

## Quantitative Cell and Tissue Analysis (E074011)

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

**Credits 6.0**

**Study time 180 h**

**Course offerings and teaching methods in academic year 2024-2025**

A (semester 1)

English

Gent

practical  
lecture

**Lecturers in academic year 2024-2025**

Skirtach, Andre

LA25

lecturer-in-charge

Hendrix, An

GE38

co-lecturer

**Offered in the following programmes in 2024-2025**

	<b>crdts</b>	<b>offering</b>
Bachelor of Science in Engineering(main subject Biomedical Engineering)	6	A
Bridging Programme Master of Science in Bioinformatics(main subject Engineering)	6	A
Master of Science in Electrical Engineering (main subject Communication and Information Technology )	6	A
Master of Science in Electromechanical Engineering(main subject Control Engineering and Automation)	6	A
Master of Science in Electromechanical Engineering(main subject Electrical Power Engineering)	6	A
Master of Science in Electrical Engineering (main subject Electronic Circuits and Systems)	6	A
Master of Science in Bioinformatics(main subject Engineering)	6	A
Master of Science in Electromechanical Engineering(main subject Maritime Engineering)	6	A
Master of Science in Electromechanical Engineering(main subject Mechanical Construction)	6	A
Master of Science in Electromechanical Engineering(main subject Mechanical Energy Engineering)	6	A
Master of Science in Chemical Engineering	6	A
Master of Science in Chemical Engineering	6	A
Master of Science in Computer Science Engineering	6	A
Master of Science in Photonics Engineering	6	A
Preparatory Course Master of Science in Biomedical Engineering	6	A

**Teaching languages**

English

**Keywords**

Cell biology, histology, microscopy, molecular analysis

**Position of the course**

This course builds on the contents of From Genome tot Organism and focuses on the principles behind and the application of quantitative techniques for the analysis and assessment of the structure and function of cells and tissues.

**Contents**

- Cell and tissue culture techniques
- Histology and histological techniques
- Enzyme and Enzyme kinetics
- Light microscopy techniques
- Electron microscopy
- Cell biomechanics and atomic force microscopy
- Molecular spectroscopy, mass spectrometry and chromatography

- PCR (Polymerase Chain Reaction) and qPCR, electrophoresis and blotting
- Introduction into omics
- High-throughput and lab-on-chip technologies

### **Initial competences**

From Genome to Organism, Optics

### **Final competences**

- 1 Understand the working principles of techniques to culture cells and tissues
- 2 Understanding of histology and histological techniques and being able to interpret histological coupes
- 3 Understand various quantitative techniques for the quantitative analysis of cell morphology, cell properties, structure and function and be able to apply quantitative analysis
- 4 Understand the relation between cell composition and cell function as inferred from the above mentioned technique

### **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, Practical, Peer teaching

### **Extra information on the teaching methods**

- Lectures
- Complemented with selected online lectures or pre-recorded lectures with online discussion if applicable
- Practical and demonstrations: applying or demonstrating different techniques for the quantitative analysis of cells and tissues
- Microteaching: using acquired basic competences to interpret and summarize scientific results from practicals, demonstrations and literature

### **Study material**

None

### **References**

- "Molecular Cell Biology", 5th edition. Lodish, Berk, Matsudaira, Krieger, Scott, Zipursky, Darnell, Freeman NY, 2003
- "Physical biology of the cell", 2nd Edition. R. Phillips, J. Kondev, J. Theriot, H. G. Garcia. Publisher: Garland Science, 2013
- Junqueira's Basic Histology-Text and Atlas. Anthony Mescher, Mcgraw-Hill Education
- General techniques of cell culture. Harrison & Maureen A. Cambridge University Press
- PDF papers and reviews in top ranked journals: nature, science, cell etc..
- Hand-outs

### **Course content-related study coaching**

#### **Assessment moments**

end-of-term and continuous assessment

#### **Examination methods in case of periodic assessment during the first examination period**

Written assessment

#### **Examination methods in case of periodic assessment during the second examination period**

Written assessment

#### **Examination methods in case of permanent assessment**

Participation, Assignment

#### **Possibilities of retake in case of permanent assessment**

examination during the second examination period is not possible

#### **Extra information on the examination methods**

- Periodic evaluation: written closed-book exam
- Non-periodic evaluation: practicals are compulsory
- The examiner can declare a student who has withdrawn from periodic and / or non-periodic evaluations for this course as failed

**Calculation of the examination mark**

- Periodic evaluation (95 %)
- Non-periodic evaluation (5 %)
- Practicals are compulsory