UNIVERSITY OF GOTHENBURG

DEPARTMENT OF CHEMISTRY AND MOLECULAR BIOLOGY

BIO210 Bioinformatics and Functional Genomics, 15 higher education credits

Bioinformatik och funktionsgenomik, 15 högskolepoäng

First Cycle

Confirmation

This course syllabus was confirmed by Department of Chemistry and Molecular Biology on 2015-08-07 and was last revised on 2017-07-03 to be valid from 2017-07-04, spring semester of 2017.

Field of education: Science 100%
Department: Department of Chemistry and Molecular Biology

Position in the educational system

This is a course in biology at ground level. The course can be part of the Bachelor's programme in Molecular Biology and Biology. The Master's programms in Molecular Biology, Biology and Genomics and System Biology. The course is also offered as a separate course.

Main field of studies	*Specialization*
Molecular Biology with Specialization in Genomics and Systems Biology	G2F, First Cycle, has at least 60 credits in first-cycle course/s as entry requirements
Molecular Biology	G2F, First Cycle, has at least 60 credits in first-cycle course/s as entry requirements
Biology	G2F, First Cycle, has at least 60 credits in first-cycle course/s as entry requirements

Entry requirements

The students must have successfully completed the basic courses in Cell Biology, BIO900,15 hec, Molecular Genetics, BIO905, 15 hec, Biological Form and Function, BIO910, 15 hec, Ecology and Evolution, BIO915, 15 hec and Biodiversity and Systematics, BIO920, 15 hec or equivalent courses.

Alternatively;
Passesd courses (MAR101-112 + NTH001) within the first and second year of the Bachelor program in Marine Science. At least 90 of the 120 credits must be passed.

In addition English proficiency is required to the level of English 6/English Course B from Swedish Upper Secondary School, or be certified by an internationally recognized test, for example TOEFL, IELTS.

Learning outcomes

After completing the course the student is expected to;

Knowledge and understanding

• have knowledge of methodology for handling and understanding sequence information in DNA and proteins.
• have a good overview and understanding of the information available in public databases.
• have a good view of the large amount of sequence data currently available.
• have experience of how one can extract physiologically and ecologically relevant information
from sequence data.
• have a broad knowledge of experimental methods for large scale and genome-wide analysis of molecular components.
• have insight into the strengths and weaknesses of different methods in functional genomics.
• have a good overview of the weaknesses and strengths of different experimental model organisms
• have a basic understanding of the methodology and objectives of bioinformatics
• have advanced knowledge in scientific methodology

Skills and abilities

- be able to read and understand the scientific literature in bioinformatics and functional genomics.

Judgement and approach

- show ability to orally and in writing present and discuss the collected data and information.

Course content

The course involves an -depth contact with concepts and methods in the new biology based on the rapidly expanding amount of fully sequenced genomes. This includes

concepts in the purely theoretical science field of bioinformatics going through algorithms for database searches, and clustering, as well as information about different existing databases, and a detailed description of the large-scale and genome methods that have been made possible as a result of all sequence data, such as for example DNA microarrays, proteomics with mass spectrometry as well as phenomics. The course is very research-oriented and exemplifies methods and ways of thinking to generate and interpret experimental data.

Form of teaching

The course is based on lectures, practical sessions on databases and some applications in bioinformatics. It also includes two projects where the students for instance create hypotheses and suggest follow-up experimental verification/falsifiering on the basis of the obtained knowledge.

Compulsory parts in the course are laboratory sessions as well as other exercises in groups as shown in the course schedule.

Language of instruction: Swedish and English

Assessment

The course ends with an exam covering the full course. During the course, an opportunity is given for "dugga" which is not graded but the student must pass. Two project work during the course that includes both a written and oral presentation are graded.
Compulsory parts in the course are laboratory sessions as well as other exercises in groups as shown in the course schedule.

Grades

The grading scale comprises: Pass with Distinction (VG), Pass (G) and Fail (U).

Course evaluation

A written and oral course evaluation is given at the end of the course (scheduled).