Probability Theory and Statistics

Werner Nutt

Acknowledgments

- The course is based on the book

  "**Probability and Statistics
  for Engineers and Scientists**",

  by **Sheldon M. Ross**, Elsevier Academic Press.

- We follow the script "**Probability Theory and Statistics**" by **Rafael Penaloza**, who taught this course until 2018/19.

- We also use teaching material (exercises, tables etc.) created by Rafael, as well as new exercises and assignments.

Overview

- Introduction to Probability Theory

- Random Variables

- Special Random Variables

- Sampling

- Parameter Estimation

- Hypothesis Testing

Learning Outcomes

- **Concepts** of probability theory and statistics (sample space, probability, independence, random variable, distribution density, mean, variance, joint distribution, binomial, normal, exponential, Poisson distribution, confidence interval, p-values, …)

- **Apply the tools** of probability theory and statistics to simple data analysis tasks

- Use the **R language** to answer statistical questions

- **Foundation** for further studies

Literature

Sheldon M. Ross

Introduction to Probability and

Statistics for Engineers and Scientists

Elsevier Academic Press, 2004
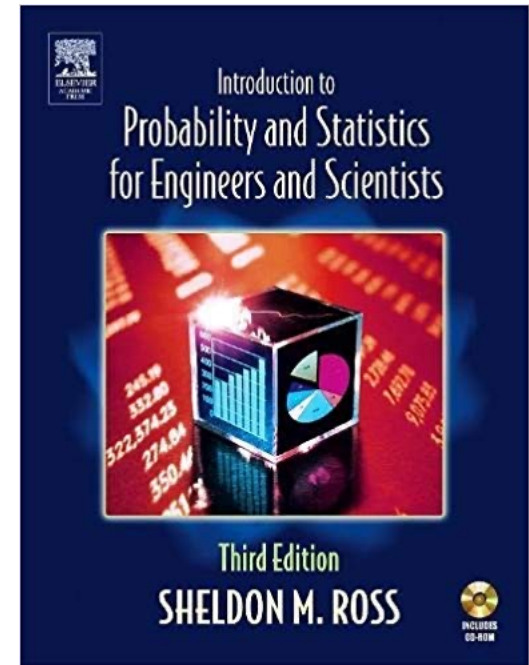
Course is based on this book

The book is available online via the library.

(siehe diesen [Link](#))

Other Literature

Script

   Probability Theory and Statistics

   by Rafael Penaloza

Rafael held the course in 2017/18 and 2018/19

Translation of the script with the title

   Wahrscheinlichkeitstheorie und Statistik

   (to be completed during the semester)

on OLE

Course Organization

- Lectures: Tue 10:30-12:30, Thu 8:15-10:15

- Labs (starting 12 October):
  - Tue 4:30-5:30 (CS), Wed 1:30-3:30 (BI)

  by

  Oswald Lanz (1 x CS, 1 x BI), Werner Nutt (1 x CS)

- Office hours
  - to be determined
    (in any case, please make appointsments)

Assignments

There will be 3 assignments

- Assignments will be marked. The assignment mark will count towards the course mark.

- Any attempt at plagiarism (copying from the web or copying from other students) leads to a 0 mark for all assignments.

Assignments, Final Exam, and Course Mark

- There will be
  - one written exam at the end of the course
  - three assignments
- To pass the course, one has to pass the written exam.
- Students who do not submit assignments will be marked on the final exam alone.
- For students who submit all assignments the final mark will be a weighted average

  70% exam mark + 30% assignment mark

Assignments, Final Exam and Course Mark

- If students submit fewer assignments, the percentage will be lower.

- Assignments for which the mark is lower than the mark of the written exam will not be considered.

- The assignment marks apply to all future exam sessions.

Lecture Style

- Lectures will generally be by writing on my iPad, without slides (to imitate chalk and blackboard)

- Lectures will be very close to the script

- I will use handwritten notes for my lectures, which I will publish on OLE

- Still, taking handwritten notes^{sie} is likely to be useful

- (In my on-premise lectures, phones, etc. are not allowed: There is ample evidence that learning in lectures is more effective without them.)

Interaction

In my presence lectures I like to

- answer questions by students

- ask questions to students

- give little exercises, to check understanding

We will have to experiment to see how that works

in online teaching.