Linnæus University

Dnr: 2016/4733-3.1.2.2

Course syllabus

Faculty of Health and Life Sciences

Department of Chemistry and Biomedical Sciences

1BL012 Grundläggande laboratoriemetodik, 7,5 högskolepoäng
1BL012 Fundamental Laboratory Methodology, 7.5 credits

Main field of study
Biomedical Laboratory Science, Chemistry

Subject Group
Biomedical Laboratory Science

Level of classification
First Level

Progression
G1F

Date of Ratification
Approved 2009-12-09
Revised 2016-09-02 by Faculty of Health and Life Sciences.
The course syllabus is valid from autumn semester 2016

Prerequisites
General chemistry, 7.5 credits, or the equivalent.

Objectives

Module 1 Biomedical laboratory science, theory, 2.5 credits
After completing the module, the student should be able to:

- describe the risks associated with blood analysis
- describe the quality assurance of experimental laboratory activities
- describe the structure, function, measurement principles, calibration, and maintenance of instruments such as UV/VIS spectrophotometer, atomic absorption and flame emission spectrophotometer, pH meter, and analytical balance
- calculate the concentration, preparation, and dilution of solutions
- perform statistical analysis of measurement data based on knowledge of normal distribution, measures of dispersion, hypothesis testing, and confidence intervals, and to explain correlation and linear regression, sensitivity, specificity, prevalence, and predictive value.

Module 2. Biomedical laboratory science, laboratory experiments and theory 2.5 credits
After completing the module, the student should be able to:

- review and apply risk and safety information in conection with experimental laboratory activities
- plan, conduct, evaluate, and write reports on laboratory work and analyses based on certain selected techniques
- handle basic laboratory equipment.

Module 3. General Chemistry, 2.5 credits
After completing the module, the student should be able to:

- describe simple electrochemical cells using the cell reaction and calculate the cell potential using the Nernst equation
- describe the function of ion-selective electrodesin general terms
- describe the structure of, and name substances in, some important organic substance classes – primarily hydrocarbons, alcohols, aldehydes, ketones, carboxylic acids, and amines
- describe the spatial structure and physical properties of some important organic substance classes – primarily hydrocarbons, alcohols, aldehydes, ketones, carboxylic acids, and amines
- describe some fundamental types of organic reactions (addition, elimination, substitution, isomerisation, and esterification).

Content

Module 1. Biomedical laboratory science, theory, 2.5 credits
This module includes the following components:

- risks associated with blood analysis
- quality assurance of laboratory activities, including Good Laboratory Practice (GLP), Good Clinical Practice (GCP), Good Manufacturing Practice (GMP), and accreditation
- the structure, function, measurement principles, calibration, and maintenance of measuring instruments
- quantitative and qualitative analyses
- calculations in solution preparation
- statistical tests and calculations, including measures of dispersion, correlation and linear regression, normal distribution, hypothesis testing (t-test), confidence intervals, sensitivity, specificity, prevalence, and predictive value.

Module 2. Biomedical laboratory science, laboratory experiments and theory 2.5 credits
This module includes the following components:

- risk analysis in preparation for laborations
- handling of basic laboratory equipment
- weighing, pipetting, diluting, and dissolving substances
- preparation of buffers and basic syntheses
- report writing.

Module 3. General Chemistry, 2.5 credits
This module includes the following components:

- galvanic cells, cell reactions, standard potentials, calculation of cell potentials using the Nernst equation, and ion-selective electrodes
- chemical and structural properties and characteristic reactions of some organic substance classes, particularly hydrocarbons, alcohols, aldehydes, ketones,

carboxylic acids, and amines, and basic nomenclature and isomerism of these substance classes.

Type of Instruction

Teaching is delivered in the form of lectures, group exercises, laboratory sessions, and seminars. Participation in laborations, seminars, and certain specified lectures is mandatory.

Examination

The course is assessed with the grades Fail (U), Pass (G) or Pass with Distinction (VG).

Module 1. Biomedical laboratory science, theory, 2.5 credits
This module is examined through oral and written presentations and a written examination. The examination is assessed using the grades Pass with Distinction, Pass, and Fail. To receive a passing grade, the student must have passed the written examination, as well as the oral and written presentations.

Module 2. Biomedical laboratory science, laboratory experiments and theory 2.5 credits
This module is examined through written laboratory reports and a practical test. The laboratory reports as well as the practical test are assessed using the grades Pass with Distinction, Pass, and Fail.

Module 3. General Chemistry, 2.5 credits
This module is examined through a written examination. The examination is assessed using the grades Pass with Distinction, Pass, and Fail.

The first resit examination will be offered within six academic weeks. Examination of the practical test may be limited to five times.

The course objectives (see above) constitute the grading criteria for the grade of Pass. The final grade for the course as a whole is determined by weighting the results of each module relative to their respective number of credits.

Course Evaluation

During or shortly after the course, a course evaluation should be conducted. The result and analysis of the course evaluation should be promptly communicated to the students who have taken the course. Students who are taking the course when it is offered the next time should be informed of the result at the course introduction. The course evaluation is anonymous.

Required Reading and Additional Study Material

Björk, J. *Praktisk statistik för medicin och hälsa*. Liber, the latest edition.
Chang, R and Goldsby, K. Chemistry. McGrawHill,the latest international edition. Approx. 1000 pp; only a small part of the book is included in the course.
Simonsen, F. *Analysteknik*. Lund: Studentlitteratur, the latest edition.
Laborationshandledning i Grundläggande Laboratoriemetodik, Linnéuniversitetet. Available as an electronic resource in the form of a PDF file.

Blackman and Gahan: *Aylward and Findlay´s SI Chemical Data*. John Wiley & Sons, the latest edition.