

Basic Course 2 - Experimental Methods

About the course

subject	Den internationale naturvidenskabelige bacheloruddannelse
Activity type	Basic course
Teaching language	English
Registration	Students will be signed up for this course by the study administration. If you have taken the course before and need to be signed up again please contact inm-exams@ruc.dk
Detailed description of content	<p>Course runs in the first weeks of the semester To follow this course you must have completed the Lab Safety Course. If you have not completed that please let the studieadministration know.</p> <p>Experiments are a cornerstone of natural scientific investigations of nature.</p> <p>Basic course 2 presents several central experimental methods, and you learn to obtain, analyze and interpret empirical data using quantitative and qualitative methods, so that you can compare experimental and theoretical results. Furthermore, you learn to handle common and safety-related procedures in the laboratory, including chemical and gene technology-classified laboratories.</p> <p>Basic course 2 supports Basic Project 2, where the students explore the interplay between theory, model, experiment, and simulation in natural science and often do experimental work in their BP2.</p>
Expected work effort (ECTS-declaration)	<p>About 15 hours of laboratory work in both Biology, Physics and Chemistry. In addition 8 hours of remote sensing Geography activities. Reports are handed in by teams after the laboratory sessions.</p> <p>Work load:</p> <ul style="list-style-type: none">• 54 hrs of laboratory time• 28 hrs of laboratory preparation• 53 hrs of report work <p>Total 135 hr</p>
Course material and Reading list	Notes and guidelines for the laboratory work provide at the course.
Evaluation- and feedback forms	<p>Feedback is given during the laboratory work and on the reports, which need to be approved.</p> <p>The course includes formative evaluation based on dialogue between the students and the teacher(s) (as well as written feedback on the reports).</p> <p>At the end, the course is evaluated through a questionnaire in SurveyXact. The Study Board will handle all evaluations along with any comments from the course responsible teacher.</p>
Administration of exams	INM Registration & Exams (inm-exams@ruc.dk)
Responsible for the activity	Martin Niss (maniss@ruc.dk) Rie Jønsson (riej@ruc.dk)
ECTS	5
Learning outcomes and assessment criteria	<ul style="list-style-type: none">• Knowledge of simple sodium salts and other common laboratory chemicals' qualitative and quantitative properties such as solubility, acid-base ratio and redox potential• Knowledge of simple - including photospectroscopic - methods for quantification of biological processes• Knowledge of basic relationships in physics in terms of the concepts of current and voltage as well as the harmonic oscillator• Knowledge of how to obtain and use remote sensing data• Skills to be able to obtain, analyze and interpret empirical data using quantitative and qualitative methods• Skills to be able to follow and assess experimental procedures• Skills to be able to handle common and safety-related procedures in chemical and gene technology-classified laboratories• Skills to be able to produce and use a standard curve, Lambert-Beers' law for determining biomass of microorganisms and determining concentration

	<ul style="list-style-type: none"> • Skills to be able to use a multimeter and interpret the results in terms of currents and voltages • Skills to be able to use multi-spectral data to characterise and map biophysical characteristics of soil, vegetation and water • Skills to be able to read and use specialist symbolic language and other formal representation • Skills to be able to use relevant IT tools in connection with empirical work • The competence to be able to compare experimental, numeric and analytical results • The competence to be able to process and interpret data for a simple development of a measured concentration into a rate equation and determining a rate constant • The competence to be able to design, implement and interpret the results of a simple experiment to test antimicrobial drugs • The competence to be able to describe and understand transport phenomena in terms of current and voltage as well as to be able to interpret swinging and resonance phenomena in the harmonic oscillator • The competence to be able to process, use, interpret and assess remote sensing data
Overall content	<p>The course includes exemplary lab exercises in the fields of biology, geography, physics and chemistry.</p> <p>In the biology component, students work with bacterial growth and DNA analysis. In the geography component, students work with remote sensing data. In the physics component, students work with electric circuits and harmonic oscillators. In the chemistry component, students work with analysis of a sodium salt and the use of buffer solutions.</p>
Teaching and working methods	Laboratory exercises.
Type of activity	Mandatory course
Form of examination (p1)	<p>The course is passed through regular, active and satisfactory participation.</p> <p>Regular participation is defined as: The student must be present for a minimum of 75 per cent of the experimental/practical parts of the course including the elaboration of analyses and interpretation of data in reports.</p> <p>Active and satisfactory participation is defined as: The student must participate in course-related activities (e.g. workshops, seminars, field excursions, process study groups, working conferences, supervision groups, feedback sessions). The student must demonstrate acquiring skills mentioned in the learning outcomes and assessment criteria. The student must submit a number of group laboratory experiment reports.</p> <p>Assessment: pass/Fail.</p> <p>Reexam: Students that have been present for a minimum of 75 per cent of the experimental/practical parts of the course but not have had all the experiment reports approved must re-submit the reports. The reports must be approved by the teacher.</p>
Form of Re-examination (p1)	Samme som ordinær eksamen
Exam code(s)	Exam code(s) : U26531