3. OUTCOMES

3.1. KNOWLEDGE AND UNDERSTANDING

The knowledge and understanding of science, mathematics and engineering fundamentals are essential to satisfying the other programme outcomes. Graduates should demonstrate their knowledge and understanding of their engineering specialisation, and also of the wider context of engineering.

First Cycle (BACHELOR) graduates should have:		
Documents in proof	**Proofs provided by the individual interview**	**FINDINGS**
Graduates should be able to relate their knowledge acquired further to the graduated academic programme to the underlying basic knowledge in the fundamental fields of science, art, culture – Exact Sciences		
• The availability and volume of courses in the fundamental Exact Sciences (physics, mathematics, chemistry, computer sciences)		
	• Appreciations and criticism of the specialty knowledge acquiring system. • Raising awareness as to the usefulness of certain concepts of physics, chemistry, and mathematics.	
The graduate shall be able to identify, reproduce and interpret basic concepts of the engineering branch and to highlight actual feasibility aspects of such concepts.		
• Course contents, technical		

exercises. • Correlating theoretical aspects with actual aspects occurring in the industrial environment that is specific for the field of the completed Bachelor cycle of studies. • Examinations.		
	• Capacity to logically think and express oneself. • Knowledge of industrial environment (present technological level) and business environment where the student is going to develop his/her career.	
The graduate shall be able to distinguish at the level of certain courses the differences between the academic programmes in the field of the graduated Bachelor cycle studies in terms of the specificity and the boundary of such fields.		
• The availability of basic discipline specificities in the branch and complementary discipline specificities in the field of the basic engineering sciences. • The sequence of disciplines as completed within the graduated academic programme. • Conditions to attend in the academic years to come.		
	• The availability of well	

	reasoned logically supported personal viewpoints concerning the graduated academic programme. • Assessment of the teaching aspects noticed during the Bachelor cycle of studies.	
The graduate shall be able to identify the multidisciplinary aspects featured by products made in the field of the graduated Bachelor cycle studies.		
• Course contents. • Correlation and adaptation of the contents to actual situations occurring in the engineering practice. • Integrating exercises. • Examinations.	•	
	• Information on top achievements in the field of the Bachelor cycle of studies. • Participation or accomplishment of works requiring interdisciplinary knowledge, also oriented towards innovating products that are specific to the engineering specialization.	
Graduates of the second (MASTER) cycle of studies should:		

Documents in proof	Proofs provided by the individual interview	FINDINGS
The graduate should be able to identify, reproduce and interpret topics related to his/her own area of expertise, using the acquired scientific, mathematical and engineering knowledge. The graduate shall also prove the same ability, however to a different extent, whenever topics from other fields of expertise arise.		
• Course contents. • Technical exercises. • Examinations.		
	• Learning attraction. • Interest in technical matters. • Engineering talent.	
The graduate shall be able to word and sustain opinions on the evolution and trends of the research / investigations in his/her field of expertise, relying on the acquired scientific, mathematical and engineering knowledge.		
• Course contents. • Case studies. • Equipment / facilities to access information.		
	• Decision-making capacity. • Exemplary attitude. • Basic knowledge.	

3.2. ENGINEERING ANALYSIS

Graduates should be able to solve such engineering problems at their level of knowledge and understanding, which might involve considerations beyond their field of specialization. The engineering analysis may include the identification of the problem, the clarifications of the specification, the consideration of possible methods for the solution, selecting the most suitable method and providing a proper implementation.

Graduates should be able to use several methods including mathematical analysis, IT model or practical experiments and should also be able to take into account the importance of the restrictions in society, health and safety, environment and commerce.

First Cycle (BACHELOR) graduates should have:		
Documents in proof	**Proofs provided by the individual interview**	**FINDINGS**
The graduate should be able of team-work, or to work independently, in the field of applied science, at the level of the Bachelor studies.		
• Collective participation in applied scientific research. • Contributions to the identification of actual technical issues during the practice period or whenever exercising the profession, after having completed the first cycle of studies.		
	• Clear and well-reasoned explanation of any such collective or individual contribution to fulfil tasks.	
The graduate should be capable to identify - relying upon the knowledge acquired by him/her and further to an engineering analysis - the product specificity and the processes used for the production thereof.		
• Contents of courses, technical exercises and case studies.		
	• Simulated discussions (brainstorming).	
The graduate should be able to be aware of and use up-to-date modelling, simulation (CAD programs), and calculation means in the field of his/her Bachelor studies, as acquired in the faculty or subsequently, by way of personal study.		
• Participation in teams or individually in the application of analytical and modelling methods.		

• Knowing for team-work or individual work, to use dedicated software, computer science concepts for documentation and creating/using databases, etc.		
	• Knowledge of the performances and limits of certain dedicated software. • Using professional databases.	

Graduates of the second (MASTER) cycle of studies should:

Documents in proof	Proofs provided by the individual interview	FINDINGS
The graduate should be able to understand the sophistication of usual, non-usual and non-defined issues, and to make presumptions, provide testing solutions, identify the main factors influencing the outcomes.		
• Course contents. • Technical exercises. • Case studies. • Simulated discussions. • Tests.		
	• Structured (modular) thinking. • Ability to speculate. • Forecasting abilities. • Experience in diverse situations.	
The graduate should be able to make use of the basic knowledge supplemented with new approaches and theories for investigating and solving technological issues with up-dated techniques.		

• Course contents. • Technical exercises. • Means to access documentation. • Simulated discussions.		
	• Attraction towards innovation. • Ability to make discoveries. • Innovation culture.	
The graduate shall be able to conceive models interpreting natural processes and phenomena using numeric analysis and digital and analogical systems and to iteratively adapt the model.		
• Intense modelling work. • Study-trips on site. • Labour-establishment concepts.		
	• Powerful basic knowledge. • Structured (modular) thinking. • Ability to speculate	.
The graduate shall be able to find innovative solutions using up-dated models and to test the utilization of instruments, systems and non-traditional processes.		
• Case studies. • Simulated discussions. • Comparisons between the developed model and the actual situation.		
	• Attraction towards innovation and invention. • Ability to make discoveries.	

3.3. ENGINEERING DESIGN

Graduates should be able to make consistent engineering designs at their level of knowledge and understanding, working in cooperation with engineers and non-engineers. Such designs shall include devices, processes, methods, and the specifications may be more than technical, including requirements to take into consideration situations in the society, health and safety, environment and commerce.

First Cycle (BACHELOR) graduates should have:		
Documents in proof	**Proofs provided by the individual interview**	**FINDINGS**
The graduate should be able to conceive designs in an approach oriented towards the capacities to accomplish the same, in keeping with the actual methods of production.		
• The course shall include actual methods to be used for making a product, technical exercises, using the DFM (Design For Manufacture) concepts.		
	• Personal vision on the development of creativity during the Bachelor years of study. • Simulated discussions	
The graduate shall prove his/her capacity to use CAD methods including the ones that are specific for manufacturing (Computer Aided Manufacturing).		
• Contents of courses, technical exercises and conception of the documentation for execution. • Extra-curricular projects / designs.		
	• Awareness of the	

	possibilities and utilization limits of dedicated software.	
Graduates of the second (MASTER) cycle of studies should:		
Documents in proof	**Proofs provided by the individual interview**	**FINDINGS**
The graduate should be able to conceive solutions taking into account environmental and economic aspects during the accomplishment of the engineering design, to use methodologies and models for optimizing solutions and to collaborate with engineers and other specialists from other branches.		
• Course contents. • Case studies. • Research studies. • Extra-curricular projects/ designs. • Virtual prototype.		
	• Documentary abilities. • Broad engineering knowledge. • Invention. • Objectivity.	
The graduate should be able to apply innovative solutions and to assess the applicability thereof in designing goods, systems and processes.		
• Case studies. • Simulated discussions.		
	• Inventions. Applied personality. • Documentary abilities.	
The graduate should be able to establish conditions, set up hypotheses, and test models in order to assess solutions, undefined situations and undefined parameters, taking into account and compensating for improper forecasts.		
• Research studies. • Work reports.		

• Case studies. • Examinations.		
	• Powerful basic knowledge. • Structured (modular) thinking. • Ability to speculate.	

3.4. INVESTIGATIONS

Graduates shall be able to use suitable methods for conducting - at their level of knowledge and understanding - detailed investigations of technical aspects. Such investigations may involve browsing the literature, designing and making experiments, construing data and simulating on the computer. Databases may be necessary to be consulted, and codes of practice and safety regulations, just the same.

First Cycle (BACHELOR) graduates should have:		
Documents in proof	**Proofs provided by the individual interview**	**FINDINGS**
The graduate should be able to carry out either individually, or in a team, suitable bibliography documentation activities for a clearly defined purpose and to use written or electronic databases.		
• Participation, either individually or in a team, in suitable bibliography investigation. • Using databases and other written or electronic sources.		
	• Motivating the choice of certain sources of information. • Explanation of the	

	applicability of the obtained data or capitalization suggestions.	
The graduate shall be able to conceive proper experiences, make proper analyses and draw valuable and useful conclusions for the pursued aim.		
• Participation, either individually, or as a team, in the conception and organization of scientific investigations. • Drawing useful conclusions in terms of the assumed tasks.		
	• Explanation and justification of technical and organizational steps.	
The graduate should have abilities to work and to organize labour in workshops and laboratories.		
• Direct participation and organization of activities in workshops or laboratories.		
	• Lack of any labour protection event. • Knowledge of laws and specific steps.	

Graduates of the second (MASTER) cycle of studies should:

Documents in proof	Proofs provided by the individual interview	FINDINGS
The graduate shall be able to use different instruments in order to identify, locate, obtain and organize data requested for a certain purpose.		
• Research studies. • Means to access documentation.		

• Means to organize documentation.		
	• Attraction towards learning. • Objectivity.	
Whenever encountering an issue in his/her field of expertise, the graduate shall be able to: conceive experiments; conceive models; use and/or build and/or adapt equipment or systems for analytical purposes.		
• Research studies. • Means to access documentation. • Intense modelling work. • Laboratory work. • Simulated discussions. Statistic disciplines.		
	• Powerful basic knowledge. • Inventions. • Persistence. • Applied personality.	
The graduate shall be able to interpret experimental and bibliographical data, and to adapt model design retaining a physical meaning.		
• Research studies. • Course contents. • Laboratory work. • Simulated discussions. • Statistic courses.		
	• Powerful basic knowledge. • Strong thinking ability.	
For investigations in his/her field of engineering, the graduate shall be able to explore the utilization of proven technologies of new or emerging technologies in applications that have not been tested before.		
• Research studies.		

• Means to access documentation. • Laboratory work. • Simulated discussions.		
	• Attraction towards innovation. • Invention. Persistence. • Ability to speculate. • Applied personality.	

3.5. ENGINEERING DESIGN

Graduates shall be able to apply their knowledge and understanding for developing practical problem-solving abilities, conducting investigations and designing engineering devices and processes.

Such abilities may include knowledge related to the utilization of materials, computer-aided modelling, engineering processes, equipment, practice in the workshop and technical literature and source of information. They should also be able to recognize significant, non-technical implications of the engineering practice, just the ethic, environmental, commercial and industrial ones.

First Cycle (BACHELOR) graduates should have:		
Documents in proof	**Proofs provided by the individual interview**	**FINDINGS**
The graduate shall prove his/her ability to justify the forecasted technical solution, to use it for making products developed by him/her within the framework of the designs.		
• Participation in commissions or as an individual in procurement activities for machinery or equipment in the field of his/her Bachelor studies.		
	• Clear, logical, well-reasoned description of	

	personal viewpoints concerning the procured instrumentation / machinery or equipment.	
The graduate shall prove his/her ability to optimize the technical solutions suggested by him/her, and such optimization shall rely upon his/her valuable technical and practical knowledge.		
• Participation as a team or individually in working out scientific papers. • Comparisons between computer-generated models, functional simulation and real product measurements.		
	• Ease of communication and reasoning.	
The graduate shall prove his/her knowledge of techniques and methods of investigation in the field of his/her Bachelor studies.		
• Participating as a team or individually in defining and reasoning in support of techniques or methods of scientific investigation. • Reasoning and sustaining the adopted technical solutions including the ones concerning the choice of the materials used for the execution. Simulated discussions.		
	• Wording verbal recommendations, remarks or corrections of investigation activities, as	

	to colleagues or ancillary support staff. • Ability to understand the correlation between the materials used in the solution of the given topics; cost optimization.	
The graduate's attitude towards the industrial and business environment, as shown in the relations with the institution where he/she graduated.		
• Participating by speeches or by working out written materials, in emphasizing and highlighting non-technical practices in industry.		
	• Communication capacity and ability to clearly sustain and reason in terms of personal ideas.	
Graduates of the second (MASTER) cycle of studies should:		
Documents in proof	**Proofs provided by the individual interview**	**FINDINGS**
The graduate shall be able to apply different instruments, having a realistic and integrated overall view in terms of the engineering works and the way such works are supposed to act together within the framework of one and the same objective.		
• Course contents. • Case studies. • Simulated discussions. • Means to access documentation.		
	• Experience in applications.	

	• Broad engineering knowledge. • Ability to synthesize. • Objectivity.	
The graduates should recognize and be able to apply technological systems, the peculiarities and the utilization thereof, methods of adaptation for each and every situation.		
• Practical presentation of methods. • Case studies. • Study-trips on site. • Laboratory work.		
	• Experience in applications. • Objectivity.	
The graduate shall be able to overcome problems, conflicts and difficulties, to make decisions after having assessed alternatives, risks, importance and priority.		
• Problem-solving. • Case studies. • Study-trips on site.		
	• Experience in applications. • Persistence. • Objectivity.	

3.6. TRANSFERABLE SKILLS

Abilities required for engineering practice, which are applicable in a broader sense, should be developed within the framework of the programme.

First Cycle (BACHELOR) graduates should have:		
Documents in proof	**Proofs provided by the**	**FINDINGS**

	individual interview	
The graduate should prove a well-grounded professional training, constructive initiative and attachment, either individually, or as member of a team.		
• Designs. • Proposals. • Periodical appreciations. • Compensations, stimulations. • Awards, decorations.		
	• Future studies. • Conception as to the improvement of the own results or the results of the team.	
The graduate should know and use the basic communication knowledge, should master 1-2 foreign languages.		
• Elaborated documents. • Published papers. • Courses and briefing held with other team members or other groups. • Participation in technical negotiations or in negotiations with trade unions. Participation in mass-media activities.		
	• Ease in expressing oneself when presenting technical solutions. • Basic conversation art. • Expressing oneself in a foreign language.	
The graduate should notice and critically assess aspects of legislation, health, safety and environment, and to provide proof of the same, either		

individually, or as a person in charge, to promote professional ethics and norms in engineering practice.		
• Proposals to improve industrial and business legislation. • Activities in support of the knowledge and observance of the legislation, aspects of health, labour safety, keeping a clean environment, promoting a professional ethics. • Elaborated and/or published materials.		
	• Logical reasoning. • Power to convince and validity of reasons. • Attitude as to notorious events in his/her profession.	
Knowledge and application of project management, business management and risk management.		
• Actual involvement in project management. • Actual involvement in business management. • Actual involvement in risk management. • Reviews or papers elaborated / published in the above matters.		
	• Public attitudes, at least at the level of the team,	

	as to the project management, business management, risk management. • Courses completed in the field / branch. • Outcomes of practiced management or management in which he/she participated.	
Availability to participate in actions or individual self-improvement activities by permanent learning (LLL - Life Long Learning), as acknowledged by the relevant national or European legislation.		
• Requests to participate, either individually, or as a team, in LLL (Life Long Learning) actions. • Participation in actions or individual self-improvement activities by permanent learning (LLL - Life Long Learning), as acknowledged by the relevant national or European legislation.		
	• Involvement in the LLL process. • Knowledge and popularization of the LLL legislation.	

Graduates of the second (MASTER) cycle of studies should:		
Documents in proof	**Proofs provided by the individual interview**	**FINDINGS**

The graduate shall accumulate management abilities in order to organize, plan, control and coordinate; the graduate shall develop sensitivity to economy and commerce issues, with a view to future cases of high responsibility.		
• Management courses. • Report on team-work. • Report on individual activity. • Presentations on the activity.		
	• Leadership by management. • Self-confidence.	
The graduate shall be able to understand and use leadership techniques and shall be sensitive to labour environment issues, as well as to safety, environment and social responsibility of those involved in the economic activity.		
• Disciplines of leadership techniques. • Disciplines of team-work.		
	• Leadership competences. • Self-confidence.	
The graduate shall have the ability to communicate in different languages, different cultures and different contexts in order to attain the involved objectives. Ability to use computer science developments and other technological developments with a view to a more efficient communication is also a must.		
• Disciplines of communication techniques. • Presentations of the activity.		
	• Communication competences. • Abilities related to foreign languages. • Self-confidence.	