

Syllabus for

3D Printing and Bioprinting in the Life Sciences

Swedish: 3D-printning och bioprintning inom livsvetenskaperna

5 credits

Course code: FMF0002

Education cycle: Third cycle

Main field(s) of study and in-depth level: Biomedicine A1N, Medical Science A1N

Grading system: FOG One-grade scale

Established: 2018-09-07

Applies from: 2018H Last six months of 2018

Entry requirements: registered as PhD-student at Uppsala University or other higher educational facility.

Responsible department: Department of Medical Cell Biology, Uppsala University

Learning outcomes

The course will give the student knowledge in 3D-printing and bioprinting, and introduce related applications in medicine, biology and biochemistry. After the course, the student should be able to:

- explain the principles of stereolithography (SLA) and fused deposition modelling (FDM)
- explain the principles of bioprinting (layer-by-layer)
- describe different applications for 3D-printing and bioprinting in the life sciences
- describe the process going from an idea to a final 3D-printed object
- create a project description for a small 3D-printing project, and to plan and carry out the project
- create a basic 3D-model with the help of 3D-CAD
- carry out 3D-printing of a 3D model
- critically evaluate and analyse objects created by 3D-printing for use within the life sciences

Content

The course introduces the possibilities and opportunities that 3D-printing and bioprinting offers researchers and innovators within medicine, biology and biochemistry. The course starts with lectures about 3D-printing and bioprinting, followed by mandatory workshops on 3D-modeling and practical 3D-printing, together with the execution of a smaller supervised individual project relevant to a research application within medicine, biology or biochemistry. The project work processes as well as results are documented in an individual report.

Instruction

The course is given as mandatory theoretical assignments, workshops and practical assignments, complemented with lectures. The course is given in English.

Assessment

To pass the course, all the mandatory parts need to be passed: individual practical assignments, oral presentations including discussions, together with an individual project report that describes theory, method and results of the individual project carried out within the course.

If there are special reasons for doing so, an examiner may make an exception from the method of assessment indicated and allow a student to be assessed by another method. An example of special reasons might be a certificate regarding special pedagogical support from the University's disability coordinator.

Syllabus Revisions

Latest syllabus (applies from week 02, 2019)

Previous syllabus (applies from week 01, 2019)

Reading list

Applies from: week 01, 2019

Some titles may be available electronically through the University library.

- *Gibson, I.; Rosen, D.; Stucker, B. **Additive Manufacturing Technologies: 3D Printing, Rapid Prototyping, and Direct Digital Manufacturing***

Springer Science+Business Media New York, 2015

Available via the Uppsala University Library

Mandatory