

**Course description**  
**Introduction to Mathematics**

# Introduction to Mathematics

Study Board of Business Economics

Teaching language: English  
EKA: B220014402  
Censorship: Second examiner: None  
Grading: 7-point grading scale  
Offered in: Soenderborg  
Offered in: Autumn  
Level: Bachelor

Course ID: B220014401  
ECTS value: 5

Date of Approval: 12-02-2021

Duration: 1 semester

## ▼ Course ID

B220014401

## ▼ Course Title

Introduction to Mathematics

## ▼ Teaching language

English

## ▼ ECTS value

5

## ▼ Responsible study board

Study Board of Business Economics

## ▼ Date of Approval

12-02-2021

## ▼ Course Responsible

Name	Email	Department
Nils Karl Sørensen	nks@sam.sdu.dk	Institut for Virksomhedsledelse og Økonomi

## ▼ Offered in

Soenderborg

## ▼ Level

Bachelor

## ▼ Offered in

Autumn

## ▼ Duration

1 semester

## ▼ Recommended prerequisites

Mathematics level B from secondary school.

## ▼ Aim and purpose

The objective of this course is to provide the student with skills in using tools for mathematics for solving problems within the area of business administration. The objective is also to give the student an understanding of the interaction between mathematical methods and economic problems.

The course thus provides tools that are used in other subjects, for example Corporate Finance, Microeconomics, and Statistics. This course provides the student with skills within functional analysis in particular, which is used e.g. investment theory, finance and macroeconomics. The course also provides a brief introduction to matrix algebra. Calculus is used to deduce and calculate elasticity of supply and demand, and to calculate profits and losses in trade, while optimization and equation systems are used in the planning of production and the planning of a company's marketing efforts. Matrix algebra is used to solve equation systems with multiple unknowns. Such systems are seen, for example, in statistical analyses and in models for economic planning. Finally, an introduction to integral theory is provided. Integral methodology is particularly used in Investment and Corporate Finance and Trade theory in order to find the gains from trade.

## ▼ Content

The following topics are addressed in order to achieve the objectives of the course.

Functions of several variables

- \* Partial differentiation
- \* Implicit differentiation

Optimisation of functions that are relevant in economics

- \* Primary and secondary conditions for maxima and minima
- \* Use of the Lagrange method for optimization under constraints with economically motivated examples - including economic interpretation of Lagrange multipliers
- \* Geometric interpretation of functions of several variables - level curves, surfaces, etc.

Integration

- \* Calculation rules for integrals
- \* Rules for exponential and power functions
- \* Interpretation of integrals in relation to areas, including applications

Introduction to matrix algebra .

## ▼ Learning goals

In order to achieve the learning goals, the student should be able to demonstrate knowledge about the course topics and concepts of the course, and ability to select and apply the relevant methods relative to a simple analysis of issues related to business and economics.

The student should be able:

## ▼ Description of outcome - Knowledge

- to apply differential calculus for function of several variables, optimization, methods in matrix algebra in order to solve mathematical issues within the fields of business and economics.

## ▼ Description of outcome - Skills

- to perform partial differentiation and implicit differentiation of functions of several variables.
- to perform optimization and functional forms relevant in business and economics including first and second order conditions for maxima and minima.
- to perform the Lagrange method for optimization under restrictions with applications from business and economics including an interpretation of the Lagrange multiplier in an economic context.

- to perform a geometric interpretation of functions of several variables – niveau curves, planes etc.
- to perform calculus rules for integrals including calculus rules for exponential and power functions and to be able to interpret integrals in relation to areas for example related to consumers and producers surplus.
- to use matrix algebra in order to solve systems of equations including input-output systems.

## ▼ Description of outcome - Competences

- to identify the correct mathematical method in order to solve a given issue within business and economics.
- to evaluate if the archived mathematical result is correct in perspective to the issue addressed.

## ▼ Literature

Ian Jacques, Mathematics for Economics and Business, Special edition compiled by Nils Karl Sørensen SDU Denmark, Pearson.

Supplementary notes.

## ▼ Teaching Method

The students acquire knowledge of the subject area through independent literature studies supported by lecture sessions aiming to provide an overview of the area and links between different parts of the subject. The lectures are also used to enhance the textbook explanations of particularly difficult topics.

The students develop skills in applying the scientific methods used in the field by working with assignments in the subject. This process is facilitated by exercise sessions enabling students to debate issues when solving assigned problems and get feedback on their own work.

## ▼ Workload

### Scheduled classes:

2 lectures and 1 exercise session per week for 15 weeks. The exercises may be planned as 2 exercise sessions every second week.

### Workload:

Students will be required to do 125 hours of work, which is expected to be spent as follows:

- Lectures: 30 hours
- Exercise sessions: 15 hours
- Preparations for exercise sessions and lectures 45 hours
- Preparations for examination: 32 hours
- Written examination: 3 hours.

## ▼ Examination regulations

### ▼ Exam

#### ▼ Name

Exam

#### ▼ Timing

Exam: January.  
Reexam: February.

### ▼ Tests

#### ▼ Exam

##### ▼ Name

Exam

##### ▼ Form of examination

Written in situ exam

##### ▼ Censorship

Second examiner: None

##### ▼ Grading

7-point grading scale

##### ▼ Identification

Student Identification Card - Exam number

##### ▼ Language

English

##### ▼ Duration

3 hours written exam.

##### ▼ Length

No limit.

##### ▼ Examination aids

No digital aids allowed. It is only allowed to work in the retrieved Word-template. It is not allowed to use other templates, mathematical templates or other PC-based programs. See also under special circumstances. It is allowed to bring along books, notes, and pocket calculator. . Maximum allowed pocket calculator is Texas TI-89 / TI-nspire. A list of allowed pocket calculators is available from the Blackboard page of the course. The pocket calculator must not be connected to the computer It is not allowed to use the build-in pocket calculator in the computer. It is not allowed to bring iPads/tablets/smartphones. It is not allowed to communicate with others.

##### ▼ Assignment handover

Digital hand-out via "Digital Exam".

##### ▼ Assignment handin

Only digital submission via "Digital Exam".

##### ▼ ECTS value

5

##### ▼ Additional information

Internet access: The Internet must only be used to access digital exam in order to submit and retrieve the Word-template to be used for the exam. Aside from this activity the Internet must not be used during the examination.

Preparation: The assignment has to be written in a Word-template that is handed out via digital exam at the beginning of the exam. Graphs, formulas and similar may be written by hand and transferred to the template by use of either a digital pen or a hand scanner. See under special circumstances.

Special Circumstances:

- If you have bought the book in the edition by Ian Jacques for the course in a digital format, then it is permitted to have this digital book open on your own computer during the exam, the appendix on "Input-Output" models, and the note on 3x3 models. It is not permitted to have other documents open.
- Own notes have to be printed out on paper. It is not allowed to have your own notes open on your computer during the exam.
- If the assignment is written by use of a digital pen, then it is allowed to use the software accompanying the digital pen. It is permitted to use a digital pen with a Surface computer.
- The assignment can be written by hand, and then be digitally transferred by use of a hand scanner. It is allowed to use the software accompanying the hand scanner.
- The assignment can be written by hand, and then being photographed by use of a digital camera (not lpads/tablets/smartphones). Use of the computer camera is allowed. The files of the photo images can then be transferred to the Word-template.
- The memory of the digital pen, the hand scanner and the digital camera has to be empty/cleared before the start of the exam.
- All handmade graphs, formulas and similar has to be transferred to the Word-template before the end of the exam.

A change in the examination form will be announced no later than 14 days prior to the re-exam.

▼ **EKA**

B220014402

▼ **External comment**

NOTE - This course is identical with the former courses

83303x01 / Odense: 83303301 Sønderborg: 83303501 Supplementary course in Mathematics.

Odense: B220014101 Introduction to Mathematics.

Used examination attempts in the former identical course will be transferred.

Courses that are identical with former courses that are passed according to applied rules cannot be retaken.

▼ **Courses offered**

Offer period	Offer type	Profile	Education	Semester
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▼ **URL for Skemaplan**

**Sønderborg**

Show full time table