A - General description

Programme Title – Product Design and Development

Qualification awarded – Bachelor's Degree (*Licenciatura*)

Admission requirements - This degree may be accessed through the National Application for Admission to Higher Education, Special Admission Regimes or Re-Enrolment, Change and Transfer schemes. The National Application requires one of the following admission exams: History of Visual Arts, Descriptive Geometry; Drawing or Economics.

Educational and Professional Goals

The study program leading to the Product Design and Development degree is mainly theoretical-practical and is intended to develop basic skills required by a Product Designer: performance of all project stages from the initial idea to its materialization, research, development, testing, technical drawing and final presentation.

In the last three semesters training comprises two specialization profiles in key Product Design areas: Virtual Design and Industrial Innovation. As for Virtual Design the emphasis is placed on virtual 3-D environment including the creation of fixed images and animations and as for Industrial Innovation the focus is the development of products according to CAD-CAM specifications.

Graduates of this degree are prepared to perform Design-related activities on their own or as part of a team as technical staff in enterprises or as independent workers. They will be able to perform such activities as product design, analysis, project and management, visual communications and services as well as teaching and research related activities.

Access to further studies – The Bachelor's degree allows access to second cycle studies (Master's Degrees).

Course structure diagram with credits (60 per year)

Course Title	Year	Semester	Number of Credits
Introduction to Product Design	1	1	7
Drawing I	1	1	6
Descriptive Geometry	1	1	6
Contemporary Culture Studies	1	1	3
Mathematics	1	1	5
English	1	1	3
Project I	1	2	7
Drawing II	1	2	6
Technical Drawing	1	2	5
Design History	1	2	3
Digital Representation Methods	1	2	5
Materials	1	2	4
Project II	2	1	7
Computer-Aided Drawing	2	1	6
Design Theory	2	1	4
Visual Form	2	1	3
Project Methodology	2	1	5
Manufacturing Technologies	2	1	5
Virtual Design Project I (Opt.1)	2	2	7
Industrial Innovation Project I (Opt.1)	2	2	7
3D Modelling (Opt.2)	2	2	6
Geometric Modelling (Opt.2)	2	2	6
Lighting and Textures (Opt.3)	2	2	5
Prototyping (Opt.3)	2	2	5

Object Semiotics	2	2	3
Ergonomics	2	2	4
Conventional Technological Processes	2	2	5
Contemporary Design	3	1	4
Design and Industrial Property	3	1	4
Traineeship in Virtual Design (Opt.4)	3	1	12
Traineeship in Industrial Innovation (Opt.4)	3	1	12
3D Animation I (Opt.5)	3	1	6
Industrial Models (Opt.5)	3	1	6
Communication Design (Opt.6)	3	1	4
Audio and Video Techniques (Opt.6)	3	1	5
Storyboard (Opt.6)	3	1	4
Quality (Opt.6)	3	1	4
Materials and Sustainability (Opt.6)	3	1	4
Production Management (Opt.6)	3	1	4
Standardization (Opt.6)	3	1	4
Marketing and Advertisement	3	2	4
Virtual Design Project II (Opt.7)	3	2	11
Industrial Innovation Project II (Opt.7)	3	2	11
Product's Structure (Opt.8)	3	2	6
3D Animation II (Opt.8)	3	2	6
Museology (Opt.8)	3	2	6
Multimedia Design (Opt.9)	3	2	5
Digital TV(Opt.9)	3	2	5
Packaging Design (Opt.9)	3	2	5
Value Analysis (Opt.9)	3	2	5

Entrepreneurship and Innovation (Opt.10)	3	2	4
Sociology (Opt.10)	3	2	4
Science History (Opt.10)	3	2	4
Luminance Techniques (Opt.10)	3	2	4
Entrepreneurial Organization (Opt.10)	3	2	5

Final examination, if any – Not Applicable

Examination and assessment regulations – Not Applicable

ECTS Departmental Coordinator – Mário Pinto Lima Barros

B – Description of individual course units

Course title	Introduction to Product Design
Course code	9642001
Type of course	One-semester course
Level of Course	NA
Year of study	1
Semester/trimester	1
Number of credits	7
Name of lecturer	Mário Barros / Rute Gomes
Objectives of the course (preferably expressed in terms of learning outcomes competences)	The students should develop methods, research, techniques and communication skills in the field of product design and their own methods adapted to the specific constraints of the project as well as observation abilities, critical analysis and creativity in the solution of project problems.
Prerequisites	NA
Course contents	Detection of needs with basis on the analysis of Man/Context relationship; Methodology of recognition, collection and analysis of information; Identification of the main components of the primary function; Ergonomics evaluation; Concept generation, selection and evaluation; Practical experimentation (2d and 3d studies); Definition of techniques and productive issues; Material selection; Appropriate communication of concepts and ideas.
Recommended reading	ALBARRACIN, Jesús e JULIÁN, Fernando, *Desenho para Designers Industriais*, Lisboa, Editorial Estampa, 2005. MUNARI, BRUNO *Fantasia, invenção, criatividade e imaginação na comunicação visual,* Lisboa, Editorial Presença, 1981. BONSIEPE, Gui, *Teoria e Prática do Design Industrial*, Lisboa, Ed. C.P.D.nº2, 1992. HANNAH, Bruce, *Becoming a Product Designer,* New Jersey, John Wiley & Sons, 2004. MANZINI, Ezio, *A Matéria da Invenção*, Lisboa, Ed. C.P.D nº3, 1993.
Teaching methods	Lectures and Tutorials.
Assessment methods	Projects carried out throughout the semester and respective presentation.
Language of instruction	Portuguese

B – Description of individual course units

Course title	Drawing I
Course code	9642002
Type of course	One-semester course
Level of Course	I
Year of study	1
Semester/trimester	1
Number of credits	6
Name of lecturer	Rute Gomes / Mário Barros
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Drawing 1 is based in observation drawing to train the student to the practice of drawing as a creative mode of expression.
Prerequisites	NA
Course contents	1. Line and Observation 2. Line and Movement 3. Volume 4. Proximity and Fade 5. Light and Shadow 6. Memory
Recommended reading	ARNHEIM, Rudof, Arte e Percepção Visual, Nova Versão, São Paulo: Livraria Pioneira Editora, 3a edição., 1986 BERGER, J. - Modos de Ver - Ed. 70 DONDIS, Donis A. Sintaxe da linguagem visual. São Paulo : Martins Fontes, 1997. EDWARDS, Betty; *Desenhando com o lado direito do cérebro*; São Paulo: Ediouro, 2001; GOMBRICH, E. - Arte e ilusão - Ed. Martins Fontes. GOMBRICH, E. - A imagem e o olho - Ed. Alianza Forma GREGORY, R. L. - A Psicologia da Visão (O olho e o cérebro) - Ed. Inova. KANDINSKY, Wassily, Ponto, Linha, Plano, Lisboa: Edições 70, 1987 MASSIRONI, M. - Ver Pelo Desenho - Ed. 70
Teaching methods	Lectures and Tutorials.
Assessment methods	Classification of the exercises carried out during the semester.
Language of instruction	Portuguese

B - Description of individual course units

Course title	Descriptive Geometry
Course code	9642003
Type of course	One-semester course
Level of Course	NA
Year of study	1
Semester/trimester	1
Number of credits	6
Name of lecturer	Pedro Casaca
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Development of technical drawing using geometrical representation practices; Represent 3D space in 2D technical drawing; Develop the ability to pre-visualize objects in space.
Prerequisites	NA
Course contents	Orthogonal projections Kinds of projections Representation norms for orthogonal projections European System and American System Lines: meaning and using Cuts and Sections Quick Perspective Rigorous Perspective
Recommended reading	CUNHA, LUÍS VIEIRA – *Desenho Técnico.* Fundação Calouste Gulbenkian, Lisboa, 1994. RICCA, GUILHERME – *Geometria Descritiva, Método de Monge.* Fundação Calouste Gulbenkian, Lisboa, 1992. THOMAE, R. – *Perspectiva y Axonometria.* Gustavo Gilli, Barcelona, 1978 TAIBO, A. – *Geometria Descritiva y sus Aplicaciones I e II.* Tebar Flores, Madrid, 1983
Teaching methods	Lectures and Tutorials.
Assessment methods	Exercises carried out during the semester.
Language of instruction	Portuguese

B - Description of individual course units

Course title	Contemporary Culture Studies
Course code	9642004
Type of course	One-semester course
Level of Course	NA
Year of study	1
Semester/trimester	1
Number of credits	3
Name of lecturer	Eunice Ramos Lopes
Objectives of the course (preferably expressed in terms of learning outcomes competences)	• Encourage students to reflect on significant issues and its importance in the development of society in their various fields; • To provide the main trends and debates on contemporary culture as well as promote critical skills.
Prerequisites	NA
Course contents	1.Culture as a social construction ; 2. Modern and Contemporary Culture; 3. Cultural and ideological trends from late nineteenth century to the present day; 4. The social phenomena and cultural processes in contemporary societies viewed from science heritage perspective; 5. Communication, interpretation and dissemination of contemporary cultural studies: the social role of the Designer ;
Recommended reading	APPADURAI, A.(2004), *Dimensões culturais da globalização*. Lisboa: Teorema ARANGUREN, José Luís L., (1992), *La Comunicación Humana,* 2ª ed., Tecnos, Madrid, BAUDELAIRE, C.. (2006), *A invenção da modernidade*. Lisboa: Relógio D'Água, EAGLETON, T. (2003), *A ideia de cultura.* Lisboa: Temas e Debates, ELIOT, T. S. (1996), *Notas para uma definição de cultura*. Lisboa: Século XXI., FEATHERSTONE, Mike, (1995), *Undoing culture: globalization, postmodernism and identity*, London, Sage Publications,
Teaching methods	Lectures and Tutorials.
Assessment methods	Records of Interpretation (in textual form and iconography) carried out over half (50%) and written test (40%).
Language of instruction	Portuguese

B - Description of individual course units

Course title	Mathematics
Course code	9642005
Type of course	One-semester course
Level of Course	NA
Year of study	1
Semester/trimester	1
Number of credits	5
Name of lecturer	Maria Helena Morgado Monteiro
Objectives of the course (preferably expressed in terms of learning outcomes competences)	The students should learn to use Mathematics as an instrument of interpretation and intervention in the reality, to identify mathematical models in real problems and to use them to formulate and to solve these problems.
Prerequisites	Basic Mathematics
Course contents	Basic algebraic operations – real numbers, powers and polynomials. Equations and inequalities (linear and quadratic). Systems of linear equations – solving a system using matrices. Graphs and functions – basics concepts and graphing linear and quadratic functions, vertical and horizontal translations, reflection, expansion and contraction of a graph. Exponential and logarithmic functions.
Recommended reading	Barnett, Raymond e Ziegler, Michael, *College Algebra*, 5ª ed., McGraw-Hill, 1993. Caraça, Bento de Jesus, *Conceitos Fundamentais da Matemática*, Coleccção Ciência Aberta, vol. 98, Gradiva, Lisboa, 1998. Spiegel, Murray R., *Álgebra Elementar*, McGraw-Hill, 1998.
Teaching methods	Lectures and Tutorials.
Assessment methods	Periodic assessment (two mini-tests and two mid-term tests) and final assessment (examination).
Language of instruction	Portuguese

	B – Description of individual course units
Course title	English
Course code	9642006
Type of course	One-semester course
Level of Course	NA
Year of study	1
Semester/trimester	1
Number of credits	3
Name of lecturer	Zélia Patrocínio
Objectives of the course (preferably expressed in terms of learning outcomes competences)	This unit course studies the English language as a tool in contemporary communication.
Prerequisites	NA
Course contents	1. Introduction 2. Business Language 3. Grammar
Recommended reading	*Oxford Advanced Learner´s Dictionary* Kramsch, Claire, *Language and Culture*, Oxford University Press Naunton, Jon; Tulip, Mark, *ProFile 1 , Pre-Intermediate, Oxford University Press* Eastwood, J. *Oxford Practice Grammar* Oxford University Press Markley, R.W. and Sheeler, W.D., *Spot Drills* – 1, 2, 3, Oxford University Press
Teaching methods	Presentation of the theoretical subjects. Language training in Theoretical-Practical classes.
Assessment methods	Written Test, Theoretical-Practical classes.
Language of instruction	Portuguese / English

B – Description of individual course units

Course title	Project I
Course code	9642007
Type of course	One-semester course
Level of Course	I
Year of study	1
Semester/trimester	2
Number of credits	7
Name of lecturer	Mário Barros / Jorge Sá
Objectives of the course (preferably expressed in terms of learning outcomes competences)	-Development of proposals by means of experimentation (two and three-dimensional studies). Combination of technical knowledge and practical with the aesthetic sensibility and composition of different materials and their potential; -Proper communication of concepts and projects developed through the use of the proper representation tools; -Experimenting with new ways of research in product design, integrating theoretical work, debate and practical verification.
Prerequisites	NA
Course contents	Design issues analysis; Methodology for recognition, collection and analysis of information; Concept generation; Technical, ergonomic and aesthetic efficiency; Formal coherence in product development; Materials and manufacturing processes; Representation tools; Model making techniques.
Recommended reading	ALBARRACIN, Jesús e JULIÁN, Fernando, *Desenho para Designers Industriais*, Lisboa, Editorial Estampa, 2005. MUNARI, BRUNO *Fantasia, invenção, criatividade e imaginação na comunicação visual,* Lisboa, Editorial Presença, 1981. BONSIEPE, Gui, *Teoria e Prática do Design Industrial*, Lisboa, Ed. C.P.D.nº2, 1992. HANNAH, Bruce, *Becoming a Product Designer,* New Jersey, John Wiley & Sons, 2004.
Teaching methods	Lectures and Tutorials.
Assessment methods	Projects carried out during the semester and respective presentation.
Language of instruction	Portuguese

B – Description of individual course units

Course title	Drawing II
Course code	9642008
Type of course	One-semester course
Level of Course	II
Year of study	1
Semester/trimester	2
Number of credits	6
Name of lecturer	Rute Gomes
Objectives of the course (preferably expressed in terms of learning outcomes competences)	The students should be able to create drawing solutions for the different situations presented and develop critical and creative skills.
Prerequisites	NA
Course contents	1. Creation of new landscapes 2. Objects and Characters 3. Illustration 4. Collage and mix media
Recommended reading	ARNHEIM, Rudof, Arte e Percepção Visual, Nova Versão, São Paulo: Livraria Pioneira Editora, 3a edição., 1986 BERGER, J. - Modos de Ver - Ed. 70 DONDIS, Donis A. Sintaxe da linguagem visual. São Paulo : Martins Fontes, 1997. EDWARDS, Betty; *Desenhando com o lado direito do cérebro*; São Paulo: Ediouro, 2001; GOMBRICH, E. - Arte e ilusão - Ed. Martins Fontes. GOMBRICH, E. - A imagem e o olho - Ed. Alianza Forma GREGORY, R. L. - A Psicologia da Visão (O olho e o cérebro) - Ed. Inova. KANDINSKY, Wassily, Ponto, Linha, Plano, Lisboa: Edições 70, 1987
Teaching methods	Lectures and Tutorials.
Assessment methods	Exercises carried out during the semester.
Language of instruction	Portuguese

B – Description of individual course units

Course title	Technical Drawing
Course code	9642009
Type of course	One-semester course
Level of Course	NA
Year of study	1
Semester/trimester	2
Number of credits	5
Name of lecturer	Bruno Chaparro
Objectives of the course (preferably expressed in terms of learning outcomes competences)	The students should be able to use Computer-Aided Design as a support tool to other course units as well as the basis to a future progression in the CAD field.
Prerequisites	NA
Course contents	1. Preliminary Concepts 2. Orthogonal Projections 3. Axonometry 4. CAD Introduction
Recommended reading	Arlindo Silva, João Dias, Luís Sousa, *Desenho Técnico Moderno*, Lidel Simões Morais, *Desenho Técnico Básico, Vol. 3*, Porto Editora José Garcia, AutoCAD 2004 – 2D & AutoCADLT2004, FCA editora (Lidel). Luís Veiga da Cunha, *Desenho Técnico*, Fundação Calouste Gulbenkian Normas NP e ISSO
Teaching methods	Lectures and Tutorials.
Assessment methods	Exercises carried out during the semester.
Language of instruction	Portuguese

B - Description of individual course units

Course title	Design History
Course code	9642010
Type of course	One-semester course
Level of Course	NA
Year of study	1
Semester/trimester	2
Number of credits	3
Name of lecturer	Horácio Peixeiro
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Study of the evolution of the design systems in the society as a result of the industrialization process. Relation and interaction of product design with similar subjects such as urbanism, architecture and visual culture.
Prerequisites	NA
Course contents	1. Introduction – Design background. Design in pre-industrial era. 2. Work Frame 3. Design Schools and Design Movements 4. Design and Communication
Recommended reading	BAYLEY, Stephen, *Guía Conran del diseño*. Madrid, Alianza ed., 1992. BONSIEPE, Gui, *Teoria e prática do design industrial*. Lisboa, Ed. Presença, 1983. BURDEK, Bernard E., Diseño – *Historia, teoria y prática del diseño industrial*. Barcelona, E. G. Gili, 1994 DE MICHELLI, Mario, *Las vanguardias del siglo XX*. Madrid, Alianza ed., 1994. FIZ, Simón Marchán, *La estética en la cultura moderna*. Madrid, Alianza ed., 1992. FLORES, Oscar Salinas, *História del diseño industrial*. México, Ed, Trillas, 1992.
Teaching methods	Lectures.
Assessment methods	Written test (70%), Investigation work, bookmarks for reading, Attendance (30%)
Language of instruction	Portuguese

B – Description of individual course units

Course title	Digital Representation Methods
Course code	9642011
Type of course	One-semester course
Level of Course	NA
Year of study	1
Semester/trimester	2
Number of credits	5
Name of lecturer	Mário Barros
Objectives of the course (preferably expressed in terms of learning outcomes competences)	The students should be able to use computer tools to refine their visual communication according to different approaches: illustration, photo composition and free composition.
Prerequisites	NA
Course contents	1. Program Interface 2. Format saving options 3. Introduction to documents layer structure and its management 4. Image and graphic import and edition 5. Format and quality suitability 6. Selection and Mask tools 7. Colour edit, brightness, contrast, saturation, opacity controls 8. Scale and Position Transformation 9. Filters 10. *Paths* creation and management 11. *Actions*
Recommended reading	FERREIRA, Fernando Tavares, *Fundamental do Photoshop CS2,* Lisboa, FCA – Editora de Informática, 2006.
Teaching methods	Lectures and Tutorials.
Assessment methods	Projects carried out throughout the semester and respective presentation.
Language of instruction	Portuguese

B - Description of individual course units

Course title	Materials
Course code	9642012
Type of course	One-semester course
Level of Course	NA
Year of study	1
Semester/trimester	2
Number of credits	4
Name of lecturer	Carlos Coelho
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Characterize different types of materials. Understand the material-process-structure-proprieties relation. Understand the processes underlying material corrosion and the techniques to avoid it. Know the life cycle of different kinds of materials.
Prerequisites	NA
Course contents	1. Measures and properties 2. Introduction to materials 3. Raw Materials 4. Summary of the manufacturing processes of different types of materials. 5. The Building Materials in Industrial Design 6. Corrosion and degradation. Protection of materials. 7. Eco-efficient materials, recycling and recovery of Solid Waste 8. Selection of materials in Project.
Recommended reading	*Princípios de Ciência e Engenharia dos Materiais* - W.F. Smith, ed. McGraw-Hill - Lisboa, 1998. ASHBY, M. & JOHSON, K., Materials and Design, Butterworth-Heinemann, Amsterdam, 2002. *"Introduction to Materials Science for Engineers"*, 2ª ed., - James F. Shackelford 1988, Macmillan Publishing Company. *"Engineering Materials 1, 2, 2ª ed"* – M. F. Ashby e D.R.H. Jones, MPG Books Ltd, Great Britain "Materials Selection in Mechanical Design", Ashby, F. Michael, Butterworth –Heinemann, 1999
Teaching methods	Lectures.
Assessment methods	2 Written tests and Investigation work.
Language of instruction	Portuguese

B – Description of individual course units

Course title	Project II
Course code	9642056
Type of course	One-semester course
Level of Course	II
Year of study	2
Semester/trimester	1
Number of credits	7
Name of lecturer	Rute Gomes / Jorge Sá
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Development of proposals by means of experimentation (two and three-dimensional studies). Combination of technical and practical knowledge with the aesthetic sensibility and composition of different materials and their potential; Proper communication of concepts and projects developed through the use of the proper representation tools; Experimenting new ways of research in product design, integrating theoretical work, debate and practical verification.
Prerequisites	NA
Course contents	Design issues analysis; Methodology for recognition, collection and analysis of information; Concept generation; Technical, ergonomic and aesthetic efficiency; Formal coherence in product development; Materials and manufacturing process; Representation tools; Model-making techniques
Recommended reading	MUNARI, BRUNO,*Fantasia, invenção, criatividade e imaginação na comunicação visual,* Lisboa, Editorial Presença, 1981. BONSIEPE, Gui, *Teoria e Prática do Design Industrial*, Lisboa, Ed. C.P.D.nº2, 1992. HANNAH, Bruce,*Becoming a Product Designer,* New Jersey, John Wiley & Sons, 2004. MANZINI, Ezio,*A Matéria da Invenção*, Lisboa, Ed. C.P.D nº3, 1993. JULIER, Guy, The Thames and Hudson Encyclopaedia of 20th Century Design and designers, London, Thames and Hudson Ltd, 1993.
Teaching methods	Lectures and Tutorials.
Assessment methods	Projects carried out throughout the semester and respective presentation.
Language of instruction	Portuguese

	B – Description of individual course units
Course title	Computer-Aided Design
Course code	9642013
Type of course	One-semester course
Level of Course	NA
Year of study	2
Semester/trimester	1
Number of credits	6
Name of lecturer	Bruno Chaparro
Objectives of the course (preferably expressed in terms of learning outcomes competences)	This course aims to provide the student a deeper knowledge of CAD tools. A review is made on the evolution of geometric modelling. Main theories about construction and manipulation of three-dimensional geometries.
Prerequisites	NA
Course contents	I – Introduction to Geometric Modelling II – Surface modelling III – Parameterization IV – Model creation with different components V – Technical Drawing
Recommended reading	Catia for Designers V5R16, Sham Tickoo, CADCIM Technologies, USA. (ISBN: 1-932709-18-5) Catia V5 Tutorials, Mechanism Design and Animation Releases 16, N Zamani e J Weaver, SDC Publishing. (ISBN: 978-1-58503-357-7)
Teaching methods	Lectures and tutorials.
Assessment methods	Exercises throughout the semester.
Language of instruction	Portuguese

B – Description of individual course units

Course title	Design Theory
Course code	9642014
Type of course	One-semester course
Level of Course	NA
Year of study	2
Semester/trimester	1
Number of credits	4
Name of lecturer	Mário Barros
Objectives of the course (preferably expressed in terms of learning outcomes competences)	This course aims to study the multiple approaches to design - with greater emphasis on the industrial/product side - during the twentieth century, attempting to relate the evolution of theoretical thought with the right historical, socio-cultural and economic contexts.
Prerequisites	NA
Course contents	Project Methodology. Product analysis form. The development of industrial design and its aesthetics: Organicism, Good Design, Ulm and Braun school, Pop Art and Design, Domestic utopias of the fifties, Italian Design: Radical Design and Post-Modernism, High-Tech Design, Late 20th century trends.
Recommended reading	BONSIEPE, Gui, *Teoria e Prática do Design Industrial*, Lisboa, Ed. C.P.D.nº2, 1992. PAPANEK, Victor, *Arquitectura e Design – Ecologia e Ética*, Lisboa, Edições 70, 1995. PARRA, Paulo, *Ícones do Design, Colecção Paulo Parra*, Lisboa, Ed. Casa da Cerca, 2003. FIELL, Charlotte; FIELL, Peter, *Design do Século XX*, Lisboa, Taschen, 2001. FIELL, Charlotte; FIELL, Peter, *Industrial Design A-Z*, Colónia, Taschen, 2000. A.A.V.V,
Teaching methods	Lectures and debates.
Assessment methods	Written Test, Records of Interpretation, Investigation work.
Language of instruction	Portuguese

B – Description of individual course units

Course title	Visual Form
Course code	9642015
Type of course	One-semester course
Level of Course	NA
Year of study	2
Semester/trimester	1
Number of credits	3
Name of lecturer	Isabel Maria da Cruz Ferreira
Objectives of the course (preferably expressed in terms of learning outcomes competences)	• Describe the functioning of the visual system • Contribute to the knowledge of the perceptual organization • Encourage the debate on multiple visual aspects: balance; configuration; form; space • Ability to represent the basic principles of good form
Prerequisites	NA
Course contents	• Introduction • Visual Perception: bottom-up and top-down processes • Light: wavelength, amplitude and frequency • Vision's neurophysiologic approach • *Gestalt* Theory • Subjective outline and visual illusions • Perceptual constancy • Perception of depth and motion • Balance, Configuration, Form and Space notions • Form, colour and its spatial effects
Recommended reading	ARNHEIM, R. (2004). *Arte e percepção visual*. Trad. São Paulo, Editora Arte, arquitectura e urbanismo. BONNICI, P. (1999). *Visual language*. East Sussex, Roto Vision. EYSENCK, M.; KEANE, M. (1994). *Cognitive psychology*. Hillsdale, LEA. FAVRE, J.-P.; NOVEMBRE, A. (1979). *Color and und et communication*. Zurich, Ed.ABC. GLEITMAN, H. (1993). *Psicologia*. Trad. Lisboa, F.C.Gulbenkian. GORDON, I. (1989). *Theories of visual perception*. Chischester, John Wiley & Sons.
Teaching methods	Lectures including data show.
Assessment methods	Written Test
Language of instruction	Portuguese

B - Description of individual course units

Course title	Project Methodology
Course code	9642017
Type of course	One-semester course
Level of Course	NA
Year of study	2
Semester/trimester	1
Number of credits	5
Name of lecturer	Jorge Sá
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Understand the design process and methodology involved; Identify the methodology associated with the development of a project; Analyze information associated with various stages of the methodology applied; Understand the importance of ergonomics and anthropometry.
Prerequisites	NA
Course contents	- Industrial Design Methodology - Alternative Methodologies - Industrial Design Methodology according to different authors - Practical Examples
Recommended reading	MUNARI, BRUNO, *Fantasia, invenção, criatividade e imaginação na comunicação visual,* Lisboa, Editorial Presença, 1981. DIAS, Susana, Lage, *Alexandra, "Desígnio", Porto Editora* LORENZ, Christopher, *"A dimensão do design", Centro Português d Design, 1991* MUNARI, Bruno, *"Das coisas nascem coisas", Edições 70, 1981* PEVSNER, Nikolaus, *"Os pioneiros do design moderno", Editora Ulisseia, 1960, 1975* ROCHA, Carlos Sousa, *"Teoria do design", Plátano Editora, 1997*
Teaching methods	Lectures and Tutorials.
Assessment methods	Practical work.
Language of instruction	Portuguese

	B – Description of individual course units
Course title	Manufacturing Technologies
Course code	9642016
Type of course	One-semester course
Level of Course	NA
Year of study	2
Semester/trimester	1
Number of credits	5
Name of lecturer	Jorge Antunes
Objectives of the course (preferably expressed in terms of learning outcomes competences)	This course aims to provide the student with knowledge in the area of process for the production of components.
Prerequisites	NA
Course contents	1. Introduction 2. Technology processing of materials a. Cut by start-chip b. Moulds 3. Project Analysis
Recommended reading	[1] J. M. Antunes – *"Máquinas-ferramenta "(teacher's notes)*. [2] J.P. Davim – "Maquinagem de alta velocidade", Publindústria, 1995. [3] D. Ferraresi – "Fundamentos da usinagem dos metais", Edgard Blucher, 1970.
Teaching methods	Lectures and Tutorials.
Assessment methods	Projects carried out during the semester.
Language of instruction	Portuguese

	B – Description of individual course units
Course title	Virtual Design Project I (Option 1)
Course code	9642021
Type of course	One-semester course
Level of Course	I
Year of study	2
Semester/trimester	2
Number of credits	7
Name of lecturer	To assign
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Encourage the practice of project activity as central to a designer's life. Acquire mature research, methods, techniques and communication skills inherent to a project in Product Design. Experiment with new ways of research in product design, integrating theoretical work, debate and practical verification. Use creativity as a problem-solving ability.
Prerequisites	NA
Course contents	Development of a project in visual communication using resources for the creation and animation of virtual three-dimensional images. Creation and combination of elements to the dynamics of visual narrative.
Recommended reading	BONSIEPE, Gui, *Teoria e Prática do Design Industrial*, Lisboa, Ed. C.P.D.nº2, 1992. HANNAH, Bruce, *Becoming a Product Designer,* New Jersey, John Wiley & Sons, 2004. *BAUDRILLARD, Jean,* *A Sociedade de Consumo, Lisboa, Edições 70, 2005.* MANZINI, Ezio, *A Matéria da Invenção*, Lisboa, Ed. C.P.D nº3, 1993.
Teaching methods	Lectures and Tutorials.
Assessment methods	Projects carried out throughout the semester and respective presentation.
Language of instruction	Portuguese

B – Description of individual course units

Course title	Industrial Innovation Project I (Option 1)
Course code	9642022
Type of course	One-semester course
Level of Course	I
Year of study	2
Semester/trimester	2
Number of credits	7
Name of lecturer	Rute Gomes / Mário Barros
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Encourage the practice of project activity as central to a designer's life. Acquire mature research, methods, techniques and communication skills inherent to a project in Product Design. Experiment with new ways of research in product design, integrating theoretical work, debate and practical verification. Use creativity as a problem-solving ability.
Prerequisites	NA
Course contents	Mould production material analysis; Electronic products; Methodology for recognition, collection and analysis of information; Concept generation; Technical, ergonomic and aesthetic efficiency; Formal coherency in product development; Materials and manufacturing process; Representation tools; Analysis of new lifestyles and cultural issues; Model-making and functional prototypes.
Recommended reading	BONSIEPE, Gui, *Teoria e Prática do Design Industrial*, Lisboa, Ed. C.P.D.nº2, 1992. HANNAH, Bruce, *Becoming a Product Designer,* New Jersey, John Wiley & Sons, 2004. *BAUDRILLARD, Jean,* *A Sociedade de Consumo, Lisboa, Edições 70, 2005.* MANZINI, Ezio, *A Matéria da Invenção*, Lisboa, Ed. C.P.D nº3, 1993.
Teaching methods	Lectures and Tutorials.
Assessment methods	Projects carried out throughout the semester and respective presentation.
Language of instruction	Portuguese

	B – Description of individual course units
Course title	3D Modelling (Option 2)
Course code	9642023
Type of course	One-semester course
Level of Course	NA
Year of study	2
Semester/trimester	2
Number of credits	6
Name of lecturer	Mário Barros
Objectives of the course (preferably expressed in terms of learning outcomes competences)	This course aims to provide the student with knowledge of computer tools to enhance 3D visual communication complementing CAD.
Prerequisites	NA
Course contents	File types, NURBS modelling, Box Modelling, modifiers, selection modes, visualization options, clones, compound objects, map and material editor, rendering, import/export.
Recommended reading	BARATA, João e SANTOS, 3ds Max 9 Curso Completo, ISBN: 978-972-722-564-4
Teaching methods	Lectures and Tutorials.
Assessment methods	Exercises carried out during the semester.
Language of instruction	Portuguese

	B – Description of individual course units
Course title	Geometric Modelling (Option 2)
Course code	9642024
Type of course	One-semester course
Level of Course	NA
Year of study	2
Semester/trimester	2
Number of credits	6
Name of lecturer	Bruno Chaparro
Objectives of the course (preferably expressed in terms of learning outcomes competences)	This course aims to provide the student a deeper knowledge of CAD tools. A review on the evolution of geometric modelling. Main theories about construction and manipulation of three-dimensional geometries.
Prerequisites	NA
Course contents	I – Introduction to advanced Geometric Modelling II – Surface modelling III – Parameterization IV – Model creation with different components V – Technical Drawing VI – Kinematics and Rendering
Recommended reading	Catia for Designers V5R16, Sham Tickoo, CADCIM Technologies, USA. (ISBN: 1-932709-18-5) Catia V5 Tutorials, Mechanism Design and Animation Releases 16, N Zamani e J Weaver, SDC Publishing. (ISBN: 978-1-58503-357-7)
Teaching methods	Lectures and Tutorials.
Assessment methods	Exercises carried out across the semester.
Language of instruction	Portuguese

	B – Description of individual course units
Course title	Lighting and Textures (Option 3)
Course code	9642025
Type of course	One-semester course
Level of Course	NA
Year of study	2
Semester/trimester	2
Number of credits	5
Name of lecturer	To assign
Objectives of the course (preferably expressed in terms of learning outcomes competences)	This course aims to provide the student with knowledge of different computer tools for creating textures. Lights setup and realistic rendering.
Prerequisites	NA
Course contents	Material editor, Maps customizing, UVW Mapping, Multiple materials in single object, advanced texturing. Visualization projects realism. Shaders Different kinds of illumination. Plug-ins.
Recommended reading	FERREIRA, Fernando Tavares, *Fundamental do Photoshop CS2,* Lisboa, FCA – Editora de Informática, 2006. BARATA, João e SANTOS, 3ds Max 9 Curso Completo, ISBN: 978-972-722-564-4
Teaching methods	Lectures and Tutorials.
Assessment methods	Exercises carried out throughout the semester.
Language of instruction	Portuguese

	B – Description of individual course units
Course title	Prototyping (Option 3)
Course code	9642026
Type of course	One-semester course
Level of Course	NA
Year of study	2
Semester/trimester	2
Number of credits	5
Name of lecturer	Jorge Antunes
Objectives of the course (preferably expressed in terms of learning outcomes competences)	An introduction to the compatibility between drawing and prototype, materials and processes used in prototyping.
Prerequisites	NA
Course contents	1. Introduction 2. Prototyping types 3. Rapid prototyping 4. Tools prototyping 5. Prototyping design models
Recommended reading	[1] Protoclik-Prototipagem Rápida. Fernando Jorge Lino Alves, Fernando Jorge Sousa Braga, Manuel São Simão, Rui Jorge de Lemos Neto, Teresa Margarida Guerra Pereira Duarte. INEGI.
Teaching methods	Lectures and Tutorials.
Assessment methods	Written test, projects carried out throughout the semester.
Language of instruction	Portuguese

B – Description of individual course units

Course title	Object Semiotics
Course code	9642018
Type of course	One-semester course
Level of Course	NA
Year of study	2
Semester/trimester	2
Number of credits	3
Name of lecturer	Mário Barros
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Promote discussion on the various meanings attributed by users to the different artifacts of their surrounding environment; Study the double function of artifacts: operative and symbolic. Develop critical observation and reflection about the continuous metamorphosis of objects in the context of a consumption culture.
Prerequisites	NA
Course contents	• Sign concept: the Signifier, the Signified and the Referent. Signification levels. • The object position in material culture: object categorization, industrial and handicraft objects. • Pragmatic Function versus Symbolic Function. • Man-Object Relationship: object as a body extension; the Needs Pyramid; the Target-Public. • Evolution of domestic environment. Colour, Materials and shapes. Domotics. • Household extension: transportation and routes.
Recommended reading	BAUDRILLARD, Jean, *O Sistema de Objectos*, 4ª ed., São Paulo, Editora Perspectiva, 2004. BAUDRILLARD, Jean, *A Sociedade de Consumo*, Lisboa, Edições 70, 2005. ECO, Umberto, *O Signo*, 6ªed, Lisboa, Editorial Presença, 2004. PEIRCE, Charles, *Semiótica*, 3ª ed., São Paulo, Editora Perspectiva, 2003. MOLES, Abraham, *O Kitsch*, São Paulo, Editora Perspectiva, 1986.
Teaching methods	Lectures.
Assessment methods	Written Test, theoretical work.
Language of instruction	Portuguese

B - Description of individual course units

Course title	Ergonomics
Course code	9642019
Type of course	One-semester course
Level of Course	NA
Year of study	2
Semester/trimester	2
Number of credits	4
Name of lecturer	Jorge Sá
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Understand the importance of the ergonomics and anthropometry in the design process.
Prerequisites	NA
Course contents	Ergonomics definition and branches. Physical Ergonomics: Muscular Labour; Motion Control; Motion Optimization, Anthropomorphic characteristics, Hard Labour definition; Load Handling; Equipment Interaction; Cognitive Ergonomics: Mental Activity; Fatigue; Stress, Man-Machine Systems; Definition of Routine Tasks. Break Management; Night Labour; Vision; Lighting; Noise and Vibration; Climate Control; Physical Work Environment.
Recommended reading	Cushman, William H.; Rosenberg, Daniel J. (1991) Human factors in product design. Amsterdam, Elsevier. De Keyser, V.; Van Daele S. (1989) L'Ergonomie de conception. De Boeck-Wesmael. Jordan, Patrick W. (1996) Usability evaluation in industry. London, Taylor & Francis. Nielsen, Jakob (1993) Usability enginnering. New York, Academic Press. Quarante, D. (1984) Éléments de design industriel. Maioine S.A. Editeur.
Teaching methods	Lectures and Tutorials.
Assessment methods	Practical assignment.
Language of instruction	Portuguese

	B – Description of individual course units
Course title	Conventional Technological Processes
Course code	9642020
Type of course	One-semester course
Level of Course	NA
Year of study	2
Semester/trimester	2
Number of credits	5
Name of lecturer	Jorge Antunes
Objectives of the course (preferably expressed in terms of learning outcomes competences)	This course aims to provide the student with knowledge of the technological process of obtaining conventional components: stamping, forging, casting, welding, sintering, rolling, etc.
Prerequisites	NA
Course contents	1. Introduction 2. Shear Cut 3. Plastic deformation conformation 4. Material Connection Processes 5. Knowledge practice
Recommended reading	[1] Processos de soldadura – J. F. Oliveira Santos e L. Quintino, 2ª ed., Ed. Técnicas do ISQ; Lisboa, 1998 [2] J. M. Antunes – *Máquinas-ferramenta*.
Teaching methods	Lectures and Tutorials.
Assessment methods	Projects carried out throughout the semester.
Language of instruction	Portuguese

B – Description of individual course units

Course title	Contemporary Design
Course code	9642027
Type of course	One-semester course
Level of Course	NA
Year of study	3
Semester/trimester	1
Number of credits	4
Name of lecturer	Rute Gomes
Objectives of the course (preferably expressed in terms of learning outcomes competences)	The contemporary design course aims to reflect on the different approaches inherent to the activity of a designer in the current global context. Students should seize and develop content where their reflection and critical analysis skills on the role of design and designers in contemporary world will be assessed.
Prerequisites	NA
Course contents	1-Introduction 2-Design and designers 3-New trends in design practice
Recommended reading	FIELL, Charlotte; FIELL, Peter, Designing the 21st Century, Colónia, Taschen, 2005. FIELL, Charlotte; FIELL, Peter, Design do Século XX, Lisboa, Taschen, 2001. JULIER, Guy The Thames and Hudson Encyclopaedia of 20th Century Design and designers, London, Thames and Hudson Ltd, 1993 LORENZ, Chistopher A Dimensão do Design, Centro Português de Design. Lisboa, 1991
Teaching methods	Lectures and seminars.
Assessment methods	Written Test, seminar (theoretical work and presentation)
Language of instruction	Portuguese

B – Description of individual course units

Course title	Design and Industrial Property
Course code	9642028
Type of course	One-semester course
Level of Course	NA
Year of study	3
Semester/trimester	1
Number of credits	4
Name of lecturer	Rute Gomes
Objectives of the course (preferably expressed in terms of learning outcomes competences)	The aim of this course is to provide an approach to the labour market. The students will pick a project that they have previously carried out and submit it to all stages, from its initial phases to its production and sale.
Prerequisites	NA
Course contents	1. Product 2. Budget 3. Product's image 4. Industrial and intellectual protection 5. Contract Terms 6. Client
Recommended reading	Design protegido – manual, centro português de design, 2003. Blackett, Tom. Trademarks. – London: Macmillan Press Ltd, 1998. Código da propriedade Industrial – Decreto-Lei nº 36/2003, de 5 de Março. – Lisboa: INPI, 2003. Como requerer uma patente europeia – Guia do requerente – Lisboa: INPI, 1992. Cooper, Rachel e Mike Press. The design agenda – a guide to successful design management. – Nova York: John Wiley & Sons, Inc. 1995
Teaching methods	Lectures.
Assessment methods	Written Test, theoretical work
Language of instruction	Portuguese

B – Description of individual course units

Course title	Traineeship in Virtual Design (Option 4)
Course code	9642029
Type of course	One-semester course
Level of Course	NA
Year of study	3
Semester/trimester	1
Number of credits	12
Name of lecturer	NA
Objectives of the course (preferably expressed in terms of learning outcomes competences)	The traineeship in Virtual Design aims to integrate the student in a corporate environment and / or research, so the finalist student have a closer relation to the reality of the aimed profession of designer in an institution, to a better future integration. The practice of project suitable for institutional constraints in terms of structure, procedures, information systems, concepts of research, specifications, planning of resources, cost, delivery time, among others, are an integral part of the traineeship.
Prerequisites	NA
Course contents	Development of a personal design project to certify the ability of each student in the research, synthesis and relationship skills acquired during the graduation. Find a solution to a real design problem under the Product Design and Development frame.
Recommended reading	BAUDRILLARD, Jean, *O Sistema de Objectos*, 4ª ed., São Paulo, Editora Perspectiva, 2004. BAXTER, Mike, *Product Design: Practical Methods for the Systematic Development of New Products,* London, Chapman & Hall,1995. ROBERT, Michael, *Product Innovation Strategy,* New York, McGraw-Hill, 1995. NORMAN, Donald A., *The Design of Everyday Things*, London, The MIT Press, 2001
Teaching methods	On-going practice of design in business environment.
Assessment methods	Traineeship report, traineeship diary, presentation and enterprise information.
Language of instruction	Portuguese

B – Description of individual course units

Course title	Traineeship in Industrial Innovation (Option 4)
Course code	9642030
Type of course	One-semester course
Level of Course	NA
Year of study	3
Semester/trimester	1
Number of credits	12
Name of lecturer	Mário Barros / Bruno Chaparro
Objectives of the course (preferably expressed in terms of learning outcomes competences)	The traineeship in Industrial Innovation aims to integrate the student in a corporate environment and / or research, so the finalist student have a closer relation to the reality of the aimed profession of designer in an institution, to a better future integration. The practice of project suitable for institutional constraints in terms of structure, procedures, information systems, concepts of research, specifications, planning of resources, cost, delivery time, among others, are an integral part of the traineeship.
Prerequisites	NA
Course contents	Development of a personal design project to certify the ability of each student in the research, synthesis and relationship skills acquired during the graduation. Find a solution to a real design problem under the Product Design and Development frame.
Recommended reading	BAUDRILLARD, Jean, *O Sistema de Objectos*, 4ª ed., São Paulo, Editora Perspectiva, 2004. BAXTER, Mike, *Product Design: Practical Methods for the Systematic Development of New Products,* London, Chapman & Hall, 1995. ROBERT, Michael, *Product Innovation Strategy,* New York, McGraw-Hill, 1995. NORMAN, Donald A., *The Design of Everyday Things*, London, The MIT Press, 2001
Teaching methods	On-going practice of design in business environment.
Assessment methods	Traineeship report, traineeship diary, presentation and enterprise information.
Language of instruction	Portuguese

	B – Description of individual course units
Course title	3D Animation I (Option 5)
Course code	9642031
Type of course	One-semester course
Level of Course	I
Year of study	3
Semester/trimester	1
Number of credits	6
Name of lecturer	To assign
Objectives of the course (preferably expressed in terms of learning outcomes competences)	This course aims to provide the students with knowledge of computer tools to produce 3D virtual animation.
Prerequisites	3D Modelling
Course contents	Animation definition; Primary and secondary animation; Kinematics; Constrains.
Recommended reading	BARATA, João e SANTOS, 3ds Max 9 Curso Completo, ISBN: 978-972-722-564-4
Teaching methods	Lectures and Tutorials.
Assessment methods	Exercises carried out throughout the semester.
Language of instruction	Portuguese

B – Description of individual course units

Course title	Industrial Models
Course code	9642032
Type of course	One-semester course
Level of Course	NA
Year of study	3
Semester/trimester	1
Number of credits	6
Name of lecturer	Jorge Antunes
Objectives of the course (preferably expressed in terms of learning outcomes competences)	This course aims to provide the students with knowledge in the field of geometrical and dimensional tolerance used in model making.
Prerequisites	NA
Course contents	1. Introduction 2. Tolerance 3. Connection Geometry 4. Model construction 5. Advanced shaped fabrication
Recommended reading	[1] Oswaldo Luiz Agostinho, Tolerâncias, Ajustes, Desvios E Análise De Dimensões, Edgard Blucher, 1977.
Teaching methods	Lectures.
Assessment methods	Written test, projects carried out throughout the semester.
Language of instruction	Portuguese

	B – Description of individual course units
Course title	Communication Design (Option 6)
Course code	9642033
Type of course	One-semester course
Level of Course	NA
Year of study	3
Semester/trimester	1
Number of credits	4
Name of lecturer	To assign
Objectives of the course (preferably expressed in terms of learning outcomes competences)	This course aims to provide the student with comprehension and the correct usage of graphic elements and their force in the construction of visual messages.
Prerequisites	NA
Course contents	Organization of nonverbal communication. Graphics basics. Tests for readability. Information vs. Noise. Concept of space, structure, sequence, figure - background. Coordination of communication's elements. Messages' transmission in specific media. Formats and standards. File Management. Printing.
Recommended reading	AYNSLEY, Jeremy, *Pioneers of Modern Graphic Design* - A Complete History, Octopus Publishing Group, 2004. BAINES, Phil & HASTAM, Andrew, *Type & typography*. 2nd edition. London: Laurence King, 2005 FRUTIGER, Adrian, *Signos, símbolos, marcas, senãles*. Barcelona: Gustavo Gilli Diseño, 1981 SWANN, Alan *Basic Design and Layout*. Oxford: Phaidon, 1987 DABNER, David, Guia de artes Gráficas: Design e Layout, Gustavo Gilli, 2003
Teaching methods	Lectures and Tutorials.
Assessment methods	Exercises carried out throughout the semester and respective presentation.
Language of instruction	Portuguese

	B – Description of individual course units
Course title	Audio Techniques (Option 6)
Course code	9642034
Type of course	One-semester course
Level of Course	NA
Year of study	3
Semester/trimester	1
Number of credits	5
Name of lecturer	To assign
Objectives of the course (preferably expressed in terms of learning outcomes competences)	This course aims to provide the student comprehension and the correct usage of audio elements and their force in the construction of audiovisual messages.
Prerequisites	NA
Course contents	Audio and Acoustics. Acoustic area and architectural acoustics. The sound and its features. Origin and graphic representation. Frequency, intensity, timbre and spread. Intelligent listening and education hearing. The Chain Recording / Playback. Microphones: types and characteristics and techniques for capturing analogue and digital recorders. The studio and sound effects processors: reverberations, digital delays, and parametric graphic equalizers, compressors / limiters; units of "noise reduction". Mixture techniques: PA; recording, radio, Post-Production Techniques. Equipment for audio post-production. Digital recording. Mastering.
Recommended reading	RUMSEY, Francis, Desktop Audio Technology: Digital audio and MIDI principles, Focal Press, Oxford, 2004 WATKINSON,Jonh Introduction to Digital Audio, Focal Press, Oxford, 2002 NAKAMJIMA, H., Digital Audio Technology McGraw-Hill Inc., 1982.
Teaching methods	Lectures and Tutorials.
Assessment methods	Exercises carried out throughout the semester.
Language of instruction	Portuguese

	B – Description of individual course units
Course title	Video Techniques (Option 6)
Course code	9642035
Type of course	One-semester course
Level of Course	NA
Year of study	3
Semester/trimester	1
Number of credits	5
Name of lecturer	Júlio Silva
Objectives of the course (preferably expressed in terms of learning outcomes competences)	This course aims to provide the student with comprehension and the correct usage of audiovisual elements and their force in the construction of audiovisual messages.
Prerequisites	NA
Course contents	1. Introduction to the history of television and video. 2. Techniques' evolution. 3. Colour, light, optical image 4. The sound on the video 5. The camcorder (magnitude of plans: video formats) 6. The non-linear video editing 7. The video post-production 8. Video compression. 9. Broadcast video. 10. Streaming video. 11. Studio, record, work multi-layers. 12. Record of the video signal. 13. Systems for video recording.
Recommended reading	DROBLAS, Adele and GREENBERG, Seth, Adobe Premiere Pro CS3 Bible, Whiley Publishing, Indianapolis, 2008.
Teaching methods	Lectures and Tutorials.
Assessment methods	Exercises carried out throughout the semester.
Language of instruction	Portuguese

B – Description of individual course units

Course title	Storyboard (Option 6)
Course code	9642036
Type of course	One-semester course
Level of Course	NA
Year of study	3
Semester/trimester	1
Number of credits	4
Name of lecturer	To assign
Objectives of the course (preferably expressed in terms of learning outcomes competences)	This course unit allows students to use and develop customary techniques in the construction of visual narratives.
Prerequisites	NA
Course contents	Memory and images. Different types of signs. Adequacy of representation to narrative. Materials and techniques for traditional illustration. Mixed techniques: from traditional to digital. Pose selection, script structuring and adaptation, composition studies. Colours, lighting and texture. Viewpoint angle.
Recommended reading	ARNHEIM, Rudof, Arte e Percepção Visual, Nova Versão, São Paulo: Livraria Pioneira Editora, 3a edição., 1986 BERGER, J. - Modos de Ver - Ed. 70 KANDINSKY, Wassily, Ponto, Linha, Plano, Lisboa: Edições 70, 1987 MASSIRONI, M. - Ver Pelo Desenho - Ed. 70 SOUSA, R. - Desenho, IV Volume, T.P.U. 19
Teaching methods	Lectures and Tutorials.
Assessment methods	Exercises carried out during the semester.
Language of instruction	Portuguese

	B – Description of individual course units
Course title	Quality (Option 6)
Course code	9642037
Type of course	One-semester course
Level of Course	NA
Year of study	3
Semester/trimester	1
Number of credits	4
Name of lecturer	To assign
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Undertake a critical analysis of the factors that determine the quality of any process / product / service within organizational terms; Identify and assess the needs of several activities of planning work; Using tools for assessing the quality of a process / product / service. Interpret the reference standards for quality management systems.
Prerequisites	NA
Course contents	• Development and Concepts • Traditional Tools • Troubleshooting • New Tools for Quality • Team Work • Brainstorming • Quality Activities • Implementation of a Quality System • Audit Quality • Quality Management vs. Certification • Accreditation laboratories • Models of Excellence • Management in Change Context • Portuguese Quality System
Recommended reading	J.M. Juran, “Quality Control Handbbok”, Maccgraw-Hill International Editions CARVALHO, Óscar, “Qualidade Total”, Porto Editora FEY, Robert, “A Matriz da Qualidade Industrial”, Gulbenkian.
Teaching methods	Lectures and Tutorials.
Assessment methods	Written test, Theoretical work carried out throughout the semester and its presentation.
Language of instruction	Portuguese

B - Description of individual course units

Course title	Materials and Sustainability (Option 6)
Course code	9642038
Type of course	One-semester course
Level of Course	NA
Year of study	3
Semester/trimester	1
Number of credits	4
Name of lecturer	To assign
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Understand the material-process-structure-proprieties relationship. Know the life cycle of different kinds of materials. Tools for materials analysis and materials selection.
Prerequisites	NA
Course contents	Integrated analysis of technical and material properties. Methodology for selecting materials. Materials management. New technologies' evaluation. Resource management, waste and energy. Use of alternative energies: maximizing the use of renewable resources and minimization of energy consumption. Analysis of the product life cycle. Fundamentals of Green Design. New materials.
Recommended reading	*Princípios de Ciência e Engenharia dos Materiais* - W.F. Smith, ed. McGraw-Hill - Lisboa, 1998. ASHBY, M. & JOHSON, K., Materials and Design, Butterworth-Heinemann, Amsterdam, 2002. "Materials Selection in Mechanical Design", Ashby, F. Michael, Butterworth –Heinemann, 1999
Teaching methods	Lectures.
Assessment methods	Written test and Investigation work.
Language of instruction	Portuguese

B – Description of individual course units

Course title	Production Management (Option 6)
Course code	9642039
Type of course	One-semester course
Level of Course	NA
Year of study	3
Semester/trimester	1
Number of credits	4
Name of lecturer	To assign
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Provide an integrated vision of the concepts and techniques used in most production management companies in the production of goods and / or services. Students should be able to understand the challenges faced in these areas, and to be able to recognize ways to consider and solve them. Recognize the importance of decisions in this area, contributing to the overall success of organizations.
Prerequisites	NA
Course contents	1 - Introduction to Operations Management 2 - Strategies for Operations in a Global Economy 3 - Demand Forecast 4 - Product Design, Processes and Services 5 - Quality Management Operations 6 – Stocks Management 7 - Production Planning 8 - Information Resources Planning 9 - Just in Time (JIT)
Recommended reading	Chase, Richard B.; Aquilano, Nicholas J. & Jacobs, F. Robert Production and Operations Management: Manufacturing and service Irwin / McGraw-Hill ,1998. Roldão, Victor S. Organização da Produção e das Operações: Da concepção do produto à organização do trabalho, Lisboa, Monitor, 2004 Martinich, Joseph S. Production and Operations Management: An Applied Modern Approach, John Wiley & Sons , 1997
Teaching methods	Lectures. Case studies.
Assessment methods	Written test and theoretical-practical work.
Language of instruction	Portuguese

	B – Description of individual course units
Course title	Standardization (Option 6)
Course code	9642040
Type of course	One-semester course
Level of Course	NA
Year of study	3
Semester/trimester	1
Number of credits	4
Name of lecturer	To assign
Objectives of the course (preferably expressed in terms of learning outcomes competences)	An overview of national standardization activities according to the several project typologies for product design.
Prerequisites	NA
Course contents	1. Introduction 2. Portuguese System of Quality 3. Standardization Institutions by Activity Sector 4. Case Studies
Recommended reading	MARTIN, William B., *Qualidade no Serviço ao Cliente*, Associação Portuguesa para a Qualidade (APQ), Lisboa, 1989. SARAIVA, Pedro e outros, *Testemunhos da Qualidade em Portugal*, Instituto Português da Qualidade (IPQ), Lisboa, 1999. CRUZ, Carlos e CARVALHO, Óscar, *Qualidade – Uma Filosofia de Gestão*, 3ª edição, Texto Editora, 1988.
Teaching methods	Lectures.
Assessment methods	Theoretical work carried out throughout the semester.
Language of instruction	Portuguese

B – Description of individual course units

Course title	Marketing and Advertisement
Course code	9642041
Type of course	One-semester course
Level of Course	NA
Year of study	3
Semester/trimester	2
Number of credits	4
Name of lecturer	Inês Bettencourt da Câmara
Objectives of the course (preferably expressed in terms of learning outcomes competences)	It is intended that the student is able to: Create a marketing plan. Link the various implications of the marketing mix and new variables. Identify the main functions and nature of brands; understand the scope of the identity concept and brand image. Identify the importance of brand commitment.
Prerequisites	NA
Course contents	Ethical principles of business and consumption, including the role of social responsibility in marketing strategy; Markets' dynamics and its agents; Know the main competition methods; Know and apply the main methods for studying the consumer; Develop a marketing plan, articulating the key strategic variables; Know the specifics of marketing services, and internal management of the brand; Recognize the elements of success of a marketing strategy.
Recommended reading	HIAM, Alexander. Marketing. Lisboa: Abril/ Controljornal, 1995. HILL, Sam e Glenn Rifkin. Marketing Radical. Lisboa: Presença, 1999. HORTINHA, Joaquim e Carlos Viana. Marketing Internacional. Lisboa: Sílabo, 2002. JALLAIS, J. et al. O Marketing da Distribuição. Lisboa: Zénite, 1993. KAPFERER, Jean-Noel. Gestão das Marcas. Lisboa: Pub. Europa-América, 2003
Teaching methods	Lectures. Case Studies.
Assessment methods	Written test, Theoretical work carried out throughout the semester and its presentation.
Language of instruction	Portuguese

B – Description of individual course units

Course title	Virtual Design Project II (Option 7)
Course code	9642042
Type of course	One-semester course
Level of Course	II
Year of study	3
Semester/trimester	2
Number of credits	11
Name of lecturer	To assign
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Preparation of the overall project, where all conceptual issues, formal, functional, technical and production are studied and evaluated, from problem identification to its usage. Adequacy and management of a strong theme that can be applied as a business. Development of an innovative proposal in terms of virtual design and implementation. Reflection on the new dimensions of the "digital era". Interfaces management and its efficiency as communication to the viewer.
Prerequisites	NA
Course contents	1. Introduction 2. Investigation and development 3. Presentation
Recommended reading	BONSIEPE, Gui, *Teoria e Prática do Design Industrial*, Lisboa, Ed. C.P.D.nº2, 1992. HANNAH, Bruce, *Becoming a Product Designer,* New Jersey, John Wiley & Sons, 2004. *BAUDRILLARD, Jean, A Sociedade de Consumo, Lisboa, Edições 70, 2005.* ANNIK, Ed e SCHWARTZ, Ineke, Parallel thoughts in different times, Bright Minds Beautiful Ideas, Amsterdam , BIS Publishers, 2003 LIDWELL, William e HOLDE, Kritina e BUTLER, Jil, Principios universals de diseño, Barcelona, Blume, 2005 LEFTERI, Chris, Making it, Manufacturing theqniques for product design, London, Laurence King Publishing, 2007
Teaching methods	Lectures and Tutorials.
Assessment methods	Project carried out throughout the semester, report and its presentation.
Language of instruction	Portuguese

B – Description of individual course units

Course title	Industrial Innovation Project II (Option 7)
Course code	9642043
Type of course	One-semester course
Level of Course	NA
Year of study	3
Semester/trimester	2
Number of credits	11
Name of lecturer	Rute Gomes / Teresa Morgado
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Preparation of the overall project, where all conceptual issues, both formal, functional, technical and productive are studied and evaluated, from problem identification to its usage. Understand the markets and the productive structures and provide an innovative and competitive design solution. Develop skills in creating proposals of high formal and conceptual values.
Prerequisites	NA
Course contents	4. Introduction 5. Investigation and development 6. Presentation
Recommended reading	BONSIEPE, Gui, *Teoria e Prática do Design Industrial*, Lisboa, Ed. C.P.D.nº2, 1992. HANNAH, Bruce, *Becoming a Product Designer,* New Jersey, John Wiley & Sons, 2004. *BAUDRILLARD, Jean,* *A Sociedade de Consumo, Lisboa, Edições 70, 2005.* ANNIK, Ed e SCHWARTZ, Ineke, Parallel thoughts in different times, Bright Minds Beautiful Ideas, Amsterdam , BIS Publishers, 2003 LIDWELL, William e HOLDE, Kritina e BUTLER, Jil Principios universals de diseño, Barcelona, Blume, 2005
Teaching methods	Lectures and Tutorials.
Assessment methods	Project carried out throughout the semester, report and its presentation.
Language of instruction	Portuguese

	B – Description of individual course units
Course title	Product Structure (Option 8)
Course code	9642044
Type of course	One-semester course
Level of Course	NA
Year of study	3
Semester/trimester	2
Number of credits	6
Name of lecturer	To assign
Objectives of the course (preferably expressed in terms of learning outcomes competences)	This course aims to provide the student with knowledge in the field of compatibility between drawing and prototype, materials and processes used in products' fabrication. Analyze materials strength and deformation.
Prerequisites	CAD, Prototyping
Course contents	• Product's formal synthesis • Dimensioning components • Usage of standard components. • Technical and functional advantages • Calculation of the strength of applied materials
Recommended reading	[Catia for Designers V5R16, Sham Tickoo, CADCIM Technologies, USA (ISBN: 1-932709-18-5)
Teaching methods	Lectures.
Assessment methods	Written test, projects carried out throughout the semester.
Language of instruction	Portuguese

	B – Description of individual course units
Course title	3D Animation II (Option 8)
Course code	9642045
Type of course	One-semester course
Level of Course	II
Year of study	3
Semester/trimester	2
Number of credits	6
Name of lecturer	To assign
Objectives of the course (preferably expressed in terms of learning outcomes competences)	This course aims to provide the student further knowledge in the field of 3D virtual animation, using special effects and character animation.
Prerequisites	3D Animation I
Course contents	Skeleton's creations, Bone system, Inverse Kinematics (IK). Introduction to the use of Dummy Objects and other helpers. Morphs and Morph Targets.
Recommended reading	BARATA, João e SANTOS, 3ds Max 9 Curso Completo, ISBN: 978-972-722-564-4
Teaching methods	Lectures and Tutorials.
Assessment methods	Exercises carried out throughout the semester.
Language of instruction	Portuguese

B – Description of individual course units

Course title	Museology (Option 8)
Course code	9642046
Type of course	One-semester course
Level of Course	NA
Year of study	3
Semester/trimester	2
Number of credits	6
Name of lecturer	Eunice Ramos Lopes
Objectives of the course (preferably expressed in terms of learning outcomes competences)	• Main concepts of museum and museology. • Provide the students with tools for the spatial organization of museums. • Provide foundations for the production of space and equipment projects for temporary or permanent exhibitions.
Prerequisites	NA
Course contents	1. Notions of Museum, Museology and museography. 2. References in the field of museology. Legislation. 3. The museums and the expository speech. 4 - The relationship between Cultural Heritage, Museology and Product Design and Development. 5. Project: Design in Museum Studies
Recommended reading	ALONSO FERNÁNDEZ, L. *(1995): Museologia, Introducción a la teoria y práctica del Museo, Madrid.* GUELTON, Bernard (1998): *L'exposition. Interprétation et reinterprétation*, França. GUIMARÃES, Carlos (2004) : *Arquitectura e Museus em Portugal. Entre reinterpretação e obra nova*. FAUP Publicações. Porto. HERRERA, M. C., (1971): *El museo en la Educación. Sus orígines, evolucion y importancia en la cultura moderna*. Editorial Undex. Madrid. HERNÁNDEZ HERNÁNEZ, Francisca (1994): *Manual de Museologia*, Madrid.
Teaching methods	Lectures and Tutorials.
Assessment methods	Written test, Theoretical work carried out throughout the semester and its presentation.
Language of instruction	Portuguese

B – Description of individual course units

Course title	Multimedia Design (Option 9)
Course code	9642047
Type of course	One-semester course
Level of Course	NA
Year of study	3
Semester/trimester	2
Number of credits	5
Name of lecturer	Pedro Casaca
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Acquire and apply skills to the level of the processes of design in multimedia projects. Develop knowledge of the tools, processes and constraints on projects applied to the screen. Build solutions with aesthetic features but functional design appropriate to the purposes and users, depending on the requirements and constraints of projects
Prerequisites	NA
Course contents	1. Design Concepts 2. Screen Design 3. Internet Design 4. Multimedia Design 5. Game Design
Recommended reading	LYNCH, PATRICK J.; HORTON, SARAH – *Guia de estilo da web.* Editorial Gustavo Gili, SA, Barcelona, 2004. GORDON, BOB; GORDON, MAGGIE – *Digital Grapic Design.* Thames & Hudson Ltd, 2005
Teaching methods	Lectures and Tutorials.
Assessment methods	Exercises carried out throughout the semester and respective presentation.
Language of instruction	Portuguese

B – Description of individual course units

Course title	Digital TV (Option 9)
Course code	9642048
Type of course	One-semester course
Level of Course	NA
Year of study	3
Semester/trimester	2
Number of credits	5
Name of lecturer	NA
Objectives of the course (preferably expressed in terms of learning outcomes competences)	This course aims to provide the student with comprehension and the correct usage of several elements in digital TV broadcasting.
Prerequisites	NA
Course contents	1. Characterization of support technologies in digital TV 2. Evolution from the current situation 3. Introduction to coding standards for audio and video used in digital television; 4. TV broadcast in several media: air, satellite and cable 5. Convergence of information technology, telecommunications and television; 6. New digital services: 7. Interaction and high-definition support; 8. Receivers' new technologies.
Recommended reading	LUNDSTROM, Lars-Ingemar, Understanding Digital Television: An Introduction to DVB Systems with Satellite, Cable, Broadband and Terrestrial TV Distribution, Focal Press, Oxford, 2006
Teaching methods	Lectures and Tutorials.
Assessment methods	Exercises carried out throughout the semester.
Language of instruction	Portuguese

B – Description of individual course units

Course title	Packaging Design (Option 9)
Course code	9642049
Type of course	One-semester course
Level of Course	NA
Year of study	3
Semester/trimester	2
Number of credits	5
Name of lecturer	Mário Barros
Objectives of the course (preferably expressed in terms of learning outcomes competences)	This course unit provides the general competences to develop packaging solutions. Throughout the exercises students will develop skills in methods, research, techniques and communication issues in the field of packaging design; Development of self methods, adapted to the specific constraints of the project, as well as observation capabilities, critics analysis and creativity in the solution of the several issues in the packaging design field.
Prerequisites	NA
Course contents	Packaging as commercial activity in the contemporary design scene; Modes of purchase; Identification of market sectors and aspirations of the target user; Life cycle: production, distribution, availability at the point of sale and environmental impact; Choice of materials and control costs; Ergonomic Evaluation; Research of the concepts, selection and evaluation; Development of proposals by practical experimentation (two and three-dimensional studies).; Evaluation and definition of technical issues and production of the materials and their suitability to the form and function; Communication of appropriate concepts and ideas.
Recommended reading	ROCHA, Carlos Sousa, *A Plasticidade do Papel e Design*, Lisboa, Plátano Editora, 2000. STEWART, Bill, *Packaging Design,* London, Laurence King Publishing, 2007 VAN ROOJEN, Pepin e BAARDMAN, Joost, *Special Packaging,* Amsterdam, The Pepin Press / Agile Rabbit Editions, 2004. VAN ROOJEN, Pepin e BAARDMAN, Joost, *Structural Package Designs,* Amsterdam, The Pepin Press / Agile Rabbit Editions, 2004.
Teaching methods	Lectures and Tutorials.
Assessment methods	Projects carried out throughout the semester and respective presentation.
Language of instruction	Portuguese

	B – Description of individual course units
Course title	Value Analysis (Option 9)
Course code	9642050
Type of course	One-semester course
Level of Course	NA
Year of study	3
Semester/trimester	2
Number of credits	5
Name of lecturer	NA
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Develop skills in the use of systematic methods to increase the value of design through the identification and evaluation of the functions needed by the client, enabling the development of alternatives to maximize the function-cost relationship.
Prerequisites	NA
Course contents	• Basic of Value Analysis • Functional Analysis • The Value Analysis in the design and redesign of a product. • The Value Analysis in the manufacturing process. • The Value Analysis as a strategic tool. • The relationship between consumer needs and the resources required to meet them • Case Studies
Recommended reading	JOUINEAU, Claude. L'Analyse de La Valeur. Paris: Entreprise Moderne d'Edition - 1982. PARKER, Donald E. Value Engineering Theory. Society of American Value Engineers, 1977. PEREIRA FILHO, Rodolfo R. Análise do Valor: Processo de Melhoria Contínua. São Paulo: Ed. Nobel, 1998. WOOD, Larry E. Thinking Strategies. New York: Prentice - Hall, Inc, 1986.
Teaching methods	Lectures and Tutorials.
Assessment methods	Written test, Theoretical work carried out throughout the semester and its presentation.
Language of instruction	Portuguese

B – Description of individual course units

Course title	Entrepreneurship and Innovation (Option 10)
Course code	9642051
Type of course	One-semester course
Level of Course	NA
Year of study	3
Semester/trimester	2
Number of credits	4
Name of lecturer	Cláudia Silva
Objectives of the course (preferably expressed in terms of learning outcomes competences)	This course aims to provide the students with technical skills, practices and tools in the field of Small and Medium Enterprises management. It seeks to promote the entrepreneurial sense so that the students will be able to transform ideas into business projects.
Prerequisites	NA
Course contents	1. Entrepreneurship: Key Trends and Challenges 2. The entrepreneur profile 3. Innovation and Competitiveness 4. Sources of Business Ideas and their evaluation 5. Introduction to Business Plan 6. Sources of funding 7. Submission of plans by the participants
Recommended reading	IAPMEI – Como elaborar um plano de negócios http://www.iapmei.pt/iapmei-art-02.php?id=162&temaid=17 INC Magazine - Built a Strong Business Plan: Step by step http://www.inc.com/guides/start_biz/20660.html Business Resource Software - Business Plan Writing www.businessplans.org Entrepreneur Magazine – Creating your Business Plan http://www.entrepreneur.com/Your_Business/YB_Node/0,4507,109,00.html
Teaching methods	Seminars. Case studies.
Assessment methods	Seminar (theoretical work and presentation)
Language of instruction	Portuguese

B – Description of individual course units

Course title	Sociology (Option 10)
Course code	9642052
Type of course	One-semester course
Level of Course	NA
Year of study	3
Semester/trimester	2
Number of credits	4
Name of lecturer	Miguel Pinto dos Santos
Objectives of the course (preferably expressed in terms of learning outcomes competences)	1. Understand communication and mass media from a sociological point of view. 2. Get a theoretical perspective that allows deepening of knowledge about the communication. 3. Be able to build their own vision of the media and the society they live in. 4. Increase the ability to understand complex reading 5. Train the ability to apply theoretical knowledge to solve research problems.
Prerequisites	NA
Course contents	1. Sociology as a form of consciousness 2. The three major sociological narratives of modernity 3. The Parsonian Summary 4. Three visions of post modernity 5. The emergence of communication paradigm 6. The main theoretical traditions in communication 7. The power of the media and three recurring issues
Recommended reading	SILVA, Augusto Santos PINTO, José Madureira et alt – metodologia das Ciências Sociais – Ed Afrontamento GIDDENS, Anthony – Sociologia – Fundação Calouste Gulbenkian ARON, Raymond – As Etapas do Pensamento Sociológico GIDDENS, Anthony – Capitalismo e Moderna Teoria Social CRUZ, Manuel Braga – Antologia de textos – Vol I - Fundação Calouste Gulbenkian
Teaching methods	Lectures.
Assessment methods	Written Test, Records of Interpretation, Investigation work.
Language of instruction	Portuguese

	B – Description of individual course units
Course title	Science History (Option 10)
Course code	9642053
Type of course	One-semester course
Level of Course	NA
Year of study	3
Semester/trimester	2
Number of credits	4
Name of lecturer	To assign
Objectives of the course (preferably expressed in terms of learning outcomes competences)	An in-depth study of science framework and history.
Prerequisites	NA
Course contents	1. Outstanding figures and main events. 2. Historical constraints to the evolution of science. 3. Applied sciences and their environment. 4. The current state of affairs in science.
Recommended reading	LEITÃO, Henrique e TAVARES, Conceição, *Bibliografia de História da Ciência em Portugal 2000-2004*, Centro de História das Ciências - Universidade de Lisboa, 2006 KRAGH, Helge, *Introdução à historiografia da ciência*. Porto, Porto Editora, 2003. KUHN, Thomas, *A estrutura das revoluções científicas*. 9a ed. São Paulo, Perspectivas, 2005.
Teaching methods	Lectures.
Assessment methods	Written test, Theoretical work carried out throughout the semester and its presentation.
Language of instruction	Portuguese

	B – Description of individual course units
Course title	Luminance Techniques (Option 10)
Course code	9642054
Type of course	One-semester course
Level of Course	NA
Year of study	3
Semester/trimester	2
Number of credits	5
Name of lecturer	NA
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Develop the necessary skills to understand and undertake lighting projects, both indoor and outdoor.
Prerequisites	NA
Course contents	• Basic concepts of luminance techniques • Requirements for good lighting: characterization of spaces and functions. • Calculations of luminance. • Sizing • Energy efficiency • Operational costs of lighting
Recommended reading	CARDOSO, Rogério, Luminotecnia Fundamental, Edições Dinalivro, Lisboa.
Teaching methods	Lectures. Case Studies.
Assessment methods	Written test, Theoretical work carried out throughout the semester and its presentation.
Language of instruction	Portuguese

B – Description of individual course units

Course title	Entrepreneurial Organization (Option 10)
Course code	9642055
Type of course	One-semester course
Level of Course	NA
Year of study	3
Semester/trimester	2
Number of credits	5
Name of lecturer	To assign
Objectives of the course (preferably expressed in terms of learning outcomes competences)	This course unit aims to provide the student with knowledge in the field of Organizations Management in general, enterprises in particular. Creation, planning, business operations and its constrains are discussed in order to develop students ability to evaluate and predict changing scenarios in the management field.
Prerequisites	NA
Course contents	1. Definitions and Concepts 2. Historical Evolution of Industrial Enterprises 3. Different types of Companies 4. Start up a Company 5. The Production 6. The Supply Chain 7. Marketing and Product Development
Recommended reading	BÉRRANGER, Pierre, *As Novas Regras de Produção,* Edições Técnicas LIDEL, ISBN 972-9018-08-1. CAMARA, Pedro B., *Organização e Desenvolvimento de Empresas,* Lisboa, Publicações Dom Quixote, 1997, ISBN 972-20-1373-4. MARQUES, Ana Paula, *Gestão da Produção,* Lisboa, Texto Editora, 1996, ISBN 972-47-0259-6. MATOS, Mª Adelaide e SILVA, Hélder, *Técnicas de Organização Empresarial,* Lisboa, Texto Editora, 1999, ISBN 972-47-1244-3.
Teaching methods	Lectures. Case Studies.
Assessment methods	Written test, Theoretical work carried out throughout the semester and its presentation.
Language of instruction	Portuguese