Stockholms universitet

Course Description for Design of Experiments, GN, 7.5 hp

Department of Statistics

November 19, 2011

1 Course content

The course provides knowledge about experimental designs and analysis of data from experiments. Analysis of variance, randomized block designs, Latin-square designs, linear mixed models, split-plot designs, response surface methodology, mixture models and fractional 2^k experiments are studied. Applications of experimental planning and analysis of variance play a prominent part. The course content is valuable when planning and carrying through experiments.

2 Intended learning outcomes

After the course, the students should be able to

- Give an account for the basic methods for statistical planning of experiments.
- Analyze data from a planned experiment, using analysis of variance.

3 Literature and plan for the lectures

- **Text book**: Montgomery, D. C. (2009). Design and Analysis of Experiments. 7:th ed.
- **Extra material**, distributed on the lectures

In 2011, the course covers the text book sections that are listed in Table 1. The course comprises 14 lectures (F1–F14) and two computer sessions (D1, D2). Table 1 is a plan for the teaching on these occasions.

Table 1: Preliminary plan for teaching

Lecture	Date	Content	Section in textbook
F1	31/10	Introduction for the course, ANOVA	1,2,3
F2	3/11	Linear Model	3, 10
F3	11/11	Projection, Quadratic form	4,10
F4	16/11	Blocking Factors	4
F5	18/11	Factorial Experiment	5
F6	21/11	Mixed Model	13
D1	21/11	Computer Exercise	ANOVA, mixed model
F7	25/11	2^k experiment	6
F8	28/11	Blocking in 2^k experiment	7
F9	29/11	Fractions of 2^k experiment	8
F10	2/12	Discussion for Exercises	
D2	2/12	Computer Exercise	
F11	5/12	3^k experiment	9
F12	6/12	Response Surfaces	11
F13	15/12	Nested factors, split-plot designs	14
F14	16/12	Other topics and Summary	

4 Examination and criteria for assessment

The following seven criteria-referenced grades are used:

- A: Excellent
- B: Very good

- C: Good
- D: Satisfying
- E: Sufficient
- F: Insufficient

A (Excellent): The student can correctly use statistical techniques for planning and analysis of experiments such that have been considered in the course. Moreover, the student can apply the statistical techniques correctly on problems that have not been discussed in the course. The student can present problem solutions clearly and use a correct statistical language.

B (Very good): The student can correctly use statistical techniques for planning and analysis of experiments such that have been considered in the course. The student can present problem solutions clearly and use a correct statistical language.

C (Good): The student can correctly use statistical techniques for planning and analysis of experiments such that have been considered in the course.

D (Satisfying): The student can correctly use statistical techniques for planning and analysis of a majority of experiments such that have been considered in the course. The student can present problem solutions clearly and use a correct statistical language.

E (Sufficient): The student can correctly use statistical techniques for planning and analysis of a majority of experiments such that have been considered in the course.

F (Insufficient): The student cannot correctly plan, analyze and report results from experiments such that have been considered in the course.

The student is assessed through five home assignments, which are not compulsory, and a written examination. The examination and the home assignments are individual. The home assignments are graded and give points according to Table 3. These points are added to the result of the written examination. Because the course comprises five home assignments at most 30 points can be added to the result of the written examination. The points from the home assignments can only be added to the results of the written examinations in December 2011 and February 2012. The points cannot be added to results from examinations written at later points of time. Home assignments that are handed in too late (i.e. after the deadlines) give 0 points. The

student cannot get extra points by completing or correcting solutions after the deadlines. Students not passing the course during the present semester, planning to take the course at a later semester, are requested to contact the course coordinator in the beginning of that semester for information about the current rules for examination.

Table 2: Grades and points per home assignment

Points	Grade
6	A
5	B
3	C
2	D
1	E
0	F

The written examination comprises a number of problems that can give a total of at most 70 points. A single final grade for the complete course is given according to Table 3.

Table 3: The sum of the points from the home assignments and the written examination, and final grade in the course.

Points	Grade
91-100	A
81-90	B
71-80	C
61-70	D
51-60	E
0-50	F

5 Lecturer and examiner

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