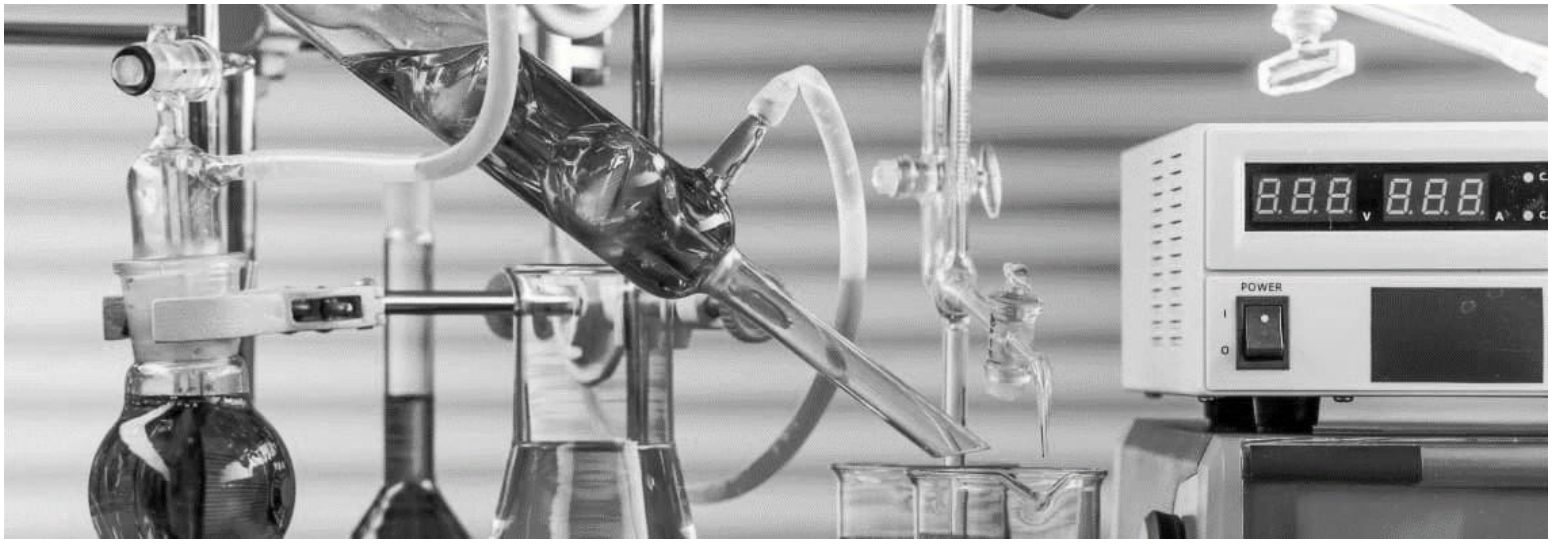
Branch:Life Sciences Engineering



Code: FRMALI
Option: From matter to life
Level: Master
Prerequisites:
Opportunities:

Description:
Explore how the interaction of the building blocks of biology can generate life and how to reproduce life-like systems. Combine new technologies by learning by doing and creatively use biological materials to gain new knowledge and invent applications in the life sciences.
What happens in this study program?
The program is part of the Max Planck Matter to Life School. This internationally oriented project comprises cooperative master's programs at three different university locations, supported by German research institutes through a network of more than 40 renowned scientists: the Max Planck School.
Matter to Life covers areas such as bio nanotechnology and synthetic biology. In bio nanotechnology, for example, synthetic Nano blocks from biomaterials are used to create molecular machines. These could one day be Nano machines capable of independent movement, catalytic activity or mechanical forces. Or imagine transport shuttles of a few nanometers that can target cancer cells in a targeted manner. Synthetic biology takes on the challenge of manipulating biological systems at the scale of cells or networks of cells in such a way that

completely new functions emerge. Bacterial strains could then execute mathematical programs, such as counting to ten. Or they might one day be able to make entirely new raw materials and medicines, or recycle waste. Another goal is to create minimal life-like systems from individual building blocks. Thus, for example, artificial cells could be generated that are able to reproduce or move. Another area of synthetic biology, DNA informatics, explores the programmability of DNA with the aim of using DNA as a new storage medium and a programmable biomaterial for the creation of biological computing machines. Another objective is to describe and quantitatively model biological systems in order to make reliable predictions about their behavior. The modelling of living and life-like systems allows for a completely new approach to the central question of how to define living systems. In this way, a deeper understanding of biological processes for basic research can be made possible.

Quality and competences: