



SUBJECT DATA SHEET AND REQUIREMENTS

last modified: 18th May 2016

DESIGN OF METAL-CUTTING MACHINE TOOLS AND MACHINE SYSTEMS

FORGÁCSOLÓ SZERSZÁMGÉPEK ÉS GÉPRENDSZEREK TERVEZÉSE

1	Code	Semester nr. or fall/spring	Contact hours/week (lect.+semin.+lab.)	Requirements p / e / s	Credit	Language
	BMEGEGT8565	spring	2+0+0	e	3	English

2. Subject's responsible:

Name:	Title:	Affiliation (Department):
Dr. István Németh	Associate professor	Department of Manufacturing Science and Engineering

3. Lecturer:

Name:	Title:	Affiliation (Department):
Dr. István Németh	Associate professor	Department of Manufacturing Science and Engineering

4. Thematic background of the subject:

Basic knowledge of metal-cutting technologies, and machine elements, machine design, structural analysis.

5. Compulsory / suggested prerequisites:

There is no special prerequisite for this subject.

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

The course gives an overview of the state-of-the-art machine tools, their tool changing and workpiece changing equipment, and their integration possibilities. The machine elements and their integration will be presented. Methodologies for systematic conceptual design, precision machine design, structural design and mechatronic design will be discussed.

7. Method of education:

Lecture 2 h/w

8. Detailed thematic description of the subject:

Week	Lecture
1.	Fundamentals of the kinematics of machine tools and the NC technology.
2.	Classification of metal-cutting machine tools. Selection criteria of machine tools. Structural materials of machine tools. Dynamics of machine tools.
3-4.	Structural building blocks: friction, rolling and hydrostatic guideways; ball screws; linear motors; rack and pinion mechanisms; hydrostatic screws; indexing and NC rotary tables; rotary actuators: gears, worm wheel, torque motor.
5.	Pneumatic and hydraulic systems applied in machine tools.

6.	Spindles: belt drive, gear drive, direct drive, integrated spindle; rolling, hydrostatic, aerostatic bearings; tool holders and tool clamping; lathe and milling spindles.
7.	Lathes, turning centres and turning cells.
8.	Milling machines, machining centres and milling cells.
9.	Grinding machines, grinding centres. EDM machines.
10.	Gear cutting machine tools and centres.
11.	Parallel kinematics machine tools. Multi-functional and hybrid machine tools.
12.	Thermal behaviour of machine tools.
13.	Precision and error sources of machine tools. Error propagation. Test and verification methods. Basic principles for precision machine design.
14.	Systematic conceptual design of machine tools. Structural design and mechatronic design of machine tool.

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):

- L.N. López de Lacalle, A. Lamikiz (Editors): Machine Tools for High Performance Machining, Springer-Verlag London Limited, 2009
- S. Kalpakjian, S.R. Schmid: Manufacturing Engineering and Technology, Fourth Edition, Prentice Hall, Upper Saddle River, NJ, 07458, 2001

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. István Németh	Associate professor	Department of Manufacturing Science and Engineering