



## SUBJECT DATA SHEET AND REQUIREMENTS

last modified: 6th February 2017

### MACHINE TOOLS AND MANUFACTURING SYSTEMS

### SZERSZÁMGÉPEK ÉS GYÁRTÓRENDSZEREK

1	Code	Semester Nr. or fall/spring	Contact hours/week (lect.+semin.+lab.)	Requirements p / e / s	Credit	Language
	<b>BMEGEGTAG92</b>	<b>spring</b>	<b>2+0+0</b>	<b>p</b>	<b>3</b>	<b>English</b>

#### 2. Subject's responsible:

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

#### 3. Lecturer:

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

#### 4. Thematic background of the subject:

Manufacturing engineering, machine elements, mechanics.

#### 5. Compulsory / recommended prerequisites:

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

The subject introduces the students to the structural elements, structural layout, and various types of the metal-cutting machine tools and their technological and operational characteristics. The subject also introduces the basic concepts and layouts of manufacturing systems and the most important material handling equipment needed to build up manufacturing systems.

#### 7. Method of education:

Lecture 2 h/w

## **8. Detailed thematic description of the subject (by topic, min. 800 character):**

The lectures include the following topics. Fundamentals of the kinematics of machine tools and the NC technology. Classification of metal-cutting machine tools. Selection criteria of machine tools. Structural building blocks: friction, rolling and hydrostatic guideways; ball screws; linear motors; rack and pinion mechanisms; indexing and NC rotary tables; rotary actuators: gears, worm wheel, torque motor. Spindles: belt drive, gear drive, direct drive, integrated spindle; rolling, hydrostatic, aerostatic bearings; tool holders and tool clamping; lathe and milling spindles. Lathes and turning centres. Milling machines and machining centres. Grinding machines and EDMs. Automatic tool and workpiece changing peripheries. Multi-task machine tools. Parallel and hybrid kinematics machine tools. Material handling principles. Material handling equipment: cranes, industrial trucks, AGVs, several types of conveyors, pallet transfer systems. Types and various layouts of manufacturing systems. Flexible manufacturing systems.

## **9. Requirements and grading**

### **a) in term-period**

There are three mid-semester checks that are written tests at the 5<sup>th</sup>, 10<sup>th</sup> and 14<sup>th</sup> week. The minimal fulfilment (40%) of each test is necessary to have the final practice mark.

### **b) in examination period**

The subject ends with a practice mark, so there is no examination.

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

Supplement to 1/2013. (I. 30.) Dean's Order (Codicil): The following students are subject to disciplinary measures.

- (a) Those students who apply unauthorized means (book, lecture notes, etc.), different from those listed in the course requirements and/or adopted by the lecturer in charge of the course assessment, in the written mid-term exams taken, and/or invite/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.
- (b) 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.
- (c) Those students who apply unauthorized means (books, lecture notes, etc.), different from those listed in the course requirements and/or adopted by the lecturer in charge of the course assessment, in the written term-end exams taken, and/or invite/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 very same exam period.
- (d) 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), the 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**

According to the general rules.

## **11. Consulting opportunities:**

Consultation hours: By email appointments.

## **12. Reference literature (compulsory, recommended):**

Books:

- Geoffrey Boothroyd, Winston A. Knight: Fundamentals of Machining and Machine Tools, Marcel Dekker, 1989, ISBN 0-8247-7852-9
- Y. Altintas: Manufacturing Automation, Cambridge University Press, 2000, ISBN 0 521 65973 6
- L.N. López de Lacalle, A. Lamikiz (Editors): Machine Tools for High Performance Machining, Springer-Verlag London Limited, 2009, ISBN 978-1-84800-379-8
- Fred E. Meyers, Matthew P. Stephens: Manufacturing Facilities Design and Material Handling, Third Edition, 2005 Pearson Prentice Hall, Upper Saddle River, New Jersey, ISBN 0-13-112535-4
- D. J. Williams: Manufacturing Systems – An introduction to the technologies, Second Edition, Kluwer Academic Publishers, 1994, ISBN 0 412 60580 5
- Serope Kalpakjian, Steven R. Schmid: Manufacturing Engineering and Technology, Prentice-Hall Inc. 2001, ISBN 0-201-36131-0

Downloadable lecture notes: [www.manuf.bme.hu](http://www.manuf.bme.hu)

**13. Home study required to pass the subject:**

Contact hours	28	h/semester
Home study for the courses	20	h/semester
Home study for the mid-semester checks	42	h/check
Preparation of mid-semester homework		h/homework
Home study of the allotted written notes		h/semester
Home study for the exam		h/semester
<b>Totally:</b>	<b>90</b>	<b>h/semester</b>

**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