SYLLABUS
COURSE DESCRIPTION
ACADEMIC YEAR 2024/2025

Course title	**Technical Drawing and Industrial Engineering Methods**
Course code	42146
Scientific sector	IIND-03/B (former ING-IND/15) – Design Methods for Industrial Engineering
Degree	Bachelor in Industrial and Mechanical Engineering (L-9)
Semester	2nd
Year	I
Credits	6
Modular	No

Total lecturing hours	44
Total lab hours	-
Total exercise hours	16
Attendance	Highly recommended
Prerequisites	None
Course page	Teams channel to be activated before the beginning of the classes

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 as regards the contents of IIND-03/B. The course's objective is to provide students with 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 mechanical design.

Lecturer	Yuri Borgianni
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Scientific sector of lecturer	IIND-03/B (former ING-IND/15) – Design Methods for Industrial Engineering
Teaching language	English
Office hours	From Monday to Friday, upon email request
Lecturing Assistant (if any)	-
Contact LA	-
Office hours LA	-

List of topics covered	The course will cover the following topics:
	• Drawing standards and representation options:
	  ○ drawing lines
	  ○ orthographic projections and axonometric drawings
	  ○ section drawings
	• Dimensioning and indications of admitted errors in the technical drawing
	  ○ dimensioning
	  ○ dimensional tolerances

	○ geometric tolerances ○ surface roughness ● Machines' main components and representation thereof: ○ screws, bolts, nuts and threaded connections ○ shaft-hub connections ○ permanent joints ○ gears ○ bearings.
Teaching format	The course includes frontal lectures, in which the topics are presented by the lecturer through the support of slides, and exercises. While the former provide the foundations and general knowledge of the discipline, the latter are aimed to verify comprehension through tests. Some exercises are meant to facilitate the preparation of the exam. The teaching material coincides with the presented slides, the held exercises and their corresponding solutions.

Learning outcomes	**Intended Learning Outcomes (ILO)** 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 method 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 Learning skills 11) Ability to autonomously extend the knowledge acquired during the study course by reading and understanding.

Assessment	The students will be evaluated through a written exam, which includes practical exercises (e.g., projections, sections and axonometric drawing), calculation of relevant parameters for mechanical parts or assemblies (e.g., dimensional tolerances, properties of bearing or gears), identification and recognition of mechanical components and properties thereof, questions about the course's contents. An exam simulation of the written test will be uploaded in the Teams group, used as online repository, on which students will train at the end of the course. The kind of exercises proposed during the course are eligible to be included in the exam as well. **Formative assessment** Not foreseen formally, but students will receive feedback on their performances during exercise hours. Additional feedback can be given to students participating in meetings with the lecturer during office hours. **Summative assessment** The assessment is made through the written exam. The maximum score achievable is indicated for each exercise included in the written exam. The final mark is calculated as a sum of scores achieved in each exercise.
Assessment language	English
Evaluation criteria and criteria for awarding marks	The final evaluation is based on the outcomes of the written exam, which, as aforementioned, 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 (ILOs 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 (ILO 2) through specific exercises • the understanding of the concepts about machine elements and their functions through questions and exercises (ILO 3), as well as the correctness and clarity of answers (ILOs 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. ILOs 6-8 concerning the capability to make judgments will be stimulated during lectures since the lecturers will ask the students to agree on design and drawing choices that have been made – some of them will, besides, present shortcomings. ILO 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	Slides of the course, uploaded in the used repository.
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.