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)

Design and manufacture ● Machine Design and Production Technology

1.2. Neptun code

BMEGEGINWDT

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)	2	-
exercise	1	coupled
laboratory exercise	-	-

1.5. Type of assessments (quality evaluation)

exam

1.6. ECTS

4

1.7. Subject coordinator

name:	Dr. Baka Ernő Zsolt
post:	adjunct
contact:	baka.erno@gt3.bme.hu

1.8. Host organization

Department of Machine and Product Design (http://www.gt3.bme.hu/)

1.9. Course homepage

http://gt3.bme.hu/NWDT

1.10. Course language

english

1.11. Primary curriculum type

mandatory

1.12. Direct prerequisites

Strong prerequisite:	-
Weak prerequisite:	-
Parallel prerequisite:	-
Milestone prerequisite:	-
Excluding condition:	BMEGEGEMW01

(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

To acquaint students with the process of construction design (task specification, compilation of requirements list, creation and evaluation of product variants). Provide an overview of the design and development process and principles as well as fault mode and impact analysis (FMEA) and different methods of quality assurance. Summarize the basic concepts of manufacturing technology as well as the basics of CAM. Introduce modern production systems. Introduce students to manufacturing cost and time analysis. To get acquainted with the basics of production planning, material requirements planning (MRP), production scheduling. Summarize the consideration of manufacturing aspects in design.

2.2. Learning outcomes

Competences that can be acquired by completing the course:

A. Knowledge

- Student is aware of the steps in the construction design process.
- Identifies the needs and requirements for the task specification.
- Knows traditional, intuitive and discursive methods of concept formation.
- Student is informed about the different qualitative and quantitative evaluation methods.
- Student knows the different methods of quality assurance in the product manufacturing process.
- Knows the basic concepts of the manufacturing and production process.
- Student is aware of the role of manufacturing processes in the production process and their place.
- Understands the role and effects of organizational and management methods used in production and manufacturing.
- Informed about manufacturing quality assurance and lean manufacturing tools and methods.
- Student has a comprehensive knowledge of the individual steps of the manufacturing process, their sequencing, the characteristics and parameters that influence the process.
- Understands the role and operation of the equipment used in production, the tasks of the related production equipment.
- Student was informed about the most important software suitable for the management, planning and organization of production and production processes, and the possibilities inherent in them.

B. Ability

- Creates a deterministic timeline for the product manufacturing process.
- Creates task specification and requirements list.
- Apply discursive methods of concept formation.
- Evaluates the developed concepts on the basis of a system of criteria compiled on the basis of the list of requirements.
- Prepares the fault mode and effect analysis of the construction.
- Apply the concepts and definitions of manufacturing and production processes.

- It determines the conditions and parameters that ensure the optimal operation of the production and production process.
- Selects the appropriate planning and organization methods, required calculation procedures, and software to solve the problem.
- Able to apply basic methods of quality assurance and lean manufacturing.
- It prioritizes the sometimes conflicting conditions that can be deduced from technical requirements and makes an engineering decision.
- At a basic level, use the software used to operate, manage and optimize production processes and production systems.
- Defines the methods and procedures appropriate to the planning and organizational task that arises.

C. Attitude

- Student constantly monitors the work, results and conclusions.
- It continuously expands your knowledge in the field of design and production.
- Open to the use of information technology tools.
- It seeks to learn and routinely use computer-aided design methods and tools.
- It publishes its results in the expected format.
- Student is open to learning about and accepting computer technology developments in the technical field.
- It strives for an accurate and error-free solution.
- It seeks to learn about and routinely use the tools needed to solve manufacturing and process engineering problems.

D. Independence and responsibility

- Collaborates with the instructor and fellow students to expand knowledge.
- Accepts well-founded professional and other critical remarks.
- It suggests ways to apply the new knowledge.
- With his knowledge, he makes a responsible, informed decision based on his analyzes.
- Student is committed to the principles and methods of systematic thinking and problem solving.
- Student feels responsible for the problems of production technology, production management and the sustainable use of the environment, as well as for present and future generations.

2.3. Teaching methodology

The teaching of the subject takes place in the framework of lectures and classroom practice. The lectures basically introduce the students to the information defined by the knowledge competence elements using the technique of frontal education. The application and acquisition of knowledge takes place in practical sessions, where basic computational and design tasks are practiced at a skill level. The management and use of the software presented in the exercises are deepened by independent work through practical tasks.

2.4. Support materials

a) Textbooks

Kalpakjain, Schmid: Manufacturing Engineering and Technology, Prentice-Hall Inc. Publ.2001, ISBN 0-201-36131-014

David g. Ullman: The Mechanical Design Process 6th Edition. McGraw Hill, 2017, New York, ISBN-13: 978-0999357804

b) Lecture notes

No book or note is available for the subject at the time of filling in the form, its earliest publication date is 2024.

c) Online materials

http://gt3.bme.hu./NWDT

2.5. Validity of the course description

Start of validity:	2019. September 1.
End of validity:	2025. July 15.

II. SUBJECT REQUIREMENT

3. ACHIEVEMENT CONTROL AND EVALUATION

3.1 General rules

The assessment of learning outcomes during the diligence period is a summative performance assessment. The condition for obtaining the signature is the completion of at least 40% of the summary performance evaluation and at least 75% of active participation in the exercises. The exam takes into account both the knowledge competencies described in the lectures and the computational and design competencies practiced in the practical sessions. Only the aids and devices authorized and described by the examiner may be used in the examination.

3.2 Assessment methods

A. Detailed description of mid-term assessments

Mid-term assessment

type: summative assessment

count: 1

purpose, description: Summative assessment assesses students 'learning outcomes determined by knowledge and ability type competencies. Accordingly, the summative assessment assesses the acquisition of the designated theoretical knowledge material, as well as the existence of the knowledge and skills acquired in practice. It will be completed on the date specified in the study performance assessment plan, expected to be in the 12th week of education. A total of 50 points can be obtained in the summary performance evaluation, the minimum 40%, ie 20 points must be completed.

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: Learning outcomes are assessed by a summative performance measurement, with a written exam. Both the knowledge competencies given in the lectures and the ability competencies practiced in the practical sessions will be taken into account in the exam. The exam may also include conceptual knowledge to be answered briefly, questions to be explained, calculation and practical type tasks.

2. oral partial exam

-

3. practical partial exam

-

4. inclusion of mid-term results

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

description: The score of the summary performance evaluation completed during the diligence period is taken into account with a weight of 50% in the examination grade. .

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

identifier	weight
Mid-term assessment	100 %

The condition for signing is that the score obtained in the mid-year assessments is at least **40%**.

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

type	**weight**
written partial exam	50 %
oral partial exam	0 %
practical partial exam	0 %
inclusion of mid-term results	50 %

3.5 Determination of the grade

grade ● [ECTS]	**the grade expressed in percents**
very good(5) ● Excellent [A]	above 90%
very good(5) ● Very Good [B]	85% .. 90%
good(4) ● Good [C]	70% .. 85%
satisfactory(3) ● Satisfactory [D]	55% .. 70%
sufficient(2) ● Pass [E]	40% .. 55%
insufficient(1) ● Fail [F]	below 40%

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

3.6 Attendance and participation requirements

Must be present at at least **70%** (rounded down) of lectures.

At least **75%** the exercises (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).

Need mid-term assessment to individually complete?

yes

The way of retaking or improving a summary assessment for the first time:

the summative assessments can be retaken or improved only combined

Is the retaking-improving of a summary assessment allowed, and if so, than which form:

one single, combined retake or grade-improving exam is possible for all assesments

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

new result overrides previous result

3.8 Study work required to complete the course

Activity	**hours / semester**
participation in contact classes	42
mid-term preparation for practices	7
preparation for summary assessments	16
exam preparation	28

additional time required to complete the subject	27
summary	**120**

3.9. Validity of subject requirements

Start of validity: 2019. September 1.

End of validity: 2025. 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:

Mechanical modelling

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 organisation and management of research and development tasks, basic communication, including in foreign languages.
- Student has the theoretical and practical knowledge and methodological skills to design, manufacture, model, operate and manage complex engineering systems and processes
- Student has the knowledge of a wide range of problem-solving techniques for research or scientific work.

b) ability

- Student has the ability to apply and put into practice the knowledge acquired, using problem-solving techniques.
- Student has the ability to select, apply and develop appropriate modelling methods in the field of engineering design and technology.

c) attitude

- Student shall strive for continuous self-training in engineering modelling and in other fields related to student's work, in accordance with student's professional objectives.
- Student is open and receptive to new, modern and innovative processes and methods in engineering modelling.

d) independence and responsibility

- Student independently selects and applies relevant problem-solving methods when solving professional tasks.
- Student acts independently and proactively in solving technical problems.
- Student has a demonstrated responsibility for sustainability 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 knowledge of construction and manufacturing technology

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)	preparation of engineering documentation