

Programming with MATLAB and *Mathematica* — Course Syllabus

Course Number: AMCS 107

Course Title: Programming with MATLAB and *Mathematica*

Academic Semester: Summer

Academic Year: 2015/2016

Semester Start Date: Jun 6, 2016

Semester End Date: Aug 4, 2016

Class Schedule: Mon & Thu, 13:30-16:30

Classroom Number:

Instructor(s) Name(s): Lajos Loczi

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Teaching Assistant name:

Email:

Office Location: Bldg 1, MCSE, 4307-CU03

Office Hours: By appointment

COMPREHENSIVE COURSE DESCRIPTION

The course consists of three main parts: *Mathematica*, MATLAB and LaTeX.

Description of the *Mathematica* part

Introduction to *Mathematica* and to the Wolfram Language (knowledge-based language, built-in support for real-world entities, Wolfram|Alpha and the Wolfram Demonstrations Project).

Typesetting and presenting your work and data (2D typesetting and LaTeX output, 2D/3D charts, deploying interactive documents, 100+ supported file formats for import and export).

Numerical and symbolic computations (arbitrary-precision arithmetic and automatic precision tracking, dynamic interactivity).

Lists, strings, rules, patterns and pattern matching.

Different programming paradigms (procedural, functional and rule-based).

Graphics and image manipulation (the 30+ members of the plot family, pixels and voxels, the built-in image editor).

Linear and polynomial algebra. Exact and numerical optimization. Calculus and differential equations (analytic and numerical solutions of ODEs and PDEs). Plane and solid geometry.

Probability and statistics (descriptive statistics, built-in support for 100+ distributions).

Description of the MATLAB part

Getting started. Scripts, variables, basic operations, and basic plotting.
Functions. Flow control. Line plots, image and surface plots. Vectorization.
Linear algebra and polynomials. Optimization. Differentiation and integration. Differential equations.
Probability and statistics. Structures, images and animations. Debugging.

Description of the LaTeX part

Introduction. Tables, BibTeX and graphics. Presentations, drawing and programming.

GOALS AND OBJECTIVES

To efficiently use these technical computing systems in one's studies and research.

REQUIRED KNOWLEDGE

Freshman-level calculus and linear algebra.

METHOD OF EVALUATION

Percentages	Graded content
45%	<i>Mathematica</i>
45%	MATLAB
10%	LaTeX

COURSE REQUIREMENTS

Assignments

In the *Mathematica* part, there will be 5 quizzes (5x9%).

In the **MATLAB** part, there will be 5 quizzes (5x9%).

In the **LaTeX** part, there will be 2 quizzes (2x5%).

To pass the course with a Satisfactory grade (S), one should obtain at least 70%.

Course Policies

Students are expected to attend all classes. They are required to submit every assignment on time.

Incomplete grade (I) for the course will only be given under extraordinary circumstances (such as sickness).

NOTE

The instructor reserves the right to make changes to this syllabus as necessary.