## Basics of Material Technology (BAEAAE1BNE) – individual tasks

During the semester the students have to accomplish two individual tasks and upload them to a certain deadline to the Moodle platform.
The tasks are related to present a particular technology, group of materials, manufacturing processes or product technology. The individual tasks should be made in the form of a Power Point presentation (with a minimum of 12, up to 15 slides), the presentation should contain a proper lay-out, the chapter title font is Ariel 24 pt, the text font is Ariel 20 pt. The presentation should contain appropriate quantity and quality of picture material, diagrams, tables, equations if needed).

The presentations should contain:
a) the title of the subject and the task as well as the student's name, neptun code,
b) at the beginning of the presentation the table of contents,
c) at the end of the presentation, a list of the used literature (including the internet references, links).

The name of the file consists of the name of the student and the order number of the assignment, e.g. Kiss Ferenc_5.

Under the News of the Moodle platform you can find the relevant information about the assignment of individual tasks assigned to a particular student and the deadline for submission.

## First individual task

1. Characterization of material groups.
2. Preparing of ores, extraction technologies of metals.
3. Primary shaping technologies of steels (overview of technologies and products).
4. Secondary shaping technologies of steels (overview of technologies and products).
5. Tertiary shaping technologies of steels (overview of technologies and products).
6. Construction of the blast furnace, pig iron production.
7. Ironmaking process in the blast furnace, products of the blast furnace
8. Steel production in basic oxygen furnace.
9. Production of unalloyed killed steel, examples of steel grades.
10. Steel production in an electric arc furnace, examples of steel grades.
11. Killed steels, semi-killed steels, rimmed steels.
12. Continuous casting of steel – characterization of technology.
13. Strip casting process, characterization of technology, examples of products
14. Steel products with powder technology, examples of steel grades.
15. Tool steels produced by powder technology
16. The world's leading steel producers.
17. Aluminium production, Bayer′s process, other methods, main Al alloys
18. Titanium production, Kroll′s process, main Ti alloys
19. Magnesium production, main Mg alloys

20. Cooper production, metallurgy of cooper, main Cu alloys
21. Overview of casting technologies, casting materials.
22. Fluidity of molten metal (viscosity, solidification pattern of the alloy, inclusions)
23. Sand casting process, exampless of products.
24. Technology of powder metallurgy, typical PM products.
25. Manufacturing of powder metallurgy products: magnets, ODS (Oxide Dispersion Strengthened) alloys.

## Second Individual Task

1. General characterization of forging, workpiece heating, heating equipment.
2. Open die forging, technology, examples.
3. Closed die forging, technology, examples.
4. Geometry of rolling, rolling force, selection of cylinder diameters.
5. Hot rolling technologies: pre-rolling, sheet rolling, examples.
6. Mannesmann's tubing technology, equipment, examples.
7. Pilger rolling technology, equipment, examples.
8. The technological steps of cold rolling, pack rolling, tandem rolling.
9. The technology of bar drawing, bar drawing machines.
10. Wire drawing technology, wire drawing machines.
11. Tube reduction technologies, examples.
12. General characteristics, properties and structure of plastics.
13. Thermoplastics, behavior, properties, applications.
14. Thermosets, behavior, properties, applications.
15. High temperature polymers, electrically conducting polymers, biodegradable plastics.
16. Elastomers, characteristics, applications.
17. Polymer matrix reinforced plastics.
18. General characterization, properties and structure of ceramics.
19. Shaping ceramics, casting, plastic forming, pressing.
20. Glasses, structure, properties, applications.
21. Forming and shaping glass.
22. Ceramic matrix composites, processes, products.
23. Graphite, carbon-nanotubes, synthetic diamond, daimondlike carbon (DLC)
24. Classification of composites based on the matrix, main production technologies, typical examples of composite products.
25. Classification of composites based on the additive, main production technologies, typical examples of composite products.

**Budapest, 4th of June 2021.**

**Dr. Pinke Péter**
**subject leader**