

Transilvania University of Braşov, Romania

Study program: Manufacturing Engineering

Faculty: Technological Engineering and Industrial Management

Study period: 4 years (bachelor)

1st YEAR

*Support in English offered

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Material science and engineering	SIM	Romanian	5	3	-	2	-

Course description (Syllabus): structure and properties of metallic materials; alloys theory, man type of equilibrium diagrams; Fe-C alloys; thermophysical and thermochemical treatments for steels; alloyed steels; non-ferrous alloys; extractive metallurgy; moulding, plastic processing; metals welding.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Mechanics	MEC	Romanian	5	2	3	-	-

Course description (Syllabus): Statics: material point; rigid; rigid systems; application in engineering. Kinematics: point; rigid; relative movement; application in engineering. Dynamics: theorems; rigid solids.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Technical drawing and info- graphics 2	DTI2	Romanian	5	1	-	4	-

Course description (Syllabus): AutoCAD introduction; basic drawing elements: coordinates, functional keys, OSNAP mode; drawing commands: line, circle, arc, rectangle, point, ellipse, polygon, ray, Xline, Mline; entities selection, editing and properties; generating and editing text; hatching and dimensioning; polylines and spline curves; assembly.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Computer programming and programming languages 2	PCL2	Romanian	5	2	-	2	-

Course description (Syllabus): introduction in VisualBasic; structure of VB program; objects and properties; code lines; control routines; modular programming; menus, file managing, data base managing, object oriented programming.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
General economics	ECC	Romanian	3	1	1	-	-

Course description (Syllabus): demand, offer, market, concurrency; labour market, employment, unemployment, wages; monetary market, inflation, loan and interest; capital market; macroeconomics; international economic relations.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Modern languages 2a (English)	LM2a	Romanian	3	1	1	-	-

Course description (Syllabus): word order (in declarative/ interrogative/ imperative/ exclamatory sentences); sequence of tenses; reported speech; inversion; negation; complex sentences.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Modern languages 2b French	LM2b	Romanian	3	1	1	-	-

Course description (Syllabus): pronoun; adverbs; preposition; communication skills.

2nd Year

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Strength of materials 1	RM1	Romanian	5	2	1	1	-

Course description (Syllabus): Fundamentals: mechanical properties of materials; external tensions and constrains; equilibrium equations; Sectional stress: general aspects; differential dependents between forces and sectional stresses; sectional stress diagrams; static and inertial momentum; axial stress; shear stress; bending; elasticity theory.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Numerical methods	MNI	Romanian	4	2	-	2	-

Course description (Syllabus): mathematical software: Matlab, Mathematica, Maple, Mathcad; introduction in Mathcad; Mathcad programming; vectors and matrixes; numeric solution of equations and equations system; optimizations: nonlinear, mono-objective and multi-objective; multi-attribute decision; interpolation; regression; Monte Carlo simulation method.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Fluid mechanics and hydraulic equipment	MFH	Romanian	3	2	-	1	-

Course description (Syllabus): fluids physical properties; fundamental law of hydrostatics; fluid forces; fluid kinematics; fluid dynamics; hydraulic engines: pumps, actuators.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Electrotechnics and applied electronics	EEA	Romanian	5	2	-	2	-

Course description (Syllabus): electromagnetism; eletrokinetic; DC linear circuits; electrostatics; AC linear circuits; electronic devices: diode; transistors; electric plants.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Modern languages 3a (English)	LM3a	Romanian	3	1	1	-	-

Course description (Syllabus): quadratic equations; simultaneous equations; indices and logarithms; geometry; trigonometry; functional notations. limits; differentiation; integration; simple harmonic motion; rotation of a rigid body; beyond Newton's law; fields: strength and forces, potential energy.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Modern languages 3b French	LM3b	Romanian	3	1	1	-	-

Course description (Syllabus): quadratic equations; simultaneous equations; indices and logarithms; geometry; trigonometry; functional notations. limits; differentiation; integration; simple harmonic motion; rotation of a rigid body; beyond Newton's law; fields: strength and forces, potential energy.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Machine elements 1	OM1	Romanian	4	2	-	1	1

Course description (Syllabus): screw assemblies; shape assemblies (keys, studs, grooves, bolts, etc.) friction assemblies; elastic assemblies – springs; couplings.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Strength of materials 2	RM2	Romanian	4	2	1	1	-

Course description (Syllabus): bar bending deformations; curved bars; complex stress; energetic methods to determine the displacements of a linear-elastic system; statically undetermined systems; buckling of straight bars; dynamic stress; stress fatigue.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
3D Modelling	M3D	Romanian	4	2	-	2	-

Course description (Syllabus): general aspects of working in AutoCAD 3D space; modelling in AutoCAD; 3D primitives; special commands for 3D modelling: Revolve, Extrude, Sweep, Loft; editing/modifying solids; 3D Surfaces; working with layouts, shop floor drawing; applications.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Basics of Industrial engineering	BII	Romanian	4	2	-	2	-

Course description (Syllabus): industrial engineering - definitions and concepts; industrial engineer's competencies; industrial Engineering Pioneers; ethics and responsibility in industrial engineering; introduction to manufacturing processes; overview on cutting tools and manufacturing devices; introduction to numerical control; productivity and performance in industrial engineering; ergonomics and safety.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Heat treatments	AMTT	Romanian	3	2	-	1	-

Course description (Syllabus): ferrous and non-ferrous materials; sintered materials; materials resistant to: corrosion, high temperature, low temperature and wear; composites, plastics and adhesives; criteria used in rational choice of materials: a functional, technological and economic criteria; materials and treatments for: axis, bearings, guides, springs and tools.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Thermotechnics and heat engines	TET	Romanian	3	2	-	1	-

Course description (Syllabus): thermodynamics: first law of thermodynamics; ideal gas; second law of thermodynamics; energy and anergy; thermodynamics and transformations of steam; heat engines: internal combustion engines; compressors; gas turbine plants; heat transfer.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Industrial Management	MIN	Romanian	2	2	1	-	-

Course description (Syllabus): management functions; company concept; company environment; company attributes; types of companies; resources raised and use by a company; production management.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Modern languages 4a (English)	LM4a	Romanian	2	1	1	-	-

Course description (Syllabus): metals; measurement; design and function; energy, heat and work; control devices; pumps; air-conditioning systems; diesel engines; refrigeration systems; data communications; electric power systems; telecommunications; engineering design; engineering and the Earth's resources.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Modern languages 4b French	LM4b	Romanian	2	1	1	-	-

Course description (Syllabus): metals; measurement; design and function; energy, heat and work; control devices; pumps; air-conditioning systems; diesel engines; refrigeration systems; data communications; electric power systems; telecommunications; engineering design; engineering and the Earth's resources.

3rd Year

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Data acquisition and distribution systems	SADD	Romanian	4	2	-	2	-

Course description (Syllabus): general remarks related to data acquisition and distribution. Brief presentation of LabVIEW; virtual instruments; LabVIEW environment; controls and indicators; LabVIEW functions; using NI-USB 6009 device to acquire data from processes; data processing; applications.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Computer aided parametric design	PPAC	Romanian	4	2	-	2	-

Course description (Syllabus): introduction. DNC, CNC, DsNC systems; Pro/NC Manufacturing. Pro/NC concepts; manufacturing process in Pro/NC(operations, sequences, coordinate systems, tooling, manufacturing parameters etc.); milling NC sequences; turning NC sequences; drilling NC sequences; NC Post-Processing.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Machine elements II	OM2	Romanian	4	2	-	1	-

Course description (Syllabus): gears: calculus, forces; shafts; bearings; seals; belt gearing; motor speed control devices.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Machine elements II Project	OM2P	Romanian	3	-	-	-	2

Course description (Syllabus): designing a gear reducer. performing the strength calculi of main components; assembly design, shop floor drawing of main components

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Tolerances and dimensional control	TCD	Romanian	5	2	-	2	-

Course description (Syllabus): mechanical instruments for measurement; optical instrument for measurement; limits and fits for cylindrical smooth parts; surface texture measurement; geometric dimensioning and tolerance; tolerances and fits for part threads; tolerances and fits for gear pairs; tolerances and fits for keys and splines; angle measurements; pneumatic gaging.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Finite elements method	MU	Romanian	5	2	-	2	-

Course description (Syllabus): introduction to finite element method. Computer-Aided Engineering. theory of finite element method. preprocessing (modelling, material properties, mesh strategy, boundary condition, load); processing (solve linear equations); post processing (FEA results). one-Dimensional, 2D and 3D finite elements (beams, frames, bars, trusses, plate and shell). static and fatigue analysis; modal and buckling analysis; finite element analysis of composite materials.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
CAD/ CAPP/ CAM Systems	CADM	Romanian	4	2	-	2	-

Course description (Syllabus): Introduction in CAD/CAPP/CAM/CAE/PLM/RP; CAD/CAM systems the core of concurrent engineering; Computer aided design; Techniques of 3D modelling of the products; Computer aided manufacturing; CAD/CAPP/CAM integrated systems; Computer aided process planning; Basic of Reverse engineering technologies;

4th Year

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Cold-pressing technologies II	TPR2	Romanian	4	1	-	-	2

Course description (Syllabus): cup-drawing - the process and technological conditions by cup-drawing; retention and clamping of the blank in cup-drawing; cup-drawing coefficient; determination of the shape and dimensions of blanks utilized in cup-drawing; the technology and the dies for the cup-drawing of parts; special cup-drawing procedures; fashioning of sheet-metal components: relief forming, bordering, rimming, widening, necking, smoothing and fashioning in special machines; processing of components by volumetric cold-forming: spreading, upsetting, volumetric cold-forming in dies, calibration, cold extrusion, cold rolling.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Automation of manufacturing processes	APT	Romanian	4	2	-	2	-

Course description (Syllabus): using of compressed air in automation of manufacturing processes; pneumatic valves; pneumatic drives; grippers; automation of feeding of machine tools; electric drive technology; GRAFCET concept; Sensors; image processing; handling systems.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Numerical control	CN	Romanian	4	2	-	2	-

Course description (Syllabus): course objectives, general and basic concepts, definitions; CNC machine-tools; machine-tools programming; general structure of the programs, subprograms and blocks in numerical control; coordinate systems of numerical control; geometrical and technological addresses; G codes; M codes;

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Computer aided design of products – CAD systems	CADM	Romanian	4	2	-	2	-

Course description (Syllabus): a brief presentation of the most used CAD/CAM software packages; basic techniques for part modelling using CATIA; advanced techniques for complex part modelling using CATIA – surface modelling; parts assembling; defining the workpiece and tools for NC milling; roughing strategies; finishing strategies;

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Robotics in manufacturing processes	RPT	Romanian	4	2	-	2	-

Course description (Syllabus): Definition of industrial robot (IR), classification of robots.. Mechanisms of IR: actuators and transmissions for prismatic and revolute joints. Modular IR: structure and construction. Grippers and end-effectors Perirobotics: conveyors, AGVs, paletts. Elements of robot geometry and kinematics, control system of IR. Robot programming. Applications of IR: machine tending, packaging/palletizing, industrial workpartners, spot&arc welding, spray painting/coating, assembling.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Developing computer applications in engineering	DCAI	Romanian	4	2	-	2	-

Course description (Syllabus): measurement units converting; drilling force determining; costing for product sales; determining the best offer price for a particular product; surface ordering for rotational parts; dimensions chains computing; cutting parameters calculating in turning operation; cutting parameters choosing from speed ranges and feeds.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Computer aided manufacturing	FAC	Romanian	3	1	-	2	-

Course description (Syllabus): introduction. DNC, CNC, DsNC systems; Pro/NC Manufacturing. Pro/NC concepts; manufacturing process in Pro/NC(operations, sequences, coordinate systems, tooling, manufacturing parameters etc.) ; milling NC sequences; turning NC sequences; drilling NC sequences; NC Post-Processing.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Flexible manufacturing systems	SFF	Romanian	4	2	-	2	-

Course description (Syllabus): a brief presentation of the most used CAM software packages: Pro/Engineer, Catia, PowerMill, Solid Works; advanced techniques for complex part modelling using Pro/Engineer – surface modelling; defining the workpiece and tools for NC turning and milling using Pro/E; roughing and finishing strategies for turning and milling using Pro/E; NC program generation using Pro/E.

Course title	Code	language of instruction*	No. of credits	Number of hours per week			
				course	seminar	laboratory	project
Concurrent engineering	IS08	Romanian	3	1	-	2	-

Course description (Syllabus): introduction. Product development cycle; concurrent Engineering concept. Factors of influence. Definitions; sequential Engineering vs. Concurrent/Simultaneous Engineering; concurrent Engineering principles; methods and tools used in concurrent engineering (Quality Function Deployment - QFD, Failure Modes and Effect Analysis – FMEA, Design for Manufacture and Assembly – DFMA etc.); software packages for concurrent engineering.