

Manufacturing

Geometry and 3D imaging

IDENTIFICATION

CODE : GM-5-S2-EC-CEGEO
ECTS : 3.0

HOURS

Lectures : 0.0 h
Seminars : 10.0 h
Laboratory : 20.0 h
Project : 0.0 h
Teacher-student
contact : 30.0 h
Personal work : 10.0 h
Total : 40.0 h

ASSESSMENT METHOD

Report and case studie

TEACHING AIDS

Slides [pdf]

TEACHING LANGUAGE

French

CONTACT

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AIMS

In the design phase, the engineer must master the prismatic or surface geometric definition of the products. He must ascertain at the earliest possible feasibility of manufacture, geometric quality and material.

This course allows us to master the various "links of the geometric digital chain" of the mechanical products of the design to the service quality.

- To analyze manufacturing returns and to take into account the geometric quality of the real products,
- Proficiency in 3D scanning and imaging tools for product design,
- Understand the role of non-destructive testing (NDT) methods in the life cycle of a product,
- Knowledge of advanced NDT methods such as radiography or X-ray tomography,
- Know how to analyze reconstructed images in 3D.

CONTENT

TOMOGRAPHY / NDT [16H Labsession/Project] : Jean Michel LETANG and Jean-Yves BUFFIERE

- Basic concepts of physics, of technologies and of instrumentation in x-ray imaging
- Study and parametrisation of digital X-ray imaging
- Use of simulation modeling toolboxes and experimental benches of radiography and tomography
- Processing of 2D and 3D reconstructed images

GEOMETRIC AND SURFACE CONTROL [2H Tutotrials + 12H Labsession/Project] : Stéphane RAYNAUD and Adrien CHOUVIER

- Digital metrology chain
- Technology of contact or laser
- Analysis of specifications
- Capabilities of the means of acquisition and treatment
- Implementation of inspection with 3D means to contact or with laser scanner [MMT contact and laser, ARM laser scanner, large laser scanner]
- Point cloud processing
- Control report and mapping of defects
- Geometric expertise, decision making
- Implementation of large-scale scanning for TQC, implantation, augmented reality applications, meter surveyor.

BIBLIOGRAPHY

Advanced Tomographic Methods in Materials Research and Engineering, J. Banhart, OUP Oxford, 2008

- Industrial Tomography: Systems and Applications, M. Wang, Woodhead Publishing, 2015
- Nondestructive Testing of Materials and Structures, O. Büyüköztürk, Springer, 2013

PRE-REQUISITE

Bachelor in Mechanical Engineering