Óbudai University	
Kandó Kálmán Faculty of Electrical Engineering	Institute of Microelectronics and Technology

Subject name and code: Electrotechnics, KMEEL1AMND, KMEEL1AMNC			Credits: 5	
Full-time, fall semester (3rd semester)				
Course: technical management				
Responsible:	Dr. Kovács Balázs		Lecturer	Horváth Márk
Prerequisites:		Physics, KMEFI1AMND, KMEFI1AMNC		
Contact hours per week:	Lecture: 2	Classroom discussion: 2	Laboratory: 0	Consultation:
Assessment and evaluation:	**exam**			

Subject description

Aims: To develop a firm understanding of the most important concepts and laws of electricity theory and network calculation methods. To know the most important electrical and electronic components and circuits.

Topics of lecture	Week	Lesson length
Structure of matter, atoms, electrons, protons, ions. Electric charge and current, voltage, resistance and power. Ohm's law. Conductors and insulators.	**1.**	**2**
DC networks. Voltage and current generators. Resistors. Net resistance. Specific resistance.	**2.**	**2**
DC networks. Kirchoff's laws and application for simple circuits.	**3.**	**2**
DC networks. Voltage and current divider formulae. Method of superposition.	**4.**	**2**
DC networks. Real generators. Thevenin and Norton principles. Power matching and efficiency.	**5.**	**2**
Electric and magnetic fields. Capacitors and inductors. DC and step function operation.	**6.**	**2**
AC networks. Sinusoidal voltage in time domain. Voltage, current and power on resistor. Effective power and voltage. AC operation of capacitors and inductors. Reactive power. Power factor.	**7.**	**2**
Complex number and vectorial representation of sinusoidal signals. Impedance, complex Ohm's law. Impedance of R,C,L.	**8.**	**2**
Fourier series and transformation. Frequency domain and spectrum. Spectral transfer functions.	**9.**	**2**
Serial and parallel resonant circuits. Filters.	**10.**	**2**
Magnetic field and induction. Transformers, relays, fuses, electromagnets, motors and generators. Basics of electromagnetic waves.	**11.**	**2**
Semiconductors. Diodes, Zener-diodes.	**12.**	**2**
Basics of transistors.	**13.**	**2**
Break/holiday.	**14.**	**2**
Topics of classroom discussions		
Calculations of simple resistor networks. Voltage, current, resistance, power. Net resistance. Re-drawing and simplifying of resistor circuits.	**1.**	**2**
Kirchoff's laws for resistive circuits. Calculations with specific resistance.	**2**	**2**
Calc. of circuits with more than one generator using Kirchoff's laws.	**3**	**2**
Calc. of circuits with more than one generator using superposition.	**4**	**2**
Applying Thevenin and Norton transformations. Calculations of power and efficiency.	**5**	**2**
Test on DC networks.	**6**	**2**
AC network calculations. Public power networks.	**7**	**2**
Series RCL network calculations. Vector representations.	**8**	**2**
Parallel RCL network calculations. Filters.	**9**	**2**
Transformers and motors. Cosine phi correction.	**10**	**2**

Rectifier circuits. Limiter circuits.	**11**	**2**
Basics of operational amplifiers	**12**	**2**
AC networks test.	**13**	**2**
Break/holiday/repetition.	**14**	**2**

Assessment and evaluation:

Attendance of lectures and classroom discussions is mandatory. Students whose absence from lectures exceeds the limits stipulated in the Rules and Regulations of the University cannot be admitted to examination.

The condition for admission to examination, besides the above rules concerning lecture attendance, is at least a pass mark (2) in both mid-term tests.

Exam:
Written and oral examination in the exam period from the whole material discussed in classes.

Literature
Recommended: Electronic material given by the lecturer.