

MODULE INFORMATION SHEET

Name of Module Unit	Mathematics II
Name in polish language	Matematyka Semestr III
Module type	compulsory
Form of studying	full-time day courses
Level of study	undergraduate course (B.Sc. level)
Type of study (for extra-mural courses)	-
Programme	Environmental Engineering
Speciality	Environmental Engineering
Responsible department	Faculty of Mathematics and Information Sciences Department of Geometry/Zakład Podstaw Geometrii
Responsible person	Dr Krystyna Kibalczyk

Semester	Lectures(E)	Tutorials	Laboratory	Computer Exercises	Projects	ECTS
3	15	15				3

Objectives (summary)

1. Making the students familiar with elements of complex analysis.
2. Making the students use the Laplace transform in practice.

Prerequisites

Knowledge of mathematics from : Algebra, Calculus I and II.

Rules of integrated grade

0,5 tutorial grade + 0,5 lecture grade

Recommended readings

1. E. Kreyszig , Advanced Engineering Mathematics, John Wiley@ Sons, inc, 1999.
2. Glyn James, Advanced Modern Engineering Mathematics, Addison- Wesley, 1999.
3. C. Ray Wylie, Advanced Engineering Mathematics, McGraw-Hill, 1975.

Contents of lectures (syllabus)

	Topics	Time (hrs.)	Scope (S / Ex)
1	Complex functions. Complex differentiation. The Cauchy-Riemann equations. Laurent series. Singularities, zeros and residues. Contour integrals. The Cauchy integral theorem. The residue theorem.	7	S
2	The Laplace transform. Transforms of simple functions. Existence of the Laplace transform. Properties of the Laplace transform. The inverse transform. Evaluation of inverse transforms. Applications of the Laplace transforms to solution of differential and integral equations.	8	S
Total		15	hours

S – topics listed in the legal study programme standards from 12.07.2007

Ex – extended topics

Lecturers

Dr Krystyna Kibalczyk

Assessment method

One written test from theory on the last lecture.

Contents of tutorials

	Topics	Time (hrs.)	Scope (S / Ex)
1	Complex mappings. Inversion mapping. Bilinear mappings.	1	S
2	Analytic functions.	1	S
3	Mappings revisited.	1	S
4	Taylor series. Laurent series.	1	S
5	Singularities, zeros and residues of complex functions.	1	S
6	Evaluations the contour integral by the Cauchy integral theorem.	1	S
7	The Laplace transform, the definition and properties.	1	S
8	Transforms of simple functions	1	S
9	The first shift theorem. Derivative of transform.	1	S
10	Evaluation of inverse transforms. Transforms of integrals.	1	S
11	Applications of the Laplace transforms to solution of ordinary linear differential equations first- order with constants coefficients	1	S
12	Applications of the Laplace transforms to solution of ordinary linear differential equations second- order with constants coefficients	1	S
13	Applications of the Laplace transforms to solution integral equations.	1	S
14	Engineering applications	1	S
15	Test	1	
Total		15	hours

S – topics listed in the legal study programme standards from 12.07.2007

Ex – extended topics

Persons responsible for tutorials

Dr Krystyna Kibalczyc

Assessment method for tutorials

Final test at the end of semester and students activity during tutorials.
