Study program / course: Mechanical engineering

Type and level of study: Master academic studies

Course: Formability in plastic forming processes

Lecturers: Milentije C Stefanovic, Srbislav M Aleksandrovic

Status of course: Elective for module M_1, III semester

Number of ECTS: 6

Precondition: Passed Production technology examination

The objective of course

Qualifying for evaluation and determination of materials formability in plastic forming processes. It is the foundation for successfull solving of technological problems which appears especially in forming of new modern materials.

The outcome of course

After the course finishing student can be able to: determine of sheet metal formability properties, analyze formability problems and give solutions, use of strain distributions and forming limit diagrams, determine formability properties for massive forming, consider and solve tribological problems in sheet metal forming and massive forming.

Syllabus

Theoretical study

Introduction. Definitions and classifications. Sheet metals formability. Basic properties. Technological tests. Chemical composition, condition, structure of materials. Work hardening. Anisotropy. Homogeneity of forming process. Strain distributions (properties). Forming limit in sheet metals forming (forming limit diagrams). Tribological aspects of sheet metals forming. Roughness. Friction (laws and specialty of friction in metal forming). Tribological tests. Specialties of new, advanced materials formability (high strength steel sheets, tailor welded blanks, Al alloy sheets, laminate sheets, stainless steel sheets etc.). Formability in massive forming. Tribological aspects of massive forming. Cold and warm forming. Active using of friction. Lubrication. Software simulations of plastic forming processes and formability evaluation (principles, significance and limitations).

Practical classes include:

In laboratory practical classes students are qualifying for practical knowledge and skills from selected fields of formability in plastic forming processes.

Recommended reading

1. M. Stefanovic: Deep drawing process tribology, JDT and Faculty of Mech. Eng., Kragujevac, 1994.
2. M. Stefanovic, S. Aleksandrovic: Technology of plastic forming, selected chapters, auxiliary book, Faculty of Mech. Eng., Kragujevac, 1998.(in Serbian).
3. B. Devedzic: Formability by Deep Drawing , Faculty of Mech. Eng., Kragujevac,1977.
4. S. Aleksandrovic: Blank holding force and deep drawing process control, monograph, Faculty of Mech. Eng., Kragujevac, 2006.
5. V. Vujovic: Formability, FTN, Novi Sad, 1992.

The number of hours of active teaching:				Other classes:
Theory: 3	Practical classes: 1.4	Other forms of teaching: 0.6	Research study: 0	1

Methods of teaching

Classic, beam projector presentations etc.

Evaluation of knowledge

Pre-final exam obligations	**points 70**	**Final exam**	**points 30**
Activities during the classes:	**5**	writen	**-**
Practical classes:	**20**	verbal	**30**
Colloquiums(s) :	**35**	**-**	**-**
Seminar(s) :	**10**	**-**	**-**