Course description BMB539: Applications of mathematics in life sciences

# SDU **\*** BMB539: Applications of mathematics in life sciences

Study Board of Science

Teaching language: Danish EKA: N200028112, N200028102 Assessment: Second examiner: None, Second examiner: External Grading: Pass/Fail, 7-point grading scale Offered in: Odense Offered in: Spring Level: Bachelor STADS ID (UVA): N200028101 ECTS value: 5

Date of Approval: 23-10-2018

Duration: 1 semester

Version: Archive

## - Comment

Discontinued – The last time offered is Spring 2022. The last three examination attempt will be held in June 2022, August 2022 and January 2023

# • Entry requirements

- Academic preconditions

- Students taking the course are expected to:
  - Have knowledge of basic calculus corresponding to the course Mathematics for BMB, Biomedicine and Chemistry.

## - Course introduction

The purpose of this course is to introduce mathematical notation and mathematical methods for analysis of problems in lifesciences. Emphasis will be on practical / computing aspects of the mathematical methods introduced in the course. The course will introduce the student to applications of mathematics which the students of BMB and biomedicine will use in later courses of during their studies. The course will combine mathematics with relevant examples from physics, chemistry and biology.

The course builds on the knowledge acquired in the course Mathematics for BMB, Biomedicine and Chemistry. It gives an academic basis for applying mathematics to describe physical, chemical and biological phenomena.

In relation to the competence profile of the degree it is the explicit focus of the course to enable the student to analyze relevant problems related to physical, chemical and biological phenomena with a mathematical approach and to perform calculations on typical mathematical problems related to life sciences.

## • Expected learning outcome

- The learning objective of the course is that the student demonstrates the ability to:
  - Use mathematics to describe and solve typical mathematical problems in life sciences.
  - · Gain an overview and understanding of the basic concepts of the mathematical methods used in life sciences

#### Content

- The following main topics are contained in the course:
- · Calculations and analysis of mathematical functions relevant to life sciences.
- Descriptive statistics
- Visual display of data
  Linear regression
- Biological applications of derivatives
- Rates of change
- Thermodynamics
- Applications of integration.Thermodynamics
- Poiseuille's Law: Blood flow
- Differential equations
- Enzyme kinetics
- Chemical reactions
- · Linear algebra including vectors, matrices, solution linear systems of equations, determinants, eigenvalues and eigenvectors.
- Numerical methods (interpolation, numerical integration, minimization), and their applications in life sciences

## - Literature

See itslearning for syllabus lists and additional literature references.

## - Examination regulations

## Exam element a)

- **Timing**
- Spring
- Tests
  - Project reports
    - ▼ EKA N200028112
    - Assessment Second examiner: None
    - Grading Pass/Fail

    - ▼ Identification Full name and SDU username

    - ▼ Language Normally, the same as teaching language

    - ▼ Examination aids To be announced during the course
    - **-** ECTS value

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## Exam element b)

**Timing** June

# **v** Tests

# Written exam

- **•** EKA N200028102
- Assessment Second examiner: External
- Grading 7-point grading scale

## - Identification Student Identification Card

Language

Normally, the same as teaching language

 Duration 3 hours

## - Examination aids

All common aids are allowed e.g. books, notes, computer programmes which do not use internet etc.

Internet is not allowed during the exam. However, you may visit the course site in its learning to fill in the MCQ test. If you wish to use course materials from its learning, you must download the materials to your computer the day before the exam. During the exam you cannot be sure that all course materials is accessible in itslearning.

**v** ECTS value

# - Indicative number of lessons

52 hours per semester

# **•** Teaching Method

The intro phase consists of lectures which provide an introduction to the course. Students are expected to independently read prescribed text (the text book) to achieve the expected competencies and necessary overview. The skills training phase deals with the central parts of the course using theoretical and computer based exercises. The tutorials are based on prior independent work or, if wanted, self-organized group work. The training phase also includes Computer based lab exercises in which students work together in groups. The study phase is partly preparation for the intro lectures, tutorials and laboratory exercises as well as preparation of laboratory reports and exam preparation (repetition).

- Work with the material from the book
- Problem solving Mini project

# **▼** Teacher responsible

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Name	E-mail	Department	
Jonathan R. Brewer	brewer@memphys.sdu.dk	Institut for Biokemi og Molekylær Biologi	
<ul> <li>Additional teachers</li> </ul>			
Name	E-mail	Department	City
Kristian Debrabant	debrabant@imada.sdu.dk	Computational Science	
Veit Schwämmle	veits@bmb.sdu.dk	Institut for Biokemi og Molekylær Biologi	
▼ Timetable			
Odense Show full time table			

# **v** Administrative Unit

Biokemi og Molekylær Biologi

## ▼ Team at Educational Law & Registration NAT

## Recommended course of study

Profile	Education	Semester	Offer period