BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
FACULTY OF MECHANICAL ENGINEERING

SUBJECT DATASHEET

I. SUBJECT DESCRIPTION

1. GENERAL DATA

1.1. Subject name (in Hungarian, in English)

Manufacturing for engineers in mechatronics • Manufacturing for engineers in mechatronics

1.2. Neptun code

BMEGEGTBM01

1.3. Type

study unit with contact hours

1.4. Course types and number of hours (weekly / semester)

course type	number of hours (weekly)	nature (connected / stand-alone)
lecture (theory)	1	-
exercise	1	coupled
laboratory exercise	2	coupled

1.5. Type of assessments (quality evaluation)

exam

1.6. ECTS

4

1.7. Subject coordinator

name:	Biró István
post:	adjunct
contact:	biro.istvan@gpk.bme.hu

1.8. Host organization

Department of Manufacturing Science and Engineering (https://www.manuf.bme.hu)

1.9. Course homepage

https://manuf.bme.hu/?page_id=11203

1.10. Course language

hungarian, german

1.11. Primary curriculum type

mandatory

1.12. Direct prerequisites

Strong prerequisite:	BMEGEMTBMA1
Weak prerequisite:	-
Parallel prerequisite:	-
Milestone prerequisite:	-
Excluding condition:	-

(the subject cannot be taken if you have previously completed any of the following subjects or groups of subjects)

2. AIMS AND ACHIEVEMENTS

2.1. Aim

The subject acquaints students with the basic concepts and basic information of component production and assembly, the basic production procedures, their production tools, equipment and control. It presents the steps of production planning, methods of maintaining production quality, and issues of economy on the example of simple parts production. By presenting the development trend of mechanical engineering technology, he presents the most modern production processes, production structures, and covers the issues of integration. As part of laboratory sessions, he provides direct experience of the operational tasks of production and the practical problems of manufacturability.

2.2. Learning outcomes

Competences that can be acquired by completing the course:

A. Knowledge

- 1. knows the basic concepts and basic information of component production and assembly.
- 2. understands the structure and operation of production equipment.
- 3. is familiar with the characteristic relationships between the movement conditions of machining and the geometry of the part.
- 4. understands the role of production equipment and the aspects of its design.
- 5. possesses the basic concepts of manufacturability and assemblability.
- 6. knows the tasks and sequence of production planning.
- 7. determines the most important characteristics and steps of computer-aided production planning methods.
- 8. distinguish the role of estimated cost and lead time data in production planning.
- 9. systematizes the integration solutions of production systems and the role of hybrid processes.
- 10. interprets the methods of determining the force and heat effects, the basic models and relationships.

B. Ability

- 1. be able to select manufacturing processes based on the geometry to be manufactured and the technological requirements.
- 2. Defines the settings to be used during machining.
- 3. interprets the machine programs, parameters and comments of machining.
- 4. uses the basic regulations and requirements necessary for the planning of production.
- 5. is able to perform basic assembly scale analysis tasks, build assembly scale.
- 6. select standards for the design of inspections and quality assurance.
- 7. explores problems that arise based on the operating principles of manufacturing processes.
- 8. interprets the production plan and the specifications specified therein.
- 9. is able to operate and control the production process independently.
- 10. solves the selection of the right tool and settings.

C. Attitude

- As you expand your knowledge, you will be involved in problem solving with your instructor and fellow students.
- It expands its knowledge and broadens its horizons through continuous acquisition of knowledge.
- It strives for an accurate and error-free solution.
- Open to the use of information technology tools.
- It strives to apply the principles of economy and quality in solving production tasks.

D. Independence and responsibility

- It independently thinks through production and assembly tasks and problems and solves them based on specific resources.
- He accepts well-founded critical remarks and continues his work accordingly.
- In some situations, as part of a team, you work with your fellow students to implement the exercises.
- In his thinking, he performs his duties using a systematic approach.
- It accepts aspects of sustainable development and environmental protection in its work.

2.3. Teaching methodology

During the lectures the basic definitions, procedures, connections, presentation of basic production design steps and parameter calculations in calculation and design exercises, written and oral communication, as well as the use of IT tools and techniques, the most frequently used manufacturing procedures and measurement knowledge of control methods.

2.4. Support materials

a) Textbooks

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b) Lecture notes

Horváth-Markos: Gépgyártástechnológia, Műegyetemi Kiadó, 2005, Azonosító: 45018

c) Online materials

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2.5. Validity of the course description

Start of validity:	2022. May 1.
End of validity:	2026. July 15.

II. SUBJECT REQUIREMENT

3. ACHIEVEMENT CONTROL AND EVALUATION

3.1 General rules

According to the subject requirement, the basis of performance evaluation is the exam. At the same time, the mere presence in laboratory classes and classroom exercises is not sufficient as a condition for completion in the semester and for admission to the exam. As an independent partial performance assessment, this requirement is not formulated, but an appropriate attitude in practices and laboratories is also required to obtain a signature.

3.2 Assessment methods

A. Detailed description of mid-term assessments

B. Detailed description of assessments performed during the examination period (if relevant)

Elements of the exam:

1. written partial exam

obligation: mandatory (partial) exam unit, failing the unit results in fail (1) exam result

description: A complex, written way of evaluating the knowledge and ability type competence elements of the subject in the form of a dissertation. The dissertation basically focuses on the application of the acquired knowledge, so it focuses on the recognition and solution of the problem, ie in addition to theoretical questions, practical (computational) tasks must be solved during the performance evaluation. The part of the curriculum on which the assessment is based covers the theoretical knowledge given in the lectures and the skills acquired in the exercises. The available working time is determined uniformly on the basis of the task sequence.

2. oral partial exam

obligation: (partial) exam unit chosen by the student, the exam result assessed by other partial exam unit can be changed unrestrictedly

description: Based on the written result, the final result is formed after answering the oral questions. In this section, we assess the more comprehensive picture of the subject and its ability to convey it. The condition for the oral sub-examination is to achieve at least 40% in the written sub-examination. The examining teacher may dispense with the oral questioning on the basis of written performance, but the oral part must also be retained at the request of the student.

3. practical partial exam

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4. inclusion of mid-term results

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3.3 The weight of mid-term assessments in signing or in final grading

identifier	weight

The condition for signing is that the score obtained in the mid-year assessments is at least **0%**.

3.4 The weight of partial exams in grade (if relevant)

type	weight

written partial exam	100 %
oral partial exam	100 %
practical partial exam	0 %
inclusion of mid-term results	0 %

3.5 Determination of the grade

grade ● [ECTS]	**the grade expressed in percents**
very good(5) ● Excellent [A]	above 92%
very good(5) ● Very Good [B]	85% .. 92%
good(4) ● Good [C]	71% .. 85%
satisfactory(3) ● Satisfactory [D]	56% .. 71%
sufficient(2) ● Pass [E]	41% .. 56%
insufficient(1) ● Fail [F]	below 41%

The lower limit specified for each grade already belongs to that grade.

3.6 Attendance and participation requirements

Must be present at at least **0%** (rounded down) of lectures.

At least **80%** the exercises (rounded down) must be actively attended.

At least **100% of** laboratory practices (rounded down) must be actively attended.

3.7 Special rules for improving, retaken and replacement

The special rules for improving, retaken and replacement shall be interpreted and applied in conjunction with the general rules of the CoS (TVSZ).

Taking into account the previous result in case of improvement, retaken-improvement:

new result overrides previous result

Completion of unfinished laboratory exercises:

missed laboratory practices must be performed in the teaching term at pre-arranged appointment

Repetition of laboratory exercises that performed incorrectly (eg.: mistake in documentation):

incorrectly performed laboratory practice (e.g. Incomplete/incorrect report) can be corrected by repeating the practice

3.8 Study work required to complete the course

Activity	**hours / semester**
participation in contact classes	56
mid-term preparation for practices	7
preparation for laboratory practices	14
exam preparation	28
additional time required to complete the subject	15
summary	**120**

3.9. Validity of subject requirements

Start of validity: 2022. May 1.

End of validity: 2026. July 15.

4. ADDITIONAL INFORMATION

4.1 Primary course

The primary (main) course of the subject in which it is advertised and to which the competencies are related:

Mechatronics engineering

4.2 Link to the purpose and (special) compensations of the Regulation KKK

This course aims to improve the following competencies defined in the Regulation KKK>

a) knowledge

- Student has the knowledge of the main properties and applications of mechanical and electrical materials used in mechatronics.
- Student has the knowledge and application in context of the scientific and technical theories and causal relationships relevant to the profession of mechatronics engineer.
- Student has the comprehensive knowledge of robotics and adaptive mechatronics.

b) ability

- Student has the ability to process and organise information collected during the operation of mechatronic systems and processes, to analyse it in different ways and to draw theoretical and practical conclusions.
- Student has the ability to ensure the quality of mechatronic systems, technologies and processes, to formulate theoretical and practical solutions to measurement and process control problems.
- Student has the ability to develop independently the theoretical knowledge and to apply new theory to the practical solution of complex mechatronic design problems of an unconventional nature.

c) attitude

- Student strives to carry out their work in a complex approach based on a systems and process-oriented mindset.
- Student strives to plan and carry out tasks to a high professional standard, either independently or in a team.
- In student's work and decisions, Student respects the relevant technical, economic and legal regulations and engineering ethics.

d) independence and responsibility

- Student shares gained knowledge and experience with those working in the field through formal, non-formal and informal information transfer.
- Student takes an independent and proactive approach to solving professional problems.
- Student demonstrates responsibility for sustainability, health and safety culture and environmental awareness.

4.3 Prerequisites for completing the course

Knowledge type competencies

(a set of prior knowledge, the existence of which is not obligatory, but greatly facilitates the successful completion of the subject)	Basic material knowledge, machine elements, and IT knowledge

Ability type competencies

(a set of prior abilities and skills, the existence of which is not obligatory, but greatly contributes to the successful completion of the subject)	drawing and programming skills