Course Specfications
Valid as from the academic year 2019-2020

Biochemical and Molecular Analysis  (I700163)

Course

Lecturers in academic year 2019-2020
Audenaert, Kris  LA21  lecturer-in-charge
Ameye, Maarten  LA21  co-lecturer
Briers, Yves  LA25  co-lecturer
De Groote, Philippe  LA25  co-lecturer

Teaching languages
Dutch

Keywords
Multispectral analyses, omics techniques, experimental setup, big data, flow cytometry, phylogeny, histochemistry

Position of the course
In this intensive course a wide range of techniques which are used to determine various types of macromolecules qualitatively and quantitatively, is studied. This course builds upon the knowledge achieved during the educational training of Industrial sciences: Biochemistry.

Contents

Theory:
- Introduction to experimental setup and research questions
- multispectral imaging
- characterization of organisms and genetic diversity
- metabolomics
- transcriptomics
- data analysis
- flow cytometry
- directed evolution of proteins
- seminars
- protein quality control
- high-throughput protein engineering
- study of protein-protein interactions
- biochemical and molecular analysis of bacteriophages

Practical excercises:
- Different DNA extraction methods
- Several protein extraction and -detection methods
- Genomics: PCR, sequencing, finger-printing, DGGE
- Proteomics: SDS-PAGE, blotting, immunodetection, MALDI-TOF, massaspectrometry
- Fluorescent detection methods

Initial competences

(Course size (nominal values; actual values may depend on programme)
Credits 6.0  Study time 160 h  Contact hrs 72.0 h

Course offerings and teaching methods in academic year 2019-2020
A (semester 1)  Dutch
demonstration 2.0 h
practicum 48.0 h
lecture 22.0 h

Offered in the following programmes in  2019-2020
Master of Science in Biochemical Engineering Technology 6 A
'Biochemical and Molecular analysis' relies on certain final competences of the courses 'Genetics', 'Agrobiotechnology', 'Molecular biotechnology', 'Biochemistry' and 'Supplementary biochemistry'. The final competences may also be acquired in another way.

Final competences

1. Advanced knowledge of and insight in molecular and biochemical analytical techniques, which have their application in the medical and pharmaceutical sector, and in agrobiotechnology
2. To be able to search and handle scientific publications
3. To be able to develop and implement appropriate, new research methods
4. To be able to critically assess the results obtained themselves and the results of others
5. To be able to formulate relevant decisions on an investigation
6. To be able to communicate written and orally about the experimental design and results to colleagues
7. To analyze problems and define research questions and research methodology

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

Demonstration, lecture, practicum

Learning materials and price

Syllabus with scientific articles, supplemented with slides on Minerva, slides are in English

References

Course content-related study coaching

Personal: by appointment; during practicum; before, during and after the lectures

Evaluation methods

End-of-term evaluation and continuous assessment

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

Written examination, oral examination

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

Written examination, oral examination

Examination methods in case of permanent evaluation

Oral examination, participation, report

Possibilities of retake in case of permanent evaluation

Examination during the second examination period is possible in modified form

Extra information on the examination methods

During practicals, students will be evaluated concerning their motivation, participation and the quality of the work.

During the practical courses, the student writes his/her activities in a laboratory notebook. In the continuous assessment, the oral examination comprises a discussion session with the assistants in which the student interprets the obtained results, tries to explain encountered problems and explains his/her activities.

Calculation of the examination mark

Combination of continuous assessment (40% of the final mark consisting of 10% of participation, and 30% report and presentation) and end-of-term evaluation (60% of the final mark). The participation consists of motivation (50%) and the quality of the work performance (50%)

Unjustified absence during the practicals give rise to a total score (theory + practical exercises) of maximum 9/20, irrespective of their score for the theoretical part.

Deadlines need to be respected. In case of late submission the total score (theory and practical) may be subtracted by 1.

When a student has less than 9/20 for the permanent or periodic evaluation, the student cannot pass the course. If the final score would still be a mark of 10/20 or more,
it is reduced to 9/20.