UPPSALA UNIVERSITY
Dept of Mathematics
Rolf Larsson

Mathematical statistics
Inference 1 1MS035
2022–10–06

Inferens 1 1MS035

Course home page:
See studium.

Course literature:
Sven Erick Alm & Tom Britton (AB): *Stokastik — Sannolikhetsteori och statistikteori med tillämpningar.* Liber, 2008. Kap. 6, 7, 9.
Wackerly, Mendenhall, Schaeffer: *Mathematical Statistics with applications, 7th ed.* Thomson, 2008. Chap. 1, 7-11, 12.3.
(Only one of the books is needed, but in the problem sessions, we will in the first place follow AB.)
Formelsamling för stokastik (on Studium).
Old exams (on Studium).
Lars-Åke Lindahl: *En introduktion till R.* Kompendium
(on Studium).

Teaching:
12 lectures (L) with theory and examples.
4 problem sessions (P), including one guest lecture (45 minutes).
2 computer labs (C).
2 student presentation sessions (S, project work).
English on demand: Slides for lectures are in English. The spoken language will be English if there is any non Swedish speaking students present.

Teacher:
Rolf Larsson (rolf.larsson@math.uu.se)

Examination:
Exam: Written exam, January 3.
Permitted aids: Pocket calculator, collection of formulae (formelsamling).
Hand in assignments: Two, not mandatory but will give bonus on the final exam, 1p each (see further below).
Quizzes: One for each lecture, not mandatory.

Project:
Choose your own data set and analyse it with the methods given in the course. Hand in a short written presentation of your analysis. You are also supposed to present your project orally to the other students. *Compulsory.*
Please hand in your written presentation on Studium no later than December 8.

Please turn the page!

Computer labs:
The computer labs are done individually or in groups of two students.
The purpose is to learn the statistics program R. This program will be useful for solving parts of the hand-in assignments.

Hand-in assignments: There are two non mandatory hand-in assignments, each giving 1 bonus point on the final exam if passed (normally at least 10p of a maximum of 20p is required). The bonus points are only valid for the ordinary exam. The hand-in assignments will be posted on Studium. They should also be handed in to Studium, and they will be corrected there.
The assignments may be solved individually or in groups of at most two students.
Time plan:

#	Out	In
1	18/11	28/11
2	5/12	14/12

Teaching plan:

#	Date	Contence	Chapter in AB
L1	1/11	Course information, introduction, data analys	6.1-4
L2	2/11	Sample, estimation	7.1-7.2.2
L3	9/11	Method of moments, Maximum likelihood	7.2.3-7.2.4
L4	11/11	Least squares etc.	7.2.5-7.2.7
P1	15/11	Problem solving	
L5	16/11	Confidence intervals	7.3
L6	18/11	Hypotesis testing	7.4
L7	21/11	The χ^2 and t distributions	7.5.1-2
C1	22/11	Computer lab	
L8	23/11	Inference for standard distributions	7.6.1-3
L9	24/11	Normal approximation	7.6.4
P2	29/11	Problem solving	
L10	30/11	Chi square methods	8.1-2
L11	1/12	Fisher's exact test, Sign test, Rank based tests	8.3-4.2
L12	5/12	Sperman's rank correlation, Runs test, Permutation test	8.4.3-8.6.1
C2	6/12	Computer lab	
P3	8/12	*Guest lecture*, Problem solving	
S1	13/12	Project presentation by students	
S2	14/12	Project presentation by students	
P4	19/12	Problem solving	

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Problem solving:

#	Övningar	Problem
P1	6.4.3, 7.2: 2, 5-8, 10, 12, 14-15, 17-19	601, 602, 605, 701, 702, 703, 705
P2	7.3.1-3, 7.4.1-2, 4, 7.5.1-4, 7.6: 1-8, 10-19	712-714, 716-719, 723, 727, 729
P3	8.1.1, 8.2: 1-3, 5-6, 8.3.1-2, 8.4:2-4, 7 8.5.1, 8.7.1	801, 802, 805-808, 812, 817, 820, 821
P4	Old exams (will be posted on Studium)	