Course Specifications
Valid as from the academic year 2016-2017

The Cell I (D012571)

Course offerings and teaching methods in academic year 2017-2018
A (semester 1) Dutch seminar: coached 10.0 h
                              lecture 31.25 h
guided self-study 1.25 h

Lecturers in academic year 2017-2018
Lynen, Frederic WE07 lecturer-in-charge
Bacher, Klaus GE05 co-lecturer
De Buysser, Klaartje WE06 co-lecturer

Offered in the following programmes in 2017-2018
Bachelor of Science in Medicine 6 A
Bachelor of Science in Dentistry 6 A

Teaching languages
Dutch

Keywords
Biomedical physics, general and inorganic chemistry, organic chemistry, cell biology

Position of the course
Basic principles of physics and chemistry are used to understand the molecular, cell-biology related mechanism that regulate the cell. Basic laws of physics and chemistry are highlighted to analyse cell biological processes.

Contents
- Body fluids: visco-elasticity, rheology of mucus, surface tension of lung surfactant.
- Pressure and flow in the human body; law, hemodynamics of the circulation, biophysics of lung alveoli.
- Molecular transport: diffusion, osmosis and osmotic pressure, active and passive transport via cell membranes
- Bio-electricity: model of cell membranes, model of electrical conductivity in axons, potential cycles of the heart, ECG
- Alternating current via the human body: impedance of tissue, skin model for alternating current, electrocution
- Optical fibers and endoscopy: electromagnetic waves
- Light lasers Therapy: interaction of electromagnetic waves with tissue, principles of lasers, laser assisted therapy
- Eye and visus: optical strength of a contact surface, the eye as optical instrument, vision corrections
- Sound and hearing: sound waves, acoustic impedance and sound intensity, biophysics of the ear, hearing loss
- Atoms, molecules and intermolecular forces
- Solutions; osmosis, reactions in solutions such as acid-base reactions, electrochemistry and electrophoresis
- Chemical reactions: energy balance and biochemical kinetics
- Electronic structure and bonding
- Organic compounds: nomenclature and representation

Credits 6.0 Study time 180 h Contact hrs 40.0 h

Course size (nominal values; actual values may depend on programme)
• The arrangements of atoms in space, Stereoisomerism and stereochemistry
• Organic reactivity – chemical transformations
• Nucleophilic substitution
• Elimination reactions
• Addition to the p-bonding
• Radical reactivity
• Reactivity of the carbonyl function
• The carboxylic function and derived functionalities
• Oxidation and reduction reactions
• Saccharides: structure and chemistry
• Waxes, lipids, fats and oils

Initial competences
The final terms of secondary school (scientific education) related to chemistry, physics and biology as defined in the content of the entrance examination for medical doctor.

Final competences
The final competences include the basic principles of biomedical physics, general and organic chemistry relevant for medical sciences.
Competences: 1.2; 2.1; 2.2 and 2.4

Conditions for credit contract
This course unit cannot be taken via a credit contract

Conditions for exam contract
This course unit cannot be taken via an exam contract

Teaching methods
Guided self-study, lecture, seminar: coached exercises

Learning materials and price
Course material
A-books: H. LODISH ET AL. Molecular Cell Biology
Additional documentation (illustrations, slides): available via electronic learning platform (minerva.ugent.be)

References
Course content-related study coaching
Prof. dr. J. Philippé (jan.philippe@ugent.be)

Evaluation methods
end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period
Written examination with multiple choice questions

Examination methods in case of periodic evaluation during the second examination period
Written examination with multiple choice questions

Examination methods in case of permanent evaluation

Possibilities of retake in case of permanent evaluation
not applicable

Calculation of the examination mark
The final score is a result of a mathematical sum of the different parts (organic chemistry, general chemistry and physics)