UNIVERSITÀ DI PAVIA

Anno Accademico 2019/2020

MACHINE DESIGN (SURNAMES A-K)	
Enrollment year	2019/2020
Academic year	2019/2020
Regulations	DM270
Academic discipline	ING-IND/15 (DESIGN AND METHODS FOR INDUSTRIAL ENGINEERING)
Department	DEPARTMENT OF ELECTRICAL,COMPUTER AND BIOMEDICAL ENGINEERING
Course	INDUSTRIAL ENGINEERING
Curriculum	PERCORSO COMUNE
Year of study	1°
Period	(02/03/2020 - 12/06/2020)
ECTS	6
Lesson hours	45 lesson hours
Language	Italian
Activity type	WRITTEN AND ORAL TEST
Teacher	GIBERTI HERMES - 6 ECTS
Prerequisites	No prerequisites required
Learning outcomes	This course is aimed at providing students with the knowledge of methodologies which are the basis of machine design. In particular, machine components and graphic representation techniques are dealt with. The latter are acquired through the use of manual drawings and CAD ones. At the conclusion of the course the students will be able to draw a simple mechanical component, describing its functionality, and also the assembly made up of multiple items. Extensive use is made of practical exercises based on actual design problems.
Course contents	Introductory concepts: technical industrial drawing as communication language. Geometrical constructions: Drawing tools, line tracing typologies;

geometrical construction (such as polygon construction, circumferences, arches, simplified construction, technical ones, and the like)

Orthogonal projection: plane projection of simple figures and solid bodies, axonometry (illustrative drawing), cross section of simple solids and in industrial drawing (Full Section, Half Section, Auxiliary Sections).

Standards: Sheet Sizes, designation of Sizes; title Block; Borders and Frames; Centring Marks; Metric Reference Graduation; Grid Reference System; Trimming Marks.

Drawing and mechanical machining: notes on how technology influences drawings: foundry, plastic deformation machining (rolling, extrusion, drawing, forging, etc), chip removal machining (machine tools, milling, turning, drilling, grinding, lapping, etc), unconventional machining (electro-erosion, laser cutting, water cutting, etc.); thermal treatments

Dimensioning: General Principles; Method of Execution; Termination and Origin Indication; Methods of Indicating Dimensions; Arrangement of Dimensions

Limits and tolerances: Fundamental Tolerances; Fundamental Deviations: Method of Placing Limit Dimensions (Tolerancing Individual Dimensions); Fits; Clearance Fit; Transition Fit; Interference Fit; introduction to Tolerances of Form and Position.

Surface Roughness: Actual Profile (Af); Reference Profile (Rf); Datum Profile (Df); Mean Profile (Mf); Peak-to-valley Height (Rt); Mean Roughness Index (Ra); Surface Roughness Number.

Screw thread: Screw Thread Nomenclature; Forms of Threads; Thread Designation; Multi-start Threads; Right Hand and Left Hand Threads; Coupler-nut; Representation of Threads.

Screwed Fasteners: Bolted Joint; Locking Arrangements for Nuts; Washers; Nuts

Machine components: Gears, Belt Driven Pulleys, Shaft Coupling, Sliding Contact Bearings, Rolling Contact (Anti-friction) Bearings

Teaching methods	Lessons
Reccomended or required readings	E. Chirone, S. Tornincasa. Disegno tecnico industriale, Voll. 1 e 2. Il Capitello. Testo di riferimento. Norme per il disegno tecnico. UNI M1, Voll. I, II. Manuali di consultazione.
Assessment methods	At the end of the course two tests will be carried out: a multiple choice test with 10 questions regarding the program and a CAD test.
Further information	At the end of the course two tests will be carried out: a multiple choice test with 10 questions regarding the program and a CAD test.
Sustainable development goals - Agenda 2030	$lbl_legenda_sviluppo_sostenibile