Fakultät für Ingenieurwesen
Facoltà di Ingegneria
Faculty of Engineering

COURSE DESCRIPTION – ACADEMIC YEAR 2023/2024

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	1
Credits	6
Modular	No

Total lecturing hours	44
Total lab hours	16
Attendance	Highly recommended
Prerequisites	
Course page	Teams channel reachable through this link

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 SSD ING-IND/15. 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 product development.

Lecturer	Yuri Borgianni
Contact	L5-03, yuri.borgianni@unibz.it, +39 0471 017821
Scientific sector of lecturer	ING-IND/15
Teaching language	English
Office hours	From Monday to Friday, upon email request
Lecturing Assistant (if any)	-
Contact LA	-
Office hours LA	-

List of 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	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 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 online repository, on which students will train during the last exercise of the course with the lecturers' support. The kind of exercises proposed during the course are eligible to be included in the exam as well.

Assessment language	English
Assessment Typology	Monocratic
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 lecturers 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 excerpts 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.
Software used	-