



## SUBJECT DATA SHEET AND REQUIREMENTS

last modified: 7<sup>th</sup> September 2017

### NC MACHINE TOOLS

### NC SZERSZÁMGÉPEK

1	Code	Semester Nr. or fall/spring	Contact hours/week	Requirements	Credit	Language
	<b>BMEGEGTMW03</b>	<b>fall</b>	<b>1+1+0</b>	<b>p</b>	<b>3</b>	<b>English</b>

#### 2. Subject's responsible:

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

#### 3. Lecturer:

Name:	Title:	Affiliation (Department):
Dr. István Németh	associate professor	Dept. of Manufacturing Science and Engineering
Dr. Péter Zentay	associate professor	Dept. of Manufacturing Science and Engineering

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

Manufacturing engineering, machine elements, mechanics.

#### 5. Compulsory / suggested prerequisites:

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

The subject introduces the students to the structural layouts, structural elements and various types of the modern metal-cutting NC machine tools and their technological and operation characteristics. The students practice the basics of the structural design and the selection of structural elements of machine tools in the framework of a design assignment.

#### 7. Method of education:

Lecture 1 h/w, seminar 1 h/w.

#### 8. Detailed thematic description of the subject:

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; hydrostatic screws; rotary actuators: gears, worm wheel, torque motor. Linear drives. Indexing and NC rotary drives. 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. Automatic tool and workpiece changing peripheries. Multi-functional and hybrid machine tools. Parallel kinematics machine tools.

The **seminars** support the design assignment and help the student in selecting the motion unit components (i.e. rolling guideway, ball screw, servo motor, or linear motor) and designing the main structural elements (i.e. frames, moving slides, tool changers) of machine tools.

## **9. Requirements and grading**

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

The subject ends with a practice mark. During the semester the students must do a design assignment in three-person teams and they must pass a written test. The deadline for submission of the results of the design assignment is the 14<sup>th</sup> week of the semester. The written test takes place during the 13<sup>th</sup> week. The final practice mark is composed of the scores of the design assignment and the test results. The maximum score of the design assignment and the test are 50-50 points, and the students have to reach the 40% of each. The practice mark is determined by the sum of the scores of the design assignment and the test results as follows: 40-55: pass; 56-70: fair; 71-85: good; 86-100: excellent.

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

### **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:**

Books:

- 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
- Y. Altintas: Manufacturing Automation, Cambridge University Press, 2000, ISBN 0 521 65973 6
- Geoffrey Boothroyd, Winston A. Knight: Fundamentals of Machining and Machine Tools, Marcel Dekker, 1989, ISBN 0-8247-7852-9

Downloadable materials: [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	8	h/semester
Home study for the mid-semester checks	22	h/check
Preparation of mid-semester homework	32	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	Dept. of Manufacturing Science and Engineering