

Research Methodology and Project (0000154)

Due to Covid 19, the education and evaluation methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

Course size *(nominal values; actual values may depend on programme)*
Credits 20.0 **Study time** 500 h **Contact hrs** 150.0 h

Course offerings and teaching methods in academic year 2020-2021

A (year)	English	Incheon	lecture	30.0 h
			bachelor's dissertation	120.0 h

Lecturers in academic year 2020-2021

Dunne, Michael	KR01	lecturer-in-charge
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Offered in the following programmes in 2020-2021

	crdts	offering
Bachelor of Science in Environmental Technology	20	A
Bachelor of Science in Food Technology	20	A
Bachelor of Science in Molecular Biotechnology	20	A

Teaching languages

English

Keywords

Scientific Research, Scientific Method, Experimental Design, Data-analysis, Statistical Analysis, Synthesis, Scientific Literature; Scientific Reporting; Product Development

Position of the course

The Bachelor Project aims to ensure that the student acquires a range of competences in an integrated manner. The project consists of a case study based on literature or practice. Therefore, the student makes use of techniques for literature search and annotation and for writing a scientific publication. In this course, specific attention is given to orally presenting scientific results. Depending on the project scope students may learn, individually or in groups of up to four members. Activities that can be included as part of the project work are:

- develop a project proposal for future research: translate scientific problem statements into testable hypotheses, elaborate experimental design
- a quantitative computation
- a simulation
- a questionnaire: drawing up and practical execution of the questionnaire, processing of the results
- a case study: study of a practical application and quantitative audit
- a small lab experiment
- development of a product

The objective of the practical part of the project is to go through a certain learning process. The students have to gain insight in the organization of the execution of a project, learn how to formulate and answer a specific question and address a problem, both independently and/or as a team. They have to learn how to adapt the work flow, planning and group dynamics according to unexpected issues they may be confronted with in the process. The description of the project process can be part of the report, next to results and solutions. Both the literature review and the practical component comprise at least one third of the project. The topic can be broad, and make it possible to blend knowledge from different main subjects, or be more focused on a limited number of course units, from one or more main subjects. Where relevant, due attention is given to ethical, technical-economical, social and sustainability aspects. The results

are compiled in a short written manuscript. This report has to include a critical final consideration. The results are to be presented to a jury and a defense is given. Information about the organization and regulations of the bachelor project can be found on the Ufora coursesite.

Contents

In the theoretical part of the course, experts will present a synopsis of important aspects of the Bachelor's project and dissertation, during 4 to 5 workshops. Topics will deal with (1) Scientific Integrity and intellectual property (including ethical concerns and plagiarism), (2) Retrieving scientific literature and referring to it, (3) Scientific communication (reporting and presentation; including formatting and content aspects of the Bachelor's dissertation and the oral defense), (4) Correct statistical analysis of results (and a summary of frequently occurring problems).

Depending on the subject, the practical part may include an induction phase, a phase of data-collection, data-analysis and summarizing the project and its results in the Bachelor's dissertation. During these phases, the student will be supervised by a direct supervisor and there will be continuous communication with the promoter. The student will perform the research under supervision, in agreement with promoter and/or supervisor. The Bachelor's project needs to be written in English according to a template that will be provided via Ufora.

Initial competences

Theoretical and Practical Skills gained during the Bachelor's program. The student is only allowed to start the Bachelor's project if all courses from BA1/2/3 have been followed

Final competences

- 1 The student is fully aware of the rationale behind the scientific method and can reduce a scientific question to a limited number of experimentally testable specific research questions.
- 2 The student can autonomously gather, from different sources, relevant scientific information on a specific subject (i.e. the research subject).
- 3 The student can critically evaluate scientific literature and formulate logical conclusions for translation into working hypotheses for initiating research activities.
- 4 The student can design and perform experiments, relevant to the hypotheses that are to be tested, and to remediate where necessary.
- 5 He/she can report his/her findings logically and with clear argumentation in a brief and structured proposal.
- 6 He/She can present and discuss scientific information with colleagues in an objective and critical way.
- 7 For Food Technology majors: He/she can work in a team and plan and execute a project.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Lecture, bachelor's dissertation

Learning materials and price

For the theoretical part of the course, powerpoints will be made available through Minerva. Access to scientific literature is granted via the UGent network.

References

N/a

Course content-related study coaching

The student is under direct supervision of a supervisor (predoctoral or postdoctoral level) with the necessary experience in the research field, and the coordination of the research topic lies with the promoter.

Evaluation methods

end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period

Oral examination, participation, report

Examination methods in case of periodic evaluation during the second examination period

Oral examination, participation, report

Examination methods in case of permanent evaluation

Participation

Possibilities of retake in case of permanent evaluation

examination during the second examination period is not possible

Extra information on the examination methods

The Bachelor's project will be evaluated on three levels: evaluation of the experimental work regarding the research project, the dissertation itself and an oral presentation and defense followed by a number of questions from a jury panel.

Calculation of the examination mark

Evaluation of the experimental work (40% of final weight)

(by promotor in consultation with supervisors)

- dedication and motivation
- technical skills, planning, organization
- scientific skills (critical and creative thinking)
- communication and independence

Evaluation form and content of manuscript (40% of final weight)

(by promotor and readers)

- Scientific aspects
 - literature review
 - results
 - goal, discussion, conclusion (depth)
- form of manuscript
 - language, grammar, spelling
 - structure manuscript, coherence, logic
 - layout (figures, tables, reference lists)

Evaluation oral presentation and defense (20% of final weight)

(by promotor and readers)

- presentation (structure, relevance, graphical representation, presentation skills, etc.)
- knowledge of content, answering questions