

**SYLLABUS**

# **Design of Experiments 7.5 credits K7003N**

**Försöksplanering**

**Course syllabus admitted: Autumn 2023 Sp 1 - Present**

DECISION DATE  
**2022-02-11**

# Design of Experiments 7.5 credits K7003N

## Försöksplanering

### Second cycle, K7003N

| Education level | Grade scale | Subject         | Subject group (SCB)                   |
|-----------------|-------------|-----------------|---------------------------------------|
| Second cycle    | G U 3 4 5   | Kvalitetsteknik | Industrial Engineering and Management |

## Entry requirements

Completed courses of at least 120 credits, with at least the grade Pass. This must include the following courses: Quality management, Introduction course (K0001N) 7,5 credits, Mathematical Statistics (S0001M) 7,5 credits and Linear Algebra and Calculus (M0048M) 7,5 credits, or equivalent knowledge.

## Selection

The selection is based on 30-285 credits

## Course Aim

After completing the course, the student should be able to:

- demonstrate an ability to plan, perform, and analyze experiments based on central experimental design principles in the field; such as two-level fractional factorial experiments.
- describe how response surface methodology can be applied sequentially and demonstrate the ability to plan, perform, and analyze experimental designs that can estimate second-order terms.
- demonstrate an ability to analyze experiments with restricted randomization.
- orally and in writing present planning, execution and analysis of an own chosen experiment in an understandable way for other students with the same skill set as can be expected from taking this course.
- use professional and relevant computer software to aid the analysis of designed experiments and visual presentation of analysis results.

## Contents

The course includes theory on experimental designs and analysis methods to systemize planning and analysis of experiments. The course covers the most common experimental designs that can be useful in industrial experimentation or laboratory experiments, e.g. two-level factorial and fractional factorial designs. Response surface methodology and related designs are also covered. Other more advanced and specialized experimental designs such as robust design and split-plot are normally also covered.

## Realization

Each course occasion's language and form is stated and appear on the course page on Luleå University of Technology's website.

The teaching consists of classroom lectures and seminars, video recordings, lab assignments and group work. Compulsory attendance may apply during oral presentations of group work and other teaching activities. Part of the teaching can be held in English.

## Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided. The grading scale of the course includes the steps U, 3, 4, 5.

To receive the grade 3 (pass), the student must demonstrate the knowledge objectives are achieved through the final oral or written exam, and through mandatory laboratory reports, and reports and oral presentations of own experiments during the course. The grade may be affected by how the compulsory tasks have conducted and presented. Assignments that give points to the final exam may apply. The final exam gives a numeric grade, and, provided that other compulsory parts in the course have been completed with a passing grade, it will determine the final grade on the course together with other extra-credit tasks on the course. The extra credits can only influence the grading results of the exam directly adjacent to the course's closure.

## Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term "unauthorized aids" refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

## Remarks

The course is based on active participation from students in different group-based projects and assignments. Therefore, the number of students accepted to the course may be limited. Priority is given to students that are accepted to the quality management specialization.

Students must register for the courses themselves, or contact ETKS educational administration [eduetks@ltu.se](mailto:eduetks@ltu.se), not later than three days after the quarter commences. Failure to do so can result in the place being lost. This rule also applies to students with a guaranteed place.

## Overlap

The course K7003N is equal to IEK350

## Course offered by

Department of Social Sciences, Technology and Arts

## Modules

| Code | Description     | Grade scale | Cr  | Status    | From period | Title |
|------|-----------------|-------------|-----|-----------|-------------|-------|
| 0001 | Written exam    | G U 3 4 5   | 4.5 | Mandatory | A08         |       |
| 0002 | Laboratory work | U G#        | 3   | Mandatory | A08         |       |

## Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

## Last revised

by Director of Undergraduate Studies Daniel Örtqvist, Department of Social Sciences, Technology and Arts 2022-02-11

## Syllabus established

by Institutionen för Industriell ekonomi och samhällsvetenskap 2007-12-17