

# Transilvania University of Braşov

## Study program: Economic and Industrial Engineering

### Full time and Distance learning

Faculty:	Technological Engineering and Industrial Management
Study period:	4 years (bachelor)
Academic year structure:	2 semesters (14 weeks per semester)
Examination sessions (two):	winter session (January/February) summer session (June/July)

#### 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
Calculus	CAL	5	2	2	-	-

**Course description (Syllabus):** This course offers a foundational understanding of mathematical analysis, with a focus on essential concepts in differential and integral calculus. It covers numerical series, methods for computing derivatives and differentials, techniques for identifying extrema for function optimization, and applications of integrals. Students will also study surface and volume integrals, which are fundamental for solving problems in physics and engineering. The course emphasizes both theoretical understanding and practical problem-solving skills.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Physics	PH	4	2	-	2	-

**Course description (Syllabus):** This course offers a comprehensive introduction to fundamental concepts in physics, encompassing both classical and modern theories. Topics include classical mechanics, oscillatory motion, and an overview of relativity. Students will examine elastic waves, thermodynamics, and the basics of electromagnetism. The course also introduces key concepts in optics, quantum mechanics, atomic physics, solid-state physics, and nuclear physics, providing a broad perspective on the physical principles that govern the natural world.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Chemistry	CH	5	2	1	1	-

**Course description (Syllabus):** This course introduces the fundamental principles of chemistry, covering both theoretical and applied aspects. Topics include atomic structure and properties, physical and chemical bonding, and the principles governing chemical reactions and the states of aggregation of matter. Students will examine the characteristics and roles of water, electrolytes, metals, and alloys, as well as the phenomena of corrosion. The course also explores inorganic polymeric materials such as glass and ceramics, along with organic polymers formed through polyaddition and polycondensation processes.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Applied Software	AS	4	2	-	2	-

**Course description (Syllabus):** This course provides an introduction to database systems and their applications. Students will learn fundamental concepts of data management, database design, and implementation, as well as the role and structure of database management systems. Key topics include database planning, design, and administration, entity–

relationship modelling, and database normalization. The course also covers conceptual design methodologies, logical design for relational databases, and principles of physical design, offering students a comprehensive understanding of database development and optimization.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Communication Management	CM	5	2	2	-	-

**Course description (Syllabus):** This course examines the structure of communication processes, presenting key theories and models of communication. Students will explore individual and organizational communication within social contexts, along with effective oral communication techniques. The course addresses corporate communication in social and public settings, including recruitment communication, meeting management, and conflict resolution. It also introduces research methods in scientific, economic, and administrative fields, as well as essential information resources and databases used in effective communication management.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Law	LAW	2	1	1	-	-

**Course description (Syllabus):** This course provides an introduction to the legal framework governing business activities, covering key aspects of production, trade, and services. Students will explore the roles and responsibilities of professionals and commercial operators, as well as the legal forms of business entities. The course also examines commercial contracts, focusing on their structure, essential clauses, and legal implications in business transactions.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Ethics and Academic Integrity	EAI	2	1	1	-	-

**Course description (Syllabus):** This course introduces the principles of ethics and academic integrity, emphasizing their importance in higher education and professional practice. Students will examine fundamental ethical theories, values, and norms, as well as the responsibilities of academic community members. The course addresses key issues such as plagiarism, proper citation practices, responsible use of information, and the ethical conduct of research. Through case studies and practical activities, students will learn to recognize ethical dilemmas, make informed decisions, and uphold standards of honesty, fairness, and accountability in academic work.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Physical Education and Sports 1	PES1	2	1	1	-	-

**Course description (Syllabus):** This course introduces students to the fundamentals of physical education and sports through four different sport disciplines. The program emphasizes the development of motor abilities, physical fitness, and healthy lifestyle habits, while fostering teamwork, discipline, and fair play.

#### Optional pack

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
English Language 1	EL1a	2	1	1	-	-

**Course description (Syllabus):** This course focuses on fundamental aspects of English grammar, with particular attention to verb structures and the use of nouns and adjectives. Students will study verb mood, tense, and aspect, including the indicative mood in the present, past, and future tenses, as well as the use of modal verbs. The course also covers nouns, examining their classification, gender, number, and case. Additionally, students will explore adjectives, including their classification, degrees of comparison, special constructions, and positional usage within sentences.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
French Language 1	FL1	2	1	1	-	-

**Course description (Syllabus):** This course provides an introductory foundation in the French language, focusing on basic communication skills in both oral and written form. Students will learn essential vocabulary and grammar structures, including noun–adjective agreement, verb conjugation in the present tense, and common sentence patterns. The course develops listening, speaking, reading, and writing abilities through practical exercises and everyday communication contexts. By the end of the course, students will be able to engage in simple conversations, understand basic texts, and express themselves using fundamental French structures.

## 1<sup>st</sup> Year, 2<sup>nd</sup> Semester

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Computer Programming and Programming Languages	CPPL	5	2	-	2	-

**Course description (Syllabus):** This course introduces students to object-oriented programming (OOP) through the Delphi programming environment. Students will become familiar with the OOP interface, the object manager, and the use of forms, properties, and events. The course covers component toolbars and component management, focusing on key elements such as Button, BitBtn, Edit, Memo, CheckBox, MainMenu, and ToolBar. Students will also learn dynamic programming techniques and explore the development of multi-form applications. Through practical exercises, the course provides hands-on experience in designing and building interactive software applications.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Technical Drawing	TD	5	2	0	3	0

**Course description (Syllabus):** This course provides fundamental knowledge of technical drawing and graphical representation in engineering. Topics include multiview drawing, encompassing views, projections, and sectional representations. Students will learn dimensioning techniques, along with the concepts of tolerances and precision required in technical documentation. The course also covers the drawing and dimensioning of mechanical elements such as threads, splines, keyways, and gears, as well as the principles of assembly drawing. Together, these elements ensure the accurate representation and effective communication of engineering designs.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Material Science and Engineering	MSE	4	1	-	2	-

**Course description (Syllabus):** This course provides an in-depth study of the structure and properties of metallic materials, with a strong emphasis on alloy theory and equilibrium phase diagrams, including Fe–C alloys. Students will examine thermophysical and thermochemical treatments applied to steels, as well as the characteristics, processing, and applications of alloy steels and non-ferrous alloys. The course also introduces principles of extractive metallurgy and fundamental manufacturing processes such as casting, plastic deformation, and welding. Together, these topics offer a comprehensive understanding of material behaviour and processing techniques essential to engineering applications.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
General Economics	GE	5	2	2	-	-

**Course description (Syllabus):** This course provides an introduction to fundamental economic concepts and mechanisms. Topics include demand, supply, market structures, and competition, as well as the labour market, employment, unemployment, and wage formation. Students will explore key aspects of the monetary market, including inflation,

loans, and interest rates, along with the functioning of the capital market and its role in economic growth. The course also examines macroeconomic principles and international economic relations, offering a broad understanding of how economies operate at both national and global levels.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Linear Algebra, Analytical and Differential Geometry	LAADG	5	2	2	-	-

**Course description (Syllabus):** This course offers a comprehensive introduction to linear algebra, analytical geometry, and differential geometry, with applications in mathematics, engineering, and related fields. In linear algebra, topics include vector spaces and their subspaces, Euclidean spaces, free vectors, vector products, linear transformations, eigenvalues and eigenvectors, diagonalization, and linear, bilinear, and quadratic forms. Analytical geometry covers the study of planes and lines in space, angles, conic sections, canonical forms, and quadrics. In differential geometry, the course examines plane curves, osculating circles, tangents and normals, the Frenet frame, and surfaces, including conic surfaces and cylindrical surfaces. By integrating these concepts, the course provides a solid mathematical foundation essential for work in physics, engineering, and computational sciences.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Mechanics	MEC	4	2	1	1	-

**Course description (Syllabus):** This course introduces the fundamental concepts of mechanics and their applications in engineering. The statics component covers the study of the material point, rigid bodies, and rigid systems, with emphasis on equilibrium conditions and their practical relevance to engineering problems. The kinematics section examines the motion of points and rigid bodies, including relative motion and its significance in mechanical systems. In the dynamics component, students will analyse the main theorems governing the motion of rigid bodies, developing a solid understanding of forces, motion, and their effects on engineering structures.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Physical Education and Sports 2	PES2	2	1	1	-	-

**Course description (Syllabus):** This course builds on the skills and competencies developed in Physical Education and Sports 1. Activities are organized across four sport disciplines, allowing students to refine previously acquired techniques and apply them in more complex practice scenarios. The program promotes teamwork, discipline, and fair play, while encouraging students to adopt active and healthy lifestyle habits. By the end of the course, students will demonstrate improved physical conditioning, better sport-specific skills, and increased confidence in participating in individual and team-based physical activities.

#### Optional pack

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
English Language 2a	EL2	4	2	1	-	-

**Course description (Syllabus):** This course deepens students' understanding of essential English grammar structures, with a focus on word order in declarative, interrogative, imperative, and exclamatory sentences. Students will study the sequence of tenses, reported speech, inversion, negation, and the structure of complex sentences. The course aims to strengthen grammatical accuracy and enhance students' ability to use English effectively in a variety of contexts.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
French Language 2	FL2	2	1	1	-	-

**Course description (Syllabus):** This course builds upon the knowledge and skills acquired in *French Language 1*, further developing students' competence in both oral and written communication. Students will expand their vocabulary and strengthen their understanding of essential grammar structures, including noun–adjective agreement, verb conjugation in the present tense, and the introduction of additional tenses and sentence patterns. The course continues to develop listening, speaking, reading, and writing skills through practical exercises and everyday communication scenarios. By the end of the course, students will be able to participate in simple dialogues with greater confidence, comprehend short written texts, and express ideas using a wider range of basic French structures.

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

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Numerical Methods	NM	4	2	-	2	-

**Course description (Syllabus):** This course introduces students to numerical techniques and their practical applications using mathematical software tools such as MATLAB, Mathematica, Maple, and Mathcad. It includes an introduction to Mathcad and Mathcad programming, with emphasis on vector and matrix operations. Students will learn numerical methods for solving equations and systems of equations, as well as optimization techniques, including nonlinear, single-objective, and multi-objective optimization. The course also covers multi-attribute decision-making, interpolation, regression analysis, and the Monte Carlo method. Through these topics, students gain a solid foundation in computational problem-solving for engineering and scientific research.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Accountancy	ACC	4	2	-	2	-

**Course description (Syllabus):** This course introduces students to the fundamentals of financial and accounting statements, focusing on the balance sheet and the profit and loss statement. Students will learn the accounting framework used by companies, including accounts, the chart of accounts, and operating account rules. The course examines capital accounts, fixed asset accounting, inventory (stock) accounting, treasury accounting, and settlements with third parties. It also covers trial balance preparation and year-end closing activities, providing students with essential skills for financial reporting and basic financial analysis.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Basics of Management	BM	4	2	2	-	-

**Course description (Syllabus):** This course introduces the fundamental principles of management and their application in manufacturing systems. Students will explore key concepts such as decision-making processes, participatory management, and organizational management. The course also covers planning and activity control, as well as the design of manufacturing systems and the evaluation of investment economic efficiency. Together, these topics provide a solid foundation for understanding effective management practices in industrial and business environments.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Economic Statistics	ES	1	1	-	2	-

**Course description (Syllabus):** This course introduces fundamental statistical methods used in economic analysis and decision-making. Topics include parameter estimation, hypothesis testing, and product quality control. Students will also study regression analysis, with emphasis on its application in economic modelling and forecasting. The course focuses on practical statistical techniques for analysing economic data and supporting business decision-making.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Mechanisms	MEC	3	2	-	-	2

**Course description (Syllabus):** This course provides an in-depth study of mechanisms and machine elements, focusing on their structure, kinematics, and dynamics. Students will explore the general structure of mechanisms, including joints, structural modelling of complex mechanisms, and structural optimization. The course covers the kinematics and dynamics of involute gears, planetary gears, linkage mechanisms, and cam gears. Additionally, it includes gear calculations, force analysis, shafts, bearings, seals, and belt transmissions. Special attention is given to motor speed control devices and various mechanical assemblies, such as screw connections, shape-based connections (keys, studs, grooves, bolts, etc.), friction-based assemblies, elastic assemblies (springs), and couplings. The course equips students with essential knowledge for designing and analysing mechanical systems in engineering applications.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Strength of Materials	SM	4	2	1	1	-

**Course description (Syllabus):** This course explores fundamental concepts in mechanics and strength of materials, focusing on the mechanical behaviour of structures under various loading conditions. Students will study the mechanical properties of materials, external stresses and constraints, and the fundamental equilibrium equations. The course covers sectional stress analysis, including general principles, differential relationships between forces and sectional stresses, stress diagrams, static and inertial moments, axial stress, shear stress, bending, and the basics of elasticity theory. These concepts provide the essential foundation for the design and analysis of mechanical and engineering structures.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Economic Legislation	EL	3	1	1	-	-

**Course description (Syllabus):** This course provides an overview of the legal framework governing business operations, with a particular focus on company closure procedures. Topics include the winding up of solvent companies, close-out processes, and commercial bonds. Students will also examine the legal aspects of insolvency and its implications for businesses, creditors, and other stakeholders. The course equips students with a solid understanding of economic and legal regulations relevant to corporate activities and financial accountability.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Physical Education and Sports 3	PES3	2	1	1	-	-

**Course description (Syllabus):** This course further develops the abilities and knowledge acquired in *Physical Education and Sports 1* and *Physical Education and Sports 2*, advancing students' physical fitness and sport-specific competencies. Activities continue to be structured across four sport disciplines, enabling students to perfect their techniques, enhance performance, and engage in more demanding practice situations. The program reinforces teamwork, discipline, and fair play, while supporting long-term healthy lifestyle habits. By the end of the course, students will demonstrate higher levels of physical conditioning, refined technical and tactical skills, and increased proficiency in both individual and team-based sporting activities.

#### Optional pack

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
English Language 3	EL3	4	2	1	-	-

**Course description (Syllabus):** In this course, students focus on advanced grammar, sentence structure, and professional communication. The course covers complex verb forms, modal constructions, and nuanced tense usage, as well as subordinate clauses and inversion for clarity and emphasis. Special attention is given to expanding academic and

business vocabulary to improve both formal and informal communication. Through reading and writing exercises, students develop skills in essay composition, report writing, and text summarization. The course also provides practical training in professional communication, including drafting emails, preparing presentations, and participating in discussions and negotiations, ensuring students are prepared for real-world communication tasks.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
French Language 3	FL3	2	1	1	-	-

**Course description (Syllabus):** This course further develops the knowledge and communication skills acquired in French Language 1 and French Language 2. Students will broaden their vocabulary and deepen their understanding of essential grammar structures, including increasingly complex noun–adjective agreement, expanded verb conjugations, and the use of additional tenses and sentence patterns. The course strengthens listening, speaking, reading, and writing abilities through practical exercises, dialogues, and real-life communication contexts. By the end of the course, students will be able to engage in more sustained conversations, understand a wider range of short texts, and express ideas with improved fluency and grammatical accuracy using intermediate-level French structures.

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

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Databases in Management	DM	4	2	-	2	-

**Course description (Syllabus):** This course introduces students to database systems and their applications in management. Students will examine key concepts in data management, database design, and implementation, as well as the fundamental principles of database management systems (DBMS). The course covers database planning, design, and administration, with emphasis on entity–relationship modelling, database normalization, and the conceptual, logical, and physical design of relational databases. Through hands-on laboratory work and practical case studies, students will develop essential skills for structuring, managing, and optimizing databases to support managerial processes and decision-making.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Machine Elements	ME	4	2	-	1	-

**Course description (Syllabus):** This course provides an advanced study of mechanisms and machine elements, focusing on their structure, kinematics, and dynamics. Students will examine the general structure of mechanisms, including joints, structural modelling of complex assemblies, and principles of structural optimization. The course explores the kinematics and dynamics of involute gears, planetary gear trains, linkage mechanisms, and cam mechanisms. Additional topics include gear calculations, force analysis, shafts, bearings, seals, and belt drives. Special emphasis is placed on motor speed control devices and a wide range of mechanical assemblies, including screw fastenings, shape-based connections (keys, studs, grooves, bolts, etc.), friction-based joints, elastic elements (springs), and couplings. By the end of the course, students will be equipped with essential knowledge for the design and analysis of advanced mechanical systems in engineering applications.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Basics of Technology	BT	1	1	-	2	-

**Course description (Syllabus).** This course introduces the fundamental concepts of cutting tools and machining technologies. Students will study the basic elements of cutting tools, their classification, and the constructive and geometric characteristics of various tool types, including lathe tools, drills, reamers, drifts, broaches, milling tools, thread-cutting tools, gear-cutting tools, and abrasive tools. The course also covers machining devices, examining their types, design principles, and modular systems. In addition, students will learn how to design fixing schemes and analyse

example designs of devices used on cutting machine tools. The course provides a solid foundation for understanding machining processes and tooling in manufacturing.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Finance	FIN	4	2	2	-	-

**Course description (Syllabus):** This course offers a comprehensive introduction to business finance and the principles of financial management. Students will learn to analyse balance sheets, interpret income statements, and assess a company's self-financing capacity. Key topics include breakeven analysis, financial evaluation using rates methods, and financial planning. The course also covers short-term financial management, medium- and long-term financing strategies, inventory management, investment funding, and dividend policies. By the end of the course, students will be equipped with essential tools for effective corporate financial analysis and decision making.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Materials Selection	MS	3	1	-	2	-

**Course description (Syllabus):** This course introduces the principles and methods used in selecting materials for engineering applications. Students will examine the main classes of engineering materials and their key mechanical, thermal, and chemical properties. The course presents material selection criteria such as performance, cost, sustainability, and manufacturing constraints. Through selection charts and practical case studies, students learn to identify suitable materials for specific components and engineering requirements.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Marketing	MK	4	2	1	-	1

**Course description (Syllabus):** This course introduces the fundamental concepts and practices of marketing. Topics include the marketing concept, market analysis, and company marketing strategies. Students will examine the components of the marketing mix, including product and product strategies, pricing and pricing strategies, distribution and distribution strategies, as well as promotion and advertising strategies. The course provides a foundational understanding of how companies create value, position their offerings, and communicate effectively with target markets.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Practice 1 (90 hours/ year)	PR1	4				

**Course description (Syllabus):** This course offers practical, hands-on experience in industrial manufacturing environments, enabling students to apply theoretical knowledge in real production settings. The practice component covers key technological areas such as moulding, hot forming, heat treatment, galvanic coating, and welding processes. Through direct participation in these activities, students develop essential practical skills and gain insight into manufacturing operations, materials processing, and industrial engineering applications.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Physical Education and Sports 4	PES4	2	1	1	-	-

**Course description (Syllabus):** This course represents the advanced stage of the Physical Education and Sports program, consolidating and expanding the skills developed in the previous levels. Students participate in four sport disciplines, with activities focused on improving advanced techniques, strategic understanding, and performance consistency. The course emphasizes independent practice, efficient movement execution, and the ability to adapt skills across various sport contexts. Teamwork, discipline, and fair play continue to be core components, with additional focus on leadership, cooperation, and responsible participation in sports.

### Optional pack

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
English Language 4	EL4	2	-	2	-	-

**Course description (Syllabus):** This course focuses on advancing students' linguistic competence by expanding specialized vocabulary and consolidating mastery of advanced grammatical structures. Emphasis is placed on developing fluent, coherent communication in both written and spoken contexts through the study of authentic materials, including academic articles, media texts, and selected literary excerpts. Students apply their skills in practical tasks such as drafting official documents, delivering presentations, participating in debates, and simulating professional interactions. The use of digital resources and interactive platforms supports active learning and communication with native speakers, enabling the development of advanced language abilities essential for academic and professional success.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
French Language 4	FL3	2	1	1	-	-

**Course description (Syllabus):** This course advances the linguistic and communication skills developed in earlier French language levels, focusing on the use of French in more complex contexts. Students will expand their vocabulary across broader thematic areas and refine advanced grammatical structures, including compound tenses, the subjunctive mood, and complex sentences. Listening, speaking, reading, and writing abilities are strengthened through interactive activities, debates, and the analysis of authentic materials such as news articles and short literary texts. By the end of the course, students will communicate with greater fluency and accuracy, interpret longer texts, and express nuanced ideas using upper-intermediate French structures.

### 3<sup>rd</sup> Year, 5<sup>th</sup> Semester

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Production Management	PM	4	1	2	-	-

**Course description (Syllabus):** This course provides an overview of management functions and their application within production processes. Students will explore the concept of the company, its environment, and defining characteristics, as well as the classification and analysis of different types of enterprises. The course examines how organizations acquire and use resources efficiently to optimize production. A central focus is placed on production management, including strategies for planning, organizing, and controlling manufacturing activities to improve efficiency, productivity, and competitiveness in industrial and business settings.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Quality Management	QM	4	2	-	2	-

**Course description (Syllabus):** This course offers an in-depth understanding of quality management principles and their application in industrial and business environments. Students will study key concepts in quality engineering, with emphasis on experimental data processing and statistical quality control. The course covers capability analysis, production monitoring using control charts, and product receiving control to ensure conformity with quality standards. It also examines quality assurance costs, highlighting cost-effective strategies for optimizing production processes and maintaining high product quality.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Fundamentals of Computer-aided Design	FCAD	5	2	-	2	1

**Course description (Syllabus):** This course introduces the fundamental concepts of computer-aided design (CAD), with a focus on modelling and visualizing three-dimensional objects. Students will learn about coordinate systems, 3D viewing techniques, and methods for defining the third dimension. The course covers the creation and manipulation of 3D surfaces, polygonal objects, and polygonal networks, as well as techniques for generating and editing solid models. In addition, students will study methods for representing and rendering 3D objects, gaining essential skills for digital modelling in engineering and design applications.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Nanomaterials and Nanotechnologies	NN	5	2	2	-	-

**Course description (Syllabus):** This course introduces the fundamental concepts of nanomaterials and nanotechnologies, with an emphasis on their structure, properties, and applications. Students will study nanostructures, nanoparticles, nanosensors, and the development and use of smart nanomaterials. The course also covers carbon nanotubes and various classes of nanostructured materials, highlighting their significance in advanced engineering, medicine, and emerging technologies. Through both theoretical and applied perspectives, students will gain insight into the latest developments and innovations in the field of nanotechnology.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Machine-tools Command and Driving	MTCD	5	2	-	2	-

**Course description (Syllabus):** This course offers an in-depth study of the mechanics and control systems of industrial machine tools, with a focus on their electrical and hydraulic drive mechanisms. Students will examine general electrical devices and equipment, including three-phase asynchronous motors, direct current motors, and stepper motors, as well as their applications in industrial automation. The course also covers hydraulic drive systems, emphasizing hydraulic machine tools and devices used for flow and pressure control and regulation. In addition, students will study hydraulic circuits and gain practical knowledge of their design and implementation in modern manufacturing systems.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Machining	MAC	5	2	-	1	1

**Course description (Syllabus):** This course provides an overview of material cutting and surface generation processes. Students will study cutting forces, specific cutting force, and the behaviour of various materials during machining. The course addresses key phenomena such as thermal effects in cutting, tool wear, and tool life. Major cutting processes are covered, including turning, milling, drilling, grinding, slotting, shaping, and thread machining. Students will also examine surface roughness, processing costs, and gain introductory knowledge of numerical control in cutting operations. Together, these topics offer a comprehensive understanding of modern machining techniques and their industrial applications.

#### Optional pack

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Commercial Law	CL	3	1	2	-	-

**Course description (Syllabus):** This course introduces the fundamental principles of commercial law, focusing on key concepts and classifications related to commercial acts. Students will study the legal notion of traders, their categories, and the professional obligations that govern their activities. The course also covers trade companies, including their definition, formation, operation, modification, dissolution, and liquidation. In addition, students will explore commercial obligations and special trade contracts. Together, these topics provide a comprehensive understanding of the legal framework that regulates commercial activities and business operations.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Labour Law	LL	3	1	2	-	-

**Course description (Syllabus):** This course provides an introduction to labour law, focusing on the essential concepts and classifications related to employment relations. Students will explore the fundamental rights and obligations of employers and employees, the main categories of workers, and their professional duties. The course aims to deepen students' understanding of labour legislation and the application of core legal principles governing rights, responsibilities, and protections in the workplace.

### 3<sup>rd</sup> Year, 6<sup>th</sup> Semester

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Modelling and Simulation of Economic Systems	MSES	4	2	-	1	1

**Course description (Syllabus):** This course introduces modelling and simulation techniques applied to economic and production systems. Students will examine the general principles of modelling and simulation, including the stages involved in simulating manufacturing processes. The course covers the modelling and simulation of waiting lines, inventory management models, and fuzzy models for addressing uncertainty. In addition, students will study dynamic modelling and simulation, forecasting methods and techniques, and the simulation of flexible manufacturing systems. Together, these topics equip students with essential tools for analysing, optimizing, and supporting decision-making in economic and production environments.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
3D Modelling	3DM	4	2	-	2	1

**Course description (Syllabus):** This course introduces the fundamental concepts of Computer-Aided Design (CAD) and Computer-Aided Manufacturing (CAM) systems. Students will learn to work with CAD software, including navigating the program interface and using the drawing editor effectively. Key topics include coordinate systems, display commands, and graphic tools for creating and modifying designs. Students will practice selecting and editing objects, defining object properties, applying dimensioning, and using hatching techniques. The course also addresses design optimization, managing external blocks and references, text editing, drawing annotation, and plotting. Together, these skills provide a solid foundation for both 2D and 3D modelling in engineering and manufacturing applications.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Tolerances and Dimensional Control	TDC	4	1	-	2	-

**Course description (Syllabus):** This course focuses on the principles and techniques used for dimensional measurement and control in manufacturing. Students will study mechanical and optical measuring instruments and their role in ensuring production accuracy. The course covers limits and fits for cylindrical smooth parts, surface texture measurement, and geometric dimensioning and tolerancing (GD&T). Additional topics include tolerances and fits for threaded parts, gear pairs, keys, and splines. The course also addresses angle measurement and the application of pneumatic gaging for high-precision inspection in industrial environments.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Technology Management	TM	4	2	-	2	-

**Course description (Syllabus):** This course introduces key principles of technology management and their role in organizational performance and innovation. Students will examine the technology lifecycle from development and acquisition to implementation and replacement, as well as methods for evaluating technological needs and capabilities.

Key topics include innovation management, technology strategy, R&D management, and the influence of emerging technologies on competitiveness. Through case studies and practical examples, students learn to plan and manage technological resources to improve efficiency, sustainability, and long-term organizational success.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Manufacturing Machines and Equipment	MME	4	2	-	2	-

**Course description (Syllabus):** This course introduces the main manufacturing machines and equipment used in modern production. Students will study the structure, operating principles, and classification of key machines, including cutting machines, forming machines, and machining centers. The course covers essential mechanisms, kinematic systems, transmission elements, and the technological capabilities of industrial equipment. Additional topics include technological parameters, machine-tool performance, automation elements, and operational safety. Through theoretical and practical work, students gain a solid understanding of how manufacturing machines are selected, operated, and integrated into efficient production systems.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Practice 2 (90 hours / year)	PR2	4	-	-	-	-

**Course description (Syllabus):** This course provides hands-on experience in analysing a company's product nomenclature, organizational structure, and interdepartmental relationships. Students will become familiar with bookkeeping documents, as well as procedures for purchasing and initiating manufacturing operations. The course covers methods for tracking and monitoring the production process and introduces techniques for product analysis. Students will also learn about organizing the goods disposal process, marketing and promotion methods, and gain basic knowledge of the investment process. In addition, the course addresses principles of continuous improvement, enabling students to apply these concepts to enhance business efficiency and organizational growth.

#### Optional packs

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Human Resources Management	HRM	3	1	2	-	-

**Course description (Syllabus):** This course introduces the fundamental concepts of human resources management within an organization. Students will examine the role of the human resource function, including forecasting staffing needs and evaluating workforce performance and potential. The course covers processes related to educating, training, and developing employees, as well as understanding labour motivation and performance management systems. Additional topics include reward systems, working conditions and labour relations, and the administration and record-keeping of human resources. Together, these areas provide a comprehensive foundation for effectively managing and optimizing workforce potential in organizations.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Project Management	PM	3	1	2	-	-

**Course description (Syllabus):** This course introduces the essential principles of project management, with a focus on strategy development and implementation. Students will examine strategy definitions, key components, and the various types of strategies used in managing projects. The course covers tools and methods for strategic planning, as well as the formation, coordination, and leadership of project teams. Key topics include defining objectives, developing project schedules, and evaluating project outcomes. Through practical activities, students will acquire the skills needed for effective project planning, execution, and monitoring.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Technological Methods and Procedures	TMP	3	1	-	2	1

**Course description (Syllabus):** This course provides fundamental knowledge of technological methods and procedures used in the processing of parts within the manufacturing industry. Students will study the general principles of designing technological processes for mechanical machining and gain an understanding of processing accuracy. The course covers material removal techniques, including cutting methods for machining external and internal cylindrical and conical surfaces. Students will also learn about mechanical processing using CNC machine tools and examine key aspects related to the economic efficiency of cutting processes. Through theoretical and practical activities, the course builds essential skills for planning and optimizing machining operations.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Deformation Systems and Technologies	DST	3	2	1		1

**Course description (Syllabus):** This course introduces the fundamental systems and technologies used in the plastic deformation of materials. Students will study the principles of deforming metals and other engineering materials through processes such as rolling, forging, extrusion, drawing, and sheet-metal forming. The course covers deformation mechanics, stress-strain behaviour, and factors influencing material flow and formability. Students will also explore equipment and tooling used in deformation technologies, process parameters, and methods for improving efficiency and product quality. Through theoretical concepts and practical applications, the course provides a comprehensive understanding of how deformation systems are designed, controlled, and optimized in modern manufacturing.

#### 4<sup>th</sup> Year, 7<sup>th</sup> Semester

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Engineering of Production Systems	EPS	6	2	-	-	2

**Course description (Syllabus):** This course examines the principles and techniques used in the design and optimization of manufacturing systems. Students will study the development and evolution of manufacturing systems, analysing the key stages that shape modern production environments. The course introduces mathematical models of manufacturing, providing analytical tools for evaluating and improving production processes. Students will also learn about manufacturing system design, including criteria for system layout, methods for determining manufacturing capacity, and approaches to enhancing efficiency and productivity in industrial operations.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Economic Analysis	EA	5	2	1	-	1

**Course description (Syllabus):** This course introduces the fundamental concepts of economic and financial analysis, equipping students with the tools needed to evaluate a company's financial health. Students will study key indicators used in financial analysis and learn how to apply them to assess different aspects of business activity. The course covers analyses of production and sales performance, human resources, and material resources. In addition, students will examine cost structures, profitability, and the overall financial position of an enterprise. Through these topics, the course provides a comprehensive framework for evaluating financial performance and organizational stability.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Logistics	LOG	4	2	-	2	-

**Course description (Syllabus):** This course examines logistics as an integrating function and a key competitive factor within organizations. Students will explore core logistics activities, including inventory management and internal transport operations. The course places emphasis on internal logistics and the integration of modern manufacturing

and administrative concepts. In addition, students will analyse current trends in logistics and supply chain management, gaining insight into how these developments enhance efficiency, reduce costs, and improve overall organizational competitiveness.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Industrial Design	ID	1	1	-	2	1

**Course description (Syllabus):** This course introduces the principles and practices of industrial design, focusing on the development and refinement of products. Students will study the prototyping process, shape design, and methods for promoting, implementing, and utilizing designed products. Emphasis is placed on creativity, functionality, and the ability to transform an initial concept into a final product. Through hands-on activities, students will learn to create, evaluate, and improve product designs for industrial applications, ensuring that the resulting solutions are both aesthetically appealing and practically efficient.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Specials Systems and Technologies	SST	4	1	-	2	-

**Course description (Syllabus):** This course examines advanced technological methods used in erosion-based material processing. Students will study electric erosion machining, including its principles and industrial applications, as well as electrochemical erosion techniques. The course also covers abrasive-based processes such as lapping, magnetic abrasive machining, and ultrasonic abrasive erosion. In addition, students will explore processing methods that use high-pressure fluid flow, including fluid and abrasive suspension techniques. These modern technologies are presented in the context of achieving high-precision machining and enhanced surface quality in industrial manufacturing.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Investment Management	IM	5	2	1	-	1

**Course description (Syllabus):** This course introduces the fundamental concepts of investment management and examines the role of firms as key organizational structures in economic activity. Students will explore different types of investments and the stages of the investment process, developing strategies for identifying and accessing financial resources. The course emphasizes strategic decision-making, particularly the alignment of financing choices with investment objectives. Topics include sources and methods of financing, lending mechanisms, and the influence of time on investment outcomes. Students will analyse the components of an investment project's feasibility, conduct economic and financial evaluations, and understand how financing systems shape investment decisions. The course concludes with methods for assessing and selecting investment projects to support effective managerial decisions.

#### Optional pack

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Entrepreneurship	ENT	4	1	2	-	-

**Course description (Syllabus):** This course introduces the concept of entrepreneurship and examines the role of the entrepreneur in the modern economy. Students will explore various forms and typologies of entrepreneurship, gaining insight into different entrepreneurial models and approaches. The course also analyses the entrepreneurial environment, focusing on the factors that influence the creation, development, and success of new ventures. By the end of the course, students will understand how to identify business opportunities, assess and manage risks, and address the challenges faced by entrepreneurs in today's competitive landscape.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Starting and Developing a Business	STB	4	1	2	-	-

**Course description (Syllabus):** This course examines the key aspects of entrepreneurial activity and the role of the entrepreneur in starting and growing a business. Students will learn how markets function and how to identify economic opportunities suitable for launching a new venture. The course covers the development of a business plan, emphasizing its structure, purpose, and importance in guiding the entrepreneurial process. Additional topics include business operations and management, along with the stages of establishing a company, from the initial idea to successful launch and subsequent development. By the end of the course, students will be equipped with the knowledge needed to start, manage, and expand a sustainable business.

#### 4<sup>th</sup> Year, 8<sup>th</sup> Semester

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Intern and International Commerce	IIC	3	1	1	-	1

**Course description (Syllabus):** This course provides an overview of the framework governing the development and organization of economic activities in Romania. Students will study the organization of commercial activities and the placement of products in both domestic and international markets. The course examines commercial contracts and the principles of commercial negotiation, along with the fundamentals of international commerce. Students will gain insight into export and import operations, international trade techniques, and international payment methods, including letters of credit. The course also explores interstate organizational structures and introduces the principles of international business ethics, preparing students to navigate the complexities of domestic and global commercial environments.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Digital Production Systems	DPS	3	2	-	1	1

**Course description (Syllabus):** This course introduces the integration of digital technologies into modern manufacturing processes. Students will explore automated production systems and advanced digital technologies such as 3D printing, robotics, and additive manufacturing. The course covers production control and monitoring technologies, including production management systems, computer numerical control (CNC) systems, and the integration of CAD/CAM software. Students will also examine methods for improving efficiency and optimizing production processes through digitalization and smart technologies, as well as the role and impact of these technologies within the context of Industry 4.0.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Simulated Enterprise	SE	4	1	-	2	-

**Course description (Syllabus):** This course introduces the concept of a simulated enterprise and its use as a practical tool for understanding business operations. Students will examine the organization of production within the simulated company, focusing on collaboration between departments to optimize workflows. The course covers commercial activities and supply chain management, along with the roles and responsibilities of the accounting and administrative departments. Students will also study sales and marketing activities and their contribution to overall business performance. In addition, the course addresses key elements of financial management, providing insight into budgeting, cost control, and financial decision-making in a realistic business context.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Design of Production Systems	DPS	4	2	1	-	2

**Course description (Syllabus):** This course introduces the principles and methods used in the design and optimization of production systems. Students will learn to use quality and quantitative indicators to determine the appropriate manufacturing type. The course covers the selection of technologies and the preliminary determination of machine tools using cost-evaluation methods based on technological and equipment factors. Students will also examine the final

selection of industrial equipment, including the tools and devices required for production. Additional topics include establishing manufacturing tasks and designing production systems for various environments, such as mass production, series production, single-item production, and assembly systems. Through practical applications, students will develop the skills needed to design and implement efficient and adaptable production systems.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Environment Management	EM	4	1	2	-	-

**Course description (Syllabus):** This course provides an overview of ecology and environmental protection, with a focus on the principles of sustainable development. Students will examine environmental management systems, their scope, requirements, and methods for integrating environmental practices within an organization. The course covers environmental performance evaluation, including the procedures for conducting an environmental audit. Students will also study life cycle assessment to analyse the environmental impact of products and processes. In addition, the course introduces environmental labels and declarations, preparing students to implement, manage, and evaluate environmental standards in business and industrial contexts.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Research Methods in Management	RMM	3	1	-	2	-

**Course description (Syllabus):** This course introduces essential techniques and tools for conducting research in the field of management. Students will study various data collection methods, including surveys, interviews, and case studies, and will explore both quantitative and qualitative approaches to data analysis. The course covers research models commonly used in management, as well as statistical methods for interpreting data and drawing meaningful conclusions. Ethical considerations in management research, including ensuring data validity and reliability, are also addressed. Throughout the course, students will be guided through the stages of developing a research project, from formulating a research question to collecting and analysing data to address a management-related issue.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Diploma Project Documentation	DPD	4	-	-	-	-

**Course description (Syllabus):** This course provides guidance for preparing the documentation required for the diploma project. Students will analyse the current state of the field related to their chosen topic and review relevant trends and developments. They will present and justify a proposed solution, which may involve cinematic, constructive, technological, or organizational improvements, as well as equipment or material replacement options. Emphasis is placed on supporting the proposed solution through appropriate calculations and demonstrating its economic efficiency. Students will also learn to prepare the necessary technical and economic documentation and apply computer-based methods to develop and present their final project, ensuring it meets professional technical and economic standards.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Practice for Diploma Project (60 hours/year)	PDP	4	-	-	-	-

**Course description (Syllabus):** This course provides students with the practical experience required for completing their diploma project. Throughout the practice period, students will apply the knowledge and skills gained during their studies to develop, refine, and finalize their project work. Under the guidance of academic advisors, they will engage in research, design, and implementation activities to ensure their project meets academic and professional standards. The practice also helps students strengthen their technical expertise and problem-solving abilities, preparing them for the professional challenges they will encounter after graduation.

### Optional pack

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Maintenance Management	MM	3	2	2	-	-

**Course description (Syllabus):** This course introduces the fundamental principles of maintenance management in industrial environments, focusing on key concepts such as reliability, maintainability, availability, and system performance. Students will study equipment wear and degradation and explore maintenance and repair systems that support efficient production. The course covers the planning and organization of maintenance activities, including the sizing and allocation of maintenance resources. Additional topics include equipment reconditioning, the link between maintenance and product quality, and strategies for extending equipment life and improving efficiency. By the end of the course, students will understand how to plan, manage, and optimize maintenance processes within a production system.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Value Management and Engineering	VME	3	2	2	-	-

**Course description (Syllabus):** This course introduces techniques and methods for creating, analysing, and maximizing value within projects and organizations. Students will study core concepts such as defining value, identifying factors that influence product or service value, and applying strategies to enhance value in production and project management. The course covers value engineering methods used to identify cost-effective solutions that maintain or improve performance. Additional topics include cost evaluation and benefit analysis to support informed decision-making in project and resource management. By the end of the course, students will be able to apply value management principles to improve efficiency and competitiveness in a dynamic business environment.