



Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

SLUkurs

Syllabus

PNSo145 Protein structure hands-on workshop, 2.0 credits

Syllabus approved

2017-01-09

Subjects

Biology/Chemistry

Education cycle

Third cycle

Grading scale

Pass / Failed

The requirements for attaining different grades are described in the course assessment criteria which are contained in a supplement to the course syllabus. Current information on assessment criteria shall be made available at the start of the course.

Language

English

Prior knowledge

The course is primarily intended for PhD students within the SLU Graduate School Organism Biology, but will be open for all interested PhD students and researchers at SLU, and PhD students from other universities as space allows.

Objective, including learning outcomes

The course aims to provide a comprehensive introduction to protein structure studies and hands-on training of primary programs and web services for display,

analysis and interpretation of 3D structures of proteins. The course has a dual purpose:

- As an introductory course for becoming protein crystallographers.
 - As an overview and basic tutorial for others who need for their research projects.
- At the end of the course the student shall be able to
- Critically read, understand and extract relevant information from articles in the field of protein structure studies.
 - Utilize tables of statistics from diffraction data collection and protein structure refinement to judge the most important aspects of quality of protein structures.
 - Utilize the Protein Data Bank to find and retrieve protein structure atom coordinate and structure factor data files; display, superpose and compare protein structures; obtain, display and interpret electron density maps; do various measurements (e.g. atom distances, bond angles, torsion angles, hydrogen bonds) and statistical analyses (e.g. Ramachandran plot, temperature factors) on protein structures; make the most common types of protein structure figures (e.g. secondary structure cartoon, stick model, accessible surface).
 - Examine binding between proteins, other macromolecules (e.g. DNA, RNA) and small molecules at a molecular level.
 - Judge when protein crystallography may be feasible within his/her research, and select possible strategies to initiate such a project.

Content

The course will consist of three elements:

- 1) Literature study corresponding to one full day of studies.
- 2) An intensive scheduled course week, where lecture(s) are followed by hands-on computer practicals. The topics covered are explained under Objectives. Students are encouraged to bring own examples/projects to work on during practicals.
- 3) A home assignment corresponding to one full day of studies.

Requirements for examination

Attendance at all scheduled activities during the course week, satisfactory performance at computer practicals, and approved individual written report.

Additional information

This course is given as a postgraduate course within the SLU Graduate School in Organism Biology. The number of students will be limited to 15.

Responsible department

Department of Molecular Sciences