

# Vector Analysis

Programme course

6 credits

Vektoranalys

TNA007

Valid from: 2017 Spring semester

**Determined by**

Board of Studies for Electrical  
Engineering, Physics and Mathematics

**Date determined**

2017-01-25

## Main field of study

Mathematics, Applied Mathematics

## Course level

First cycle

## Advancement level

G2X

## Course offered for

- Electronics Design Engineering, M Sc in Engineering
- Media Technology and Engineering, M Sc in Engineering

## Entry requirements

Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

## Prerequisites

Calculus and Linear algebra

## Intended learning outcomes

This course is a continuation of the course in multi variable calculus. Consequently, the aims are similar: to give students an understanding of mathematical concepts and familiarity with mathematical methods of analysis. Here, these aims relate to the treatment of functions of several variables and vector fields which arise in all branches of physics and engineering. Students will be expected to be able to do the following after completing this course:

- find potentials and vector potentials for a vector field
- find flow lines of a vector field
- calculate path and surface integrals
- use Gauss' and Stokes' theorems for calculations of flux and path integrals
- use spherical and cylindrical coordinates in calculations

## Course content

Scalar and vector fields. The gradient, divergence and curl. Line, surface and flux integrals. The Divergence theorem and Stokes's theorem. Curvilinear coordinates. Partial differential equations.

## Teaching and working methods

The course is given in the form of lectures, tutorials, tests and a final examination.

## Examination

KTR3	Optional Written Test	0 credits	D
KTR2	Optional Written Test	0 credits	D
TEN1	Written examination	6 credits	U, 3, 4, 5

## Grades

Four-grade scale, LiU, U, 3, 4, 5

## Other information

Supplementary courses: Electromagnetic Field Theory and Electromagnetism, Acoustics.

## Department

Institutionen för teknik och naturvetenskap

## Director of Studies or equivalent

George Baravdish

## Examiner

Olof Svensson

## Course website and other links

<http://www2.itn.liu.se/utbildning/kurs/>

## Education components

Preliminary scheduled hours: 48 h

Recommended self-study hours: 112 h

## Course literature

### Additional literature

#### Books

Anders Ramgard, *Vektoranalys*  
THS AB.

## Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at [http://stydokument.liu.se/Regelsamling/Innehall/Utbildning\\_pa\\_grund-\\_och\\_avancerad\\_niva](http://stydokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva).