2024/2025 SEMESTER I.

Course title	*Software for Mathematics*
Course Code	IVB044ANMI
Hours/Week: le/pr/lab	0/0/2
Credits	3
Degree Programme	Computer Science Eng. (BSc)
Study Mode	full-time
Requirements	term grade
Teaching Period	fall
Prerequisites	-
Department(s)	Dept. of Technical Informatics
Course Director	Landek Nikoletta
Teaching Staff	Mhd Mouayad Ahmad Abdalla

COURSE DESCRIPTION

A short description of the course (max. 10 sentences).
Neptun: Instruction/Subjects/Subject Details/Basic data/Subject description

About mathematical software in general. Introduction to MATLAB, syntax, simple scripts, functions, and their usage. Fundamentals of MATLAB programming, simple I/O, possibilities of visualization. Programming structures, loops, conditional statements, data structures, logical indexing. Solving engineering problems in the MATLAB environment, equations, regression, signal processing tasks. The structure, operation, and usage of Simulink, Matlab-Simulink connection. Syntax, expressions, variables, operations, etc.

SYLLABUS

Neptun: Instruction/Subjects/Subject Details/Syllabus

1. GOALS AND OBJECTIVES

Goals, student learning outcome.
Neptun: Instruction/Subjects/Subject Details/Syllabus/Goal of Instruction

The course provides an insight into the practical applications of mathematical software widely used in various engineering fields. Through practical and theoretical problems and tasks, the course introduces students to efficient software-supported problem-solving, data analysis, and visualization.

Completing the course helps students approach and solve engineering-mathematical tasks related to other professional courses (or various types of professional problems) effectively, as well as interpret, evaluate, and visualize the results. The knowledge and skills acquired in the course provide a solid foundation for handling and solving complex problems efficiently in the future.

2. COURSE CONTENT

Neptun: Instruction/Subjects/Subject Details/Syllabus/Subject content

TOPICS

LAB	
	1. *MATLAB Environment, Introduction*
	2. *Fundamentals of MATLAB Programming*
	3. *Programming Structures, Data Structures*
	4. *Scripts and Functions*
	5. *Complex Data Types, File I/O*
	6. *Solving Engineering Problems*
	7. *Signal Processing Tasks*
	8. *Simulink, System Testing*
	9. *Matlab-Simulink conection*
	10. *Simple Data Analysis, Visualization*
	11. *Simple Data Analysis, Descriptive statistics, tests*

DETAILED SYLLABUS AND COURSE SCHEDULE

ACADEMIC HOLIDAYS INCLUDED

LAB

week	Topic	Compulsory reading; page number (from … to …)	Required tasks (assignments, tests, etc.)	Completion date, due date
1.	MATLAB Environment, Introduction, Elementary Operations, Arithmetic, Help System.	[1.] [2.] [3.]		
2.	Fundamentals of MATLAB programming, elementary I/O, visualization	[1.] [2.] [3.]		
3.	Programming structures, loops, conditional statements, important data structures	[1.] [2.] [3.]		
4.	Using scripts and functions, built-in functions and operations	[1.] [2.] [3.]		
5.	Complex Data Types, File I/O	[1.] [2.] [3.]		
6.	Solving engineering problems, differential equations, regression, plotting parametric functions, etc	[1.] [2.] [3.]		
7.	Solving signal processing tasks, convolution, FFT, spectrum of signals	[1.] [2.] [3.]		
8.	**Midterm Exam 1**			
9.	**Autumn brake**			
10.	Using the Simulink environment, creating simple system models, simulations. Examining simple control systems in the Simulink environment	[1.] [2.] [3.]		
11.	Matlab - Simulink connection syntax, variables, expressions, operations, equation solving	[1.] [2.] [3.]		
12.	Simple data analysis, visualization, basic statistical analysis of data, fundamental distributions	[1.] [2.] [3.]		
13.	Simple data analysis, descriptive statistics, statistical tests	[1.] [2.] [3.]		
14.	**Midterm Exam 2**			
15.	**Retakes**			

3. ASSESSMENT AND EVALUATION

(Neptun: Instruction/Subjects/Subject Details/Syllabus/Examination and Evaluation System)

ATTENDANCE

In accordance with the Code of Studies and Examinations of the University of Pécs, Article 45 (2) and Annex 9. (Article 3) a student may be refused a grade or qualification in the given full-time course if the number of class absences exceeds 30% of the contact hours stipulated in the course description.

Method for monitoring attendance *(e.g.: attendance sheet / online test/ register, etc.)*

Attendance sheet. Maximum allowed absence: 30%.

ASSESSMENT

Cells of the appropriate type of requirement is to be filled out (course-units resulting in mid-term grade or examination). Cells of the other type can be deleted.

Course resulting in mid-term grade (PTE TVSz 40§(3))

Mid-term assessments, performance evaluation and their ratio in the final grade *(The samples in the table to be deleted.)*

Type	Assessment	Ratio in the final grade
Midterm Test 1	*max. 100%*	*50%*
Midterm Test 2	*max. 100%*	*50%*

Opportunity and procedure for re-takes (PTE TVSz 47§(4))

The specific regulations for improving grades and resitting tests must be read and applied according to the general Code of Studies and Examinations. E.g.: all tests and assessment tasks can be repeated/improved at least once every semester, and the tests and home assignments can be repeated/improved at least once in the first two weeks of the examination period.

Each midterm test can be retaken one time during the semester.

Grade calculation as a percentage

based on the aggregate performance according to the following table

Course grade	Performance in %
excellent (5)	85 % …
good (4)	70 % … 85 %
satisfactory (3)	55 % … 70 %
pass (2)	40 % … 55 %
fail (1)	below 40 %

The lower limit given at each grade belongs to that grade.

4. SPECIFIED LITERATURE

In order of relevance. (In Neptun ES: Instruction/Subject/Subject details/Syllabus/Literature)

COMPULSORY READING AND AVAILABILITY

[1.] Matlab Onramp
https://matlabacademy.mathworks.com/details/matlab-onramp/gettingstarted
[2.] Matlab fundamentals
https://matlabacademy.mathworks.com/details/matlab-fundamentals/mlbe
[3.] MATLAB® The Language of Technical Computing
https://www.mn.uio.no/astro/english/services/it/help/mathematics/matlab/getstart.pdf

RECOMMENDED LITERATURE AND AVAILABILITY