Name Module:	Soft and Biological Physics
Module code:	201700186
Language:	English
Module Coordinator/contact person:	B.M.Tel
Specific prerequisites:	None
Participating study:	Applied Physics
Starting block:	TN MOD09

Theme:
Soft Matter Physics contains 3 parts: Soft and Bio Materials (SBM), Colloids and Interfaces (C&I) and Soft and Biological Techniques (SBT).
SBM is a theory course that covers all aspects of physical systems that are governed by potentials close to thermal energy. Traditionally, this includes polymers, colloids, and liquid crystals. More recently, certain granular flows joined the club. Today it also includes soft and squidgy things that ooze. You will learn how bacteria swim, how to sequence DNA, and even how pinching your arm leads to a neural response ("ouch"). You will consider the manipulation of wet, ionic things (e.g., colloids, HIV in blood, molecular motors, ion channels,…) with electric fields and electrodes. Electrodes = quantum mechanics & solid state physics; fields = electrodynamics; thermal energy = statistical physics; wet = fluid dynamics. This is ultimate physics at its best. You have never sat a module like this before and you will feel incomplete without it.
The CI theory course covers a variety of chemical and physical interactions between materials, and studies their consequences for the behavior of colloidal particles (e.g. stable (dis) ordered suspension, or flocculation into aggregates) and the wetting of surfaces. Topics include Interfacial Tensions and Wetting, Van der Waals Interactions, Acid-Base Interactions, Colloidal Interactions and stability: electrostatic, DLVO, steric, polymer-induced interactions.
SBT is a practical course in which you will do experiments on topics that are treated in SBM and CI.

Leading goals:
- To be able to pick up a copy of Science or Nature and understand (= read, understand, dissect, analyse, and review) any article in the field of soft matter physics.
- To apply this to your research in Soft Matter Physics in your BSc, MSc, and PhD.

Module breakdown:
Soft and Biological Matter (SBM) – 5 EC – lecture course
Soft and Biological Techniques (SBT) – 5 EC – practicum
Colloids and Interfaces (C&I) – 5 EC – lecture course

Assessment:
SBM: Written exam + presentation of literature
SBT: Preparation + performance + written reports
C&I: Weekly Case Submissions + Written Exam