Blekinge Institute of Technology
Department of Mathematics and Science

COURSE SYLLABUS

Komplex analys och transformer

Complex Analysis and Transforms

7,5 ECTS credit points (7,5 högskolepoäng)

Course code: MA1305
Educational level: Basic level
Course level: G1F
Field of education: Natural sciences
Subject group: Mathematics

Subject area: Mathematics
Version: 10
Applies from: 2008-10-24
Approved: 2009-11-01
Replaces course syllabus approved: 2007-02-13

1 Course title and credit points
The course is titled Complex Analysis and Transforms/Komplex analys och transformer and awards 7,5 ECTS credits. One credit point (högskolepoäng) corresponds to one credit point in the European Credit Transfer System (ECTS).

2 Decision and approval
This course is established by The Board of the Department of Mathematics and Science 2007-02-13. The course syllabus was revised by The Board of the Department of Mathematics and Science and applies from 2008-10-24.
Dnr: TEK56-59/2007.
Replaces MAB014, Complex Analysis and Transforms.

3 Objectives
The course yields knowledge in analytic functions and residue calculus in order to teach the Fourier, Laplace and z-transforms. These constitute the background of applications to telecommunications, signal processes and other technical fields.

4 Content
• Complex functions, analytic functions, the Cauchy-Riemann equations, integration along open and close curves
• The Taylor and Laurent series, poles and residues, the Cauchy theorems
• Calculations of the values of real integrals over the intervals using resudues
• The Laplace, Fourier and z-transforms
• Solution of ordinary differential equations, the Volterra integral equations and difference equations

5 Aims and learning outcomes
On completion of the course the student will be able to:
•learn the basis of complex analysis and residue calculus.
•evaluate the values of generalized integrals of the Laplace and Fourier type by means of residue calculus.
•learn the Laplace, Fourier and z-transforms.
•use the transforms and the residue calculus to solutions of ordinary differential equations and difference equations.
•analyze and synthesize hypotheses to determine correct methods of solutions.

6 Generic skills
The following generic skills are trained in the course:
• Skills in searching of the mathematical apparatus that has been learnt to select solution models fitted to the posed questions
• Skills in working in interdisciplinary teams
• Skills in expressing problems in English

7 Learning and teaching
The teaching comprises lectures and exercises.
The teaching language is English.

8 Assessment and grading
Examination of the course

Code	Module	Credit	Grade
0710	Written examination[1]	7.5 ECTS	F/P/3/4/5

[1] The final grade is the same as the examination mark.
The course will be graded Fail, Pass, 3, 4 or 5 .
On request grades according to ECTS will be given.

9 Course evaluation
The course coordinator is responsible for systematically gathering feedback from the students in course evaluations and making sure that the results of these feed back into the development of the course.

10 Prerequisites
15 credits in one-variable calculus and 7,5 credits in multi-variable calculus and theory of transforms .

11 Field of education and subject area
The course is part of the field of education Natural sciences and is included in the subject area Mathematics.

12 Restrictions regarding degree
The course cannot form part of a degree with another course, the content of which completely or partly corresponds with the contents of this course.

13 Additional information
The course is included in programmes at Blekinge Institute of Technology and is
also available as a separate course.

14 Course literature and other teaching material
Mathews J. H. & Howell R. W. (2006). *Complex Analysis for Mathematics and Engineering.* (5:e upplagan) Sudbury, MA: Jones and Bartlett Pub. Inc. ISBN 0-7637-3748-8.
Stephenson G. & Radmore P. M. (1993). *Advanced mathematical methods for Engineering and Science Students.* (2:a upplagan eller senare) Cambridge: Cambridge University Press. ISBN 0-521-36860-X.
The lecturer's own material (the home page of the course).
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