

Assessment and subject description

Óbuda University		Kandó Kálmán Faculty of Electrical Engineering			Institute of Microelectronics and Technology	
Subject name and code: General engineering studies KMEÁM11AND				Credits: 3		
full-time				2016/17_fall Semester		
Course: Electrical engineering						
Responsible:	Dr. Bugyjas József PhD		Teaching staff:	Dr. Bugyjas József PhD		
Prerequisites:		Technical documentation KMEMD11AND				
Contact hours per week:	Lecture: 2	Class discussion.: 1	Lab hours: 0	Tutorial:		
Assessment and evaluation:		written examination				
Subject description						
<p><i>Aims:</i> To provide to the engineering students the fundamentals of the forces and strains in the operation and design methods of electromechanical structures and devices. The students should acquire the ability to assess the forces and strains in and the operation of various structural elements</p> <p><i>Tasks serving the fulfillment of the aims of the course:</i></p> <ul style="list-style-type: none"> • Basics of engineering mechanics (statics, strength of materials) • Analysis of the forces and strains in the operation of various structural elements <p>The core material, the methods of education, and the requirements of the course should incorporate those knowledge, proficiencies and skills, which make possible to train electrical engineers having convertible knowledge.</p> <p><i>Topics to be covered:</i> Equilibrium of forces in electromechanical structures and devices: basic concepts and laws, forces, basic calculation methods, methods of calculation of resultant forces, and center of gravity, determination of first order moment and of reaction force, concept of constraints Basics of stress analysis: concept and types of strains, stress-strain functions and diagrams, general problems of design for stress, state of stress and deformation, stresses and deformations in bars Elements of electromechanical structures and devices: locking elements, moving/mobile elements, driving- and actuating elements.</p>						
Topics:				Week	Lessons	
Statics: General Information: Role of electromechanical structures in electronic devices. Basic concepts in engineering mechanics: force, moment. Operations with force vectors (addition, translation, calculation of resultant)				1.	2+1	
Force Systems: Equilibrium of forces (determination with calculation and construction), Distributed force systems, Calculation of centre of gravity.				2.	2+1	
Constraints: Equilibrium of mechanical structures, Friction.				3.	2+1	
Statics Stress of structures, Basic types of stresses. Stress-strain functions and diagrams. Relation between stress-strain functions.				4.	2+1	
1 st test				5.	2+1	
Holiday				6.		
Concept and calculation of mechanical stress, Elastic and plastic deformation, Stress-strain diagram, Loadability of materials. Calculation of tensile and bending stresses, Differential equation of elastic fibre				7.	2+1	
Shear and torsion stresses, calculations. Concept of deflection and deformation, calculations. Combined stresses. Design of mechanical structures for simple and combined static stresses				8.	2+1	

Cases of alternate loads. Fatigue of materials, Design theories. Work of deformation. Castigliano's theorem, examples	9.	2+1
2 nd test	10.	2+1
Elements of electromechanical devices Joint-elements of electromechanical devices. Classification of joints. Joints with elastic deformation.	11.	2+1
Plastic deformations. Permanent joints Application area.	12.	2+1
Driving and actuating elements in electromechanical devices, bearings, shafts, guides. Application area.	13.	2+1
Make-up tests, advanced examination	14.	2+1
<i>* Class meetings accomodate program of the lectures with calculation of examples and practical solution of problems. .</i>		
Assessment and evaluation:		
<p>Students are recommended to attend lectures, class meetings are mandatory. Requirements of the signature: - test encompassing lecture topics - home assignment and a presentation about it. Admittance to examination is a home assignment and presentation submitted on due date and at least 40% level on each mandatory test. Failed tests can be made up last week. Missing home assignments can be made-up till the last class meeting for a fee. Prerequisites of the advanced examination are the minimum of mid-semester results of 70%.</p>		
Evaluation of the exam:		
<p>Written examination including the theoretical material of the semester. Evaluation is composed by scores. System of scores is made out by the responsible. The threshold for pass mark (including the results of home assignment and mid-semester test) is 40 %. Pass mark will incorporate test and examination results.</p>		
Suggested Materials:		
<p>R.C. Hibbeler: Mechanics of Materials 2011 Prencice Hall ISBN-13 978-981-06-8509-6 Putoki István: Basics of mechanics 213/2004 Budapest Meriam: Engineering Mechanics Statics SI version 2008 Wiley ISBN 13: 9780471787020 Jim Morrison: Statics for Engineers 2009 Wiley ISBN 13: 9780470745564 Strauch: Classical Mechanics 2009 Springer ISBN 13: 9783540736158</p>		
Auxiliary materials:		
<p>Auxiliary materials (like brochures, videos, electronic curricula) can be found on the network, as well as formal requirements of home assessments..</p>		