

MODULE INFORMATION SHEET

Name of Module Unit	Informatics II
Name in Polish language	Informatyczne podstawy projektowania II
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	Department of Informatics and Environment Quality Research
Responsible person	dr inż. Wiktor Treichel

Semester	Lectures(E)	Tutorials	Laboratory	Computer Exercises	Projects	ECTS
4				30		3

Objectives (summary)

The main purpose of the module is to introduce students to MATLAB, an universal and high level programming language of scientific and engineering computing. Students should acquire the skills in integration of engineering computing, graphical presentation, visualisation and programming in MATLAB environment. Moreover, an introduction to Simulink package will give the possibility of modelling and simulation of dynamic systems (continuous and discrete) in the field of environmental engineering. After the course, the students will be able to analyze and solve basic numerical and environmental engineering problems in their further study.

Prerequisites

Information Technology, Calculus I and II, Algebra with geometry

Rules of integrated grade setting

Grade of computer exercises.

Recommended readings

MATLAB software documentation
 Holzbecher E. – Environmental modelling using MATLAB, Springer Verlag, Berlin 2007
 Hornberger G. , Wiberg P. – Numerical methods in the Hydrological Sciences, Special Publication Series 57, AGU 2005
 Klee H. – Simulation of dynamic systems with MATLAB and Simulink, CRC Press, 2007
 Elnashaie S. – Numerical techniques for chemical and biological engineers using MATLAB, Springer 2007

Contents of computer exercises

	Topics	Time (hrs.)	Scope (S / Ex)
1	Introduction to MATLAB environment. Graphical User Interface, Matlab language, matrix and element-by-element calculations	2	S
2	Basic mathematical operation and functions. Relations. Logical operators and functions. Matlab language structures: conditional instructions and loops.	2	S
3	Programming in MATLAB, m-files, scripts and functions	2	S
4	2D graphics in MATLAB	2	S
5	3D graphics in MATLAB. Visualisation	2	S
6	Introduction to Simulink. Examples of simple dynamic system modelling	2	S/Ex
7	Simulink – modelling of environmental dynamic systems	2	S/Ex
8	Plotting 1D and 2D functions. Working with data files in Matlab environment	2	
9	Introduction to numerical methods. Solving the nonlinear equations. Finding roots of polynomial. Interpolation. Approximation	4	S/Ex
10	Solving systems of linear equations. Numerical integration	2	
11	Numerical methods for solving first order ordinary differential equations	4	S/Ex
12	Solving individual problems from environmental engineering	4	S/Ex
Total		30	Hours

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

Ex – extended topics

Persons responsible for computer exercises

dr inż. Wiktor Treichel

Assessment method for computer exercises

Continuous assessment. Practical test of MATLAB using. Assessment of individual project.