University *of Ljubljana*
Faculty *of Mechanical Engineering*

Geometric Product Specifications 5 ECTS

Lecturer: **R. Kunc, S. Zupan**

Lectures: 30h | Tutorials: 22h | Labs: 8h | Project: 0h | Lang. :

Objectives

1. Gaining theoretical and practical knowledge in the field of detailed geometrical product specifications (GPS).
2. Understanding principles and rules of standardized GDT system and practical use.
3. Understanding statistical geometrical tolerances and statistical control of production processes and practical use.
4. Understanding and developing geometrical tolerance analyses (TA) and practical use.
5. Understanding and development of specialised software tools (GPS, GDT, TA).

Programme

Lectures :

Introduction and basic definitions of GPS according to ISO standards. General GPS principles and rules, specifications on virtual (3D) models and on technical drawings (2D).
What is Geometrical dimensioning and tolerancing (GDT) and why to us it. Datums and datum systems (i.e. references). Material conditions of GDT, meaning and use. Geometrical tolerances (GT) definitions and use – form, orientation and location tolerances. GT runout na profile tolerances.
Methods of geometrical tolerance (GT) verification, tolerance analyses (TA). Statistical tolerances (ST).
State of technical surfaces and edges. Adding GPS in 3D virtual models (Model Based Definition) and transmission into technical documentation (2D).

Prerequisites

In order to successfully achieve this course, the students must have:

- Meeting the enrolment conditions for the Master's study programme of Mechanical Engineering - Research and Development program.

Learning outcomes

Knowledge:

In-depth theoretical, methodological and analytical knowledge with elements of research, which is the basis for demanding specialist work skills:

- Know how to interpret complex technical drawings and 3D models with added GPS symbol information and produce complex technical drawings and complete 3D models with standardized symbols and attributes. Know and understand complex concepts and rules of tolerancing (GDT) and surface and edges states marking.
- Understand and know how to use theoretical backgrounds and methods for conducting linear geometrical tolerance analyses (TA) and understand and know how to use software tools for complex spatial tolerance analyses.
- Understand the role and meaning of complex rules of technical documentation and the importance of those rules for functionality.

Assessment

- Theory examination (written/oral): 50%,
- Practical examination in laboratory (written/oral): 20%,
- Project (home) work (written): 30%.

Literature

1. Henrik S. Nielsen, The ISO Geometrical Product Specifications Handbook, ISO/Danish Standards 2012, ISBN: 978-87-7310-721-8 (print), ISBN: 978-87-7310-722-5 (pdf)
2. Stefano Tornincasa, Technical Drawing for Product Design, Mastering ISO GPS and ASME GD&T, 1st ed. 2021, Springer, ISBN 978-3-030-60853-8, e-ISBN 978-3-030-60854-5

Additional:

3. ZUPAN, Samo, KUNC, Robert, ŽEROVNIK Andrej.: Geometrijske specifikacije proizvodov (GPS); Geometrijske tolerančne analize (GTA); study material (subject online classroom) / university textbook in preparation (SLO / EN language)