Course title: Technical Drawing and Industrial Engineering Methods
Course code: 42146
Scientific sector: ING-IND/15
Degree: Bachelor in Industrial and Mechanical Engineering (L-9)
Semester: 2
Year: /
Academic year: 2018-2019
Credits: 6
Modular: No

Total lecturing hours: 46
Total lab hours: 
Total exercise hours: 18
Attendance: Highly recommended

Prerequisitses: 
Course page: https://www.unibz.it/it/faculties/sciencetechnology/bachelor-industrial-mechanical-engineering/course-offering/?academicYear=2018

Specific educational objectives:

The course belongs to the set of basic teachings within industrial engineering and, as a result, for the Bachelor in Industrial and Mechanical Engineering. It introduces the fundamental notions for what concerns the contents of SSD ING-IND/15.

The course’s objective is providing students the required skills about representation techniques for the technical drawing and the function of mechanical components. Students will be able to exploit the knowledge acquired during the course in order to improve product development cycles.

More in details, the treated topics follow:

- Drawing standards and representation options:
  - drawing lines
  - orthographic projections and axonometric drawings
  - section drawings

- Representation of machine components and simple assemblies
  - dimensioning
  - dimensional tolerances
  - geometric tolerance
  - surface roughness
• Machines’ main components:
  o screws, bolts, nuts and and threaded connections
  o shaft-hub connections
  o non-detachable joints
  o gears
  o bearings
  o other elements

Lecturer
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Scientific sector of the lecturer
ING-IND/15

Teaching language
English

Office hours
From Monday to Friday, upon email request

Teaching format
Frontal lectures and exercises

Learning outcomes

Knowledge and understanding
1) fundamentals and formalized representation standards of the technical drawing
2) tolerances and other imperfections of real mechanical parts
3) representing machine elements and understanding their function within a complex mechanical system

Applying knowledge and understanding
4) applying drawing standards correctly
5) representing a technical system accurately

Making judgements
6) pointing out pros and cons with respect to the use of technical systems, selecting design alternatives, autonomously choosing (and justifying the choice of) a specific representation methods in terms of, e.g. clarity, completeness and non-ambiguity
7) evaluating which machine elements are best integrated in more complex technical systems, according to constraints and expected performances
8) being critical with respect to standards and drawing practices that are used in countries that have not adopted European standards or that have been abandoned

Communication skills
9) using the appropriate terms for the illustrated mechanical components and their variants
10) describing the function of the illustrated mechanical components in an effective way
<table>
<thead>
<tr>
<th>Ability to learn</th>
<th>11) Ability to autonomously extend the knowledge acquired during the study course by reading and understanding.</th>
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<tr>
<td>Assessment</td>
<td>Written exam, which includes practical exercises (e.g. projections, sections and axonometric drawing) and questions about the course's contents.</td>
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<td>Assessment language</td>
<td>English</td>
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| Evaluation criteria and criteria for awarding marks | The final evaluation is based on the outcomes of the written exam, which includes practical exercises and questions about theoretical aspects. A clear indication will be given of the maximum number of points that students can achieve by solving each exercise or task. The assessment procedure evaluates  
  • the capability of interpreting and representing technical systems correctly (1, 4, 5), by means of exercises aimed at drafting and making representations such as projections, sections and axonometric drawings;  
  • the capability of leveraging dimensioning, dimensional/form tolerances and roughness indications, as well as characterizing fits (2) through specific exercises  
  • the understanding of the concepts about machine elements and their functions through questions and exercises (3), as well as the correctness and clarity of answers (9, 10), which will be evaluated through open questions.  
  The non-mentioned items of the above Learning Outcomes will be trained during the course as well. Items 6-8 concerning the capability to make judgments will be stimulated during lectures, since the lecturer will ask the students to agree on design and drawing choices that have been made - some of them will, besides, present shortcomings. Item 11 will be monitored by providing supplementary material; students will be invited to read and analyze texts that concern topics closely related to technical drawing and report the main concepts, which, in turn, support the comprehension of design choices and representation standards. |
| Required readings | Handouts of the course supplemented by extracts of selected books and Internet websites. |
| Supplementary readings | Some extra material will be provided (in Italian and German beyond English) in order to support students’ comprehension; however, it will not correspond to the contents of the course completely. |