

Részletes tantárgyprogram és követelményrendszer

Óbudai Egyetem Kandó Kálmán Villamosmérnöki Kar		Mikroelektronikai és Technológia Intézet		
Tantárgy neve és kódja: Electronics I.		KMEEL11ANC		Kreditérték: 2
Nappali tagozat, tavaszi félév				
Szakok melyeken a tárgyat oktatják: Villamosmérnöki (angol nyelvű szak)				
Tantárgyfelelős oktató:	Dr. Turmezei Péter PhD.	Oktatók:	Horváth Márk	
Előtanulmányi feltételek: (kóddal)	Electricity I practice KHTVT12ANC			
Heti óraszámok:	Előadás: 2	Tantermi gyak.:	Laborgyakorlat:	Konzultáció:
Számonkérés módja (s,v,f):	vizsga			
A tananyag				
<i>Oktatási cél:</i> The subject's aim is to understand the basic properties and applications of basic semiconductor devices and circuits such as diodes, transistors and operational amplifiers.				
<i>Tematika:</i> Electric current in semiconductors, p-n junction, diodes. Bipolar transistors. Field-effect transistors. Amplifier circuits. Frequency dependence of transistor circuits. Differential amplifiers. Operational amplifiers, comparators.				
Előadások témaköre:			Hét	Óra
<i>1 Semiconductors.</i> Intrinsic and doped semiconductors, n and p type crystal structures. Majority and minority charge carriers. Conductivity in semiconductors, drift and diffusion current. p-n junction, space charge region, diffusion potential. Behaviour of p-n junction due to external bias.			1.	2
<i>2 Application of semiconductor diodes.</i> The semiconductor diode. Thermal dependence and capacity of p-n junction. Concept of operating point, static and dynamic resistance.			2.	2
<i>3 Bipolar transistor.</i> Structure, properties, characteristics and function of bipolar transistors. Setting of operating point, thermal dependence.			3.	2
<i>4 Basic concepts of amplification.</i> Basic concepts of amplifying analogue signals. Symmetrical and asymmetrical voltages of amplifiers. Substitute circuits and frequency dependence. Bode diagrams of DC and AC amplifiers.			4.	2
<i>5 Amplification with bipolar transistor.</i> Physical process of amplification. CE, CC, CB basic circuits. Parameters of amplifiers.			5.	2
<i>6 Frequency dependence of transistor amplifiers.</i> Analysis of frequency dependence of bipolar transistor amplifiers. Impact of series and emitter capacitors.			6.	2
<i>7 MOS-FET.</i> Structure and operation of MOS-FETs. Enhancement and depletion MOS-FET. Characteristics. CMOS circuits.			7.	2
<i>8 J-FET.</i> Structure and operation of J-FET. Characteristics. Setting of operating point; thermal dependence. Basic circuits.			8.	2
<i>9 Feedback.</i> Feedback of amplifiers. Basic types of feedback and their impact on parameters.			9.	2
<i>10 Frequency dependence of feedback amplifiers</i> Effect of feedback of frequency dependence. Stability and frequency compensation.			10.	2
<i>11 Differential amplifier, operational amplifier</i> Differential amplifier circuits, operation and parameter; symmetrical and common mode signals. Operational amplifiers.			11.	2

<p><i>13. Applications of operational amplifiers.</i> Mathematical operations (summing, subtracting, differentiating and integrating circuits). Current-voltage transformer. AC amplifiers. Basic voltage and current sources. Nonlinear applications. Precision rectifiers.</p>	12.	2
<p><i>14. Comparators.</i> Null-comparator, reference voltage comparators, hysteresis comparators (Schmitt-triggers). Waveform generators.</p>	13.	2
<p>Félévközi követelmények: The attendance of lectures is mandatory. Participation in exam is available after receiving signature from subject Electronics I. practice (KMEEL12ANC).</p>		
<p>A pótlás módja:</p>		
<p>A félévközi jegy kialakításának módszere: Lásd az Elektronika I. practice KMEEL12ANC kódú tárgynál.</p>		
<p>A vizsga módja: Exam is taken from the material of the theory and practice courses, in writing and possibly orally as well. There are short theoretical questions, long theoretical questions and calculation exercises.</p>		
Irodalom:		
<p>Kötelező: Zsom Gyula: Elektronikus áramkörök I.A Bp. 1991. KKMF 1040 Molnár Ferenc – Zsom Gyula : Elektronikus áramkörök II.A I. – II. kötet Bp. 1991. KKMF 1044</p>		
<p>Ajánlott: Molnár Ferenc : Elektronikus áramkörök I.B Bp. KKMF jegyzet 49 200-I.B</p>		
<p>Egyéb segédletek:</p>		