

Tárgytematika / Course Description

Machine Elements

GKNB_MGTA010

Tárgyfelelős neve /
Teacher's name: Prof.Ing. Janco Roland

Félév / Semester: 2023/24/2

Beszámolási forma /
Assesment: Vizsga

Tárgy heti óraszám /
Teaching hours(week): 2/3/0

Tárgy féléves óraszám /
Teaching hours(sem.): 0/0/0

OKTATÁS CÉLJA / AIM OF THE COURSE

Provide overview on machine element and introduction of those on function, definition of design, assembly etc. In order to Improve and get familiar with machine elements construction competence for industrial task.

TANTÁRGY TARTALMA / DESCRIPTION

Calendar week	Date	Semester week	Name	Lecture	Practical class
week 06	07.02. 2024	week 01	Construction of mechanical components	Present requirement structure, requirement management RQM V model, how the user/client/customer requirement is translated to technical parameters Design stages, key factors, hierarchy, sensitivity eg bearing vs seal gears for lube	Repetition: technical drawing of machine elements Distribution of Homework 1

week 07	14.02. 2024	week 02	Fatigue of mechanical structure	Design to fatigue Mathematic basics, spread, Woehler curve, Gauss, 6 sigma, occurrence eg pulling force, (vehicle speed distribution, pulling force distribution at given speed) Real load to test conversion modes, damage factors, weighting Example tractor pulling force, engine curves correlation, effect on parts eg wheel hub bearing Smith/Whoehler diagram practical approach, why is created	Drawing and design of assemblies, tolerance calculation Material selection
week 08	21.02. 2024	week 03	Industrial joints	Joint types and tightening methods <i>Bolted joints</i> - Opening and tightening torque - Self closing - Friction effect - Mechanical models, forces, balances - Stresses in bolts <i>Binding connections</i> - Welding, soldering - Different modes - Sizing	Smith/Whoehler diagram
week 09	28.02. 2024	week 04	Definition of loads	Present different load occurrence (tension, compression, sheer, torsion, contact stress) in typical mechanical components Guideline for calculation	Bolted connection sizing
week 10	06.03. 2024	week 05	Lubrication	Basic tribology Lubricant types Different applications Definition of lubrication	Bolted connections

week 11	13.03. 2024	week 06	Bearing	Bearing types, roller/sliding Definition of loads Selection process, calculation Typical failures Roller bearing types: ball, needle roller, cylindrical, taper roller Production process	Shafts
week 12	20.03. 2024	week 07	Seals	Seal definition, static, dynamic Design parameters, bore/shaft/lubricant Seal types	Shafts and elements
week 13	27.03. 2024	week 08	Shaft	Shaft design Basic rules Materials Load cases, max tensile, composite tensile, rpm, vibration	Bearings Selecting seals
week 14	03.04. 2024	week 09	Friction components	Use of friction component, brakes, locks Calculation methods Materials Environment types dry/wet	Bearings
week 15	10.04. 2024	week 10	Shaft connection	Definition of different shaft connection. Fixed, non-fixed. Co axial, non-coaxial Spline design Belt, cardan shaft etc drives	Lubricants

week 16	17.04. 2024	week 11	Housing design and springs	<i>Housings</i> Definition of different housing designs Housing materials Production processes, casting, welding Machining <i>Springs</i> Definition of springs, mathematic models Characteristics of spring Different types	Springs
week 17	24.04.2024 Egyetemi Tudományos Diákköri Konferenció	week 12			Submission of the homework
week 18	01.05.2024 Munka ünnepe				
week 19	08.05. 2024	week 14	Toothed gears	Evolute maths Tooth flank generation methods Basic and modified gear tooth surfaces Gear contact characteristics, as contact pattern, kinematics, transmission errors Structural design of gears Different gear types, spur, helical, internal, spiral bevel etc	Design of housings Sizing of springs

week 20	15.05 2024			Trial exam	Sizing of gears
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SZÁMONKÉRÉSI ÉS ÉRTÉKELÉSI RENDSZERE / ASSESMENT'S METHOD

Max points	Min points to pass	Remark	
Homework 01	20	10	If submission delayed -20% from 10, max points 8
Midterm test 01	15	4	
Midterm test 02	15	4	
Total	60		
Repeated test	30		Transferred points max 15. If 25 points reached, transferred points 10 (25-15.)
Exam total	50		
Eligible for exam	If from each homework and midterm test 25% reach, and totality of two homework and midterm test min 50%. From each homework min 3-3 points, from the two homeworks 10 points in total. From each midterm test min 4-4 points, from the two midterm test 15 points in total. Otherwise repeated test to complete.		

Exemption from exam	If min 65% of each homework and midterm test reach and total points is 45 or more 4 (45-52), 5 (53-60)
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Half points not distributed

Grade

0-49 marks	inadequate	1
50-64 marks	adequate	2
65-74 marks	average	3
75-84 marks	good	4
85-100 marks	excellent	5

KÖTELEZŐ IRODALOM / OBLIGATORY MATERIAL

Obligatory

- Shigley's Mechanical engineering design

Recommended, Hungarian language

- Kovács Gáborné Mezei Gizella- Rácz Péter- Szalai Péter- Törőcsik Dávid: Gépelemek 2013. Műszaki és természettudományos alapismeretek tananyagainak fejlesztése a mérnökképzésben.
- Bider Zs.- Lászlóné P. A.-Tóth J.: Gépszerkezetan II, HEFOP

- Balogh T.- Bukoveczky Gy.- Lászlóné P. A.-Vereš M.: Gépszerkezetan III, HEFOP
- Bider Zs.- Lászlóné P. A.-Tóth J.: Gépszerkezetan II, Universitas-Győr Nonprofit Kft. 2008.
- Balogh T.- Bukoveczky Gy.- Lászlóné P. A.-Vereš M.: Gépszerkezetan III. Universitas-Győr Kht. 2007.
- Balogh T.- Bider Zs.-Háromi F.- Lászlóné P. A.-Szalai P.: Gépszerkezetan II- III segédlet. Universitas-Győr Kht. 2007.
- Szendrő Péter szerkesztette: Gépelemek. Mezőgazda kiadó 2007.
- Ajánlott aktuális MSZ ISO szabványok.

AJÁNLOTT IRODALOM / RECOMMENDED MATERIAL