

# Transilvania University of Braşov, Romania

## Study program: Engineering and Quality Management

Faculty: Technological Engineering and Industrial Management

Study period: 4 years (bachelor)

### 1<sup>st</sup> Year 1<sup>st</sup> semester

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Mathematics	AM	4	2	2	-	-

**Course description (Syllabus):** numeric series, derivatives and differentials, extreme points, integrals, surface and volume integrals.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Descriptive geometry	GD	5	2	2	-	-

**Course description (Syllabus):** line and plan drawing, relative position of two planes, intersecting and parallel planes, methods applied in descriptive geometry; polyhedrons and rotation surfaces; bodies intersections.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Chemistry	CHI	3	2	-	1	-

**Course description (Syllabus):** principles of chemistry science, atom characteristics, physical and chemistry binding, chemical transformation and aggregation states of substances; water, electrolytes, metals, metals and alloys, corrosion; inorganic polymeric materials (glass and ceramics) and organic (polymers of polyaddition and polycondensation), composites.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Computer programming and programming languages 1	PCL1	3	1	-	2	-

**Course description (Syllabus):** Microsoft Word: working with page layout, page setup, inserting page numbers, headers and footers, date and time, pictures, objects, shapes, equations, symbols, etc.; adding text, editing text, finding and replacing text, formatting text and paragraph; working with tables and columns; Microsoft Excel: working with page layout; entering data, formatting data etc.; working with formulae and functions; sorting and filtering data (auto and advanced filter); working with charts (2D and 3D); Microsoft PowerPoint: creating and formatting slides in a presentation; supplying various effects (custom animation and transition effects) in a presentation.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Technical drawing and info-graphics 1	DTI1	5	2	-	3	-

**Course description (Syllabus):** multiview drawing (view, projection, etc.), views, sections and breaks representation; dimensioning in technical drawing; tolerances and precision; drawing and dimensioning; threads, grooved wedge and grooves, gears; assembly drawing.

Course title	Code	No. of cred	Number of hours per week			
			course	seminar	laboratory	project
Physics	FIZ	5	2	-	2	-

**Course description (Syllabus):** basic of classical mechanics, oscillatory movement; relativity theory; elastic wave; thermodynamics; electromagnetism; optics; quantic mechanics; atomic physics; solid physics; nuclear physics.

Course title	Code	No. of cred	Number of hours per week			
			course	seminar	laboratory	project
Integration and personal development	IDP	2	1	1	-	-

**Course description (Syllabus):** University Organization: university, faculty, department. Leading positions in university; Leading structures in university; students' regulations; students' rights; students' liabilities, Erasmus+ frame; Erasmus+ mobilities, academic writing.

Course title	Code	No. of cred	Number of hours per week			
			course	seminar	laboratory	project
Modern languages 1a	LM1a	3	1	1	-	-
Modern languages 1b	LM1b					
Modern languages 1c	LM1c					
Modern languages 1d	LM1d					

**Course description (Syllabus):** verb: mood, tense and aspect; indicative mood – present; indicative mood – past; indicative mood – future; modals; noun: classification, gender, number, case; adjective: classification, comparison, special constructions, position.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Physical training 1	EDF1	1	-	1	-	-

**Course description (Syllabus):** practical skills training-methodical composition of complex aerobics; analytical exercises for upper limbs and scapular-humeral belt; exercises for trunk and abdominal muscles; individual actions specific basketball game in attack and defence; elementary collective tactical combinations in attack and defence in basketball: bilateral game.

## 2<sup>nd</sup> semester

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Material science and engineering	SIM	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	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Linear algebra, analytical and differential geometry	ALGA	4	2	2	-	-

**Course description (Syllabus):** linear algebra: vector spaces and subspaces; Euclidian spaces; free vector; vector product; linear transformation in vector spaces; eigenvalues and eigenvectors; diagonalization; linear, bilinear and quadratic forms; analytic geometry: plan and lines in space; angles; cons; canonical form; quadrics. Differential geometry: plane curves; oscillate circle; tangent; normal; Frenet marker elements; surfaces (generalities; conics; cylindrical, etc.).

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Mechanics	MEC	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	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Technical drawing and info- graphics 2	DTI2	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	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Computer programming and programming languages 2	PCL2	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	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
General economics	ECG	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	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Modern languages 2a Modern languages 2b Modern languages 2c Modern languages 2d	LM2a LM2b LM2c LM2d	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	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Physical training II	EDF2	1	-	1	-	-

**Course description (Syllabus):** Football: playing without ball; foot hitting; head hitting; strategies. Basketball: techniques; tactical offensive and defensive; contra-offensive; bilateral game.

## 2<sup>nd</sup> Year 1<sup>st</sup> semester

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Special mathematics	MS	4	2	2	-	-

**Course description (Syllabus):** first order differential equations; differential equations with constant coefficients; systems of differential equations; symmetrical systems; first order partial differential equations; complex functions;

holomorphic functions; integral in complex; Cauchy theorem; power series; Taylor series; Fourier series; Laurent series; Laplace transform; operational methods.

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

**Course description (Syllabus):** Fundamentals: mechanical properties of materials; external tensions and constraints; 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	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Mechanisms	MEC	6	3	-	2	-

**Course description (Syllabus):** general structure of mechanisms: joints; structural modelling of complex mechanisms; structural optimizing of mechanisms; kinematics and dynamics of: involute gears; planetary gear; linkage mechanisms; cam gear: kinematics.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Numerical methods	MNI	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	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Fluid mechanics and hydraulic equipment	MFH	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	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Electrotechnical and applied Electronics	EEA	5	2	-	2	-

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

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Modern languages 3a Modern languages 3b Modern languages 3c Modern languages 3d	LM3a LM3b LM3c LM3d	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	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Physical training III	EDF3	1	-	1	-	-

**Course description (Syllabus):** Basic technical elements of the elective discipline. Regulations of practicing the selected sport

## 2<sup>nd</sup> Year, 2<sup>nd</sup> semester

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Machine elements I	OM1	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	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Strength of materials II	RM2	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	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
3D Modelling	M3D	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	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Basics of Industrial Engineering	BII	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	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Material selection and heat treating	AMTT	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: functional, technological and economic criteria; materials and treatments for: axis, bearings, guides, springs and tools.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Thermomechanics and heat engines	TET	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	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Industrial Management	MIN	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	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Internship (90 hours/ year)	PRA2	4				

**Course description (Syllabus):** moulding sectors; hot forming sectors; heat treatment; galvanic coating; welding technologies.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Modern languages 4a	LM4a	2	1	1	-	-
Modern languages 4b	LM4a					
Modern languages 4c	LM4a					
Modern languages 4d	LM4a					

**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	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Physical training IV	EDF4	1	-	1	-	-

**Course description (Syllabus):** Basic technical elements of the elective discipline. Regulations of practicing the selected sport

### 3<sup>rd</sup> Year 1<sup>st</sup> semester

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Data acquisition and distribution systems	SADD	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	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Fundamentals of cutting surface on machine-tools	BGSA	5	3	-	2	-

**Course description (Syllabus):** generating surfaces by cutting. Introductory elements; cutting process; kinematics; parameters; dynamics (forces, machine work and power); physics of chip formation; thermodynamics of cutting; electrical phenomenon in the cutting process; wear and the life of cutting tools; cutting fluids; quality of surfaces obtained by cutting; systemic character of the cutting process; machinability of metals by cutting; diagnosis elements and the prognosis of the cutting process.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Probabilities and applied statistics	PS	4	2	1	1	-

**Course description (Syllabus):** sample space; events; probability of events; fundamental probability theorems; discrete and continuous random variables, expectation and probability distributions; statistical important distributions; Random Sampling and Data Description; Distributions of Sampling Statistics; point and interval estimation; statistical hypotheses testing.

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

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

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Machine elements II - Project	OMP	3	-	-	-	2

**Project description (Syllabus):** Design of a gear reducer. Each student has a customized subject.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Allowances and dimensional control	TCD	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	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Finite element analysis	MEF	5	2	-	2	-

**Course description (Syllabus):** finite element applications in engineering; theory and finite element analysis of: beams, frames, bars, trusses, plate and shell; modelling of 3D structures; meshing strategy; applying materials, loads and boundary conditions; static and fatigue analysis; modal and buckling analysis; finite element analysis of composite materials; analysis and interpretation of results; design and topology optimization.

### 3<sup>rd</sup> Year ,2<sup>nd</sup> semester

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Manufacturing Technologies	TCMI	4	2	-	2	-

**Course description (Syllabus):** general problems of manufacturing technology; manufacturing precision; quality of machined surface; design of manufacturing processes; optimization of technological processes; additions processing determination and intermediate technological dimension; determination of cutting regimes; synchronization of operations; about vibration of cutting processes; numerical control of technological processes.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Machine-tools	MU	3	2	-	1	-

**Course description (Syllabus):** main cutting data formulas and definitions of parameters; cutting tool materials and inserts; turning tools; parting and grooving tools; threading tools; milling tools; drilling tools; boring tools; gear cutting tools; broaches.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Cold-pressing technology	TPR1	5	3	-	2	-

**Course description (Syllabus):** fundamentals of the theory of plasticity. the plasticity hypotheses. the basic laws of plastic deformation; the main materials employed in forming parts by cold-pressing; classification of the operations and equipment of cold-forming; cropping by shears; cropping with punching dies; blanking and piercing; blanking and piercing by cold precision shearing; cutting the material; bending parts of metallic materials.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Design of cutting tools	PSA	4	2	-	1	1

**Course description (Syllabus):** main cutting data formulas and definitions of parameters; cutting tool materials and inserts; turning tools; parting and grooving tools; threading tools; milling tools; drilling tools; boring tools; gear cutting tools; broaches.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Fixture design	PDI	3	2	-	1	-

**Course description (Syllabus):** definition of the fixtures, types and functions of jigs and fixtures; supporting and locating principles of the prismatic parts, rotational parts and complex parts; design of the locators; locating accuracy of the jigs and fixtures; principles of clamping; design of the edge, screw, collet, cam-action, diaphragm and others clamps.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Databases for engineering	BDAC	3	2	-	2	-

**Course description (Syllabus):** fundamentals of databases: history of management information; definitions and classifications of databases; DBMS in industrial engineering; design elements of the structure of a database. DBMS Microsoft Access 2013: overview of Access 2013 system; data types used in Access; create and manage tables; create and manage relationships between tables; design and run of queries; design and use of forms; design and print reports; design and use of macros; design and use of switchboards; database maintenance and administration: data security issues; data integrity issues; aspects of import and export data.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Internship (90 hours/year)	PRA3	4	-	-	-	-

**Course description (Syllabus):** Mechanical processing: cylindrical, conical, spherical, eccentrically turning; face and radius milling; planning and slotting; broaching; drilling, boring; grinding and finishing; teething; threading; CNC machine tools: processing methods; programming; cold forming; technologies for: dies; automat lathes.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Basics of computer aided manufacturing design	CADM	4	2	-	2	-

**Course description (Syllabus):** The Pro/Engineer interface; a brief presentation of the CAD module; basic techniques for part modelling; defining the workpiece and tools for NC milling; defining the NC sequences for milling; manufacturing simulation; NC program generation.

#### 4<sup>th</sup> Year 1<sup>st</sup> semester

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Quality of manufacturing processes	CPT	4	2	-	-	1

**Course description (Syllabus):** elements of design and technology management for: semi-finished, added processing, cutting regime, technical standards of cutting time; elements of technology management for: dimensional accuracy, geometric accuracy, surface (roughness) quality; elements of technology management for synchronization and balancing manufacturing lines in continuous stream and discontinuous; elements of technology management for control of products in the systems of the manufacturing technology.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Quality of manufacturing processes - Project	CPTP	3	-	-	-	2

**Project description (Syllabus):** Designing a technology for the manufacture of a part. Each student has a customized subject.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Flexible fixture and assembly devices	DFP	3	-	-	2	-

**Course description (Syllabus):** general characteristics; systematic modular fixtures: T-slot systems, systems with centring pins, hybrid; precision positioning; scope; application of the modularization in the activities of design, construction and operation.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Manufacturing and cold-pressing technologies	TFPR	4	2	-	-	1

**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	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Quality management	MC	4	2	-	1	1

**Course description (Syllabus):** contributing approach to quality; the ISO 9000:2006 specific terminology; the concept of quality products; development of concept "quality" and related industrial practices; ISO 9000 family of standards; requirements of the quality management system according to ISO 9001 standard; quality management system documentation; specific development of quality management system; implementation of quality management.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Statistical control	COS	5	2	-	2	1

**Course description (Syllabus):** contributing approach to quality; the ISO 9000:2006 specific terminology; the concept of quality products; development of concept "quality" and related industrial practices; ISO 9000 family of standards;

requirements of the quality management system according to ISO 9001 standard; quality management system documentation; specific development of quality management system; implementation of quality management.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Reliability analysis of industrial systems	FES	4	2	-	2	-

**Course description (Syllabus):** acquirement of basic knowledge regarding the main issues of reliability; maintainability and industrial product and process availability; acquirement of knowledge necessary to use the procedures on the statistical processing of experimental data in the reliability field.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Advanced programming	MAP	3	2	-	1	-

**Course description (Syllabus):** Basics of the Java language: identifiers, variables, primitive data types, constants; Reading data from the keyboard and display data on the screen: print method, printing, readline, read. Java and its components: virtual machine, the Java language itself, Java compiler, Java class library; Types of programs implemented by Java applications, Java applets; Stages of development of a Java application, a Java application structure, the method main; Use predefined object classes of packets (packets API) Java, import directive, instruction package.

#### 4<sup>th</sup> Year ,2<sup>nd</sup> semester

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Production and operations management	MPO	2	2	-	1	-

**Course description (Syllabus):** production management definition; functions of production management : Production planning, Production control, Factory building, Provision of plant services, Plant layout, Physical Environment, Method study, Inventory control, Quality control, Product development; different classification/types of production: make to stock, make to order, assemble to order; planning and forecast. Strategic, tactical and operational planning. Quantitative and qualitative forecast; Material Requirements Planning MRP I, Manufacturing Resource Planning MRP II; Enterprise Resource Planning ERP; inventory; Product Life Cycle Management; Supply Chain Planning. Supply Chain Execution; Supply Chain Control. ABC methodology.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Audit	AUD	3	2	-	1	1

**Course description (Syllabus):** presentation of the quality management systems documentation; quality manual structure and documentation with case studies; presentation of the main concepts regarding the audit of the management systems; presentation and of the audit process for the certification of the quality management systems and case studies.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Ecology and environment protection	EPM	2	2	-	2	-

**Course description (Syllabus):** strategy for sustainable development; management of ecological and environment protection; air green technologies; water green technologies; soil green technologies; waste management.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Projects management	MP	2	1	-	-	2

**Course description (Syllabus):** Project management – theoretical aspects. Project life cycle and organization. Project management knowledge areas: project integration management; project scope management; project quality management; project cost management; project communications management.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Computer aided design for manufacturing	PTAC	2	1	-	2	-

**Course description (Syllabus):** The Pro/Engineer interface; a brief presentation of the CAD module; basic techniques for part modelling; defining the workpiece and tools for NC milling; defining the NC sequences for milling; manufacturing simulation; NC program generation.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Management and maintenance engineering	MIN	2	2	-	1	-

**Course description (Syllabus):** introduction about the maintenance activity in a company; the analysis of maintenance systems; methods about the management of the maintenance; the management of maintenance by costs; the management of maintenance by budgets; the analysis of the efficiency of the maintenance activity; maintenance techniques.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Engineering and industrial risk management	MSSO	3	2	-	2	-

**Course description (Syllabus):** Risk management – theoretical aspects; Risk management processes: Risk Management Planning; Risk Identification; Qualitative Risk Analysis; Quantitative Risk Analysis; Risk Response Planning; Risk Monitoring and Control; Taguchi risk; Methods and tools used for risks assessment; Risk management for quality and reliability of technological processes.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Work on diploma project	API	4	-	-	-	4

**Course description (Syllabus):** students work individually on their diploma project. The project subject is fully customized (each student has his own subject) Work is carried on under the supervision of the mentor.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Internship for diploma project (60 hours)	API	10	-	-	-	-

**Course description (Syllabus):** students work individually on their diploma project. The project subject is fully customized (each student has his own subject) Work is carried on under the supervision of the mentor.