Probability and Statistics

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INTRODUCTION

Course contents

- CH1: Probability theory
- CH2: Random variables
- CH3: Parametric families of univariate distributions
- CH4: Distributions in the presence of multi-dimensionality and functions of random variables
- CH5: Sampling to approximate the true world
- CH6: A gentle introduction to everyday statistics
- CH7: Introduction to statistical inference
- CH8: Relationships

Course objective

- To understand present-day applications of Probability and Statistics.
- To provide pointers to more advanced literature so as to be able to find material to deal with more sophisticated problems

Workshops

- As the instructors are shared with the Calculus professor, practical sessions are given before the theory sessions :
  - o Recapitulation of previous class – hence, this is your chance to ask for clarifications!
  - o Exercises about last week's course chapters

Organization

- 15h of Theory lessons by the Professor (in English) +
- 15h of Practical works by Instructors (in French) in smaller groups for better follow-up
- Contact addresses:
  - o Theory: Prof Dr Dr K Van Steen
    - kristel.vansteen@ulg.ac.be
    - www.montefiore.ulg.ac.be/~kvansteen
  - o Practicals + Theory:
    - Mr Darmont (Marcel): Marcel.Darmont@ulg.ac.be
    - Mrs Huaux (Hélène): H.Huaux@ulg.ac.be
    - Mr Lousberg (Pierre): plousberg@ulg.ac.be

Partition of the workshop groups

3ème B. Ing Cvl [A → G]   R52(B4 - Europe)
   Mr Darmont

3ème B. Ing Cvl [H → R]   R53(B4 - Europe)
   Mr Lousberg

3ème B. Ing Cvl [S → Z]   R54(B4 - Europe)
3ème B. Ing Archi.   le 16/11 : S74 (B4)
2ème B. en Sc. Info.
   Mme Huaux

Organization

PROB and STATS				# slides (*)	
Theory					
Tu 21/09	2hrs	intro + CH1	CH1	92	Probability theory
Tu 28/09	2hrs	CH2 + CH3	CH2	90	Random variables
Tu 05/10	2hrs	CH3 + CH4	CH3	127	Parametric families of univariate distributions
Tu 12/10			CH4	151	Distributions in the presence of multi-dimensionality and functions of random variables
Tu 19/10	2hrs	CH5	CH5	119	Sampling to approximate the true world
Tu 26/10	2hrs	CH6	CH6	145	A gentle introduction to everyday statistics
Tu 02/11			CH7	280	Introduction to statistical inference
Tu 09/11	2hrs	CH7	CH8	175	Relationships
Tu 16/11	2hrs	CH8			
Tu 23/11					
Tu 30/11					

- The slides are comprehensive and provide sufficient background info
- Some of the course notes are part of self-study time: ask questions during workshops as well!
- Practicals start on Tu 28 September
- Ch8 exercises + course: 16 or 17 December?

Course website   (www.montefiore.ulg.ac.be/~kvansteen)

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Introduction to Probability and Statistics 2010-2011 (Preliminary Version - Check for Final Version)

MATH0008-2: Introduction to Probability and Statistics

SOME PRACTICAL ARRANGEMENTS:

- When are the classes given?
  - Complete Course Schedule (Updated)

- Where do the classes take place?
  - Theory: B7b - Room 142
- How can I pass the exam?
  - More information? Click here
- What if I have questions?
  - Consult Kristel Van Steen (kristel.vansteen@ulg.ac.be) for any questions about theory or homeworks, preferably on
    - Tuesdays before/after class
    - Wednesdays or Fridays (check availability)

CLASS MATERIAL (use 7-Zip to unpack zipped files):

- Preview on the course notes chapters (versions in progress) :
  - Chapter 1
  - Chapter 2
  - Chapter 3
  - Chapter 4
  - Chapter 5
  - Chapter 6
  - Chapter 7
  - Chapter 8
  - Corresponding reference list for chapters - to be completed

First class: 21 September 2010 :
10h30-12h30

- Introductory Notes
- Course notes: Chapter 1
  - Downloading instructions R and Bioconductor: Follow this link
  - Information on using R:
    - Part 1: R manuals
    - Part 2: Basic Commands !!!

Written notes

- Slides in English = course notes, exercise book in French
- Reference books and publications - Recommended:

o **In English:**

*"Probability and Statistical Inference -
8th edition"*,
Hogg R.V., Tanis E.A. Pearson
Education International,
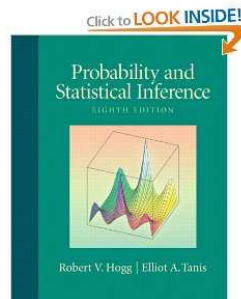Prentice Hall 2010.
ISBN : 10:0-321-63635-X

o **In French:**

*"Probabilités analyse des données et
statistique - 2e
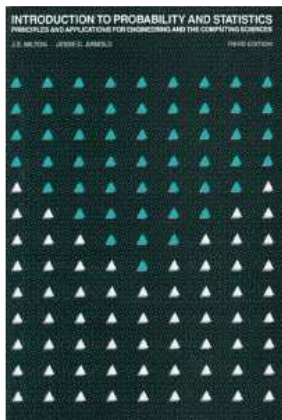édition révisée et augmentée"*,
Saporta G., Editions
TECHNIP 2006, Paris, France
*ISBN : 978-2-7108-0814-5*

- Other references:

"Introduction to Probability and Statistics. Principles and Applications For Engineering and the Computing Sciences - Third Edition", Milton J.S.; Arnold Jesse C.
McGraw-Hill Inc., 1998.
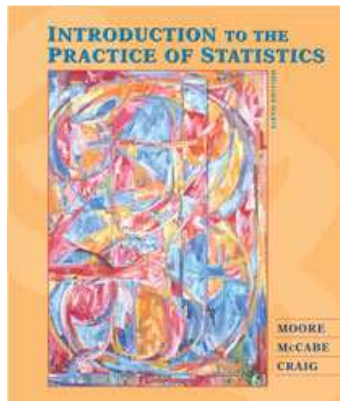ISBN : 0-07-113535-9

"Probability and Statistics for Engineers and Scientists - 6th Edition", Ronald E. Walpole; Raymond H. Meyers; Sharon L. Meyers; Keying Ye; Prentice Hall, 1998.
ISBN : 0-13-840208-6.
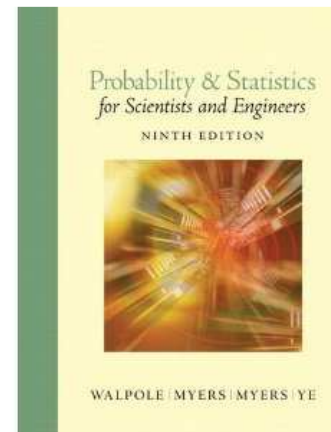
"Introduction to the practice of statistics – 6th edition", David S. Moore; George P. McCabe; Bruce Craig; W.H. Freeman 2009.
ISBN : 1-4292-1622-0

"Introduction to the theory of statistics – 3rd edition", Alexander M Mood; Franklin A Graybill; and Duane C Boes, McGraw-Hill series in probability and statistics 1974.
ISBN : 0-07-042864-6

Assessment

- January:
  - o Open book written exam
  - o Involves solving several exercises based on the theory and practical classes
  - o Total score: 20

- August:
  - o Closed book oral
  - o Involves explaining several important concepts, while completing your story by making references to as many course note sections that are applicable
  - o Total score: 20

Assessment

- Note:
    - o From next year onwards, also the workshop part will be re-organized, and hence the exam system will change
    - o e.g.,
        - January: open book multiple choice questions with some exercises/
        - August: open book oral examination)

UNLESS you would like to have this system already implemented from this year onwards …

Questions?