

## Research Methodology and Project (O000154)

Course size (nominal values; actual values may depend on programme)

Credits	20.0	Study time	500 h	Contact hrs	150.0 h
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Course offerings and teaching methods in academic year 2019-2020

A (semester 2)	English	lecture	10.0 h
		bachelor's dissertation	140.0 h

Lecturers in academic year 2019-2020

Dunne, Michael	KR01	lecturer-in-charge
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Offered in the following programmes in 2019-2020

	crdts	offering
<a href="#">Bachelor of Science in Environmental Technology</a>	20	A
<a href="#">Bachelor of Science in Food Technology</a>	20	A
<a href="#">Bachelor of Science in Molecular Biotechnology</a>	20	A

Teaching languages

English

Keywords

Scientific Research, Scientific Method, Experimental Design, Data-analysis, Statistical Analysis, Synthesis, Scientific literature; Scientific reporting

Position of the course

The student is familiarized with all the crucial steps in the scientific method relevant to hypothesis testing and design of adequate experimental procedures. As a basis for writing the Bachelor's dissertation, the student will learn how to write a clear scientific report by preparing a state of the art summary of relevant scientific literature on a particular topic. In this report, a firm scientific question is recognized and formulated, and an experimental approach is designed. Next to that, the scientific outcome of the experiments needs to be summarized in a rational and systematic way, leading to clear conclusions.

The Bachelor's project implies the independent execution of a research project, under direct supervision of a promoter and (if applicable) a direct supervisor. This will rely on the theoretical and practical skills gained during the bachelor's program whereby, in an integrated manner, research will be conducted in a research center. The choice of the Bachelor's project will be already made during the second semester of the third Bachelor, via a procedure that will be communicated through Minerva.

This course is an instrumental part of the Bachelor's program that will assess the students' ability to frame, formulate and translate a scientific problem/hypothesis to experiment driven research. The ultimate result will be a Bachelor's dissertation.

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 a 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 their will be continuous communication with the promoter. The student will perform the research independently, 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 Minerva that contains the followings sections: (1) introduction (with problem statement), (2) Goals, (3) Material and Methods, (4) Results, (5) Discussion, (6) Conclusion, (7) summary, (8) references. The student should aim at getting the level, quality and depth of the Bachelor's project similar to scientific, peer-reviewed publications.

#### 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.

#### 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 promoters 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 promoters 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 promoters and readers)*

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