verknüpfen.</p> <p><b>Urteilen</b> durch analytische Protokolle, Laborreports.</p> <p><b>Kommunikation</b> durch entsprechender Fachsprache und Gebrauch spezifischer technischer Fachausdrücke.</p> <p><b>Lernstrategien</b> durch technischen Informationen, Knowledge update, Auswahl wissenschaftlicher Literatur.</p> |
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| <b>Art der Prüfung</b>                                           | Mündliche Prüfung: a) Prüfungsfragen über die in der Lehrveranstaltung behandelten Themen, b) "Transfer-Fragen" in spezifischen Fallstudien c) Fragen mit Aufarbeitung der Erfahrungen aus dem Laboratorium.                                             |
| <b>Prüfungssprache</b>                                           | Deutsch                                                                                                                                                                                                                                                  |
| <b>Bewertungskriterien und Kriterien für die Notenermittlung</b> | Bei Prüfung werden die Klarheit der Antworten, die Beherrschung der fachspezifischen Sprache, Synthesefähigkeit, das Urteilsvermögen und die Fähigkeit, Bezüge zu den behandelten Themen herzustellen und selbständig Themen zusammenzufassen, bewertet. |

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| <b>Pflichtliteratur</b>         | •                                                                                                                                                                                                              |  |
| <b>Weiterführende Literatur</b> | <ul style="list-style-type: none"> <li>• Daniel C. Harris, CHIMICA ANALITICA QUANTITATIVA, Zanichelli, Bologna, 2005</li> <li>• Douglas A. Skoog, Fundamentals of Analytical Chemistry, 7th Edition</li> </ul> |  |

## Syllabus

### Course description

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| <b>Course title</b>      | Analytical Chemistry                         |
| <b>Course code</b>       | 43043                                        |
| <b>Scientific sector</b> | AGR/13                                       |
| <b>Degree</b>            | Agricultural and Agro-Environmental Sciences |
| <b>Semester</b>          | II                                           |
| <b>Year</b>              | II                                           |
| <b>Academic year</b>     | 2017-2018                                    |
| <b>Credits</b>           | 6                                            |
| <b>Modular</b>           | no                                           |

|                              |                                                                                                                |
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| <b>Total lecturing hours</b> | 40                                                                                                             |
| <b>Total lab hours</b>       |                                                                                                                |
| <b>Total exercise hours</b>  | 20                                                                                                             |
| <b>Attendance</b>            |                                                                                                                |
| <b>Prerequisites</b>         | To have attended the lectures and exercises of the course of General Inorganic Chemistry and Organic Chemistry |
| <b>Course page</b>           |                                                                                                                |

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| <b>Specific educational objectives</b> | <p>The course is part of the courses in the area of learning that characterize the Study Course (corsi caratterizzanti) and specifically in the context of the disciplines of Plant Production. The aim of the course is to provide students with an adequate mastership of general scientific principles and methods as well as the acquisition of some specific professional knowledge.</p> <p>The aim of the course is to acquire knowledge on the chemical, physical and biochemical processes functioning within soil systems particularly focusing on the chemical composition and fertility of soil materials. The student is thus expected to be able to define the chemical factors influencing the fate of elements (contaminant and nutrient) within soils and the soil-plant-system. In particular, based on chemical and physical characteristics of soils, the student is expected to evaluate its fertility and interpret the data.</p> |
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| <b>Lecturer</b>                          | Dr. Tanja Mimmo, Palazzo K, Stanza 1.03, e-mail: <a href="mailto:tanja.mimmo@unibz.it">tanja.mimmo@unibz.it</a> , tel 0471 017161 |
| <b>Scientific sector of the lecturer</b> | AGR/13                                                                                                                            |
| <b>Teaching language</b>                 | German                                                                                                                            |
| <b>Office hours</b>                      |                                                                                                                                   |
| <b>Teaching assistant (if any )</b>      | Plasinger Bruno, <a href="mailto:bruno.plasinger@unibz.it">bruno.plasinger@unibz.it</a>                                           |
| <b>Office hours</b>                      |                                                                                                                                   |

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| <b>List of topics covered</b> | <ul style="list-style-type: none"> <li>• Introduction to the soil environment including soil formation processes</li> <li>• Soil minerals and rocks</li> <li>• Weathering processes in soil (chemical, physical and biological weathering)</li> <li>• Soil air and water</li> <li>• Soil organic matter</li> <li>• Soil solution – chemical properties and processes within soils: Sorption, Ion exchange, cation exchange capacity, anion exchange capacity; soil pH, redox – potential.</li> <li>• Soil fertility – the soil as a plant nutrient medium</li> <li>• Fertilizers and soil amendments</li> <li>• Macronutrients</li> <li>• Micronutrients</li> <li>• Soil sampling and interpretation of soil tests</li> <li>• The Rhizosphere – properties and methods applied in rhizosphere research</li> </ul> |
| <b>Teaching format</b>        | <p>The course consists of lectures during which the Professor presents the different topics. Practical lessons and laboratory activities conducted by the Professor and the Teaching Assistants are also foreseen. Course topics will be presented using Power Point presentations; the presentations will be available in the reserve collection. If necessary, additional material will be handed out during the lectures.</p>                                                                                                                                                                                                                                                                                                                                                                                  |

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| <b>Learning outcomes</b> | <p><b>Knowledge and understanding</b> of chemical, physical and biochemical processes within the soil-plant system related to the development and maintenance of soil fertility.</p> <p><b>Capability in applying knowledge</b> by developing practical laboratory skills and the ability to draw information out of practical laboratory activities in support/integration to the theoretical lessons</p> <p><b>Making judgments</b> based on the choice of analytical protocols, writing a report</p> <p><b>Capability in presentation of the skills acquired</b> with an appropriate language and use of technical and specific terms by preparing a short seminar on a selected topic</p> <p><b>Acquisition of learning strategies</b> based on the use of technical information, knowledge updating and selection of scientific literature.</p> |
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| <b>Assessment</b> | <p>Assessment is conducted via oral examination with review questions a) to assess the knowledge and understanding of the course topics, b) to assess the ability to transfer these skills to case studies of plant production and c) to</p> |
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|                                                            | <p>assess the ability to interpret and evaluate results obtained during the laboratory exercises.</p>                                                                                                                                                                                                                                                                                                           |
| <b>Assessment language</b>                                 | <p>German Attribution of a single final mark.</p>                                                                                                                                                                                                                                                                                                                                                               |
| <b>Evaluation criteria and criteria for awarding marks</b> | <p>Criteria for awarding the mark: the clarity of the response, mastery of technical language, the ability to summarize, evaluate, and establish relationships between topics, the independence of judgment, skills in critical thinking, ability to summarize in own words.</p>                                                                                                                                |
| <b>Required readings</b>                                   | <ul style="list-style-type: none"> <li>• "Lehrbuch der Bodenkunde"-Scheffer/Schachtschabel – <a href="http://www.springerlink.com/content/978-3-8274-1444-1/#section=643722&amp;page=1&amp;locus=0">http://www.springerlink.com/content/978-3-8274-1444-1/#section=643722&amp;page=1&amp;locus=0</a></li> </ul>                                                                                                 |
| <b>Supplementary readings</b>                              | <ul style="list-style-type: none"> <li>• "Fondamenti di Chimica del Suolo" – Paolo Sequi, ed Patron, 2005</li> <li>• "Bodenkunde in Stichwörtern" – Winfried E. H. Blum, 6. Auflage, Gebr. Borntraeger Verlagsbuchhandlung, Berlin, Stuttgart 2007</li> <li>• "Pflanzenernährung und Düngung in Stichworten" - Arnold Fink, 6. Auflage Gebr. Borntraeger Verlagsbuchhandlung, Berlin, Stuttgart 2007</li> </ul> |