

Transilvania University of Braşov, Romania

Study program: Engineering of Advanced Manufacturing Processes

Faculty: Technological Engineering and Industrial Management

Study period: 2 years (master)

1st Year

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Advanced Materials	IT.IPFA.I.01.01	5	2		2	

Course description (Syllabus): Materials structures; Materials used in auto industry; Ceramic materials; Composite materials; Nanomaterials; Machinability of materials.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Technologies Used for Manufacturing Process	IT.IPFA.I.01.02	6	3		2	1

Course description (Syllabus): Advanced techniques of part modeling in Pro-E; Rough and finish strategy in milling process-Pro-E Manufacturing module; Rough and finish strategy in turning process-Pro-E Manufacturing module; Principles in technology design; Structure of technological process; Design of special cutting tools; CNC programming; Particularities of CNC turning programming; Particularities of CNC Fanuc, Heidenhain, Siemens și ISO.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Design of Experiments	IT.IPFA.I.01.03	5	2		2	

Course description (Syllabus): Elements of design of experiments and analysis of experimental data; Structure of research programs; Design of experiment and Taguchi method; Methods of testing the plane fractional factorial; "Quality loss" function; Media analysis (ANOM - Analysis of Means); Analysis of variance (ANOVA - Analysis of Variation) RSM - Response Surface Methodology.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
ERP Systems	IT.IPFA.I.01.04	5	2		2	

Course description (Syllabus): SAP Logging On – interface; Menus: SAP standard, Favorites. Help: Field Matchcode; Navigation options in SAP. Creating and working with multiple sessions; Material Master Data: structure, types of materials, classification; Customer order (Sales Order); Material requirements planning: manual and automatic; Create planned orders, production orders creation; Procurement: creating paper purchase order creation purchase; Movement of goods (Goods Movement): reception and release material; Billing orders (in Logistics).

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Design for Manufacturing	IT.IPFA.02.01	6	2		1	2

Course description (Syllabus): Design for X – DfX; Design to cost; Design for Assembly – DfA; Design for Manufacturing – DfM; Design for Additive Manufacturing – DfAM; Design for Skin and Shape in packaging industry - Df S&S; Reverse engineering; Parallel Engineering versus Concurrent Engineering.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Quality Management in Industry	IT.IPFA.I.02.02	5	2		2	

Course description (Syllabus): Contributing approach to quality; Specific terminology ISO 9000: 2006; Concept of product quality; Developing the "quality" concept and related industrial practices; ISO 9000 family of standards; Presentation ISO / TS 16949 in accordance with ISO 9001; Guidelines for auditing quality management systems, ISO 19011; Presentation requirements VDA 6.3 and VDA 6.5; Quality management system in laboratories according to ISO 17025.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Projects Management	IT.IPFA.02.03	5	2		1	1

Course description (Syllabus): Introduction to Project Management. Concept. Areas. Objectives. Deliverables; Typology of projects. The organizational structure of projects; Methods and criteria for project evaluation; Life cycle of projects; Methods and tools of project planning; Project resource allocation. Project budget; Monitoring and controlling project; Identifying and addressing the risks of a project; Team management; Conflict management.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Polymer Chemistry	IT.IPFA.0.02.01	5	2		2	

Course description (Syllabus): Definition and classification of polymers; Getting Synthetic polymers: basic principles and technologies; Physical and chemical properties of polymers; Plastics - PET, HDPE, PVC, LDPE, PP, PS; Elastomers; Composite materials.

2nd Year

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Organizational Management	IT.IPFA.I.03.01	5	2	1	1	

Course description (Syllabus): Organization, efficiency and organizational effectiveness; Design organizational structure; Management of organizational culture; Performance management; Critical factors in achieving high performance; Performance targets and KPI; Types and forms of management of change; The life cycle of the organization; Innovation, entrepreneurship and creativity at the individual and team.

Course title	Code	No. of credits	Number of hours per week			
			course	Seminar	laboratory	project
Process Management and Improvement	IT.IPFA.I.03.02	5	2		2	

Course description (Syllabus): Stem-and-Leaf chart, histogram, data recording sheet, Pareto chart, cause-effect diagram, chart concentration of defects, correlation diagram; Xbar chart and R for medium and amplitude; Me and R charts, for median and amplitude; p chart for proportion of non-compliant products; c chart for the number of nonconformities; Techniques and methods of risk assessment and prevention (FMEA, FTA, Risk Taguchi); Advanced product quality planning (APQP); Manufacturing processes improving - 6 Sigma methodology; Manufacturing processes improving - Kaizen methodology.

Course title	Code	No. of credits	Number of hours per week			
			course	Seminar	laboratory	project
Integrated Design and Manufacturing of Industrial Products	IT.IPFA.I.03.02	8	2		2	

Course description (Syllabus): CAD/CAM Systems; CAPP Systems - variant and generative. Design and manufacturing processes for different industrial products from different companies.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Injection Molding	IT.IPFA.O.03.01	6	2		1	2

Course description (Syllabus): Main plastic used for injection; Thermoplastics injection technology; Construction of injection molds for thermoplastic materials; Special injection methods; Simulation methods of plastic materials during the injection process; Machines for thermoplastics injection parts.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Manufacturing Technologies for Plastic Parts	IT.IPFA.O.03.02	5	2		2	

Course description (Syllabus): Classification of plastics; Manufacturing technologies of thermoplastic materials; Technologies for manufacturing thermosetting materials; The processing of polyurethane; Other methods of processing plastic parts; The logistic system of manufacturing plastic parts; Recycling of plastics.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Advanced Manufacturing Technologies for Bearings	IT.IPFA.O.03.03	6	2		1	2

Course description (Syllabus): Cutting processes; Turning; Milling; Grinding; Honing; Superfinishing; Workpiece clamping device; Optimization of technological processes.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Production Process Simulation	IT.IPFA.O.03.04	5	2		2	

Course description (Syllabus): Systems and production processes; Model, modeling, simulation; Time capacity definition; Time Capacity calculation using REFA UAS, MTM methodologies; DOJO Concept; Training activity using the DOJO concept; Development activities using DOJO concept; Lean production systems; Value stream analysis.