



TANTÁRGY ADATLAP ÉS TANTÁRGYKÖVETELMÉNYEK

2016. augusztus 24.

TRIBOLÓGIA

TRIBOLOGY

1.	Tantárgy kódja	Szemeszter	Óraszám, Követelmény	Kredit	Nyelv	Tárgyfélév
	BMEGE010D	2/3	2+0+0 / v	3	magyar	ősz/tavaszi

2. A tantárgy felelőse:

Név:	Beosztás:	Tanszék:
Dr. Váradi Károly	egyetemi tanár	Gép- és Terméktervezés Tsz.

3. A tantárgy előadója:

Dr. Váradi Károly, egyetemi tanár, Gép- és Terméktervezés Tsz

Dr. Kozma Mihály, professzor emerítusz, Gép- és Terméktervezés Tsz

4. A tantárgy az alábbi témakörök ismeretére épít:

Géptervezés alap ismeretei

5. Kötelező/ajánlott előtanulmányi rend:

Nincs előtanulmányi követelmény

6. A tantárgy célkitűzése:

A tárgy tribológiai rendszerekkel foglalkozik, figyelmet fordít a felületekre és a testek érintkezésére. Különböző felületi meghibásodások, súrlódási és kopási elméletek kerülnek bemutatásra, amelyek befolyásolják a csapágy (mátrix) anyagok mechanikai, hőtani, elektromos, stb. tulajdonságait különböző módon. Kenési megoldások és hidrodinamikai kenési elméletek szintén bemutatásra kerülnek.

7. A tantárgy részletes tematikája:

1. hét Definíciók, alapismeretek, tribológiai rendszerek kísérleti módszerei

2. hét A rendszer viselkedésének domináns paraméterei

3. hét	A testek felületének jellemző paraméterei
4. hét	Testek érintkezése
5. hét	A súrlódás és kopás definíciói, típusai, törvényei és elméletei
6. hét	Felületi tönkremenetelek
7. hét	Csúszó párok anyagválasztása
8. hét	Jó csúszási viselkedésű anyagok
9. hét	Súrlódó párok anyagai
10. hét	Kopásálló anyagok, felületi rétegek és bevonatok
11. hét	Kenés: kenőanyagok
12. hét	Kenés: kenési megoldások, kenési állapotok
13. hét	Határ- és hidrodinamikus kenési állapotok leírása
14. hét	Elasztó- hidrodinamikus kenés

8. A tantárgy végzésének módja:

9. Követelmények

Vizsga követelmény

10. Konzultációs lehetőségek

Félév során előzetes időpont egyeztetés szerint

11. Jegyzet, tankönyv, felhasználható irodalom:

Kontakt óra 28 óra/félév

Félévközi otthoni idő 14 óra/félév

Vizsga-készülés 48 óra/félév

12. A tantárgy elvégzéséhez szükséges tanulmányi munka:

13. Záradék

14. A tantárgy tematikáját kidolgozta:

Név:	Beosztás:	Tanszék, Int.:
Dr. Váradai Károly	egyetemi tanár	Gép- és Terméktervezés Tsz.



SUBJECT DATA SHEET AND REQUIREMENTS

last modified: 4th May 2016

TRIBOLOGY

Tribológia

1	Code	Semester nr. or fall/spring	Contact hours/week (lect.+semin.+lab.)	Requirements p / e / s	Credit	Language
	BMEGE010D	fall	2+0+0	e	3	English

2. Subject's responsible:

Name:	Title:	Affiliation (Department):
Dr. Károly Váradi	Professor	Dept. Machine and Product Design

3. Lecturer:

Name:	Title:	Affiliation (Department):
Dr. Károly Váradi	Professor	Dept. Machine and Product Design
Dr. Mihály Kozma	Professor emeritus	Dept. Machine and Product Design

4. Thematic background of the subject:

Basic knowledge of machine design

5. Compulsory / suggested prerequisites:

There is no special prerequisite for this subject.

6. Main aims and objectives, learning outcomes of the subject:

This course is about the tribological systems, it would focus the surface, the contact of solid bodies. Different types of surface damages and theories of friction and wear will be presented. that can influence the mechanical, thermal, electrical, etc. properties of the matrix materials by different ways. The lubrication techniques as well as the hydrodynamic lubrication theory will be discussed.

7. Method of education:

Lecture 2 h/w

8. Detailed thematic description of the subject:

Laws of generation of limit- and hydrodynamic lubrication.

Week	Lecture
1.	Definitions, elements, experimental methods of tribological systems.
2.	Dominant parameters of the system's behavior.
3.	Characteristic parameters of the surface of solid bodies.
4.	Contact of solid bodies.
5.	Definitions, types, laws and theories of friction and wear.
6.	Surface damages.

7.	Material selection for sliding pairs.
8.	Materials with good sliding conditions.
9.	Materials of frictional pairs.
10.	Wear resistance materials, surface layers and coatings.
11.	Lubrication: the lubricants.
12.	Lubrication: lubrication techniques, lubrication states.
13.	Laws of generation of limit- and hydrodynamic lubrication.
14.	Elasto-thermohydrodynamic lubrication.

9. Requirements and grading

a) in term-period

N.A.

b) in examination period

Oral exam.

c) Disciplinary Measures Against the Application of Unauthorized Means at Mid-Terms, Term-End Exams and Homework

The following students are subject to disciplinary measures.

1. Those students who apply unauthorized means (book, lecture notes, infocommunication means, tools for storing and forwarding electronic information, etc.), different from those listed in the course requirements or adopted by the lecturer in charge of the course assessment, in the written *mid-term exams* taken, or invite or accept any assistance of fellow students, with the exception of borrowing authorized means, will be disqualified from taking further mid-term exams in the very semester as a consequence of their action. Further to this, all of their results gained in the very semester will be void, can get no term-end signatures, and will have no access to Late Submission option. Final term-end results in courses with practical mark will automatically become Fail (1), the ones with exam requirements will be labelled Refused Admission to Exams.
2. Those students whose *homework* verifiably proves to be of foreign extraction, or alternatively, evident results or work of a third party, are referred to as their own, will be disqualified from taking further assessment sessions in the very semester as a consequence of their action. Further to this, all of their results gained in the very semester will be void, can get no term-end signatures, and will have no access to Late Submission options. Final term-end results in courses with practical mark will automatically become Fail (1), ones with exam requirements will be labelled Refused Admission to Exams.
3. Those students who apply unauthorized means (books, lecture notes, infocommunication means, tools for storing and forwarding electronic information, etc.), different from those listed in the course requirements or adopted by the lecturer in charge of the course assessment, in the written *term-end exams* taken, or invite or accept any assistance of fellow students, with the exception of borrowing authorized means, will immediately be disqualified from taking the term-end exam any further as a consequence of their action, and will be inhibited with an automatic Fail (1) in the exam. No further options to sit for the same exam can be accessed in the respective exam period.
4. Those students who alter, or make an attempt to alter the already corrected, evaluated, and distributed test or exercise/problem,
 - i. as a consequence of their action, will be disqualified from further assessments in the respective semester. Further to this, all of their results gained in the very semester will be void, can get no term-end signatures, and will have no access to Late Submission options. Final term-end results in courses with practical mark will automatically become Fail (1), ones with exam requirements will be labelled Refused Admission to Exams;
 - ii. and will immediately be inhibited with an automatic Fail (1) in the exam. No further options to sit for the same exam can be accessed in the very same exam period.

10. Retake and repeat

N.A.

11. Consulting opportunities:

1 hr/week upon appointment by e-mail

12. Reference literature (recommended):

13. Home study required to pass the subject:

Contact hours	28	h/semester
Home study for the courses	14	h/semester
Home study for the exam	48	h/semester
Total:	90	h/semester

14. The data sheet and the requirements are prepared by:

Name:	Title:	Affiliation (Department):
Dr. Károly Váradi	Professor	Dept. of Machine and Product Design