

DESIGN

FIRST YEAR

First Semester

Course: Design and Knowledge

Class hours: 40

Syllabus: Introduction to the Human Sciences - knowledge. The scientific method. Man as social being: modes of production. Man and space: ways of living. Objects and cultural anthropology. Art, Culture and Technology: modes of use. Objects and the cultural question: modes of use and production. Introduction to design concepts. Consumer society and design. Consumption and its environmental consequences. The Human Sciences and Ethnic Racial Relations.

Course: Drawing

Class hours: 80

Syllabus: Presentation Drawing. Drawing and strokes used by designers (Nomenclature, Applications). Freehand tracing (vertical/horizontal/diagonal lines/circles/ellipses/arcs). Drawing of hatches. Observation drawing. Negative space drawing. Photographic references. Continuous trace. Memory drawing. Basic conical perspective of one, two vanishing points. Ground Plane, Frame Plane, Horizon, Horizon Line, Earth Line, Observer, Vanishing Points, Polyhedral Shape Objects, and Revolution Shape Objects. Environment perspective. Cone of vision. Environment perspective. Auxiliary leakage points - inclined plane. Perspective with 3 vanishing points. Bright dark. Drop shadow. Creative design of objects from multiple photographic references. Drawing of People - proportions of heads, hands, feet. Head (eyes/mouth/nose/ears). Drawing of People in Motion. Drawing of People with Objects. Composition. Composition drawing - scenery / people / objects. Stylization. Portfolio Rating.

Course: Design Fundamentals

Class hours: 80

Syllabus: The importance of design in contemporary society. Design guiding elements. Emerging themes: sustainability, the SDGs, the circular economy and design. Classical Design Methodologies. Project development stages. Main authors. Comparative analysis. The design and the materials. Exploratory research. Design Thinking: IMMERSION. Tools: Insights Cards (IDEO), Affinity Diagram, Concept Map, Guiding Criteria, Personas, Empathy Map, Blue Prints and User Journey. Design Thinking: IDEATION. Organization of information, registration of ideas. Elaboration of concepts. Design Thinking: PROTOTYPATION. Development of quick models to make concepts, ideas and projects tangible. Design Thinking: TESTING, VALIDATION AND IMPLEMENTATION. Product or service analysis. Improvement Process. Product Design: development and detailing.

Course: Digital Image Editing

Class hours: 40

Syllabus: Concepts of digital graphic design. The visual language. Introduction to image editing software; Editing tools; Principle of layers; Digital work area. Save, export, and import files. Basic image editing; Adjustments, cropping, selection and layering. Gestalt, visual perception and theories about visuality and its applications in digital graphic design. Digital visual composition. Structuring of layout: orientation and practice for the assembly of work presentation boards. Color: composition and decomposition; Selection, management and choice of colors; RGB and CMYK color systems. Psychodynamics of colors. Definition and change of colors. Colors in different patterns. Typography. Working with digital typography in image editing software. Principles of digital layout in image editing software. Graphic Design Development. Rendering of sketches: Scanning and treatment of sketches in image editing software. Rendering of sketches: finishes, filters and lighting. Digital illustration in image editing software. Special brushes and gradients. 3D visual effects.

Course: Two-dimensional Creation

Class hours: 40

Syllabus: Compositional fundamentals. SketchBook. Composition development. Symmetry and asymmetry. Organic and geometric shapes. Compositional fundamentals: point, line, plane,

volume, texture. The complexity of form. Development of two-dimensional projects for the development of compositional solutions using the line. Composition with the use of Positive and Negative. The model. Serialization of the form. Registration of creation phases. Use of shapes of different sizes for the compositional structure. color theory. Chromatic circle. Gray tonal sequence. Surface development and chromatic application. The chromatic relationship between complementary colors. Development of surfaces and collages. Cutting and bending. The full and the void. Use of colored papers and textures. Textures. Cut and fold compositions. Use of colored papers. Texture and chromatic relationship. Composition Analog and digital process. Experimentations.

Course: Technical Drawing

Class hours: 40

Syllabus: Introduction to Drawing. Geometric Construction. Orthographic Views I, II and III. Court I and II. Isometric Perspective I and II. Drawing Dimension. Employment of the scale.

Course: Projects and Special Activities I

Class hours: 40

Syllabus: Development of competencies, skills and creative attitudes, through electives and student-centered practical activities. Training of interpretation and analysis skills. Problem solving methodologies. Development of projects. Technical visits, lectures, workshops, seminars and technological competitions. Participation In undergraduate monitoring programs, scientific projects and technological research, as well as participation in social responsibility projects.

Second Semester

Course: Design and Culture

Class hours: 40

Syllabus: Design, culture and behavior. Design and culture: objects and relationships with everyday life. Design and body: Functions and senses. synesthesia. Design, body and environment: Proxemic zones. Design and Culture: the contexts. Perception, object and meaning. Design and technology. Design and digital culture. Design, technique and culture. Material culture design. Design and anthropology of objects. Design, consumer society and sustainability. Design and Experience.

Course: Sketch

Class hours: 80

Syllabus: Perspectives, representation of objects in depth, design of cubes, cylinders and spheres. Laws of Perspectives. Transformation into simple geometric shapes. Drawings of flasks and bottles (packaging). Furniture designs (upholstery). Kitchen utensils drawings. Appliances drawings. White line drawings (appliances). Transport Design: Electric scooter, cars, trucks and buses, motorcycles. Elaboration of the portfolio.

Course: Design Thinking

Class hours: 80

Syllabus: Design Thinking and Design Sprint. Theoretical and dynamic foundation using case study (PBL). Design Thinking: IMMERSION. Understanding the user and the project proposal. Advanced tools: Insights Cards (IDEO), Affinity Diagram, Concept Map, Guiding Criteria, Personas, Empathy Map, Blue Prints and User Journey. Data analysis. Models of data analysis. Consolidation processes of generating information for the development of the project. IDEATION. Registration of ideas. Elaboration of concepts. Study of patterns derived from the analysis and solution of problems combined with research in the Immersion phase. PROTOTYPING. Development of quick models to make concepts, ideas and design tangible. TESTS, VALIDATION AND IMPLEMENTATION. Analysis of the product or service. Improvement Process. Design Sprint. PRODUCT DESIGN AND DESIGN THINKING: research of materials and technologies. Technical drawing. Digital manufacturing, digital and real models. Digital presentation (pitch format). Detailing. Tbl. Organization of drawings and elaboration of models.

Course: Vector Images Editing**Class hours:** 80

Syllabus: Introduction to Visual Programming. Introduction to the Visual Identity Project. Introduction to vector software. Corporate visual identity. Development of visual concepts. Creation of the trademark signature. Creation of contact points. Brand visual standardization. Introduction to product segments. Application in physical and visual interfaces. Problematization; Objectives, justification, visual research, theoretical basis, bibliographical references of the project, visual concept and development studies. Creation of concepts, visual line. Details, usability and dynamics. Presentation of visual product programming projects.

Course: Applied Sciences**Class hours:** 40

Syllabus: International system of units. Presentation of the laboratory. Introduction to mechanical systems. Conversion of units. Significant algarisms. Physical quantities. Baricentro. DCL. Thermal sciences.

Course: Three-dimensional Creation**Class hours:** 40

Syllabus: Unusual three-dimensional propositions. Beginning of the Sketch book. Studies with geometric solids. Unusual propositions from the look at the object in the residential space. Research - construction of the semantic panel and experimentation, geometric solids (drawing, design sketch). Research - solutions with the breaking of borders: materials and processes (investigation of the possibilities of the different materials and results). Unusual development and usability. Development of proposals with unusual materials - sketching, drawing and mock up. Development of projects with flexible materials; absence of usability. Development of projects - material research, individual course. Presentation of research, structure and finishing. Finishing and the chromatic relation: research of solutions. Rigid materials: materialization and research of solutions. Experimentation of materials and their specificity in the development of the project. Mixture of materials. Design drawings and solutions.

Course: Projects and Special Activities II**Class hours:** 40

Syllabus: Development of competencies, skills and creative attitudes, through electives and student-centered practical activities. Training of interpretation and analysis skills. Problem solving methodologies. Development of projects. Technical visits, lectures, workshops, seminars and technological competitions. Participation In undergraduate monitoring programs, scientific projects and technological research, as well as participation in social responsibility projects.

SECOND YEAR**First Semester****Course: Design and History****Class hours:** 40

Syllabus: Industrial Revolution. Changing the urban landscape and daily life. 19th Century Arts and Crafts. Crafts and industry. XIX century. Art: Questioning and daily recording. Japanese / Art Nouveau. Secession of Vienna. Artistic movements of the early 20th century and design. Art Deco. Architecture and design: new ways of living / American way of life. Werkbund. Bauhaus - Pedagogy. ULM: School of the German Form from 1947 to 1968. Institute of Design of Chicago. USA. Moholy Nagy. School of Ulm.

Course: Illustration**Class hours:** 80

Syllabus: Introduction to materials (marker, pastel, watercolor pencils, etc.). Techniques of Matte surfaces representation. Techniques of Wood surfaces representation. Furnitures sketches (composition and background). Techniques representation of Tissue. Shoes Sketches (composition and background). Techniques of reflective surfaces representation. Techniques of mirrored surfaces representation (metal and chrome). Doorknobs Sketches (gold, chrome and matte). Techniques of transparent surfaces representation. Packaging Sketches (perfume, pet,

Shampoo). Techniques of lights and illuminated surfaces. Luminaires Sketches. Transportation Sketches - vehicle interior, vehicle exterior, tire, wheel, headlamp, etc. Composition and background.

Course: Emotional Design

Class hours: 80

Syllabus: The importance of design in contemporary society. Fundamentals of Emotional Design: elements of analysis. The Emotional Design. The importance of the concepts proposed by Donald Norman for the companies of the future. Visceral level: instinctual elements of ordering and the concept of sensory impact. Behavioral level: fundamentals of usage, task, fluidity and usability analysis. Reflective level: analysis and judgment of the object. association experience analysis on how the user uses the senses in the use of a product. Creation: Product analysis using Emotional Design tools. Design Thinking and TBL. The stages of development and their scale of complexity in ED. Prototyping. Design Thinking/Emotional. Study of complexity, materials, technologies and detailing. Project development. Validation process. Digital Fabrication. Implementation of the Model, Technical Drawing, Digital Illustration, Conceptual Board and Descriptive Memorandum.

Course: 3D Parametric Modeling

Class hours: 80

Syllabus: Introduction to Solid Modeling. Software Presentation - Extrude and Revolve. Sketch, Geometric Relations, Fillet, Chanfer. Drawing, Assembly, Section. Creating Parametric Sketch. Drawing hand: Set Advanced Sketch - Parametric Modeling. Assembly II and III - Analysis of interference (mate) and Simulation. Modeling Bottom - Top Modeling Top - Down. Modeling Free-form Surfaces - Surfaces Class A (NURBS). Shell, Rib, Swept, Lofted and Helix.

Course: Electrical and Mechanical Systems

Class hours: 40

Syllabus: Introduction to mechanical systems. Machine Elements I: bolts, nuts and washers. EMachine Elements II: rivets, pins, elastic rings, keys. Machine components III: bushings, guides, bearings, bearings. Machine Elements IV: Belts, chains, gears, springs. Machine Elements V: levers and simple machines. Introduction to Electrical Systems and Electrical Installations. Elemental electrical quantities: voltage, current, resistance, power, energy. Ohm's Law. Elementary DC circuits: voltage sources, series associations, parallel associations, LED power and 12V lamp. Elementary AC circuits: transmission and distribution grid voltages, power, energy, costs.

Course: Marketing

Class hours: 40

Syllabus: Introduction and concepts of Marketing, evolution of Marketing and Marketing in the 21st Century. Marketing planning. Analysis of the Marketing environment: macroenvironment and microenvironment. Market analysis. Segmentation and definition of the target audience; needs and desires, value and dimensions of products (functional and symbolic). Introduction to Positioning Products, Services and Brands. Elaboration of the Positioning of Products, services and Brands. Introduction to Tactical Marketing - Marketing Mix: Product, Price, Distribution and Communication. Product and service strategies. Pricing and Distribution Strategies. Integrated marketing communication plan.

Course: Projects and Special Activities III

Class hours: 40

Syllabus: Development of competencies, skills and creative attitudes, through electives and student-centered practical activities. Training of interpretation and analysis skills. Problem solving methodologies. Development of projects. Technical visits, lectures, workshops, seminars and technological competitions. Participation In undergraduate monitoring programs, scientific projects and technological research, as well as participation in social responsibility projects.

Second Semester

Course: Design and Society

Class hours: 40

Syllabus: Design in Brazil: the local and the global. Interdisciplinarity - Design and crafts The Academy of Fine Arts - Rio de Janeiro. The European influence. Design in Brazil: pioneers. Post-war design and the new world organization. Pop design. Plastic and vibrant visual language. Multiple Design. The 1980s and '90s. The postmodern movement and the new conceptual theories. In Brazil: Multiculturalism. Responsible Design. XXI century. Environmental movements. Design and environmental concern. Design and innovation. Design and technology. Design in the 21st Century future developments.

Course: Digital Illustration

Class hours: 80

Syllabus: Sketches and illustrations of Furniture (setting and humanization). Sketches and illustrations of products from the White line: stove, refrigerator and washing machine (environment and humanization). Sketches and illustrations of personal products: watch / cell phone / jewelry (humanization). Glasses (humanization). Sketches and illustrations of urban furniture: bus stop (environment and humanization). Sketches and illustrations of small appliances: blender and mixer (environment and humanization). Sketches and illustrations of power tools (humanization). Sketches and illustrations of means of transport: automobile (Composition and background). Truck (Composition and Background). Bus (Composition and background). Moto (Composition and background). Boat (Composition and background). Bus / train / plane interior (humanization). Entertainment sketches and illustrations (Composition and background).

Course: Metadesign

Class hours: 80

Syllabus: Theoretical foundation of Metadesign. Gamification: Ethnographic Guerrilla. Advanced methodologies: the concept of metadesign. Creating products and contexts. Real and fictitious needs in contemporary society. Methodology for exponential problems. Understanding scales of complexity and their design implications. The interdisciplinary exploration of research and design strategies involving non-linear processes for the development of metadesign systems. To look for. Project Development - Ideation. Metadesign systems, evidence-based design solutions and methodological frameworks. Analysis of prominent symbiotic domains in context. Validation: Multivalence of data in the urban context. Prototyping. Final presentation.

Course: 3D Surface Modeling

Class hours: 40

Syllabus: Presentation of the software. Editing lines and curves. Concept of creating surfaces from curves. Analysis of normal vectors. Surface manipulation by curve. Surface manipulation by points. Creation of surface by section curves. Surface creation by section and rotation curves. Analysis and Editing of surfaces. Tonalization: color, texture, material, scenery, environment. Tonalization: Illumination, reflection, refraction, scenery, environment. Curvature analysis, Strategy analysis and generation of the machining model. Editing the template. Delivery of the final model.

Course: Polymeric Materials

Class hours: 80

Syllabus: Introduction to polymers, history. Identification of polymers: numerical classification and flame. Revision, structures, links general properties. Properties of polymeric materials - prototype. Amorphous and semi-crystalline polymers, copolymers, blends. Identification of polymers: density and melting point. Phase transition temperatures (T_g and T_m). Elastic and plastic deformations of polymers, relation structure properties. Tensile and hardness tests. Properties, applications, examples, selection (PP, LDPE, HDPE, PVC). Properties, applications, examples, selection (PMMA, PA, PC, PET). Polymer Synthesis. Processing of thermoplastics I and II. Manufacture of mold. Manufacture of the part. Elastomers, properties and application. Additions. Degradation, recycling of polymeric materials. Stickers. New materials.

Course: Market Studies and Research

Class hours: 40

Syllabus: Marketing concepts. Introduction to marketing research and design for problem solving and exploration of opportunities; Primary data and secondary data; Data, Information and Knowledge. Steps of marketing research project and Types of marketing research: exploratory, quantitative and qualitative. Definition of the marketing research problem, hypotheses and

objectives. Development of the research plan, definition of the research methodology, universe and sample and elaboration of the data collection form. Case studies of research projects. Specific marketing research: product clinic, test-market, image audit, sensory analysis. Methodology of qualitative research. Types of qualitative research. Ethnographic Research, types and applications in design. Scripting. Guidance to the research project. Presentation of the research results, their analysis and application in product development.

Course: Projects and Special Activities IV

Class hours: 40

Syllabus: Development of competencies, skills and creative attitudes, through electives and student-centered practical activities. Training of interpretation and analysis skills. Problem solving methodologies. Development of projects. Technical visits, lectures, workshops, seminars and technological competitions. Participation In undergraduate monitoring programs, scientific projects and technological research, as well as participation in social responsibility projects.

THIRD YEAR

First semester

Course: Physical Ergonomics

Class hours: 40

Syllabus: Sensitization to the importance of Ergonomics and its relation with Design. Introduction to Ergonomics: concepts, contextualization, historical insertion and fields of action. Physiology and biomechanics. Muscle work. Vision. Hearing. Kinesthetic sense. Static and dynamic efforts. Spine. Postures. Application of force and movement of loads. Examples of application of concepts. Anthropometry. Survey and use of anthropometric data. Static and dynamic anthropometry. Examples of application of concepts in the development of products and jobs. Product Lifting Drawings. Task analysis. Ergonomic / anthropometric analysis. Ergonomics of the product and the workstation. Universal Design.

Course: Systemic Design

Class hours: 80

Syllabus: Design and innovation. Design Thinking. Holistic thinking. Systems thinking. Complex systems. ESG - Environmental, Social and Corporate Governance. Sustainability and sustainable development. Design and sustainability. Environmental sustainability. Social Sustainability. Economic sustainability. Design and social innovation. Design and territory. Circular Economy. Service Design. Systemic design. Project methodology based on systemic design. Systemic design applied to the business. Sustainable products, services and brands. Systems thinking and the design of the future.

Course: Digital Modeling

Class hours: 80

Syllabus: Types of modeling and their importance in the development of the project. Review of the virtual environment and the Cartesian plan. Blender. Introduction to the software: Knowledge of the interface (tools, navigation, modes, etc.). Organization of files. Importing two-dimensional references. Import of Hardpoints. File management. Setting the scene properties. Introduction to modeling: modeling and layout. Main tools. Display type. Modifiers. Influence of the hierarchy. Creating polygons from modifiers. Construction of geometric model. Texturing. UV maps. Application of materials. Creation and editing of materials - Visualization and image generation. Construction of textured model. Simulation - Simulation types - Limiting elements - Variables. Sculpting mode - Brushes - Multi-resolution sculpture - Dynamic topology - Mirroring. Animation (part 1) - Use of frames (Rigging) - Controlling the properties of an object. Animation (part 2) - Use of Drivers - Deformation of objects. Construction of organic model. Geometries, Subdivisions, Shading, Lighting, Layers. Modeling, animation and rendering of a scene.

Course: Metallic Materials

Class hours: 80

Syllabus: CCC structures, CFC and HC. Formation of grains in polycrystalline materials. Crystalline defects, point defects, line and surface. Handling disagreements. Simple tensile test.

Hardening mechanisms applicable to metallic materials. Simple tensile test. Fe-C diagram. Steels. Injection mold wax. Cast Iron. Injection mold wax. Stainless steels. Casting and finishing. Non-ferrous. Casting and finishing. Casting processes. Hardening and cold forming processes: hardening and recrystallization; cold rolling plate, stamping, cutting, folding, stretching, hydroforming. Mechanical forming processes than hot rolling, forging. Powder metallurgy. Metal bonding processes. Surface finishing processes. Casting the individual project - jewelry.

Course: Graphic Design

Class hours: 40

Syllabus: Introduction to the graphic design project applied to the product. Review of digital techniques in graphic softwares. Seminars on trends in contemporary graphic design. Creation of contemporary graphic design projects applied to products. Practical application in image editing softwares. Branding and visual concept. Development of infographics projects: visual research, visual concept and creative line, composition, colors and typography, physical and virtual presentation. Application in presentation boards: problematization, objectives, justification. Visual research, theoretical basis, bibliographical references of the project, critical reading. Visual concept and studies of development and definition of visual line. Graphic development of usability and dynamics. Development of product design presentation boards. Presentation of visual product programming projects.

Course: Surface Design

Class hours: 40

Syllabus: The Surface Design. Theory of visual perception: light, color, surface and object. Elements of surface design. Visual Standard I: Study of textures - two-dimensional field, line, shape and color. Visual Standard II: Study of patterns. Visual Standard III: The rapport and systems of repetition (continuity, symmetry, allover, closure). Surface Design: Study of textures - three-dimensional field. Application of methodologies and case studies. Introduction to Color Theory. Introduction to colorimetry and quality standards. Colorimetry and material color. Surface Design: briefing and conceptualization, development and detailing.

Course: Projects and Special Activities V

Class hours: 40

Syllabus: Development of competencies, skills and creative attitudes, through electives and student-centered practical activities. Training of interpretation and analysis skills. Problem solving methodologies. Development of projects. Technical visits, lectures, workshops, seminars and technological competitions. Participation In undergraduate monitoring programs, scientific projects and technological research, as well as participation in social responsibility projects.

Second Semester

Course: Research Methodology I

Class hours: 40

Syllabus: Presentation of Research and Services of the library of Mauá, CAPES Sites, Bibliographic search. Logging techniques. Technical-scientific article: Structure, Contents, Examples and References. Classification of the research in a scientific article. Scientific research. Problems. Ethics in research. Research techniques: Interview and questionnaire, Observation and Documentary analysis. Case Study and Action Research. Research in Design. Formatting according to ABNT standards. Structure of a Final Work. Methods and techniques of research. Research Project - Topic / Subject Definition. Exploratory / Bibliographic Research. Definition of Needs, Problematization and Hypotheses. Definition of the Research Methodology. Formatting the content (structure). Formatyinh the report. Elaboration of the research project of the Final Work.

Course: Cognitive Ergonomics

Class hours: 40

Syllabus: Interfaces with usability problems in relation to cognition. Cognitive ergonomics and usability. Mental models. Perception. Memory. Information processing. Cognitive Ergonomics and IHC - human computer interaction. Interface analysis. Emotion, cognition and usability. Neurophysiology of emotions. Primary and secondary emotions. Emotion, mood, feeling.

Influences of emotions on cognitive processes. Emotional design: visceral, behavioral, reflective. Interface development.

Course: Design Studio

Class hours: 80

Syllabus: Development of a product / service / system project. Definition of Briefing. Intelligence - Research and conceptualization of the project. Creation and generation of ideas. Definition of the project proposal. Details of the project. Final presentation.

Course: Polygonal 3D Modeling

Class hours: 80

Syllabus: Different types of modeling. Virtual environment and the Cartesian plane. Introduction to Blender software. System requirements. User Interface, Window System, Workspaces, Status Bar, Shortcut Map, Interface Controls, Tools Editors. 3D Viewport. Fundamental elements: Introduction, Meshes, Curves and Surfaces. Modifiers: Introduction, most common modifiers, geometry changes. Key elements: Metaball, Texts, Volumes, Empties and Images. Too many modifiers. Sculpture: Introduction to the concept of Sculpture in Blender. Sculpting tools, settings, adaptive sculpting, destructive and non-destructive method. Publishers. UV Mapping and Image Editing. Shading and the Nod system. Texture Painting Mode: Introduction, tools. Confection of elements in FabLAB.

Course: Composite Materials

Class hours: 80

Syllabus: History of composites. Composites - Definition, basic properties and characteristics. Polymer matrix - definition, properties and characteristics. Preparation of Resins - PU, Epoxy, Polyester, Silicon - Exothermic Peak Properties of resins Viscosity, Thixotropy and Hardness. Synthetic fibers - Carbon, glass, aramid. Preparation of Resins - PU, Epoxy, Polyester, Silicon - Exothermic Peak Properties of resins Viscosity, Thixotropy and Hardness. Natural Fibers. Rolling in open mold, sandwich. Fabrics. Processing of composites. Bending test. Projects in composites. Sizing of composites. Vacuum Bag. Cut expanded polystyrene. Infusion.

Course: Cool Hunting

Class hours: 40

Syllabus: What is coolhunting and the role of coolhunter. The disciplines and auxiliary areas. The perception of signs and signs in the construction of future scenarios. The main methodologies and schools. Coolhunting Methodologies. Ethnography and Netnography applied to the research of trends. Methods and Field Research. Trends Mapping.

Course: Projects and Special Activities VI

Class hours: 40

Syllabus: Development of competencies, skills and creative attitudes, through electives and student-centered practical activities. Training of interpretation and analysis skills. Problem solving methodologies. Development of projects. Technical visits, lectures, workshops, seminars and technological competitions. Participation In undergraduate monitoring programs, scientific projects and technological research, as well as participation in social responsibility projects.

FOURTH YEAR

First semester

Course: Research Methodology II

Class hours: 40

Syllabus: Research in Design. Qualitative and quantitative research. The production of knowledge in the area of Design and scientific knowledge. Sources of information and means of recovery of reference materials. The organization of information. Using OneNote. The structure of the final work report and its organization with the help of OneNote. The report model, its elements and presentation form. References and citations - the basis of the credibility of academic texts. Development of preliminary reports.

Course: Undergraduate Thesis I**Class hours:** 80

Syllabus: Development of Final Work. Methodology and Project Schedule. Revision of the Rationale Phase. Phase of Conceptualization: Social Value, Creative Value, Competitive Value, Technological Value. Fundamentals Phase: Validation, Conceptual Proposal. Macro Creation: Formal, Functional, Ergonomic, Dimensional and Technical Studies (Materials, processes and Sustainability). Design Review. Preliminary model. Presentation of the Final Proposal. Partial Report of the Final Work.

Course: Product Project**Class hours:** 40

Syllabus: Product concept development. Product Life Cycle. The concept of value for stakeholders. Value Proposition. Product development: models and methodologies. Eco-design and Design for the Environment (DFE). Product Structure Representation. The Marketing View. Intellectual Property Protection. Technical and functional studies of the project. Materials and manufacturing process definition. Technical and economic product feasibility.

Course: Templates and Virtual Environments**Class hours:** 80

Syllabus: Types of modeling and their importance in the development of the project. Review of the virtual environment and the Cartesian plan. Blender. Introduction to the software: Knowledge of the interface (tools, navigation, modes, etc.). Organization of files. Importing two-dimensional references. Import of Hardpoints. File management. Setting the scene properties. Introduction to modeling: modeling and layout. Main tools. Display type. Modifiers. Influence of the hierarchy. Creating polygons from modifiers. Construction of geometric model. Texturing. UV maps. Application of materials. Creation and editing of materials - Visualization and image generation. Construction of textured model. Simulation - Simulation types - Limiting elements - Variables. Sculpting mode - Brushes - Multi-resolution sculpture - Dynamic topology - Mirroring. Animation (part 1) - Use of frames (Rigging) - Controlling the properties of an object. Animation (part 2) - Use of Drivers - Deformation of objects. Construction of organic model. Geometries, Subdivisions, Shading, Lighting, Layers. Modeling, animation and rendering of a scene.

Course: Advanced Topics in Design**Class hours:** 40

Syllabus: Big problems and their impact on the individuals, society, market and planet needs. Future scenario design: critical design, speculative design. Research and presentations of future scenarios. Social Design. Social design surveys and presentations. Circular Design. Circular design surveys and presentations. Universal Design.

ELECTIVE COURSES**Course: Neurodesign****Class hours:** 40

Syllabus: Cognition Science and Neuroscience fundamentals. The psychology of form and design. Colors, textures, patterns and surfaces and psychological interpretation. Gestalt principles and Neurodesign. The perception and construction of the senses. The triune brain and the interpretation of design. Empathy and emotion: aspects of experience and interaction. Analysis and evaluation of projects from the perspective of Neurodesign.

Course: Concept Prototyping**Class hours:** 40

Syllabus: Path of generating meaning as a concept prototyping process, from the abstraction of the fundamental concept to the concretization of the idea. Fundamental concept: Understanding the user, needs and desires beyond the tangible. Society, Business and Affinities of the working group. Building the persona in the tension between what you want, what doesn't know what you want, what you have and what you don't have yet. Society: mapping the ecosystem and its current and future values; verification of the Business, market, segment and that exists today. Insights, user narrative structure. Formation of the user's journey. Concept development Methodologies. Playback of ideas. Selection of concepts / ideas. Prototyping methodologies. Prototyping of

concepts / ideas. Definition of the best concept / idea according to Desirable, Feasible, Viable functions. Prototyping of the final concept.

Course: After Effects

Class hours: 40

Syllabus: Introduction to After Effects. Knowing the workflow. Creating projects and importing files. Creation of composition and organization of layers. Adding effects and modifying layer properties. Animation creation with presets and basic effects. Text animation. Text animation preset. Scale keyframes. Parent/child relationships (parenting). Text tracking. Non-text layer animation along a motion path. Shape layers. Custom shapes. Video and audio layers. Animating a multimedia presentation. Scenario using parenting. Point of anchorage. Layers animation. Lighting changes. Animation using the pick whip. Motion on the stage. Track matte. Mask with the Pen tool. Distorting objects with the Puppet tools. Deform pins. Chroma key. Compositions in Device Central. Color Difference Key. Color correction. Color balance. Color range. Color Filter. Creation of 3D objects. Null object. 3D Text. 3D animation. E Use of 3D resources. Reflections in 3D objects. Layers time. 3D lights. Motion Blur. Advanced editing techniques. Audiovisual Presentations.

Second Semester

Course: Research Methodology III

Class hours: 40

Syllabus: Eureka, its function, structure and necessary arrangements. Eureka planning. Elaboration of the list of needs. The academic poster: structure and examples. Case study: posters. Follow up of the final work reports.

Course: Undergraduate Thesis II

Class hours: 80

Syllabus: Continued Development of Final Work - Micro Creation. Definition of Design. Model / prototype planning: dimensional drawing + bill of materials. Rendering 3D Digital (product, environment, user). Visual identity (name, logo, colors, application in the product). Technical Drawing (3 views of the set, perspective). Specification of Materials (list of components and their materials) and Manufacturing Processes (of each component). Sustainability (material, process, project, life cycle). Production cost forecast and sales price / Business Plan. Finalization of the Physical Model. Presentation at Eureka. Final Presentation Banks. Final delivery of the report.

Course: Project Management

Class hours: 40

Syllabus: Introduction to Project Management. Understanding the project management knowledge areas. Essential documents. Project Justification. stakeholders, needs. Product and Product's requirements. Assumptions and restrictions. Production Workflow and Defining Sequence Activity. Costs and timelines. Publishing of TCC's documentation.

Course: Models and Prototypes

Class hours: 80

Syllabus: Planning the physical model of the final project. Elaboration of constructive strategies as well as possibilities of internal materials and resources. Evaluation of the strategic planning for the construction of the physical model of the CBT and definition of the materials and requirements to be used. Monitoring the delivery of materials and use of internal resources in the creation of the physical models of CBT. Accompaniment and support in the development of the executive constructive projects of the physical models. Evaluation of the constructive development of the physical model. Evaluation of the physical model during the presentation stage of the week of the EUREKA exhibition. Refinement or repair of the final physical model for evaluation in the examining bank. Completion of refining or repair details of the physical model (last step). Evaluation of the physical model in the stage of the presentation of the final evaluation bank of the Final Work. Activity management in the Trello environment. WBS, Kanban and Scrum concept.

Course: Branding

Class hours: 40

Syllabus: Marketing concepts. Concepts of brands. Brands and their influence on products, services and organization. Brand enhancement. Brand positioning I - Conceptualization. Positioning of marks II - Construction. Mapping the positioning of marks. Exercises and dynamics of Brand Mapping. Brand identity I - Conceptualization. Brand identity II - Practices. Brand image. Brand system. Brand Equity. Brand architecture. Brand Management and Naming Notions.

ELECTIVE COURSES

Course: Audiovisual Production

Class hours: 40

Syllabus: Introduction to audiovisual. Introduction to audiovisual editing software. Software of audiovisual edition - tools, effects, cutting and transitions, formats, conversion and closing. Online audiovisual platforms. Pre-production: argumentation and storyline, script and storyboard. Camera movement and image capture. Lighting and framework. Sounding. Linear and nonlinear edition. Audiovisual authorization and distribution. Algorithms of recommendation, interfaces and navigation. Production: chrome key and virtual scenarios. 360 video and lives. Lettering and vinette. Finalization: editing and post-production. Presentation of audiovisual projects.

Course: Graphical Representation Techniques: drawing and illustration

Class hours: 40

Syllabus: Basic and advanced concepts of drawing and illustration. Representation forms. Rules for representation. illustrations. 3D representations. Development and understanding. Perspective and Sketchup. Project development stages - theoretical studies. Theoretical References. Scientific article.

Course: Digital Rendering Animation

Class hours: 40

Syllabus: Introduction to animation and software presentation. Pre-production (I) Storyline, synopsis and argument, development methods for each one. Pre-production (II) Creation of script and aesthetic design of animation. Pre-production (III) Storyboard and movement studies, beginning of the materialization of the project. Production (I) Study the time of each frame (from the Storyboard) and forecast the total time of the animation. Production (II) Development of the characters using the different techniques available (Stop motion, traditional drawing or 3D modeling) and voice interpretation. Production (III) Independent development of scenarios and actions for later compilation. Production (IV) Recording and editing of voices and sounds and digitization and treatment of drawings and illustrations (if necessary). Production (V) General introduction to animation methods and the concepts of voice decoupling. Production (VI) General weighting on the compilation of visual and sound elements. Post-production (I) Composition steps, corrections (plans, transitions, effects and colors) and pre-editing. Post-production (II) Forms of finishing and final editing.

Course: Business Design

Class hours: 40

Syllabus: Review of marketing concepts about the exchange of values, desires and users' needs. Analysis of contemporary society: new economies, technologies, industry 4.0, complex problems. Trend analysis: group definition of problems of a given trend. Design thinking: concept and methodologies. Application of design thinking for business and project-oriented strategies. Definition of business problems. Trend Analysis. Definition of the problem following double diamond methodology. Development of double diamond methodology within design thinking. Prototyping the business solution. Definition of the value proposition for the end user. Concept and application of Canvas - Business Model Generation. Elaboration of the Business Model.

Course: Collaborative Creative Processes

Class hours: 40

Syllabus: The stimulation of adaptive and collaborative strategies in the different phases of a creative process. Critical thinking based on theoretical articulation for the understanding of contexts and perception of demands and behaviors. Sharing of experiences for proposing experimental projects and activating the potential of team members. Construction of methodologies that adapt to creative paths that interrelate different fields of knowledge.

