

Course Specifications

From the academic year 2015-2016 up to and including the

Mathematical Methods (E900005)

Course size (nominal values; actual values may depend on programme)

Credits 6.0 Study time 180 h Contact hrs 67.5 h

Course offerings and teaching methods in academic year 2018-2019

A (semester 1) English lecture 30.0 h

Lecturers in academic year 2018-2019

Constales, Denis TW16 lecturer-in-charge

Offered in the following programmes in 2018-2019

	crdts	offering
European Master of Science in Nuclear Fusion and Engineering Physics	6	A
European Master of Science in Nuclear Fusion and Engineering Physics	6	A

Teaching languages

English

Keywords

complex analysis, distributions, differential equations

Position of the course

in depth study of a number of topics of the first year calculus course (analytical functions and differential equations) and gaining insight in a number of mathematical methods having a range of engineering applications which is as wide as possible

Contents

- Complex Analysis: line integrals and complex functions, holomorphic functions, local and global behaviour, elementary functions and their inverses, applications
- Harmonic functions: introduction, Dirichlet and Neumann problems, Legendre functions and spherical harmonics
- Distributions: generalities, distributions with compact support and tempered distributions, Fourier transform of tempered distributions
- Initial value and boundary value problems: local analysis of 1st order systems, initial value problems for linear ODE's, boundary value problems for linear ODE's, Sturm-Liouville problems

Initial competences

bachelor's courses calculus and algebra

Final competences

- 1 Formulate the definitions and prove the main properties of holomorphic functions.
- 2 Use conformal techniques to solve 2d Dirichlet and Neumann problems.
- 3 Formulate the definitions and prove the main properties of harmonic functions.
- 4 Formulate the definitions, prove and apply the main properties of distributions.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Guided self-study, lecture

Extra information on the teaching methods

Classroom lectures; Computer-assisted problem solving

Learning materials and price

english syllabus electronically available (Minerva)

References

see syllabus

Course content-related study coaching

Minerva and email with instructor

Evaluation methods

end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period

Written examination with open questions

Examination methods in case of periodic evaluation during the second examination period

Written examination with open questions

Examination methods in case of permanent evaluation

Portfolio

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible in modified form

Extra information on the examination methods

Closed-book. The portfolio consists of about ten weekly assignments.

Calculation of the examination mark

Portfolio and final examination have equal weight