Course syllabus for

Introduction to Biomedical Laboratory Science, 12 credits

Introduktion till biomedicinsk laboratorievetenskap, 12 hp
This course syllabus is valid from autumn 2024.

Course code	1BL001
Course name	Introduction to Biomedical Laboratory Science
Credits	12 credits
Form of Education	Higher Education, study regulation 2007
Main field of study	Biomedical Laboratory Science
Level	G1 - First cycle 1
Grading scale	Fail (U) or pass (G)
Department	Department of Laboratory Medicine
Decided by	Education committee LABMED
Decision date	2024-03-21
Course syllabus valid from	Autumn 2024

Specific entry requirements

Biology 2, Physics 1a or Physics 1b1+1b2, Chemistry 2, Mathematics 3b or Mathematics 3c or Mathematics C.

Objectives

The aim of the course is that the student should develop basic knowledge and skills for the profession of the biomedical scientist. It includes the understanding of which role the biomedical the analyst have in health care, basic strategies for learning, problem-solving and introduction to research project and data analysis, and an insight in the chemical and biological principles that shape the life.

Knowledge and understanding
On completion of the course, the student should be able to:

- **Explain** scientifically and evidence-based working method and why it is an important part of the work both in health care and research. (SOLO 4)
- **Explain** the concepts knowledge, skill and method for problem-solving. (SOLO 4)
- **Explain** evidence-based methods for learning and assessment. (SOLO 4)
- **Give** an account of terms and basic principles of basic chemistry from the structure of the atom to

chemical reactions. (SOLO 3)
- **Give** an account of acid/base the equilibrium and buffer systems and put these from a physiological perspective. (SOLO 4)
- **Compare** the structure of various biomolecules and explain how enzymes function and discuss their role in the homeostasis of the cell. (SOLO 4)
- **Give** an account of various concepts, analysis and examination methods in clinical physiology and laboratory medicine relevant for diagnostics and explain the basics of quality assurance. (SOLO 3)

Skills and abilities
On completion of the course, the student should be able to:

- **Show how** one uses basic laboratory equipment and specific volume measurement.(Miller 3)
- **Show how** one uses basic hygienic instructions. (Miller 3)
- **Know how** one perform studies and laboratory work systematically based on given instructions and security regulations. (Miller 2)
- **Know how** an experiment is planned, is carried out and is documented. (Miller 2)
- **Know how** analysis and research results are processed and been interpreted through application of descriptive statistics. (Miller 2)

Values and perspectives
On successful completion of the course, the student should be able to:

- **Give** an account of their role as future biomedical scientist in relation to patient and other professions in health care and with regard to communication, equal opportunities and health care ethics. (SOLO 4)
- **Explain** the learning process and the concept the lifelong learning. (SOLO 4)
- **Give** an account of what knowledge implies and human responsibility for how it is used. (SOLO 4)

Content

The course contains overviews in all domains; basic scientific skills (the chemistry of life), biomedical laboratory science skills (the chemistry of life), academic competence (scientific methodology and biostatistics) and professional skills (introduction by profession).

Introduction to the profession, 2.0 hp

Grading scale: GU

This course component focuses on handling of physiological and laboratory-medical issues with special focus on diagnostic processes.

The course component includes the following fields:

- Basic principles of diagnostic processes
- The difference between health and disease
- Professional patient approach and equal nursing environment
- Basic hygiene procedures
- Clinically integrated training (clinically integrated training) on physiological clinic or clinical laboratory
- Possibilities to further education

Sustainable learning, 1.5 hp

Grading scale: GU

This course component explores on a general level the learning process and stress the importance of lifelong learning.

The course component includes the following fields:

- Stress management
- Cognitive Processes
- Problem-solving
- Project Work and teamwork
- Time planning and project management
- Evidence-based pedagogical models

Scientific Methodology and Biostatistics, 3.5 hp

Grading scale: GU

This course component includes studies of information versus knowledge with a special focus on the development of evidence-based knowledge and basic statistics and reporting.

The course component includes the following fields:

- Development of evidence-based knowledge
- Introduction to the evidence pyramid
- Planning and design for research
- Practical exercises in data processing and data analysis
- Use of descriptive statistics in Excel
- Reporting of research results according to IMRAD
- Presentation of results in figures and text
- Laboratory miniproject in scientific methodology and biostatistics connected to experimental analyses in "Chemistry of Life"

Chemistry of life, 5.0 hp

Grading scale: GU

This course component gives a general understanding of the structure, molecular structures and chemical bindings of biomolecules.

The course component includes the following fields:

- The structure and molecular structures of biomolecules
- Chemical bindings
- Acid-base equilibria and buffer systems from a physiological perspective
- Application of thermodynamics and redox system in the energy supply of the cell
- Basic chemistry knowledge: chemical reactions, equilibrium and functional groups
- Practical use of basic laboratory equipment
- Planning and implementation of experimental analyses in a laboratory miniproject

Teaching methods

The teaching and learning is based on student-centred and student activated learning. This for example includes lectures, digital lectures with follow-up seminars (flipped classroom), seminars, quizzes, group

assignment and laboratory sessions and miniprojects.

Examination

Introduction by profession
Examination: Oral reflection in the form of a presentation and practical examination in hygiene.
Compulsory: Clinically integrated training (VIL).
Formative assessments.

Sustainable learning
Examination: Written digital examination.
Formative assessments.

Scientific methodology and statistics
Examination: Written digital examination.
Compulsory: Miniprojects.
Formative assessments.

The chemistry of life
Examination: Written examination and practical examination of volume measurement.
Compulsory: Laboratory sessions and miniprojects.
Formative assessments.

The examiner decides if, and how, absence from compulsory parts can be compensated. Study results cannot be reported until the student has participated in compulsory course elements or compensated for any absence in accordance with instructions from the examiner. Absence from a compulsory educational component may mean that the student cannot take the opportunity until the next time the course is given.

Students who do not pass a regular examination are entitled to re-sit the examination on five more occasions. If the student has failed six examinations/tests, no additional examination is given. Each occasion the student participates in the same test counts as an examination. Submission of a blank exam paper is regarded as an examination. In case a student is registered for an examination but does not attend, this is not regarded as an examination.

In case of the existence of special reasons, or need for adaptation for a student with a disability, the examiner may decide to depart from the syllabus's regulations on examination form, number of examination opportunities, possibility of completion or exemption from compulsory educational elements, etc. Content and intended learning outcomes as well as the level of expected skills, knowledge and abilities must not be altered, removed or lowered.

Transitional provisions

For a course that has ceased or gone through larger changes or where the reading list has been changed considerably should be given additional test (excluding regular test) on the earlier contents or the previous literature during a time of a year from the date the change took place.

Other directives

Course evaluation will be carried out according to the guidelines that are established by the Committee for Higher Education.

Teaching in English occur.

Literature and other teaching aids

Recommended literature

Fundamentals of general, organic, and biological chemistry

McMurry, John; Ballantine, David S.; Hoeger, Carl A.; Peterson, Virginia E.; Madsen, Sara; Meert, Christel; Pearson, Andrew

eighth edition : Pearson, 2017 - 971 sidor

ISBN:9780134015187 LIBRIS-ID:jszqwtjhgdhb6np1

Library search

Sundström, Johan; Lind, Lars

Handbok i biomedicinsk forskning

Första upplagan : Stockholm : Liber, [2015] - 201 sidor

ISBN:9789147113996 LIBRIS-ID:18272795

This book contains basic information about the entire process from scientific theory, statistics, and how to report one's data.

Library search

Bring, Johan; Taube, Adam; Wikman, Per

Introduktion till medicinsk statistik

2., utök. uppl. : Lund : Studentlitteratur, 2015 - 233 s.

ISBN:9789144104270 LIBRIS-ID:18062641

This book contains more statistics but not scientific theory or how to report data. Will probably come back in later courses in the program.

Library search