

<b>Obuda University</b> John von Neumann Faculty of Informatics		Institute for Cyber-physical Systems		
<b>Name and Code:</b> <i>Electronics / NIEELOEBNE</i>		<b>Credits:</b> 4		
<i>Computer Engineering BSc</i>		<i>Full-time course 2022/23 year II. semester</i>		
Subject lecturer(s): Dr. Komoróczy – Steiner Henriette, Somlyai László, Fekete György, Zakár István				
Prerequisites (with code):				
Weekly hours:	Lecture:2	Seminar: 0	Laboratory 2	Consultation: 0
Way of assessment (exam or midterm grade):	Midterm grade			
<b>Course description:</b>				
<i>Goal:</i> In the course of the course, students will learn the most important tools and areas of analog signal processing, the theoretical operation, properties and typical applications of basic electronic components. They will gain an insight into computer-aided electronic design and learn the basics of metrology.				
<i>Course description:</i> Introduction to basic circuit elements Operation, characteristics and modes of operation of basic electronic circuit devices ;Basic concepts of analogue signal amplification; The operational amplifier; Feedback principles; Typical linear and non-linear applications of operational amplifiers;				

Lecture schedule	
Education week	Topic
1.	Basic electronics concepts, basic measuring techniques, measuring instruments and measuring devices
2.	Properties of passive devices, how filters work
3.	Operation, characteristics and modes of operation of the basic devices of electronic circuits: the diode
4.	Operation, characteristics and modes of operation of basic electronic circuits: diode circuits
5	The operation, characteristics and modes of operation of the basic devices of electronic circuits: the transistor
6.	Operation, characteristics and modes of operation of basic electronic circuit devices: basic transistor connections
7.	The switching mode of a transistor: the switching mode of a bipolar transistor. Structure and operation of the MOS transistor, switching mode of the MOS transistor.
8.	Basic concepts of analogue signal amplification, the operational amplifier (ME), the concept of an ideal ME, its characteristics and the basic connections with an operational amplifier
9.	Important characteristics of ideal operational amplifiers, simulation studies of electronic circuits and feedback principles
10.	Important characteristics of real operational amplifiers, frequency dependence, frequency compensation and typical nonlinear applications of operational amplifiers, comparators
11.	Online test
12.	Midterm exam + lab test
13.	Complementary midterm exam + complementary lab test
14.	Presentation of application tasks
Midterm requirements	

The subject is divided into weekly lessons in the framework of E - learning. In the case of the theoretical material, each week contains 1 to 4 sub-chapters per lesson in the form of videos. These units are accompanied by a short self-assessment test, which can be completed in any number of units. The purpose of this division is to enable students to progress through one lesson per day in small units. A longer self-assessment test and a written version of the theoretical material are provided at the end of the week. This material includes control theory questions and exercises, which you will be asked to solve orally and in writing.

Each week the exercises will be accompanied by theoretical and practical material and a video related to the specific subject, measurement or simulation task. They are also followed by a set of related self-checking questions.

During the semester, the semester performance of the students is determined on the basis of the small Exams written in the practicals, online Test, the theoretical and practical big Exams. Completion of all the assignments in the lab practicals is compulsory, all the assignment sheets of these must be submitted in full.

In order to complete the semester, the aggregate score of the small Exams written in the practical labs, the practical big EXAM, the theoretical big EXAM, must be at least satisfactory level, i.e. separately, 60%, and the online test must be at least 80% and the aggregate laboratory performance (all lab assignments must be complete) must be acceptable.

Classroom worksheets:

During the first 10 weeks, each student is required to prepare a written (handwritten) assignment sheet (record) of the given class assignments, the completed assignment sheet must be submitted and uploaded to the moodle platform. The Task Sheets should include the following: measurement task formulation, wiring diagrams, measurement/simulation plan, measurement results and finally the measurement evaluation.

Small EXAM:

6 small EXAMs will be written during the semester. The small EXAMs are written by all students at the same time, either during the theory class or during the practical class. Exams not written will be credited with 0% marks. One small EXAM can be made up once during the semester (week 12). If the average of the small Exams, including the make-up, does not reach 60%, a signature make-up exam must be taken at the time scheduled during the exam period. **IMPORTANT:** the practical small EXAM includes both the theoretical and practical material taken in the previous lessons and the material for the current lesson.

Online test

During the semester, in week 11, a test of 50 questions will be completed on Moodle.

The test can be completed 2 times and the better result will be considered. If the test score is less than 80%, the student is not eligible to take the major EXAM and must take a substitute exam

Lab mid -term exam:

The lab major EXAM will be written in week 13 during the lab practical. Here, students will be required to independently solve a lab problem based on what they have learned during the semester. The EXAM can be made up once during the semester in week 14, if the result of this or the make-up does not reach 60%, a signature make-up exam must be taken at the time scheduled during the exam period (the result of the last written EXAM counts).

Lecture major final examination:

In week 13, the lecture major EXAM will be written during the theory class, which can be corrected once during the semester in week 14 (regardless of the student's lab assignment). If the result of this or the correction does not reach 60%, a signature make-up exam must be taken at the time of the exam (the result of the last written EXAM counts).

In order to obtain a mid-term mark, the cumulative score of the practical small EXAMs, the practical large EXAM, the theoretical large EXAM, must be at least satisfactory level, i.e. separately 60%, and the online test 80% and the cumulative laboratory performance (all laboratory tasks must be complete in written form) must be acceptable.

A student who is absent from more than 30% of the lab assignments (TVSZ) will be disqualified from the course. The student must be prepared for the lab exercises according to the measurement aids provided, otherwise the student will not be allowed to participate in the lab exercise, which will be considered as an unexcused absence

### Midterm Examination

Oktatási hét (konzultáció)	Témakör
11.	Online test (min 80% need) - Test can be completed twice
12.	Complementary small EXAM (if needed)
13.	midterm exam + lab test
14.	Complementary midterm exam + complementary lab test

### Method used to determine the end-of-semester grade

All results (Small Exams, Large Exams, Online Test) are expressed as a percentage.

Method of calculation of the mark (if all other conditions are met):

MARK = (Lab EXAM % + Theoretical major EXAM %) / 2 [%]  
(each of the two EXAMs separately must achieve 60%)

Point thresholds for each merit mark:

0% - 59%: unsatisfactory (1)  
60% - 69%: satisfactory (2)  
70% - 79%: average (3)  
80% - 89%: good (4)  
90% - 100%: excellent (5)

### Complementary exam

During the semester 1 small EXAM can be substituted in week 12.

Two large EXAMs (laboratory written large EXAM and theoretical large EXAM) required to obtain a mid-term grade can be substituted in week 14.

All parts must be made up in the signature make-up exam:

- Presentation of completed worksheets from class (from material from weeks 1 to 10).
- Small EXAM questions
- Lab large EXAM
- Theoretical large EXAM

### Vizsga módja

<p>The subject ends with a mid-year mark.  Small Exams are written in the theory class or in the practical class.  The test written in week 11 is online: on Moodle.  The large theoretical EXAM written in week 13.  The large practical EXAM written in week 13 is a complex development of a measurement or simulation task during the practical in week 13.</p>
<b>Grade</b>
The subject ends with a mid-term grade.
<b>Referencies</b>
Obligatory:
Learning materials in Moodle
Recommended:
<p>In Hungarian:  Zsom Gy.: Elektronikus áramkörök I./A KKMF 1040, 1997  In English:  U. Tietze – Ch. Schenk : Electronic Circuits: Design and Applications</p>
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