

CH-319

**Experimental biochemistry and biophysics**

Hovius Ruud

Cursus	Sem.	Type
Biotechnology minor	E	Opt.
Chemistry	BA6	Obl.

Contact language	English
Credits	4
Withdrawal Session	Unauthorized Summer
Semester	Spring
Exam	During the semester
Workload	120h
Weeks	14
<b>Hours</b>	<b>6 weekly</b>
Practical work	6 weekly
<b>Number of positions</b>	

**Summary**

A 7-week long (4+8 h) experiment where you plan and construct a fluorescent sensor protein starting from DNA bricks. The protein will be expressed in and purified from E.coli, characterized by biochemical and spectroscopic methods. Your report will be in the style of a scientific paper or poster

**Content**

- i) Molecular biology: DNA fragment isolation by PCR, DNA restriction and ligation, plasmid purification and sequence analysis, agarose gel electrophoresis.
- ii) Biochemistry: Bacterial protein expression, protein purification by affinity chromatography, analysis by SDS-PAGE and spectroscopy, fluorescent labelling
- iii) Biophysics: Fluorescence spectroscopy, enzyme kinetics or molecular interactions.

**Keywords**

Molecular biology - cloning

Protein expression & purification

Bio-chemical and bio-physical characterisation

Sensor proteins

Reporting

**Learning Prerequisites****Required courses**

Admission to the TP is conditional on the successful completion of 2 of the 3 courses: CH-210 Biochimie, CH-313 Chemical biology, CH-311 Macromolecular structure and interactions

**Recommended courses**

Molecular and cellular biophysics I (CH-311)  
Chemical Biology (CH-313)

**Learning Outcomes**

By the end of the course, the student must be able to:

- Design cloning strategy
- Produce a scientific report and high-quality lab journal
- Integrate Good laboratory behavior and wet lab practice
- Assess / Evaluate Evaluate your data critically
- Produce a purified expressed protein
- Analyze proteins and DNA
- Characterize sensor function
- Interpret protein structure data

### Transversal skills

- Collect data.
- Plan and carry out activities in a way which makes optimal use of available time and other resources.

### Teaching methods

Students prepare and discuss experimental approach

Laboratory experimentation

Discussion of experimental progress and results

Reporting on scientific level  
Topical presentations

### Expected student activities

Good theoretical preparation & planning of lab work before doing experiments; skillful execution of experiments, being organized & keeping a lab book; thorough analysis of results, writing a scientific-grade report; respecting security rules and fellow students.

### Assessment methods

valuation of preparation and planning

Evaluation of experimental execution, including good laboratory behaviour

Evaluation of comprehension through discussion & written questions

Evaluation of report: including structure, data treatment and presentation, critical attitude , comparison to scientific literature

### Supervision

Office hours	Yes
Assistants	Yes

### Resources

#### Bibliography

Bibliography

TP manual

Biochemistry & Biophysics text books

ApE; a plasmid editor free software

Methods, Structures, and other useful info via Moodle

### **Notes/Handbook**

Manual

### **Websites**

- <https://go.epfl.ch/CH-319>

### **Moodle Link**

- <https://go.epfl.ch/CH-319>

### **Prerequisite for**

big plus for Msc courses and for semester or diploma projects in chemical biology or biophysics