General Information:

Name of Course: # INTELLIGENT SYSTEMS II.

Course Code: PMTMINB216HA
Semester: 6th
Number of Credits: 5
Allotment of Hours per Week: 4 Lectures /Week
Evaluation: 2 midterm exams and oral exam
Prerequisites: PMTMINB215HA

Instructors: **Dr Miklós Gerzson, Associate Professor**
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Office Hours: Thursday 09:30-10:30

Introduction, Learning Outcomes:

The course is intend for undergraduate students in the Bachelor of Engineering Information Technologist Program.

After successful completion of the course students will be enlightened upon the main concepts of discrete time systems. These skills will help them to make their future work better in the field of control engineering. During the semester, the following topics will be taught: fundamentals of sampling, description of sampled / discrete time systems, stability of discrete time system, different way of control of discrete time systems, discrete time state space representation.

General Course Description and Main Content:

Short overview of the subject: the most important forms of sampling, how to get the sampled value of a continuous signal, the mathematical interpretation of the sampling, z- and inverse z-transformation and their theorems, approaching the differential equations with difference equations, definition and use of pulse transfer function, reduced pulse transfer function of terms in serial, parallel and closed loop systems, interpretation of the stability in case of discrete time systems and the relating theorems and methods, holder equipment and its effect to work of the sampled system, discretisation of the continuous PID algorithm: position and velocity algorithms, deadbeat and Dahlin algorithms, discretisation of the continuous time state space representation, observability, controllability and stability.

Methodology:
Demonstration of theoretical background in lectures and common solving of tasks on exercises.

Schedule:

week	2019	Lecture – Thursday 13:00-14:30 A214	Lab – Thursday 14:45-16:15 A214
1	07.02	Introduction – Registration week	No lab
2	14.02	Theory of sampling, z-transformation	Exercises: z- and inverse z-transformation
3	21.02	Discretisation differential equation	Solving of difference equation
4	28.02	Pollack expo	Pollack expo
5	07.03	Definition of pulse transfer function	Exercise: pulse transfer func.
6	14.03	Reduced pulse transfer function	Exercise: reduced pulse transfer func.
7	21.03	Stability of discrete time systems	Exercises: discrete time systems
8	28.03	**Midterm I.**	
9	04.04	Holder equipment	Exercises: effect of holders
10	11.04	**Spring holiday**	-
11	18.04	Discrete PID algorithms	Exercises: control of DES

12	25.04	Deadbeat and Dahlin algorithms	Exercises: control of DES
13	02.05	Discrete time state space representation	Exercises: DSSR
14	09.05	Observability, controllability, stability of	DSSR and practice
15	16.05	Midterm II.	

Attendance:
Attending is required all classes, and may impact the grade (only positively). In case of unexcused absences from more than 30% of the total number of lesson 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.

Exam:
Exams of the Students can be done during the Exam Period. The prerequisite of the exam is to write the midterm exam minimum 35% level separately. If one or both midterms is below this minimum level, the midterm or midterms have to be rewrite in the exam period. In case of the achievement is above 35% then there is an oral exam based on themes delivered in advance.

No external aids are allowed to be used.

Evaluation + Grading
Grading will follow the course structure with the following weight:
- Midterms: 33-33%
- Oral examination: 34%.

PTE Grading Policy:
Information on PTE's grading policy can be found at the following location:
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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:
- Lecture notes, examples, exercises in the Neptun MeetSreet
- Schwarzenbach J, and Gill K.F.: System Modelling and Control, Edward Arnold, 1992
- Aström K.J and Wittenmark B.: Computer-Controlled Systems, Prentice-Hall 1990
- Kuo B.C. Automatic Control Systems, Prentice Hall, 1991