

# **CAS MA 213 – Introduction to Statistics and Probability**

**Lecture: twice a week at 90 minutes each**

**Discussions : once a week at 60 minutes**

**Laboratory: once a week at 60 minutes**

**Textbook:** “Statistics” 12<sup>th</sup> ed. by McClave and Sincich

**Instructors:** Dr. Hans-Otfried Müller, René Mauer – TU Dresden

**Notes:** \* You need a (simple) pocket calculator for this course. \* Bring the textbook to the class. \* I will distribute versions of my lecture notes.

## **Course objectives**

Statistics is essential for proper collection, analysis and interpretation of data. In this course, you will be introduced to a collection of statistical techniques that are useful for basic data analysis. In the beginning, we will discuss certain fundamental issues of data analysis, and develop related probability models. At some point during the course, you may not fully understand how a particular topic fits into the overall objective of this course. This course builds on itself, and we will eventually put everything together. Also, note that this course may start somewhat slowly, but it picks up steam along the way.

## **Homework**

Homework problems are given in the lectures. These problems will not be collected (unless otherwise announced), but they are essential part of this course. It is important that you work on them. You may work on home individually or in groups. Good group work is preferable to individual work: it allows the exchange of ideas among group members. However, if you work on a group it is very important that everyone actively participates. The problems that are assigned will be enough for most of you to understand the material. However, if you need additional work, you can do other problems in the book.

## **Discussions**

The discussion sections provide you the opportunity to ask questions about any of the course material, past or current assignments, or any subjects beyond the material covered in the lecture. We will also go through examples drawn from the lectures. Please complete all reading assignments before your section, and prepare questions in advance.

## **Laboratory**

The laboratory sections provide you the opportunity to analyze real data to show how statistical methods can be applied to real life situations. You will use statistical software to solve these problems. The statistical software for the class is SPSS (Version 24).

## Examinations

There will be four exams in the course. All exams will be closed book and closed notes (unless otherwise announced). The first three exams are not cumulative, the fourth exam is cumulative. Exams carry equal weights and will take place according to the following tentative schedule (changes will be announced in class):

1. BU has a strict policy against cheating and plagiarism. Any form of cheating or plagiarism, and disruptive activities during lectures, will not be tolerated.
2. All exams are required. Make up exams will be offered only under exceptional circumstances (medical reason and family emergencies) when the following conditions are met:
  - a) You must contact me BEFORE the exam to let me know that you will be missing the exam. If I am not available, send an e-mail or leave a message to the BU Dresden program. Be prepared to show positive proof related to your emergency.
  - b) Be prepared to take the exam at the earliest available time at my convenience.
3. CAS students are expected to take CASMA213 to fulfill their statistics requirement. If you are a CAS student taking this class, please check with your department/advisor to make sure that this class will fulfill your requirement.

## Outline of the syllabus

Week	Chapter	Reading	Description
1	1 & 2	All sections (1) and 2.1	Motivation
2 & 3	2	2.2-2.8	Summarizing Data
3 & 4	3	3.1-3.6, 3.8, 3.9	Probability
5, 6 & 7	4 & 5	All sections (4) and 5.1-5.3, 5.5, 5.6	Random variables, probability distributions
8	6	All sections	Sampling distributions
8 & 9	7	All sections	Interval estimation
9, 10 & 11	8	8.1-8.6, 8.8	Hypothesis testing (single sample case)
12 & 13	9	All sections	Hypothesis testing (two samples case)
13 & 14	10	10.1, 10.2	ANOVA