Course syllabus for

Chemical Biology, 8 credits

Kemisk biologi, 8 hp
This course syllabus is valid from spring 2025.
Please note that the course syllabus is available in the following versions:
Spring2018 , Spring2021 , Spring2022 , Spring2023 , Spring2025

Course code	1BI039
Course name	Chemical Biology
Credits	8 credits
Form of Education	Higher Education, study regulation 2007
Main field of study	Biomedicine
Level	G2 - First cycle 2
Grading scale	Pass with distinction, Pass, Fail
Department	Department of Medical Biochemistry and Biophysics
Decided by	Programnämnden för biomedicinprogrammen
Decision date	2017-11-02
Revised by	Programme committee for study programmes in biomedicine
Last revision	2024-10-10
Course syllabus valid from	Spring 2025

Specific entry requirements

At least the grade Pass (G) on the course Introduction to Biomedical Science, at least grade Pass (G) on the part Organic-chemical laboratory work, (5 credits), in the course General and Organic Chemistry, and the part Laboratory practicals (4 credits) of the course Cell-, stem cell and developmental biology, at the Bachelor's programme in Biomedicine

Objectives

Upon completion of the course, the student should be able to:

Regarding knowledge and understanding:

- describe structures of biological macromolecules and explain at a basic level the most commonly occurring methods for determination and analysis of the three-dimensional structure of biomolecules,
- explain biophysical and chemical methods that are used to study the regulation and function of biomolecules,
- account for how chemical biology methods are used within biomedical research and pre-clinical

drug discovery,
- discuss the use of chemical biology in biomedical research and pre-clinical drug discovery,

Regarding competence and skills:

- carry out and orally present chemical biology projects,
- perform basic chemical biology laboratory work safely and according to instructions,
- describe and analyse their own chemical biology laboratory work,
- analyse macromolecular structures,

Regarding judgement and approach:

- follow scientific ethical guidelines when documenting data and results,
- assess, evaluate and choose appropriate methods for basic chemical biology experiments.

Content

The course content is oriented towards chemical biology aspects of pre-clinical drug discovery as well as towards study of biological systems.

The course is divided into the following 2 parts:

Chemical biology project work and laboratory work, 4.0 hp

Grading scale: GU

Cover a chemical biology topic from different perspectives. Oral presentation of findings.

Commonly used methods in chemical biology laboratory work and computational data analysis. Written lab reports.

Integration of theory and practice, 4.0 hp

Grading scale: VU

Integration of theory and practice of chemical biology.

Teaching methods

The teaching includes lectures, laboratory sessions, computer laboratory sessions, group tuition (seminars) and project work. An emphasis is placed on problem-solving.

Examination

Part 1. Chemical biology project work and laboratory work (4 credits). The examination consists of oral presentation of the project work. Graded Fail/Pass. The examination of the laboratory work consists of written lab reports. Graded Fail/Pass/Pass with distinction.

Part 2. Integration of theory and practice (4 credits). The examination consists of a written exam covering the entire contents of the course. Graded Fail/Pass/Pass with distinction.

To pass the whole course the grade of at least pass must have been obtained for all parts of the course. To obtain a final grade of "Pass with distinction", a grade of "Pass with distinction" must be obtained for both the part "Integration of theory and practice" and the laboratory element of the part "Chemical biology project work and laboratory work".

Students that fail to submit compulsory assignments by the deadlines will lose the opportunity to be graded with pass with distinction on the course.

Compulsory participation
Laboratory sessions are compulsory, as well as other teaching occasions linked to these parts. Participation in regular project work discussions is compulsory. The course director assesses if and, in that case, how absence can be compensated. Before the student has participated in all compulsory parts or compensated absence in accordance with the course director's instructions, the student's results for respective part will not be registered in LADOK. Absence from a compulsory part may lead to that the student can't compensate the absence before the next time the course is given.

Limitation of number of examinations or practical training sessions
Students who have not passed the regular examination are entitled to participate in five more examinations. If the student has failed six examinations/tests, no additional examination or new admission is provided.
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 counted as an examination.

If there are special grounds, or a need for adaptation for a student with a disability, the examiner may decide to deviate from the syllabus's regulations on the examination form, the number of examination opportunities, the possibility of supplementation or exemptions from the compulsory section/s of the course etc. Content and learning outcomes as well as the level of expected skills, knowledge and abilities may not be changed, removed or reduced.

Other directives

The course language is English.

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

Oral evaluation in the form of course council meetings will be carried out during the course.

Literature and other teaching aids

Mandatory literature

Miller, Andrew; Tanner, Julian

Essentials of chemical biology : structures and dynamics of biological macromolecules in vitro and in vivo

Second edition. : Hoboken, New Jersey : John Wiley & Sons Inc., [2024] - xvii, 537 pages
ISBN:9781119437970 LIBRIS-ID:8s4t4crr67hbh8lr

Library search

Biochemistry
Berg, Jeremy M.; Gatto, Gregory J.; Hines, Justin K.; Beneken Heller, Jutta; Tymoczko, John L.; Stryer, Lubert

Tenth edition, international edition. : Austin : Macmillan Learning, [2023] - xxxvii, 1001, A31, I44 Seiten
ISBN:1319498507 LIBRIS-ID:vcxshzhns5dfv8h9

Library search

Additionally, specific material referred to during the course forms the course literature.

Recommended literature

Van Vranken, David L.; Weiss, Gregory A.

Introduction to bioorganic chemistry and chemical biology

New York : Garland Science, cop. 2013 - xvii, 486 s.

ISBN:978-0-8153-4214-4 LIBRIS-ID:14717687

The book is an overall good introduction to chemical biology which covers a wide range of topics. Note: not all topics of the course are covered.

Library search

Structure-Based Drug Discovery

Tari

Humana Press Incorporated, 2012

LIBRIS-ID:13855582

URL: Online access for KIB

The book covers some crystallography esp. structure base drug discovery.

Schmidt, Marco F.

Chemical Biology : And Active Ingredient Development

1st edition 2022 : Berlin : Springer Berlin, 2022 - X, 238 Seiten in 1 Teil

ISBN:9783662644119 LIBRIS-ID:xdxp872hvxjhrm51

URL: Länk

Chemical Biology and Drug Development (odd translation from German). Good chemical biology and drug discovery part but lacks some structural biology and esp methods for structure determination.

Library search

Drug Design : Structure- and Ligand-Based Approaches

Merz, Kenneth M.; Ringe, Dagmar; Reynolds, Charles H.

Cambridge : Cambridge University Press, 2010 - online resource (xii, 274 sidor)

ISBN:9780511730412 LIBRIS-ID:12004621

URL: Online access for KIB

Includes some structure determination methods as well as some basic drug discovery incl. specific case studies

Library search