PLAN OF STUDY

BACHELOR'S DEGREE
IN INDUSTRIAL DESIGN

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Faculty of Architecture, Planning and Design

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1 IDENTIFICATION:

PLAN OF STUDY OF THE BACHELOR'S DEGREE IN INDUSTRIAL DESIGN

2 – REASONS TO CREATE THE COURSE OF STUDIES

Since the beginning of time, humanity has produced objects to satisfy different needs. As societies evolved, this *Homo Faber* made more complex tools to suit the requirements of new activities. Thus, they began to surround themselves with their own productions and create an artificial environment to adapt their own material conditions of existence.

As industrial technologies appeared bringing about progress, mass produced objects began to expand, giving rise to the discipline of industrial design. Design professionals are then responsible for combining different characteristics of the objects they produce, while being aware that these are the expression of their own culture. Their productions are a reflection of the society they live in, as well as of social values, ideals and models.

The definition of Industrial Design provided by the International Council of Societies of Industrial Design (ICSID[1]) synthesizes the many-sided aspects of the discipline: "Design is a creative activity, whose aim is to establish the multi-faceted qualities of objects, processes, services and their systems in whole life-cycles". For the ICSID, design-related activities comprise products, services and systems made through the tools, arrangements and logic introduced by industrialization, although not necessarily through serial production.

According to the United Nations Conference on Trade and Development (UNCTAD), as a product and a service, design is "the result of human creativity expressed as a knowledge-based economic activity, with creative content, cultural value and market objectives". This definition includes design in the Creative Industry and, therefore, in the Creative Economy, given that it cuts across several elements of the value chain (i.e. crafts, manufacturing and services), interacts with technology and qualifies for Intellectual Property registration[2].

Both definitions show the innovative origin of this activity, since design itself implies a search for changes in products, the possibility of differentiation, the ability to identify and exploit the idiosyncratic characteristics of the organizations that develop these products. It is clear then that design is not applied only to industrial-level initiatives. Design can also be present in other instances, projects and experiences in which it enhances the process of generating, capturing and delivering value.

Regional Context

It is worth highlighting that there has been significant industrial development in the region of Rosario, focused on metal-mechanic, agricultural machinery, agri-food and textile businesses. Undertaken by the Department of Industry and Services of the Ministry of Agriculture, Industry and Commerce of Santa Fe Province, the Program *Design and Technological Innovation in Santa Fe* is a recent proof of this regional development and its

[1] See www.icsid.org

[2] UNCTAD. (2008). Creative Economy Report 2008 - *The challenge of assessing the creative economy: towards informedpolicy-making.* Geneva, Switzerland: United Nations.

potentialities related to design issues.

Moreover, the region has a strong tradition of innovation and design that dates back to some pioneering actions in Argentina: the Institute of Industrial Design was created in 1960 at the then Faculty of Sciences, Engineering and Architecture.

Likewise, including the word "design" in the very name of our Faculty of Architecture, Planning and Design of the National University of Rosario (UNR) was a crucial decision as it meant a deliberate and active policy to promote the discipline. This decision was reflected in the creation of Continuing Education Programs in Design (Visual Communication and Design of Architectural and Urban Equipment) at the beginning of the 2000s, and later in the creation of the Design Area, to expand these first actions. The results were clear: insertion of more qualified professionals in the labor market and the possibility that those professional would later pursue postgraduate studies. Besides, it was translated into the promotion of actions with the community and the productive sector.

In this sense, the decision to create a course of studies in Industrial Design in the National University of Rosario is meant as an opportunity to train professionals who can intervene in the process of value generation, contributing substantively to both sociocultural and industrial-economic development.

The importance of design for industrial and economic development [3]

Based on the above definitions, design can be considered a key tool in the process of product differentiation. Thus, regarding design as a technological tool that cuts across the set of existing productive activities is decisive to achieve more specialized professional profiles, and possibilities to dominate and maintain segmented markets, both at national and global levels. Thus, design could help generate a sustainable strategy within the manufacturing sector of emerging countries, especially in the most mature or traditional activities associated with this specialized profile.

These activities have been widely used to improve competitivity by the institutions that promote the discipline, such as the Design Council (UK), Design Centrum (Czech Republic), Design Forum (Finland), Barcelona Centre de Disenny (Spain), Sociedad Estatal para el Desarrollo del Diseño y la Innovación (DDI, Spain), Danish Design Center (Denmark). But also by public funding technology agencies, such as TEKES (Finland), DTI (UK), and international professional institutions, such as the ICSID, ICOGRADA, ADI.

In summary, these actions highlight that [a] effective design management is a vital factor to sustain competitiveness; [b] successful companies see design as an investment; [c] integrating industrial design into the development of new products has a significant impact on the performance of a company; this is especially true for new industrial investments in design; [d] the main obstacle to investments in design activities within a company is believing they are not relevant; [e] design can be implemented at different levels: operational, functional and strategic; [f] integrating users and producers through design management is fundamental. When used strategically, design constitutes a technological activity that allows for the incorporations of different forms of knowledge into products and processes. In terms of industrial practices, it becomes one of the most widely used

[3] This section is based on Silva Failde, D., Becerra, P., Milesi, D. and Yoguel, G. (2008). “Abriendo la ‘caja negra’ del diseño: la importancia de los procesos de innovación en el sector de indumentaria”. Red Pymes Seminar.

strategies to generate added value, dynamic competitive advantages and technological quasi-rents.

The more complex the products (in terms of codified tacit knowledge, design, research and development, generation of top-level supply chains, etc.), the more likely they are to enter a market and become differentiated products, which results in more possibilities for capturing technological quasi-rents both in global and national markets. In this sense, design could be seen as a mechanism that would make a system more complex, based on interrelated characteristics, such as methodological flexibility, a constant search for differentiation, the high connectivity necessary for operation, the ability to adapt and function in contexts of imbalance, the ability to acquire knowledge and transform it into products, among others.

The importance of design for cultural and social development

Several studies describe the multiple dimensions of design and agree on its importance to create, preserve and reproduce socio-cultural values, such as identity, equity or physical and social accessibility.

Broadly speaking, industrial design is born as a discipline that addresses the creation of new artifacts—products, services, systems and environments—through a systematic method that combines technological, social, cultural and economic vectors. According to Herbert Simon,[4] "An artifact can be thought of as a meeting point—an 'interface' in today's terms, between an 'inner' environment […] and an 'outer' environment, the surroundings in which it operates". For sociologist Charles Wright Mills[5], designers are part of the cultural apparatus, and act as a link with the commercial apparatus. They interpret needs, customs and behavior patterns and, by means of the design process, translate them into products. In this sense, designers are not only involved in building the characteristics of the artifact but also in an intervention in a given cultural environment through the artifact itself: the objects created by designers become mediators—interfaces—of the social relations between subjects.

If design has to do with making decisions about how to articulate the tangible and intangible features of a product, it is evidently a process that combines signs to create denotative structures—function—and connotative structures—evocation[6]. Design thus becomes a brokering of languages, a discipline[7] that facilitates message exchanges between subjects through products.

The designed object is a communication vector in socio-cultural terms, representing the objectification of values, norms, guidelines, styles; therefore, no object can be neutral in its environment. Product design necessarily implies a previous intention and reflection as regards the problem that it is trying to tackle. Designers—as subjects—become actors who produce and articulate meanings by defining the phrases of a product. Thus, the products generated by designers are transformed into vehicles of ideology(ies) resulting from their

[4] Simon, H. (2019). *The Sciences of the Artificial.* London: The MIT Press.

[5] Mills, CW (1958). "The Man in the Middle: The Designer". In I. L. Horowitz. (Ed), *Power, Politics and People.* New York: Ballantine.

[6] Moles, A. (1971) "Objeto y comunicación". In *Los objetos*. (Miscellaneous Sources) Buenos Aires: Tiempo contemporáneo.

[7] Verganti, R. (2003). "Design as brokering of languages. The role of designers in the innovation strategy of Italian firms". *Design Management Journal.*

own convictions and values, and from the influences of the political, economic, cultural, social context in which they find themselves inserted as subjects.

As any human activity, the design process can be understood as a cultural process through which designers configure a product and fill it up with social and cultural values. In their professional practice, designers must be able to face, on the one hand, the process of decoding the "message" of the artifacts and processes that they observe and, on the other, the process of encoding the new messages that they produce through their own products.

This political stance is key in a context that recognizes development as an "inside-looking-out" process[8]. It promotes a proactive society that, within its productive, material, cultural and historical realm, looks for elements to build the systems it needs to sustain a local quality of life. Creating an active social dynamic enables people to be included and participate in the decision-making process that affects their immediate context of existence: the community, technological autonomy, respect for the environment, responsible trade, technical and cultural traditions, solidarity, etc. Likewise, it democratizes the process of co-creating technology and society itself.

Regarding designers' potential contribution in such a context, Margolin[99] points out three possibilities for designers: 1. generating objects through their practice—as material contribution to a culture in constant construction; 2. reflecting and proposing critical views about the effects of design in society—as cognitive contribution to both the field of design and social sciences; and 3. committing themselves politically—as contribution in the form of conscious responsible actions.

In this sense, industrial design is a way to differentiate national products from the competition in domestic and international markets, through the generation of value and unique user experiences, understanding that today global competition depends less and less on generating low-cost, technologically-superior products. Industrial design guides its productions towards high quality products and services that incorporate feelings, values, convictions, identity and aesthetics.

Product and service differentiation in the global market would not be given only by technological innovation, but also by the "cultural value" represented by its aesthetics, its significance and, to a lesser degree, its functions. Transferred to objects through design, the cultural aspect allows for stronger links and emotional experiences, not to mention a type of association that would strengthen the identity of the area or country responsible for generating said products or services. This results in final users and consumers identifying products and brands with the culture of the area in which they were created. As a bearer of culture and identity, design would promote national culture and identity at an international level which in turn would build and strengthen a national brand.

3 -PURPOSE

Teaching design implies developing competences, learning to project the future through creative processes, which are based on, but not conditioned by, a transfer of specific knowledge in complementary and convergent areas of knowledge: design, humanistic and technology. It is therefore crucial that teachers promote university outreach, participation

[8] Max-Neef, M. (1992. *Barefoot Economics*. London: Zed Books.

[9] Margolin, V. (February 2, 2009). *El diseñador ciudadano*. In ForoAlfa. (www.foroalfa.org.es)

in scientific research and technological innovation systems, among other professional activities.

In such context, this plan of study conceives human beings as social subjects, their lives and human rights are acknowledged as supreme values that must be safeguarded and defended by professionals through their practice. Within an ethical framework, the goal is to ensure societies' quality of life and interaction with the environment.

The proposal is to train graduates to be professionally and ethically committed to the socio-environmental reality and complexity that surrounds them, who can ensure suitable interventions, make autonomous decisions and take risks and responsibilities related the exercise of the profession.

Approaching the process of product development is complex and places industrial designers in a system of interactions and mutual influences that demands from them greater social, cultural and economic awareness as professionals. At the same time, designers intervene in dynamics that promote new tools to observe reality and new resources to design.

In this context, six scenarios are identified in which industrial designers can intervene in the local context:

a- As internal agents of technological innovation and management in productive companies:

From a globally spread vision of the role of design—and designers as professionals—within the industrial value chain, the economic arguments to justify the practice grow stronger and stronger.

To the extent that several areas of the company—design, engineering, production, finance, marketing, R&D, etc.—are combined in order to carry out a design process, so that (ideally) tasks be performed jointly. That is to say, design must be conceived as a process of interpretation and translation, because it aims at coordinating different aspects of a product to meet the client's requirements and at the same time respond to the needs of the company and consumers.

b- As strategic director in creative entrepreneurial service and product development ventures:

The last decade was characterized by the emergence of numerous entrepreneurial ventures led by designers. Although the figure has been present in the history of the discipline, the designer-entrepreneur seems to have gained fresh impetus in local contexts due to new scenarios opening in industry, consumption and professional development. Over the past decades, designers have been generating their own projects to offer services or commercialize small-scale products in the local market. With this new role, designers face new responsibilities and functions, generally connected to company management, commercialization or opening up new markets.

c- As a catalyst for productive projects within social economy:

Many productive experiences with a marked social approach have emerged and created fertile ground for designers to be part of the design-economy-society synergy. As regards the process of valuation, reproduction and promotion of intangible or material cultural traditions, design interventions have a positive background in Latin America that can be analyzed through three axes: 1. Design in connection with the artisan sector, inclusion and sustainability of socially-rooted projects based on material traditions and regional

iconographies; 2. Implementation of Fair Trade initiatives, which ensure a fair and socially responsible production system, and strive to include workers in new production systems by means of training and sustainable development; 3. Designers linked to projects of productive self-managed organizations that look for technical, symbolic, functional contributions to enhance organizational values and result in high quality products that can compete in the market.

d- As researcher and developer in scientific-technological institutes:

Research and development processes linked to current innovation models are complex and involve an increasingly wide array of professionals. Science and Technology Institutions (STIs), as universities, technology centers or specialized centers—such as the Center for Knowledge Design at the Ministry of Science and Technology of Argentina—are favorable environments to investigate and open new paths of knowledge, an effort that the local private industry is not always willing or able to do. Today, it seems very common for designers to be members of multi and transdisciplinary teams, following the strategies of STIs towards improving their links with the productive area. This field of employment offers professionals the possibility to develop projects that do not pursue a short-term commercial purpose and strengthens the contributions to local—scientific and technological—development through methodologies and perspectives which are typical of design.

e- As program and project manager in the public sphere

In our country, different public policy experiences related to design have been framed: the National Design Plan, under the Undersecretariat of Industry; the Design Center of the National Institute of Industrial Technology; Buenos Aires Design, under the Undersecretariat of Industry, Commerce and Mining of the Ministry of Production, Province of Buenos Aires; the Metropolitan Center of Design, within the Government of the City of Buenos Aires; the Network of Design Services, part of the program Technological Manager for SMBs of the Federal Council of Investments. All these platforms have completely disparate objectives and programs, so they employ different methodologies with heterogeneous results. Nevertheless, they are all engaged with disciplinary development and support companies committed to this activity. In this line, industrial design professionals may participate in the definition, planning, management and evaluation of a variety of programs and projects. However, the public sphere is still one of the least explored by design professionals; even though there have been some experiences, it is not common to find designers inserted in programs or institutions that do not specifically have design as the object of their policies.

4 - PROFILE OF THE DEGREE

Bachelors in Industrial Design carry out design activities aimed at establishing the multiple qualities of objects, processes, services and their systems in complete life cycles.

Bachelors in Industrial Design take users' opinions as starting point to increase the utilitarian value of products through ergonomics, usability, functional and operational improvements, adding symbolic and visual quality to products and services by means of intervention, while taking into consideration the following factors:

1. Improving products manufacturability by simplifying their structures and taking into account material, production and assembly options.

2. Promoting rational standardization with the aim of making logistics more effective, reducing inventories and the number of tools used.

3. Promoting environmental impact reduction by a better use of energy, extending the useful life of products and the recyclability of their parts.

4. Improving products insertion and performance in the market, by building production and consumption scenarios; analyzing buyers' behaviors, objectives and desires, through information to make a better purchase decision.

5. Assisting companies and organizations in penetrating new markets, by adapting or customizing products to local conditions and taking into account the characteristics of international competition.

6. Improving the way companies and organizations communicate their corporate vision, building a brand and increasing brand value.

7. Allowing a higher differentiation of products and services for competition based on their visual, symbolic, functional qualities.

5 -CHARACTERISTICS OF THE COURSE OF STUDIES

5.1 Level: Undergraduate

5.2 Accreditation:

Those who meet all the requirements established in this plan of study will obtain the *Bachelor's Degree in Industrial Design*.

Those who pass all the courses of the Basic Cycle will obtain the degree of *University Technician in Industrial Design.*

As regards the academic credit system, it is established that 1 credit equals 10 hours of in-person classes.

5.3 Admission Requirements

The requirements are those established by existing regulations in the National University of Rosario.

6 -SCOPE OF THE DEGREES

The scope of each of the degrees that can be obtained from this plan of study are the following:

6.1 Professional Scope of the BACHELOR IN INDUSTRIAL DESIGN

As primary responsibility, the Bachelor's Degree in Industrial Design has the following scope:

Productive Sector:

- Design products/systems or services aiming at their integral development, taking into account the principles of need, functionality, market and production; considering aesthetic, ergonometric, anthropometric and significant aspects of the cultural/productive

realm of society. Check that such products meet the objectives for which they were designed.

- Be part of management activities either for organizations that incorporate design at any level of the value generation process for products and services, as head of department, team coordinator and designer, or as entrepreneur, leading a design studio or a productive company, relying on professional skills.

- Participate in goods and services assessments during processes of acquisition or catalog generation for subsequent offer to third parties.

- Advise on revision and definition of standards related to products, services or product and service systems ergonomics, usability or sequence of use.

Public Sector:

- Collaborate in leading projects related to industrial design, coordinating interdisciplinary teams and being head of area.
- Participate in the management of program and projects associated with the disciplinary field in science and technology institutes or agencies.
- Provide external consulting and appraisals related to industrial design.
- Participate in arbitrations and surveys related to the object of the discipline, assessing appraisals and budgets, design laws and industrial models.
- Act as curator in activities involving design and display of industrial products, whatever the medium and modality.

Academic-Scientific Sector:

- Participate in or direct research activities related to design, as well as organizing technology outreach and transfer activities.
- Participate in the elaboration of norms and usage patterns for products or product systems derived from research and development processes.
- Lead and participate in applied or experimental research projects for the generation of new advanced products or services.

6.2 Scope of the degree of UNIVERSITY TECHNICIAN IN INDUSTRIAL DESIGN

The University Technician in Industrial Design will have sufficient knowledge to collaborate in and assume responsibilities in different sectors and levels, under the supervision of a Bachelor in Industrial Design, an Industrial Designer and/or an Engineer who directs processes of production and development of products designed for industrial serial production.

The technician will be able to:

Productive Sector:

- Carry out technical assistance tasks and deal with operational procedures typical of products developed for serial manufacture.
- Act as project assistant in the development of goods and/or services.
- Be part of improvement or re-design processes on existing products.

Public Sector:

- Carry out design activities.
- Collaborate in surveys regarding industrial models.
- Collaborate in the appraisal of goods and services in movable assets acquisitions.

Academic-Scientific Sector:

- Participate as technical assistant in research teams on design-related issues.
- Participate in technology outreach and transfer activities.

7 - PLAN OF STUDY ARRANGEMENT

7.1 Definition and structure of Cycles, Areas and Courses

This Plan of Study has been arranged from a matrix structure composed of the Basic Cycle and the Higher Cycle, which are articulated with the Design Area, Basic Sciences and Technology Area, and Humanistic Area.

This is the structure of the plan of study, horizontally and vertically arranged:

	BASIC CYCLE		**HIGHER CYCLE**	
	FIRST, SECOND AND THIRD YEAR		FOURTH AND FIFTH YEAR	
	COURSES			
DESIGN	Design	Introduction to the Design Process Design Workshop 1 Design Workshop 2 Design Workshop 3	Specialized Design Workshop 1 Specialized Design Workshop 2 Final Project Workshop	Optional Course 1; Optional Course 2; Optional Course 3 Optional Course 4
	Morphology and Visual Representation	Graphic Representation Systems 1 Morphology 1 Morphology 2 Morphology 3		

	Theory and Practice	Ergonomics Supervised Practice on Service Provision	Project and Research Methodology Design and Innovation Management; Legislation and Professional Practice
BASIC SCIENCES and TECHNOLOGY	Basic Sciences	Mathematics Physics 1 Physics 2	
	Applied Technology	Introduction to Technology Technology 1 Technology 2 Computer-aided Design	Advanced Technology 1 Advanced Technology 2
HUMANISTIC	History	History of Industrial Design 1 History of Industrial Design 2	
	Theory and Analysis	Introduction to Scientific Thinking Technology, Design and Society	Semiotics and Visual Culture Theory and Criticism of Design
	Economy and Industry	Economy, Industry and Development Business Management and Marketing	

7.1.1 Basic Cycle

The Basic Cycle involves an initial approach to the laws, procedures and products of each area of knowledge, to be presented in a systematized way that makes them manageable.

Students should be equipped with the necessary background for propositional action within different systems of thought.

General objectives of this cycle:

1. To introduce students to the logic of thinking related to executing projects of serial good and service development.

2. To provide students with specific knowledge associated to the definition of the morphological, technological and symbolic characteristics of products.

3. To prepare students for contextualized professional insertion according to national particularities and issues.

7.1.2 Higher Cycle

The Higher Cycle is conceived as an instance for students to redraw the background knowledge provided by the Basic Cycle in parallel with the development of capacities for a critical-propositional thinking maturation of the designer to be. In this way, the student can carry out a critical review of the knowledge acquired in order to achieve a higher level of sophistication in project planning.

In this stage, disciplinary knowledge is deepened, new professional visions are integrated and higher levels of professional autonomy are reached.

General objectives of this cycle:

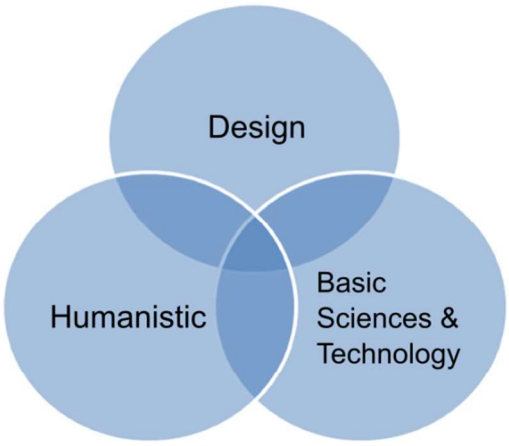
1. Strengthen specific professional capacities, providing students with more sophisticated tools, autonomy and experience.

2. Enable the exercise of critical and creative thinking in order to face concrete and objective situations in relation to the broad contemporary issues of the discipline and the material world.

3. Provide proper guidance to future graduates on job prospects and professional specialization in the region.

7.2 Areas of Knowledge

As industrial design involves intervening on the "human habitat" through actions that allow serial planning and manufacture of mass consumption objects and goods, it is essential to address the training process of future design professionals in an environment of permanent learning and reflection. To achieve this, three combined “areas” were defined as disciplinary cores to guarantee the kind of university training that can promote the generation of new knowledge from different fields of action. These cores are the Design, the Humanistic and the Basic Sciences and Technology areas.



The specificity of each area is based on autonomous disciplinary elaboration, having its own objects and methods of study, and a systematized body of specific knowledge that make

them into systems of thought. Combining these systems will provide necessary critical reflection for continuous growth and transformation in each disciplinary core, bringing it closer to the interests and needs of the program.

Thus understood, each area can be approached from different theoretical-ideological options to reach plural theoretical-ideological areas, although without exceeding the limits of their specificity, which enriches the theoretical “corpus” of the course of study.

In short, this arrangement constitutes a favorable atmosphere for a teaching-learning process conceived as joint intellectual production between the Chair and students. From this perspective, the development, advancement and production of knowledge imply eradicating the traditional concept of "knowledge transfer”. In this way, a teaching-learning process is created to promote a collective construction of education, including students as key actors in their training process.

Each area of knowledge is in turn made up of sub-areas. This allows the knowledge of each area to be approached in a segmented way, delving into their own specific epistemes and integrating them into project practice relations.

Design Area	Basic Sciences & Technology Area	Humanistic Area
a. Design b. Morphology and Visual Representation c. Theory and Practice	a. Basic Sciences b. Applied Technology	a. History b. Theory and Analysis c. Economy and Industry

7.2.1 Design Area

The Design Area groups those disciplines that use the project as a way of interpreting reality. It constitutes the core of a designer’s professional training.

These disciplines create a space for teaching and reflection that gives the opportunity to incorporate specific knowledge and practices into the exercise of design.

Likewise, from a teaching approach that conceives design as an act of creation and synthesis, the focus is on reflecting and operating on the material and cultural context that surrounds us. The aim is to assimilate into the set of knowledge, procedures and methods of the disciplines included in this area, the conception of designers as articulators in the process of culture creation and formation.

This area is made up of the following compulsory courses, grouped into the corresponding Sub-areas:

Design	▪ Introduction to the Design Process ▪ Design Workshop 1 ▪ Design Workshop 2 ▪ Design Workshop 3 ▪ Specialized Design Workshop 1 ▪ Specialized Design Workshop 2 ▪ Final Project Workshop
Morphology and Visual Representation	▪ Graphic Representation Systems 1 ▪ Morphology 1 ▪ Morphology 2 ▪ Morphology 3
Theory and Practice	▪ Project and Research Methodology ▪ Ergonomics ▪ Design and Innovation Management ▪ Legislation and Professional Practice ▪ Supervised Practice on Service Provision

7.2.2 Basic Sciences and Technology Area

The contents that make up the basic sciences and their teaching methodology are fundamental inputs for students to develop their ability to reason, their analytical capacity, spark their interest in applied research and create work habits to find solutions for real problems through scientific knowledge.

Technological education provides students with epistemological, social and pedagogical support that allows them to develop a creative and innovative profile in problem-solving related to the productive field.

Thus, the courses that integrate this area provide students with knowledge and methodologies that allow them to understand and solve design problems from a techno-scientific approach.

This area is made up of the following compulsory courses, grouped into the corresponding Sub-areas:

Basic Sciences	▪ Mathematics ▪ Physics 1 ▪ Physics 2
Applied Technology	▪ Introduction to Technology ▪ Technology 1 ▪ Technology 2 ▪ Computer-aided Design ▪ Advanced Technology 1 ▪ Advanced technology 2

7.2.3 Humanistic Area

Framed within the principles of humanism, the courses that make up this area are aimed at developing the necessary capacities for critical thinking, which will allow students to make rational judgments from a systemic thinking structure generated by the scientific method.

Taking as a basis the knowledge from the courses, students are expected to grasp the foundations of today's main epistemological currents and develop the necessary cognitive skills to exercise the role of designer responsibly within society.

Likewise, based on the existing links between design and Science, Technology and Development, the purpose of the humanistic approach is to allow future graduates to incorporate the concepts and basic notions related to the scientific method, and to reflect on the logic of technological development.

This area is made up of the following compulsory courses, grouped into the corresponding Sub-areas:

History	▪ History of Industrial Design 1 ▪ History of Industrial Design 2
Theory and Analysis	▪ Introduction to Scientific Thinking ▪ Technology, Design and Society ▪ Semiotics and Visual Culture ▪ Theory and Criticism of Design
Economy and Industry	▪ Economy, Industry and Development ▪ Business Management and Marketing

7.3 Time Allocation and Prerequisite System

7.3.1 Basic Cycle

First Year		Attendance	Weekly workload	Weeks	Total workload	Credits	Passed to sit for exam
01-01	Introduction to the Design Process (IPP)	S	8	15	120	12	
01-02	Graphic Representation Systems (GRS)	S	4	15	60	6	
01-03	Introduction to Scientific Thinking (IST)	S	4	15	60	6	
01-04	Mathematics (Math)	S	2	15	30	3	
01-05	History of Industrial Design 1 (HID1)	S	2	15	30	3	
01-06	Design Workshop 1 (DW1)	S	8	15	120	12	**01-01** IPP **01-02** GRS
01-07	Morphology 1 (M1)	S	4	15	60	6	**01-02** GRS
01-08	Introduction to Technology (IT)	S	4	15	60	6	**01-03** IST
01-09	Physics 1 (Ph1)	S	2	15	30	3	**01-04** Math
01-10	Ergonomics (ER)	S	2	15	30	3	**01-01** IPP **01-04** Math

Second Year		Attendance	Weekly workload	Weeks	Total workload	Credits	Passed to sit for exam
02-11	Design Workshop 2 (DW2)	A	8	30	240	24	**01-01** IPP **01-02** GRS **01-06** DW1
02-12	Morphology 2 (M2)	A	4	30	120	12	**01-02** GRS
02-13	Technology 1 (T1)	A	4	30	120	12	**01-03** IST
02-14	Physics II (Ph2)	S	2	15	30	3	**01-04** Math
02-15	History of Industrial Design 2 (HID2)	S	2	15	30	3	**01-05** HID1
02-16	Computer-aided Design (CAD)	S	2	15	30	3	**01-04** Math
02-17	Economy, Industry and Development (EID)	S	2	15	30	3	**01-05** HID1

Third Year		Attendance	Weekly workload	Weeks	Total workload	Credits	Passed to sit for exam
03-18	Design Workshop 3 (DW3)	A	8	30	240	24	**01-01** IPP **01-02** GRS **01-06** DW1 **01-07** M1 **01-08** IT **01-10** ER **02-11** DW2
03-19	Morphology 3 (M3)	A	4	30	120	12	**01-02** GRS **01-07** M1
03-20	Technology 2 (T2)	A	4	30	120	12	**01-03** IST
03-21	Technology, Design and Society (TDS)	S	2	15	30	3	**01-05** HID1
03-22	Supervised Practice on Service Provision 1 (SPS1)	S	2	15	30	3	**01-01** IPP **01-06** DW1 **01-10** ER **01-08** IT **02-11** DW2 **02-13** T1 **02-16** CAD
03-23	Business Management and Marketing (BMM)	S	2	15	30	3	**01-05** HD1 **02-15** HD2 **02-17** EID
03-24	Supervised Practice on Service Provision 2 (SPS2)	S	2	15	30	3	**01-01** IPP **01-06** DW1 **01-10** ER **01-08** IT **02-11** DW2 **02-13** T1 **02-16** CAD

Basic Cycle Total Workload 1800

After passing the preceding courses, students will obtain the degree of UNIVERSITY TECHNICIAN IN INDUSTRIAL DESIGN

7.3.2 Higher Cycle

Fourth year		Attendance	Weekly workload	Weeks	Total workload	Credits	Passed to sit for exam
04-25	Specialized Design Workshop 1 (SDW1)	A	8	30	240	24	**01-03** IST **01-04** Math **01-06** DW1 **01-07** M1 **01-08** IT **01-10** ER **02-11** DW2 **02-12** M2 **02-13** T1 **02-16** CAD **03-18** DW3
04-26	Optional Course 1	S	4	15	60	6	**02-13** T1 **02-16** CAD
04-27	Advanced Technology 1 (AT1)	A	4	30	120	12	**02-13** T1 **02-14** Ph2 **03-20** T2
04-28	Design and Innovation Management (DIM)	S	4	15	30	3	**01-05** HID1 **02-15** HID2 **02-17** IDE
04-29	Semiotics and Visual Culture (SVC)	S	4	15	30	3	**01-05** HID1 **02-15** HID2
04-30	Optional Course2	S	4	15	60	6	**02-13** T1 **02-16** CAD
04-31	Legislation and professional practice (RPP)	S	4	15	30	3	**02-17** EID
04-32	Theory and Criticism of Design (TCD)	S	4	15	30	3	**01-05** HID1 **02-15** HID2

Fifth Year		Attendance	Weekly workload	Weeks	Total workload	Credits	Passed to sit for exam
05-33	Specialized Design Workshop 2 (WDE2)	S	8	15	120	12	**01-02** GR **01-05** HID1 **01-06** DW1 **01-07** M1 **01-08** IT **01-09** IPP **01-10** ER **02-11** DW2 **02-12** M2 **02-13** T1 **02-16** CAD **03-18** DW3 **03-19** M3 **03-20** T2 **04-25** SDW1
05-34	Optional Course 3	S	4	15	60	6	**03-20** T2
05-35	Advanced technology 2 (AT2)	S	4	15	60	6	**01-08** IT **02-13** T1 **03-20** T2
05-36	Project and Research Methodology (PRM)	S	4	15	60	6	**03-21** (SDW)
05-37	Optional Course 4	S	4	15	60	6	**03-20** (T2)

To attend Final Project, 100% of the compulsory and optional courses passed must be accredited, except for those of the 5th year that are considered part of it.

05-38	Final Project Workshop (FPW)	S	8	15	120	12	**from 01-01** IPP **to 01-10** ER **from 02-11** DW2 **to 02-17** EID **from 03-18** DW3 **to 03-24** PSS2 **from 04-25** SDW1 **to 04-32** SDW **from 05-33** SDW2 **to 05-37**

Higher Cycle Total Workload 1800

Total hr. Bachelor's Degree in Industrial Design 2880

8 - COURSES AND DEFINITION OF CONTENTS

Name of the Course:	Introduction to the Design Process (IDP)
Cycle:	Basic
Year:	1st
Area:	Design
Sub-area:	Design
Attendance:	Semester
Weekly workload:	8 hrs
Total workload:	120 hrs
Credits:	12
Rationale:	This course encourages students to develop the ability to observe and understand the physical world that surrounds them, by means of the categories of analysis and interpretation that make up the discipline. Additionally, an attempt is made to relate these categories and the social, cultural, ethical, philosophical, environmental, historical, economic and political dimensions. Thereby, the link between the variables involved in the design process and their relationship with cultural, social and productive aspects within a given context becomes evident. This process seeks to stimulate students' interest and curiosity, based on their reflective, critical and interpretive capacity.
General goals:	To introduce students to a systemic and methodological approach to real problems and situations.
Content summary:	Notion of context. Dimension and scale in the survey of the physical context and socio-cultural context. Recognition of the Idea/Image, Form/Technology dialectic. Modes of thought: visual, critical, mediated and spatial. Notion of the project.

Name of the Course:	Ergonomics (Er)
Cycle:	Basic
Year:	1st
Area:	Design
Sub-area:	Design
Attendance:	Semester
Weekly workload:	2 hrs
Total workload:	30 hrs

Credits:	3
Rationale:	During this course, students will incorporate knowledge related to physiological, anatomical, psychological and operational aspects involved in human practices, and they will learn how to incorporate them in the design process. Students are expected to develop the ability to observe, analyze and understand the ergonomic factors involved in the development of a product, based on person-product-environment systems. At the same time, the course provides tools that help the decision-making process and a good performance by the designer in their task of contributing to the development of products that ensure the well-being, health, safety, protection and comfort of people, while considering their capabilities and limitations. In this way, an ethical and socially responsible Design Culture is promoted.
General goals:	To train students in the observation and analysis of the ergonomic factors involved in the design of artifacts, within human-object-environment systems.
Content summary:	Anatomy, physiology, biomechanics, anthropometry and environmental factors. Psychology and sensory systems. Human-machine systems. Ergonomic relations and barriers. Universal Design. Applications in machines, equipment and facilities. Current legislation. Safety regulations.

Name of the Course:	Design Workshop 1 (DW1)
Cycle:	Basic
Year:	1st
Area:	Design
Sub-area:	Design
Attendance:	Semester
Weekly workload:	8 hrs
Total workload:	120 hrs
Credits:	12
Rationale:	The Design Workshop is the first approach to the design process through reflection and product development exercises. During this course, students start to recognize and operate design categories such as form, functionality, meaning, materiality or manufacture, taking into account product scale and operating system. Thereby, it promotes an integral view of product development. From this stage on, Design Workshops are established as essential

	critical-reflective instances of the training process.
General goals:	To introduce students to design methodology in order to approach the subject-object-environment relationship by means of product generation.
Content summary:	Introduction to the process of analysis and design of a product and its parameters: formal, functional, material and significant. Generative research, as an input to the design process. mulation of a design program and formulation of conceptual and formal proposals. Research on materials and manufacturing processes. Approach to objects of haptic scaling.

Name of the Course:	Design Workshop 2 (DW2)
Cycle:	Basic
Year:	2nd
Area:	Design
Sub-area:	Design
Attendance:	Annual
Weekly workload:	8 hrs
Total workload:	240 hrs
Credits:	24
Rationale:	During this course, design criteria are broadened through the inclusion of the concepts of product family and systems. The complexity of the objects to be developed is also increased by considering complex operating mechanisms, the design of materials and the relationship between technological possibilities, scale of production and sustainability. By considering a greater number of variables in the design process, students learn to develop specific work methodologies.
General goals:	To increase the capacity for critical reflection and production in a subject-object-environment dynamics, and further the use of tools and methodologies for the generation of products and systems.
Content summary:	Research, analysis and prospection. Project strategy: market, technology, sustainability, ergonomics, etc. Management and formulation of formal proposals and alternatives. Product line and product family development. Material and productive solutions. Introduction to the notion of system. Approaching human-scale projects.

Name of the Course:	Design Workshop 3 (DW3)
Cycle:	Basic
Year:	3rd
Area:	Design
Sub-area:	Design
Attendance:	Annual
Weekly workload:	8 hrs
Total workload:	240 hrs
Credits:	24
Rationale:	During this workshop, students train in how to approach and solve complex systemic issues and/or problems, from the conceptual level to the (prototype) transfer/production stage. This process allows them to develop interaction, communication, research, reflection and criticism skills necessary to carry out a design process. It also encourages students to consider social and cultural aspects as noteworthy variables in a project.
General goals:	To strengthen students' project skills, while at the same time encouraging them to form their own design character, as professionals with a creative, open and exploratory personality.
Content summary:	Self-perception of design capabilities and identification of personal views on design. Design in relation to specific production logics: high and low scale; artisan and industrial production; basic and cutting-edge technologies. Products under special conditions. Development of systemic projects. Strategic design and sustainable design. Approaching habitable scale objects. Approaching the prototype.

Name of the Course:	Specialized Design Workshop 1 (SDW1)
Cycle:	Higher
Year:	4th
Area:	Design
Sub-area:	Design
Attendance:	Annual
Weekly workload:	8 hrs
Total workload:	240 hrs
Credits:	24
Rationale:	This workshop allows students to adapt the knowledge and

	methodologies learned during the basic cycle to a defined problem. During this process, students work simultaneously on the overview, function, components, their interconnections and the possibilities of generating new relationships between them, in order to promote the process of innovation. In addition, the course seeks to build in future professionals the cultural load necessary to overcome a "creative technician" profile towards the idea of "cultural operator".
General goals:	To introduce students to specific problems of the specialty area, through the development of comprehensive projects.
Content summary:	Development of specific projects (according to specialty area). Generative research methodology: observation and interpretation. Background search. Morphological, technological, functional and semantic continuity and break. Implementing international standards. Projects of social and cultural nature.

Name of the Course:	Specialized Design Workshop 2 (SDW2)
Cycle:	Higher
Year:	5th
Area:	Design
Sub-area:	Design
Attendance:	Semester
Weekly workload:	8 hrs
Total workload:	120 hrs
Credits:	12
Rationale:	The dynamic generated during this workshop allows students to implement the design process as a continuous and iterative process, delving into intra and interdisciplinary relationships. Simultaneously, the intellectual and ethical commitment implied in each project is promoted and encouraged, considering contextual conditions, technological advances and the information available, and approaching the design process as a cultural emergence that allows both local and regional actions.
General goals:	To further the approach to the specialty area, through the development of comprehensive projects.
Content summary:	Development of specific projects (according to the specialty area). Products as complex systems. Products and services systems.

Name of the Course:	Final Project Workshop (FPW)
Cycle:	Higher
Year:	5th
Area:	Design
Sub-area:	Design
Attendance:	Semester
Weekly workload:	8 hrs
Total workload:	120 hrs
Credits:	12
Rationale:	The aim of this workshop is for students to consolidate their personal capacities, strengthening their criteria and autonomy through self-assessment. It seeks to integrate the knowledge acquired during the training process; together with a reflective attitude towards design as a cultural activity targeted at economic development, and its impact on culture. At this stage, the training is also directed at students growing a strategic vision of development, which incorporates integral project management, from the moment they conceive a product to the moment it is sold.
General goals:	To put the approaches, methodologies and tools learned throughout the course of studies into practice in an integrative final project.
Content summary:	Development of a personal project that integrates the contents acquired during the course of studies.

Name of the Course:	Graphic Representation Systems 1 (GRS1)
Cycle:	Basic
Year:	1st
Area:	Project
Sub-area:	Morphology and Visual Representation
Attendance:	Semester
Weekly workload:	4 hrs
Total workload:	60 hrs
Credits:	6
Rationale:	This course provides students with fundamental tools to express

	and communicate ideas and solutions to different actors that intervene in the production system. Such knowledge is essential to carry out the design process, since it provides theoretical, analytical and practical support to represent two- and three-dimensional figures in order to visualize, control, communicate and document a product. During this process, students will develop skills for freehand drawing; learn the fundamentals of drawing, representation techniques, color theories and the specifics of standardized representation in technical drawing.
General goals:	For students to acquire the basic tools to use visual language in graphic and instrumental systems, as required by the project.
Content summary:	Sketch, croquis, perspective and technical drawing. Monge system. Figure series and families. Descriptive geometry. Basic concepts of shape and color. Visual codes. Operational aspects of drawing systems.

Name of the Course:	Morphology 1 (M1)
Cycle:	Basic
Year:	1st
Area:	Design
Sub-area:	Morphology and Visual Representation
Attendance:	Semester
Weekly workload:	4 hrs
Total workload:	60 hrs
Credits:	6
Rationale:	This course allows students to learn the principles of generation and organization of elementary forms, to reproduce them and understand their qualities, as well as to recognize the intrinsic properties of their geometry. Exploration of materiality and understanding of its relationship with the ideas of "the abstract" and "the concrete" are also encouraged. In addition, the course aims at developing skills for graphic representation, and approaching the instruments of modeling and creation of volumes, bodies and products.
General goals:	For students to understand the inner structure of the form and its possibilities of realization, and to address the reciprocal relationship between mental forms, precepts or images, and material forms.

Content summary:	The form as a significant entity. Reading and producing the form. Basic principles of the morphological system: shape, color, texture and cesia. Shape and form classification. Two-dimensional and three-dimensional geometry. Modes of realization: from the abstract to the concrete. Continuous and discontinuous language. Production and presentation techniques: rendering and scale models.

Name of the Course:	Morphology 2 (M2)
Cycle:	Basic
Year:	2nd
Area:	Design
Sub-area:	Morphology and Visual Representation
Attendance:	Annual
Weekly workload:	4 hrs
Total workload:	60 hrs
Credits:	6
Rationale:	In this stage, students are meant to develop the knowledge to successfully design and create forms based on the possibilities offered by different transformation processes. In addition, the course seeks to stimulate the visual perception of the form and its relationship with its superficial qualities, so as to make explicit the relationship between these characteristics and the significant, communicative and evocative aspects they produce.
General goals:	To provide students with tools to manage generative systems of spatial surfaces and their relationship with the abstract and concrete structure.
Content summary:	Generation, production and reading of spatial surfaces: conic curves and design of generatrices. Advanced Geometry. Polyhedra and constructive systems. Shape organization. Color and contrast. Color systems. Harmonies and palettes.

Name of the Course:	Morphology 3 (M3)
Cycle:	Basic
Year:	3rd
Area:	Design
Sub-area:	Morphology

Attendance:	Annual
Weekly workload:	4 hrs
Total workload:	60 hrs
Credits:	6
Rationale:	At this last level of morphological study, the aim is to fully understand and incorporate the tools as if they were intersections for new interpretations coming from known elements. It also involves comprehending the link between human behavior and forms, the latter understood as carrying values and provoking evocations. Additionally, in this stage, students are meant to handle the full potential of formal languages to express their ideas and values through design.
General goals:	For students to incorporate knowledge and tools to manage the spatial operations of the form, furthering a view of the form as appropriation of the conceptual and material spatiality of culture.
Content summary:	Volumetric intersections as design strategy. Linking forms with human conducts or behaviors. Color and cesia: selection and schemes for individual products and systems. Hierarchy of colors. Meaning of the form: paradigmatic and syntagmatic analysis of contextualized objects.

Name of the Course:	Mathematics (Math)
Cycle:	Basic
Year:	1st
Area:	Basic Sciences and Technology
Sub-area:	Basic Sciences
Attendance:	Semester
Weekly workload:	2 hrs
Total workload:	30 hrs
Credits:	3
Rationale:	This course aims at teaching the basic principles of mathematics and geometry, in order to encourage the kind of logical reasoning that is essential for problem solving. It also promotes the use of scientific practices and methodologies, which favors the designer's creative process.
General goals:	To improve the knowledge, understanding and skills needed to handle mathematics as a tool for analysis and design.
Content summary:	Functions with real numbers. Sequences and limits. Derivatives and

	integrals. Differential equations. Trigonometry. Measurements and scales. Cartesian coordinate system in a plane and in space. Projective and descriptive geometry. Basics of Topology. Probability and statistics.

Name of the Course:	Physics 1 (Ph1)
Cycle:	Basic
Year:	1st
Area:	Basic Sciences and Technology
Sub-area:	Basic Sciences
Attendance:	Semester
Weekly workload:	2 hrs
Total workload:	30 hrs
Credits:	3
Rationale:	During this course students are expected to understand the physical phenomena affecting the normal performance of an object, to develop the ability to observe and interpret these phenomena and understand the fundamental concepts and general laws that govern them. The aim is to bring to light the importance of physical reality as a determining element in the conception of a product as well as the relationship with the physical and formal capacities of the materials that make a project possible.
General goals:	For students to acquire basic tools for understanding and managing the physical phenomena associated with matter and energy.
Content summary:	Introduction to physics: phenomena, measurement, functions and calculation systems. Matter and energy. Static, work and power. Kinematics and Dynamics. Fluids. Hydrostatics. Thermodynamics. Physical measurements.

Name of the Course:	Physics 2 (Ph2)
Cycle:	Basic
Year:	2nd
Area:	Basic Sciences and Technology
Sub-area:	Basic Sciences
Attendance:	Semester
Weekly workload:	2 hrs

Total workload:	30 hrs
Credits:	3
Rationale:	At this level, the course seeks to bring to the professional training solid foundations and theoretical-practical concepts about the physics of electrical and magnetic phenomena applicable to the design process. Necessary basis to interpret, weigh, size, qualify and modify the electrical phenomena of voltage, current and power are provided; as well as vocabulary and appropriate knowledge for the development of interdisciplinary practices.
General goals:	To strengthen students' knowledge on the management of physical phenomena associated with matter and energy.
Content summary:	Waves. Sound and acoustics. Electricity and magnetism. Light and optics. Elementary notions of Modern and Nuclear Physics.

Name of the Course:	Introduction to Technology (IT)
Cycle:	Basic
Year:	1st
Area:	Basic Sciences and Technology
Sub-area:	Applied Technology
Attendance:	Semester
Weekly workload:	4 hrs
Total workload:	60 hrs
Credits:	6
Rationale:	This course is the first step in the recognition of the diversity of the materials that make up the objects that surround us. In this stage, general properties and possible applications of said materials are studied, while promoting the notion of technological components as a fundamental variable of design. It provides basic notions to understand the processes of manufacturing and transformation of materials; and interpret the regulations applied to standard documents for the development of blueprints to budget and/or produce an object or mechanism.
General goals:	To provide students with knowledge about the technological-material resources and processes necessary for the materialization of objects, not just as a functional response but as an element for formal expression.
Content summary:	Technique and technology concepts, and their relationship with the project. Technological systems. Classification of raw materials: natural and artificial materials. Materials Properties. General notions of chemical and physical phenomena on materials. Technological properties and transformation processes.

	Preparation of technical documents needed for production: IRAM technical representation system. Axonometric and oblique projections.

Name of the Course:	Technology 1 (T1)
Cycle:	Basic
Year:	2nd
Area:	Basic Sciences and Technology
Sub-area:	Applied Technology
Attendance:	Annual
Weekly workload:	4 hrs
Total workload:	120 hrs
Credits:	12
Rationale:	This first level of technological study seeks to prepare students to understand and incorporate manufacturing processes, starting by learning about raw materials, their characteristics, properties and the processes that transform them into a serial piece or product. Students also work on understanding the structural and physical properties and possible alterations of materials, to understand the variables enabled by production processes (linear, laminar, volumetric). Thereby, it is possible to explore the idea of rational management of material resources and production processes.
General goals:	To address the use of technology as a tool for design, incorporating specific knowledge about materials and key processes.
Content summary:	Metals and special alloys. Metal mechanic extraction, production and elaboration. Composite materials. Machine tools. Electromechanical processes. Cold and hot forming operations. Wood. Types, processes and manufacture of wood.

Name of the Course:	Technology 2 (T2)
Cycle:	Basic
Year:	3rd
Area:	Basic Sciences and Technology
Sub-area:	Applied Technology
Attendance:	Annual
Weekly workload:	4 hrs
Total workload:	120 hrs

Credits:	12
Rationale:	In this stage, students will incorporate knowledge and concepts related to different methods of production and technologies associated with composite materials; learn the concept of design program based on production, introducing them into management; and exercise in the rational use of the involved materials, processes and resources. The course also addresses the relationship between possible commercial configuration of raw materials and achievable results following a process of production.
General goals:	To expand students' knowledge of materials and processes, increasing their ability to manage design technological resources.
Content summary:	Plastics: classification, obtainment and production processes. Thermoplastics and thermosets. Compounds based on minerals: ceramics, cement and glass. Obtainment and production processes. Fabrics and leather. Natural and synthetic fibers. Leather and animal products.

Name of the Course:	Computer-aided Design (CAD)
Cycle:	Basic
Year:	2nd
Area:	Basic Sciences and Technology
Sub-area:	Applied Technology
Attendance:	Semester
Weekly workload:	2 hrs
Total workload:	30 hrs
Credits:	3
Rationale:	This course provides general notions about the use and scope of the computer tools applied during the project. It introduces the characteristics of different software and devices available for each stage of the design process (from submitting a sketch to preparing the documents for production). In this way, students acquire skills to decide which software is right for their creative process.
General goals:	For students to understand computing as an enabler of the design process, and to reflect on its implications.
Content summary:	Computing as a design tool: limitations and opportunities. Digital models for technical and realistic representation. Volumetric modeling and building of virtual objects. Parametric modeling software. Digital prototyping and manufacturing. CAD-CAM systems.

Name of the Course:	Advanced Technology 1 (AT1)
Cycle:	Higher
Year:	4th
Area:	Basic Sciences and Technology
Sub-area:	Applied Technology
Attendance:	Annual
Weekly workload:	4 hrs
Total workload:	120 hrs
Credits:	12
Rationale:	At this level, the goal is to actively, reflectively and critically link the current state of technology and its application possibilities to the design of industrial objects, keeping the national and regional context as a reference. Thereby, professionals approach practices that will favor their decision-making process and adopt technically and economically viable solutions that they may include in future projects.
General goals:	To strengthen students' management of technological resources within sophisticated design processes.
Content summary:	Specific technological systems. Specific processes and software. Electricity and electronics. Robotics, biodesign and mechatronics. Materiality and virtuality. Productive organizations.

Name of the Course:	Advanced Technology 2 (AT2)
Cycle:	Higher
Year:	5th
Area:	Basic Sciences and Technology
Sub-area:	Applied Technology
Attendance:	Semester
Weekly workload:	4 hrs
Total workload:	60 hrs
Credits:	6
Rationale:	In this stage, students are motivated to learn about and use the latest technologies available, so as to establish links with the project and problem solutions and situations in the context of

	production. This combination, together with research and analysis activities, enables students' development and creative and innovative thinking, apart from promoting the inclusion of technology as a stimulating factor for local production and development.
General goals:	To teach students how to use the technological systems associated with complex products.
Content summary:	Technological systems (materials, processes and production systems). Specific software and processes. Micro and Nanotechnology. Design of materials.

Name of the Course:	History of Industrial Design 1 (HID1)
Cycle:	Basic
Year:	1st
Area:	Humanistic
Sub-area:	History
Attendance:	Semester
Weekly workload:	2 hrs
Total workload:	30 hrs
Credits:	3
Rationale:	The purpose of this course is to foster the idea of the subject as a constitutive part of a culture, with local, regional and global expressions identifiable from the elements of his historical past. At the same time, it is an introduction to general history and, particularly, its relationship to design as interaction between engineering, art and industry. It offers a critical analysis of contextual, cultural, and ideological relevance. In this way, students develop interpretation and assessment abilities that are useful to understand the intended purpose of industrial objects made by main designers and companies from the Middle Ages to the present.
General goals:	To introduce students into the study and consideration of society's material production from a historical perspective.
Content summary:	Human-object evolution: the construction of artificial environments. Link between object production and the economic and production system and the ideological and cultural system. Western and Eastern design. Material culture in history: from the Middle Ages to the industrial revolution. Link with the arts and the avant-garde. Design in the 20th century: Welfare state, Fordist model of production and mass culture.

Name of the Course:	History of Industrial Design 2 (HID2)
Cycle:	Basic
Year:	2nd
Area:	Humanistic
Sub-area:	History
Attendance:	Semester
Weekly workload:	2 hrs
Total workload:	30 hrs
Credits:	3
Rationale:	This course seeks to foster students' analytical thinking by exercising their ability to understand and reflect, while addressing the history of design as a tool to incorporate the experiences of the discipline. In this stage, the historical knowledge acquired during the first level as well as the history of industrial design are analyzed from the second post-war period to the present, considering design in the Argentine and Latin American context.
General goals:	For students to deepen their knowledge and understanding of the complexity of material culture and disciplinary production from a historical dimension.
Content summary:	Design in the 20th century. Schools of Design. Industrial production in war and post-war contexts. Modernization of the home and mechanization of the industry. Economic production systems and their relationship with consumption systems at the international level. Modernity, post-modernity and design in Latin America. Argentina in the world of design. Contemporary design trends: social design, sustainable design, original design, etc. Recovery of local traditions and the discourse of globalization.

Name of the Course:	Introduction to Scientific Thinking (IST)
Cycle:	Basic
Year:	1st
Area:	Humanistic
Sub-area:	Theory and Analysis
Attendance:	Semester
Weekly workload:	4 hrs

Total workload:	60 hrs
Credits:	6
Rationale:	This course proposes an approach to scientific knowledge, its methods and practices, processes of validation and criteria of truth, based on the fundamental aspects of epistemology. In addition, it shows the impact that scientific knowledge has had on social and human practices in different historical periods.
General goals:	For students to understands the general characteristics of scientific knowledge, and develop analytical skills and critical thinking.
Content summary:	Conditions and types of knowledge. Characteristics of scientific knowledge and stages of a research process. Logic and deductive method. Science history and perspectives. Study of examples. Basic science, applied science, technique and technology. Scientific policies, scientists' social responsibility. Science and technology in Argentina. Scientific institutions. The role of University.

Name of the Course:	Technology, Design and Society (TDS)
Cycle:	Basic
Year:	3rd
Area:	Humanistic
Sub-area:	Theory and Analysis
Attendance:	Semester
Weekly workload:	2 hrs
Total workload:	30 hrs
Credits:	3
Rationale:	The contents of this course promote the idea that human beings, the production of objects and design practices not only make up a triad to satisfy society's material needs, but also a set of elements that condition innovation processes. At the same time, the course offers a systematic study of the relationship between this triad and the economic, social-cultural, technological and political context in which it takes place.
General goals:	To introduce students to the interaction between the design process, its technological and social conditions and impacts while developing abilities for responsible interventions within these dynamics.
Content summary:	Technological development and innovation. Theory of innovation and its relationship with hard and soft technologies. Society-Industry dynamics. Interactions between economic and social systems. Products and their impact on this dynamic. Design as an interface in the technology-society dynamic. Professional role and

	ethics.

Name of the Course:	Semiotics and Visual Culture (SVC)
Cycle:	Higher
Year:	4th
Area:	Humanistic
Sub-area:	Theory and Analysis
Attendance:	Semester
Weekly workload:	2 hrs
Total workload:	30 hrs
Credits:	3
Rationale:	This course aims at introducing students to understand design as a language-generating discipline. Therefore, it is necessary to provide professionals with concepts and methodology to operate the symbolic universe through projection. The contents of this course offer a rigorous approach to building tools and capacities associated with such function.
General goals:	For students to understand the factors involved in the construction of meaning through product generation, and the resulting impact on visual culture.
Content summary:	Elements of general semiotics: dyadic and triadic conception. Typology of signs. Levels and processes for meaning production. Plastic dimension of the visual system: structure of the signifier, system and value, matter and form of expression. Visual texts: semiotics and reception theory, textual subjects (author and receiver). Semiotics and visual culture: forms of visibility of contemporary society. Semiotics, aesthetics and ethics. Impact of globalization and technologies on processes of significance.

Name of the Course:	Theory and Criticism of Design (TCD)
Cycle:	Higher
Year:	4th
Area:	Humanistic
Sub-area:	Theory and Analysis
Attendance:	Semester
Weekly workload:	2 hrs

Total workload:	30 hrs
Credits:	3
Rationale:	The general objective of the course is to promote critical thinking about different design theories, distinguishing between the critical philosophical model and the model of art criticism. Moreover, as a consequence of a globalized context that forces us to redefine the training of design professionals, this course seeks to ease students' access to research and results dissemination so as to strengthen disciplinary work and bring designers closer to knowledge society.
General goals:	To provide students with a sophisticated disciplinary theoretical framework, increasing their reflective and critical ability to fit a wide range of possible professional roles.
Content summary:	Design as a science and design as practice. Philosophical-ontological, methodological, historical, ethic and aesthetic dimensions. Design theory. Design theorizing problems: aesthetics, ethics, politics, material culture. Existing paradigms, concepts and theoretical notions in Design. General methodologies or particular methods. Critical instruments: opinions, judgments of appreciation, assessment or weighing.

Name of the Course:	Project and Research Methodology (PRM)
Cycle:	Higher
Year:	5th
Area:	Design
Sub-area:	Theory and Practice
Attendance:	Semester
Weekly workload:	4 hrs
Total workload:	60 hrs
Credits:	6
Rationale:	The contents of this course provide students with the tools necessary to carry out research activities within the design area. Framed within an academic undergraduate structure, this course contributes to generate a space for investigation, which is necessary to produce, teach and transmit new knowledge and promote the detection of new intervention spaces for industrial design. Acquiring design research methodologies is essential to achieve new approaches in the development of a project.
General goals:	For students to acquire knowledge and methodological tools to formulate and execute design research projects from a scientific-technological basis.

Content summary:	Concept of innovation and relationship with design. Building a case. Research as a method to produce knowledge. Techniques for data collection during the research. Quantitative and qualitative methods. Formulation of projects and formats for preparation and dissemination of results. Research models in Design. Research process: conceptual, empirical, analytical and design stages. Technological change and production system. Consequences stemming from technological change: small-scale production. Knowledge-creating organizations. Attributes of objects: relative, absolute and contextual. Management of design in a company. Strategic design. Design for development.

Name of the Course:	Economy, Industry and Development (EID)
Cycle:	Basic
Year:	2nd
Area:	Humanistic
Sub-area:	Economy and Industry
Attendance:	Semester
Weekly workload:	2 hrs
Total workload:	30 hrs
Credits:	3
Rationale:	This course presents some of the basic theories and concepts of development economics in order to promote a holistic approach to the relationship between the economy, local industry and growth. An attempt is made to explain that the evolution and transformation of the industries that determine the path of national economy are part of an ever-changing dynamic process.
General goals:	To introduce students to the observation, analysis and discussion of emerging problems in the interaction dynamics between economy, industry and development.
Content summary:	Notion of economic system. Good and service production and distribution models. Industrial structure. Production chains and value chain. Competitiveness and innovation. Notion of economic, social and productive development. Concept of sustainable development: environmental, social and economic responsibility of agents.

Name of the Course:	Business Management and Marketing (BMM)
Cycle:	Basic

Year:	3rd
Area:	Humanistic
Sub-area:	Economy and Industry
Attendance:	Semester
Weekly workload:	2 hrs
Total workload:	30 hrs
Credits:	3
Rationale:	This course presents the main concepts of good and service management, organization and commercialization with the aim of fostering the creation of value and promoting the development of entrepreneurship. Based on the knowledge provided by the areas of economics, administration, finance and marketing, this course helps students integrate theory and practice by implementing production and marketing strategies within specific economic, political and social environments.
General goals:	To introduce students to the problems of company management, favoring reflection on the link between design and business and the market.
Content summary:	Strategic management. Diagnostic and planning tools: SWOT matrix, issue tree, project and program matrix, product-system, value chain. Business plan and detection of opportunities. Strategic management. Technological improvement and organizational change. Levels of insertion of design in the company. Creation of value. Entrepreneurship. Consumer-oriented market studies. Development of entry and penetration strategies. Marketing plan. Points of sale and design of commercial experiences.

Name of the Course:	Design and Innovation Management (DIM)
Cycle:	Higher
Year:	4th
Area:	Design
Sub-area:	Theory and Practice
Attendance:	Semester
Weekly workload:	2 hrs
Total workload:	30 hrs
Credits:	3
Rationale:	This course promotes the development of the skills necessary to carry out innovation processes in a comprehensive manner. The

	aim is for the professional to integrate the design process with innovation, knowledge and development management processes. Starting from the systemic concept of innovation, the goal is to make project research and knowledge management into tools to develop design-based business models.
General goals:	To provide specific knowledge and tools to manage design and innovation processes within different organizational structures.
Content summary:	Innovation and continuous improvement. Innovation models in products, processes, organizations and markets. Innovation typologies: market traction, technology push and design-based. Strategic design and product-system. Design planning and management in the company. Design Thinking. Methodology for creativity: divergent and convergent thinking. Prospective. Financial instruments to support innovation. Knowledge management.

Name of the Course:	Legislation and professional practice (LPP)
Cycle:	Higher
Year:	4th
Area:	Design
Sub-area:	Theory and Practice
Attendance:	Semester
Weekly workload:	2 hrs
Total workload:	30 hrs
Credits:	3
Rationale:	The importance of the contents developed in this course for the professional training of designers relies in the need to prepare them to take on a truly active role in the process of socio-political construction of artifacts and technologies. It is evident the need to introduce into this knowledge package basic notions on the regulatory framework of the discipline, comprised not only of legislation applicable to the results of the activity, but also of the rules, whether tacit or explicit, that guide professional practice. Moreover, the aim of this course is to build mechanisms and tools for critical analysis, which will allow professionals to conceive their practice in a purposeful way: as multifaceted actors who, through their commitment, ethics and practice, materialize a political conception of the universe they inhabit.
General goals:	To prepare designers to play an active role in the process of socio-political construction of artifacts and technologies.
Content summary:	Design system: structure and composition. Creative economy and productive innovation. Links with innovation systems. Professional

	Practice: Emerging Roles of the designer and alternative areas of insertion. Professional and productive ethics. Scope and responsibilities. Legal framework for creativity: intellectual property and industrial property; trade secret and contracts. Types of protection registers, registrability and scope.

Name of the Course:	Supervised Practice on Service Provision 1 (SPS1)
Cycle:	Basic
Year:	3rd
Area:	Design
Sub-area:	Theory and Practice
Attendance:	Semester
Weekly workload:	2 hrs
Total workload:	30 hrs
Credits:	3
General goals:	To put students in contact with the real context of operation, shedding light on problems and opportunities.
Content summary:	Putting acquired knowledge into practice. Reflecting on the practice.

Name of the Course:	Supervised Practice on Service Provision 2 (SPS2)
Cycle:	Basic
Year:	3rd
Area:	Design
Sub-area:	Theory and Practice
Attendance:	Semester
Weekly workload:	2 hrs
Total workload:	30 hrs
Credits:	3
General goals:	To increase students' contact with their immediate productive context.
Content summary:	Putting acquired knowledge into practice. Reflecting on the practice.

Optional Courses

During the higher cycle, students are required to take a total of 4 optional courses, which they may choose, from the ones available, according to their personal or professional interests.

Optional courses are those courses that students can choose from the curricular offer of the Faculty of Architecture, Planning and Design, in order to obtain the academic credits required to be awarded the degree of Industrial Designer.

The offer of available courses is in line with the general goals of completing and complementing disciplinary training, promoting students' vocational particularities, providing spaces for academic training that encourage the advancement of disciplinary development, linking students with the reality of local production and guiding future graduate training.

Arranged according to the areas of knowledge, the following tentative course list is suggested:

Design Area	
▪ Visual Communication ▪ Photography ▪ User experience studies ▪ Production costs and planning ▪ Naval design	▪ Participatory design ▪ Design research ▪ Design of commercial environments
Technology Area	
▪ Workshop of material testing ▪ Workshop of open source tools ▪ Virtual reality ▪ Regulations for containers and packaging ▪ Advanced mechanics	▪ Agricultural machines ▪ Technology applied to the development of machines ▪ Technology applied to the development of packaging
Humanistic Area	
▪ Sociology applied to design ▪ Art history ▪ Communication and culture	▪ Aesthetics ▪ Entrepreneurship development ▪ Heuristics

Chairs will send the proposals for the optional courses that they are interested in offering to the Director of the degree program, who will submit them to the Governing Body of the Faculty for approval, after which they will have a minimum validity of two years, with the possibility of renewal upon submitting a report that gives an account of the level of interest and response from students. Such proposals must guarantee a minimum number of optional courses per area.

Proposals must include:

- Rationale: specifying the field of knowledge to be addressed and its relevance as complement or advancement in a given field of knowledge not previously addressed, or to be further studied taking into account the compulsory courses of the plan of study.
- Area and sub-area of the course
- Attendance
- Weekly workload and total workload
- General and specific goals
- Content summary
- Main and complementary bibliography

Course of Studies Final Project

The Final Project constitutes the stage in which every training cycles and areas of knowledge involved in the development of the Industrial Design degree program converge. In this context, the aim is to generate an experience equivalent to professional practice, testing students' acquired project and management skills. Thus, the problems and critical situations posed by the implementation of a design project are faced in a controlled environment, with the assistance of teachers and peers.

The final project will be carried out individually and the choice of topic must be agreed with the professor(s) of the Final Project Course, who will act as supervisor(s).

The following will be taken into account for selecting potential projects: definition of project-related and technological aspects, relationship with the demands imposed by the topic chosen, such as scale, availability of resources, schedule, etc., and display of complete understanding of the project by its author. The proposed project must be defended before an approval committee, formed by the professors of the Workshop, during a formal meeting.

7.4.3.1 Goals

The objectives pursued during this workshop are:

- To create a space to synthesize the operative and purposeful levels reached by students during the preceding courses.
- To create a curricular environment conducive to the integration and consolidation of knowledge.
- To encourage personal growth in the capacity to create original proposals on a topic previously agreed upon by the institution.

- To promote the development and consolidation of individual skills for presentation, argumentation, debate and objective assessment (cultural coherence and technical validity) on reflection and instrumental-operative strategies at play in students' elaboration of the proposals and projects.
- To organize the academic correlation and functionality logic ("Prerequisite system") of the courses that make up the syllabus, presenting from this new conclusive stage an integrated view on the cores of training and instrumental demand to be face in teaching-learning stages.
- To build students' capacity for autonomy, by consolidating modalities and variations that are inherent to the methods and strategies used to approach a project.
- To reflect on the epistemological nature of a designer's work and the ethical dimension involved in their performance.
- To value interdisciplinary contributions.
- To encourage applied research in the development of comprehensive design proposals.

7.4.3.3 Evaluation Method

The evaluation and final grade of students' projects will be in charge of a panel chaired by the head professor of the Final Project Workshop and the presentation of each project will be public.

Depending on the needs of the project and the complexity of the chosen topic, the advice of experts may be requested in areas that cannot be covered by workshop professors, in which case, professors of other courses, members of research institutes, honorary professors, or, in special cases where the subject matter requires so, external advisors may be call upon. The participation of advisors may be proposed by the chair or the student, as long as the chair is aware of this request.

The Final Project may be taken as final exam of fifth year compulsory or optional courses, if the professors in charge of such courses consider that the topic of the Final Project is relevant to the contents addressed by their courses.

Upon taking and completing the Final Project Workshop, students will have up to two years to submit their Final Project for evaluation.

10 - ANALYSIS OF COURSE OF STUDIES INTERNAL COHERENCE

On the basis that the exercise of professional practice is understood as the implementation of a set of knowledge acquired during academic training, in the FOLLOWING TABLE, we highlight the courses that intervene directly in students' capacity building, which allow them to take on the roles and responsibilities within the scope of the degree.

Scope of degree	**Academic Requirements**
Productive sector	
• To perform in areas that have as responsibility the execution of design, planning and development tasks for the manufacture of serial products, as well as quality and production control tasks.	Design Workshop 1, 2 and 3; Final Project Workshop; Advanced Technology 1 and 2; Graphic Representation Systems; Specialized Design Workshop 1 and 2; Computer-aided Design; Advanced Technology 1 and 2. Ergonomics; Morphology 1, 2 and 3;
• To participate in the process of design and production of goods, services and environments.	Design Workshop 1, 2 and 3; Final Project Workshop Advanced Technology 1 and 2; Specialized Design Workshop 1 and 2; Computer-aided Design. Advanced Technology 1 and 2;
• To carry out design consulting and business advisory activities.	Business Management and Marketing; Design and Innovation Management; Economy, Industry and Development; Project and Research Methodology.
• To run companies that develop products or provide design services.	Business Management and Marketing; Design and Innovation Management: Economy, Industry and Development; Technology, Design and Society.

• To work as manager, head of department, team coordinator, project designer.	Design Workshop 1, 2 and 3; Specialized Design Workshop 1 and 2; Advanced Technology 1 and 2; Technology, Design and Society; Final Project Workshop; Business Management and Marketing; Design and Innovation Management.
• To be in charge of assessing goods and services during a process of acquisition or generation of product catalogs for subsequent offering to third parties.	Business Management and Marketing; Technology, Design and Society; Graphic Representation Systems.
• To create regulations and patterns of usage for product and service systems.	Project and Research Methodology; Graphic Representation Systems; Advanced Technology 1 and 2.

Public sector	
▪ To carry out activities pertaining to a project manager, interdisciplinary team coordinator or area manager positions.	Design Workshop 1, 2 and 3; Final project workshop; Advanced Technology 1 and 2; Graphic Representation Systems; Specialized Design Workshop 1 and 2; Computer-aided Design; Advanced Technology 1and 2; Ergonomics; Morphology 1, 2 and 3;
▪ To participate and hold management positions in programs and projects associated with the disciplinary field in science and technology institutes or agencies.	Business Management and Marketing; Design and Innovation Management: Economy, Industry and Development; Technology, Design and Society; Theory and Criticism of Design; Project and Research Methodology;
▪ To provide external consulting and assessments.	Business Management and Marketing; Design and Innovation Management; Economy, Industry and Development; Project and Research Methodology;

▪ To conduct arbitrations and expert reports involving design laws, industrial models or field-related concerns, as well as to assess appraisals and budgets.	Semiotics and Visual Culture; Legislation and Professional Practice; Theory and Criticism of Design; Supervised Practice on Service Provision 1 and 2; Specialized Design Workshop 1 and 2;
▪ To act as curator in any activity that affects the design and exhibition of industrial products involving any format and modality	Technology, Design and Society; History of Industrial Design 1 and 2; Theory and Criticism of Design; Semiotics and Visual Culture; Project and Research Methodology; Introduction to the Design Process.
▪ To participate in programs, projects or units within bodies that manage the city, urban or rural environments, in activities linked to value-added good and service management, purchase, installation and/or production.	Technology, Design and Society; Business Management and Marketing; Design and Innovation Management: Theory and Criticism of Design; Economy, Industry and Development; Supervised Practice on Service Provision 1 and 2; Final Project Workshop.

Academic-scientific sector	
▪ To participate and lead research activities relating to design, such as the ones carried out by centers for interdisciplinary studies.	Design and Innovation Management; Semiotics and Visual Culture; Theory and Criticism of Design; Project and Research Methodology; History of Industrial Design 1 and 2.
▪ To carry out technology-transfer and cooperation activities.	Introduction to the Design Process; Technology 1 and 2; Introduction to Technology; Advanced Technology 1 and 2; Technology, Design and Society; Business Management and Marketing; Design and Innovation Management; Theory and Criticism of Design; Project and Research Methodology.

▪ To participate in the formulation of standards and patterns of usage for products or product systems as results of research and development processes.	Business Management and Marketing; Design and Innovation Management; Semiotics and Visual Culture; Legislation and Professional Practice; Theory and Criticism of Design; Project and Research Methodology.
▪ To lead and participate in applied and experimental research projects that seek to create new products or enhanced services.	Business Management and Marketing; Design and Innovation Management; Semiotics and Visual Culture; Legislation and Professional Practice; Theory and Criticism of Design; Project and Research Methodology; Technology, Design and Society.