



**Karolinska
Institutet**

Course syllabus for

Thematic course: Acid/base and Energy, 6 credits

Temakurs: Syra/bas och Energi, 6 hp

This course has been cancelled, for further information see Transitional provisions in the last version of the syllabus.

Please note that the course syllabus is available in the following versions:

Spring2008 , [Spring2009](#) , [Spring2013](#)

Course code	1BA001
Course name	Thematic course: Acid/base and Energy
Credits	6 credits
Form of Education	Higher Education, study regulation 2007
Main field of study	Not applicable
Level	GX - First cycle
Grading scale	Pass with distinction, Pass, Fail
Department	Department of Laboratory Medicine
Decided by	Programnämnden för Biomedicinska analytikerprogrammet, inriktning laboratoriemedicin
Decision date	2007-10-15
Course syllabus valid from	Spring 2008

Objectives

On completion of the course, the student should be able to: - describe basic principles of how water molecules and biological molecules are structured and how drugs interact with each another - account in detail, for acid-base equilibria with an emphasis on the characteristics of buffers - account, at a general level, for the energy flow and the acid-base balance from a physiological perspective - account for redox reactions and their role in the energy supply of the cell - carry out simple calculations concerning thermodynamics and equilibrium systems - carry out a titration and analyse a titrimetric curve

Content

The course consists of two themes: Acid/base and Energy. The structure and properties of the water molecule are studied to give an understanding of the interaction of water and biomolecules. Equilibrium relations between acids and bases with an emphasis on the characteristics and limitations of buffers, especially physiological buffer systems, are included in the course in order to illustrate equilibrium and equilibrium shift. To understand the meaning of the laws of thermodynamics is an important part, and also to be able to decide the spontaneity of biological processes, based on the energy change in a system

. Redox reactions' central role in the energy flow is studied and illustrated by means of redox couples from the respiratory chain, related to a physiological perspective.

Teaching methods

The teaching is given as lectures, calculation exercises and laboratory sessions. Laboratory work is documented in a personal workbook.

Examination

The laboratory sessions are compulsory parts, and, in case of absence, the responsible teacher determines, how compensation should be done. Examination is arranged individually with a written examination. Students who have not passed the regular examination are entitled to participate in five more examinations. If the student is not approved after four examinations, he/she is recommended to retake the course at the next regular course date and may, after that, participate in two more examinations. If the student has failed six examinations/tests, no additional examination or new admission in the course is given. The number of times that the student has participated in one and the same examination is regarded as an examination session. Submission of a blank examination is regarded as an examination. An examination for which the student registered but not participated in, will not be regarded as an examination. If a student fails a laboratory session, the student has the opportunity to redo the laboratory session once.

Other directives

Course evaluation will be carried out in accordance with the guidelines established by the Board of Education.

Literature and other teaching aids

Laborationskompendium samt webbaserat material

Nelson, David L.; Cox, Michael M.

Lehninger principles of biochemistry

Lehninger, Albert L.

4. ed. : New York : W.H. Freeman, cop. 2005 - 1119, [91] s.

ISBN:0-7167-4339-6 LIBRIS-ID:9372754

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