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)

Polymer processing ● Polymer processing

1.2. Neptun code

BMEGEPTBGE3

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	-	-
laboratory exercise	1	coupled

1.5. Type of assessments (quality evaluation)

mid-term grade

1.6. ECTS

3

1.7. Subject coordinator

name:	Dr. Zink Béla
post:	adjunct
contact:	zink@pt.bme.hu

1.8. Host organization

Department of Polymer Engineering (http://www.pt.bme.hu)

1.9. Course homepage

http://www.pt.bme.hu/tantargy.php?id=134&l=a

1.10. Course language

english

1.11. Primary curriculum type

mandatory

1.12. Direct prerequisites

Strong prerequisite:	BMEGEPTBG01
Weak prerequisite:	-
Parallel prerequisite:	-
Milestone prerequisite:	-
Excluding condition:	BMEGEPTAGE3

(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 aim of the course is to acquaint students with polymer processing technologies (materials, machines, technology, parameters), pre-processing steps, extrusion (eg film, profile, plate, tube, wire coating), hot forming, hollow plastic parts production methods (extrusion blow molding, injection molding, rotational molding, two-layer thermoforming), polymer foams and elastomers processing technology.

2.2. Learning outcomes

Competences that can be acquired by completing the course:

A. Knowledge

- Knows basic polymer processing technologies.
- Define the concepts of viscosity, shear deformation and MFI.
- It provides an overview of the entire polymer processing process (from the raw material to the finished product).
- He is aware of the preparatory steps for polymer processing.
- Understands the extrusion process and the extruder tool.
- Understands the operation of basic hollow body manufacturing technologies.
- He is knowledgeable about thermoforming technologies for thermoplastics.
- Knows the basic foaming procedures, their characteristics.
- Knows the basic rubber processing technologies.
- He is familiar with basic polymer bonding technologies.

B. Ability

- It is able to differentiate between polymer processing technologies.
- Selects a raw material of the right quality for the given processing technology.
- It designs the manufacturing process of the entire polymer product (from raw material to finished product).
- Selects the appropriate raw material preparation processes for the specific product manufacturing technology.
- It analyzes the extrusion process as well as the extruder forming tool.
- It separates the production technologies suitable for the production of the main hollow body.
- It distinguishes between the main heat-forming processes.
- Select the appropriate foaming process, taking into account the requirements of the particular product.
- It differentiates between basic rubber processing technologies.
- He chooses the appropriate knitting technique taking into account the specifics of a given product.

C. Attitude

- It constantly monitors its findings and conclusions.
- He is constantly expanding his knowledge in the field of polymer processing.
- Open to the use of information technology for problems with polymer processing.
- It strives for accurate problem solving and engineering accuracy.

- It supports the spread of energy efficient and sustainable technologies.
- It strives to apply the latest trends and technologies in the field of polymer processing.

D. Independence and responsibility

- With his knowledge, he makes a responsible, well-founded decision based on his analyzes.
- Accepts well-founded professional and other critical remarks.
- As a member of a team, he works together to solve technical problems.
- Is committed to the principles and methods of systematic thinking and problem solving.
- Feels a responsibility for the sustainable use of the environment and for present and future generations.

2.3. Teaching methodology

The course integrates optional frontal lectures and mandatory laboratory sessions. Presentations include hands-on presentations as well as PowerPoint presentations. Polymer processing technologies are also demonstrated using short videos available on the Internet. Various polymer processing techniques are demonstrated during laboratory practice. The acquired knowledge is further deepened by practical home preparation and online study materials.

2.4. Support materials

a) Textbooks

Osswald T., Hernandez J .: Polymer Processing. Modeling and Simulation. 2006, Hanser Publications, Cincinnati, OH, USA ISBN 9783446403819

b) Lecture notes

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c) Online materials

http://www.pt.bme.hu/tantargy.php?id=134&l=a

2.5. Validity of the course description

Start of validity:	2022. July 16.
End of validity:	2027. July 15.

II. SUBJECT REQUIREMENT

3. ACHIEVEMENT CONTROL AND EVALUATION

3.1 General rules

The signature requirement is (1) at least 4 successful laboratory measurements and (2) successful submission of homework. Student participation in the measurement should reflect previously defined knowledge, skills, attitudes, and autonomy competencies. The requirements for the final grade are successful mid-term examinations as well as submitted homework that meets the requirements at least to a sufficient degree.

3.2 Assessment methods

A. Detailed description of mid-term assessments

1. Mid-term assessment

type: summative assessment

count: 1

purpose, description: The end-of-semester examination includes the full curriculum. Students must provide the definition, draw a schematic diagram of the different processing methods, and draw the necessary curves (e.g., vulcanization curve, thermomechanical curves). Students should select an appropriate method for the production of a given product and describe it briefly.

2. Mid-term assessment

type: diagnostic assessment

count: 6

purpose, description: The aim of the assessment is to identify the prior competences of students to carry out laboratory exercises. The assessment papers are therefore written by the students at the beginning of the laboratory practice. The time available is 10-15 minutes. Only students who have brought the required equipment: their own, blank protocol, calculator, identity card. To complete the laboratory practice, one must successfully pass the control paper written at the beginning of the laboratory exercises (more than 40%) and actively participate in the laboratory exercises. If the student does not show sufficient activity in the laboratory exercises, one may be dismissed. In this case, the laboratory practice will be considered as unsuccessful, regardless of the result of the control assessment, and must be retaken, where the control test will have to be repeated.

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

Elements of the exam:

1. written partial exam
   -
2. oral partial exam
   -
3. practical partial exam
   -
4. inclusion of mid-term results
   -

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

identifier	weight
1 . Mid-term assessment	80 %
2 . Mid-term assessment	20 %

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

type	weight
written partial exam	0 %
oral partial exam	0 %
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 91%
very good(5) ● Very Good [B]	86% .. 91%
good(4) ● Good [C]	71% .. 86%
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 **85% 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).

Need mid-term assessment to individually complete?

yes

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

each summative assessment can be retaken or improved

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

retake or grade-improving exam not possible

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 repeat period

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

incorrectly performed laboratory practice (e.g. Incomplete/incorrect report) can be corrected upon improved re-submission

3.8 Study work required to complete the course

Activity	**hours / semester**
participation in contact classes	28
preparation for laboratory practices	14
preparation for summary assessments	16
additional time required to complete the subject	32
summary	**90**

3.9. Validity of subject requirements

Start of validity: 2022. July 16.

End of validity: 2027. 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 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 comprehensive knowledge of machine, system and process design methods in the field of mechanical engineering.

b) ability

- Student has the ability to apply an integrated knowledge of machinery, mechanical equipment, systems and processes, materials and technologies for mechanical engineering, and related electronics and information technology.

c) attitude

- Student is committed to high quality work and sets an example to student's colleagues in this respect.

d) independence and responsibility

- Student acts independently and proactively in solving professional problems.

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)	-

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)	-