General Information:

Name of Course: # SYSTEM THEORY I.

Course Code: **IVB352ANMI**
Semester: 3rd
Number of Credits: 4
Allotment of Hours per Week: 4 Lessons /Week
Evaluation: Exam (with grade)
Prerequisites: **IVB292AN (Math2)**

Instructors: **Dr Zoltán SÁRI, associate professor**
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Introduction, Learning Outcomes:

The course provides an insight into the fundamental concepts and techniques of signal processing, and the representation of linear systems in time-, frequency-, and complex frequency-domain. The main goal of the course is to equip the students with the basic tools required for the analysis of the input-output relation of continuous- and discrete-time systems based on the description of the characteristics and connections of the components and parts, applying the corresponding mathematical apparatus.

The objectives of this course:

Upon completion of this course the student should be able to: **interpret,** and **put into practice**

- the fundamental concepts and basic tools of signal processing,
- usage of mathematics, complex variables and algebra for analysis of linear systems,
- fundamental properties of systems and input-output relations,
- representation of linear systems in time-, frequency-, and complex frequency-domain.

Schedule:
The rough outline of the schedule is as follows:
Week 1-2: Mathematical review, Complex numbers, Signals and their properties
Week 3-4: Fundamentals of time-domain representation of CT and DT systems, Basic properties of systems
Week 5: Convolution Sum, Convolution Integral, Applications of Convolution
Week 6: Superposition principle, Properties of LTI systems
Week 7: Periodic signals, Frequency response, CT Fourier series, Spectrum
Week 8: **Test 1**
Week 9: *Autumn break*
Week 10: CT Fourier transform, Properties of Fourier transform
Week 11: Fundamental concepts of sampling and reconstruction
Week 11: DT Fourier series, DT Fourier transform
Week 12: The Laplace-transform and its applications
Week 13: The z-transform and its applications
Week 14: Filtering basics
Week 15: **Test 2**

Attendance:
Attendance is required at all classes. Unexcused absences will adversely affect the grade, and in case of absence from more than 30% of the total number of lessons will be grounds for failing the class. To be in class at the beginning time and stay until the scheduled end of the lesson is required, tardiness of more than 20 minutes will be counted as an absence. In the case of an illness or family emergency, the student must present a valid excuse, such as a doctor's note.

Evaluation and Grading
End of course grades assigned by instructor are based on:
Tests: 90%
Participation, progress, effort and attitude: 10%

Grading Scale:

Numeric Grade:	5	4	3	2	1
Evaluation in points:	89%-100%	77%-88%	66%-76%	55%-65%	0-54%

Students with Special Needs:
Students with a disability and needs to request special accommodations, please, notify the Deans Office. Proper documentation of disability will be required. All attempts to provide an equal learning environment for all will be made.

Readings and Reference Materials:

A. V. Oppenheim, A. S. Willsky: **Signals and systems**, *Prentice-Hall*, 1982, ISBN: 978-0138147570
S. Haykin, B. Van Veen: **Signals and Systems**, *John Wiley and Sons*, 1999
S. T. Karris: **Signals and Systems with MATLAB Computing and Simulink Modeling** (Fourth Edition), *Orchard Publications*, 2008