13939 – 743 (8) Special topics in biophontonics (1.5L, 1.5P)

2021

Course summary:

The content may include aspects of light-matter interaction, quantum mechanics, topic from biology, chemistry or mathematical sciences, spectroscopic techniques, imaging and microscopy. The content will be of interdisciplinary nature

Method of assessment: Flexible assessment

Language policy:

Afrikaans and English in the same class groups:
During each lecture, all information is conveyed at least in English. Summaries and/or explanation of the core concepts will also be given in Afrikaans. Questions in Afrikaans and English will, at the least be answered in the language of the question. Students will be supported in Afrikaans and English during a combination of appropriate facilitated learning opportunities.

Module relevance in programme:

The module represents, in 2021, an introduction to sift condensed matter physics and the physics of cells. The knowledge is relevant to research activities in photonics and theoretical physics.

Outcomes of course:

- Basic questions of soft condensed matter physics.
- How soft condensed matter insights play a role in biology.
- Understanding equilibrium and nonequilibrium properties of soft condensed matter and cells.
- Basic introduction to physical experiments to learn about the properties of biological systems.

Lecturers:

Prof KK Müller-Nedebock
E-mail address: kkmn@sun.ac.za
Office: Room 1009, Merensky Building (Physics building)

Dr GW Bosman
E-mail address: gwb@sun.ac.za
Office: Room 1009, Merensky Building (Physics building)

Mentor:

Honours cohort mentor.

Course content:

- Physics of filaments and polymers in equilibrium
- Physics of membranes
- Diffusion
- Hydrodynamics in cells
- Dynamics of polymers
- Swimming cells
- Biological motors and pumps

Lectures and tutorials are scheduled to be face-to-face. Please observe all protocols and rules.

Tutorials:

One afternoon per week, as applicable under Covid-19 developments.

Study material:

Lecture notes, online resources

Assessment:

Methods of Assessment
Continuous Assessment, based on

- Series of assignments (reports and working sheets).
- Final short test

Venue and time of assessment opportunities
Test date set in honours calendar. Weekly assignments.

Availability of marks:
Turnaround time is typically one week. Feedback is given in terms of written and oral commentary as soon as possible.

Mark calculated: Assignments 75% + test 25%