

# **Business Mathematics (BK/IBA) – Quantitative Research Methods I (EBE)**

## **Instructions for students**

### **Introduction**

This course is a very fundamental course. It sets the stage for many other courses. It does so in three ways:

- it offers important concepts and techniques that are useful in later courses on logistics, economics, finance, etc. Examples are the summation operator, partial derivatives, integrals, and stationary points of functions of two variables;
- it develops basic skills in handling computers for quantitative purposes. These include the typesetting of professionally looking formulas and the use of Excel for mathematical modelling;
- it makes an appeal to your overall academic development. A training in mathematics develops your abstract thinking, we prepare you to be able to read the scientific and professional literature, you will learn to use the Greek alphabet, etc.

This document contains some specific details on top of the information in study guide and course manual.

### **Language**

The courses Business Mathematics for BK and Quantitative Research Methods I for EBE are given in Dutch. But most documents are in English:

- the book and extra texts;
- the slides;
- the exercises, answers, and full solutions;
- the digital tests and written exams.

It is an element of academic development to be able to participate in an international scientific and professional community. That requires becoming fluent in English – at least written English. However, we will use Dutch for BK and EBE at:

- the lectures, tutorials, and computer tutorials;
- your answers to the digital tests and exams;
- your discussions with us by email, etc.

For the course Business Mathematics for IBA, English will be used throughout. IBA students that provide answers to the digital tests in Dutch (or German, or Russian, etc.) will face a deduction.

### **Work forms**

The course consists of the following elements:

- 12 lectures of 2 hours;
- 6 tutorials of 2 hours;
- 4 computer tutorials of 2 hours;
- 2 digital tests;
- 1 written exam.

In addition, there are retake opportunities for digital tests and the written exam.

### **Lectures**

Lectures are primarily a one-way thing: the lecturer discusses the theory on the basis of slides. The slides are available on BlackBoard well before the lectures are given, and there is also an indication of the

chapters in the book (or extra documents) that belong to the subject. BlackBoard contains a week-by-week schedule with almost every week four topics, indicated by 1A, 1B, 2A and 2B. This codes for lecture 1 or 2, A for the first hour and B for the second hour.

Students are supposed to have studied chapters and slides in advance. The lectures will not discuss everything, but concentrate on the main argument of the subject. The lecturer will also go into some subtle things: notation, validity, etc.

For every topic, the slides end with two old exam questions (sometimes one or three). The lecturer will use the remaining time to demonstrate how to solve this question, also going into details like notation and where you will lose points.

There is only limited time for questions during the lectures. For detailed questions, we ask you to ask the lecturer during the break, or before or after class. You may also phone or email him or her. And you can use the tutorials for questions.

## **Tutorials**

The tutorials are done at the end of the week, after two lecture sessions have been given. They concentrate on how to apply the theory that was discussed in the lectures.

Exercises, answers, and full solutions are available to students in advance. We expect from the students that they've tried the exercises, at least most of them. During the tutorials, not every exercise will be discussed. Most likely, the teacher will ask at the start of a tutorial session which exercises are to be discussed. He or she will then make a selection from this list and/or add other exercises. Please do prepare well, and use the answers and full solutions only to check if your solution was right. It is pointless to just read the solutions without trying yourself.

To increase participation, we will adopt the following element in the tutorial session:

- Every week, the teacher will spend ~15 minutes for a part in which you will receive a new, extra, question.
- You get 5 minutes or so to work out the exercise on paper. Please also write your name and student number on the paper.
- After that, two students are invited to write down their solution on the blackboard or whiteboard. Meanwhile, the other students hand in their work. The two students in front of the class may keep their paper while they are writing on the blackboard, but hand it in after they've completed writing.
- The rest of the group is asked to comment. Are all steps correct? Is the approach straightforward? Any issues in notation?

We will not review or grade what is handed in, but we will look at it, and remove students who do not take it serious from the attendance list. Please make sure to bring paper and pen to the tutorial sessions.

There is attendance registration of the tutorials. See below for details.

## **Computer tutorials**

The computer tutorials allow you to develop quantitative skills in typesetting formulas (in Word) and in using Excel for mathematical purposes. A document with explanation and exercises is on BlackBoard.

In the computer tutorials, the role of the teacher is very limited. He or she will not synchronize the work. You work at your own pace. When you have a problem, try to solve the problem, by using Google/YouTube or the Help of Word/Excel, by asking your neighbouring student, etc. When you ask the teacher, the teacher will not give a straight answer (click here, then there, and then there), but take a Socratic attitude: where would you expect it? maybe try the icon over there ...

There is attendance registration of the tutorials. See below for details.

### **Attendance**

Attendance counts: you must attend at least 75% of the tutorials and computer tutorials (which means at least 8 out of 10). If you fail, you will have 2 points deduction from the final grade, and there is no retake for the attendance.

The procedure we develop is as follows:

- the teacher has a list with names of every student that subscribed to that specific group;
- he or she will take two minutes or so to have every student tell his name;
- the list will be published with a week delay or so on BlackBoard;
- if you have issues (you are ill, you have a topsport status, etc.) send an email to the course coordinator, not to the tutorial teacher.

### **Digital tests**

There are two digital tests, which have been scheduled in advance. Note that both test count for 15%, and that the minimum of mean of the tests is 5.00. In other words, if you don't show up at one of the tests, you must obtain a 10.0 at the other test. In case you fail for the tests but pass for the written exam, there is a retake of the combined tests.

At the tests, you will be seated at the TenT. Instructions for logging into the computers will be given. But you will at least need to bring:

- your student card (which contains your student number);
- an ID (ID-card, passport, driving license);

Further, you are allowed to bring:

- a pen for making notes;
- a bottle with water or another beverage (not a cup).

You are not allowed to bring:

- a telephone, tablet, laptop, etc;
- a USB-stick;
- a calculator;
- books, dictionaries, papers, or other documents;
- food or drinks in a cup (a bottle is allowed).

You will save your answers in a Word document. Make sure that you know the basic principles of Word (typing, opening and saving a document, etc). It is your own responsibility to save your work regularly. With a room of 350 computers, it may always happen that a computer crashes. In such cases we will help you, but if you didn't save your work, we can't.

The computers in the TenT run on Windows 7, with English-language software. This means that the Excel function for the square root will be SQRT, not WORTEL. The computers have a standard keyboard and a simple right-handed mouse. You have limited possibilities to change the settings. The numerical

settings are – most probably – Dutch. This means the number  $\pi$  is represented as 3,14, not as 3.14. However, note this may be different. You should be able to adapt to this easily.

During the digital tests, a few teachers or assistants will be available for solving problems or answering questions. However, they will not tell you how to answer the questions.

Some students have extra time, for specific reasons (ADHD, dyslexia, etc.). They should contact the study advisor in advance. Please inform the course coordinator if a special situation applies to you.

### **Written exam**

The written exam is on 21 October. Please make sure you are in time, and allow for traffic delays. The rules for taking exams have been set by the faculty, and they are non-negotiable. Please read these rules (which are on the faculty's website) carefully. You must further follow the instructions given by the vigilants. In most cases, there is no teacher present at the exam. If you think there is a mistake in the exam, check with the vigilant, and he or she will contact a teacher.

At the exam, you will need to bring:

- your student card (which contains your student number);
- an ID (ID-card, passport, driving license);
- a blue or black pen etc. for writing the answers (note: if you use a pencil, your rights for asking for a higher grade will be smaller!).

Further, you are allowed to bring:

- a blue or black pen for making notes;
- a normal scientific calculator, that can do logarithms, the cosine, the factorial function, etc;
- a bottle with water or another beverage (not a cup).

You are not allowed to bring:

- a telephone, tablet, laptop, etc;
- a graphical calculator, a programmable calculator, a calculator that can do matrix calculations, integrals or derivatives, or a calculator app;
- books, dictionaries, papers, or other documents;
- food or drinks in a cup (a bottle is allowed).

Finally, we will give you at the exam:

- a formula sheet that contains the most important formulas;
- empty paper.

If you think you need extra time or facilities (e.g., a laptop), you should contact the study advisor in advance.

### **Communication**

You may have questions on the organization. Can you always do the retake, also if you passed? Which calculator can you use? Please contact the course coordinator for such questions, not the teacher of your tutorial session.

### **Feedback**

The slides, exercises, documents, etc. may contain typos, mistakes, or blunders. All feedback is appreciated. Small mistakes may be corrected in real time, so that the document may already be updated

when you inform me. But please inform me. Please note that the information on BlackBoard may be changed. Do not download all slides and exercises in advance without any further checking for updates.

### **Contact**

Do not hesitate to contact the course coordinator for questions:

- room 11A-47
- telephone 020-5982384
- email: [r.heijungs@vu.nl](mailto:r.heijungs@vu.nl)

On behalf of all teachers, good luck!

dr. Reinout Heijungs, course coordinator