IISE

Sustainable Innovation and Energy Engineering
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Contact information
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Curricular map
2015

UDEM

DI1110 / Conceptual and Morphological Studies I
The student will be able to solve industrial design problems focusing in concepts and forms. This would be done considering all factors involved in design as well as its visual impact.

GE1110 / Energy and Resources
The student will understand the concepts related to energy and resources and the importance of the ecological vision at it's different scales or levels of integration and its usefulness of energy and resources, their use and effect.

DI1210 / Constructive Geometry
The student will be able to use drawing tools through the application of essential object drawing and descriptive geometry methods. Thus the student can apply them in future industrial design projects.

FM1009 / Quantitative tools for Business
Upon completion of this course, students will be able to understand the basic elements of graphs, derivation and integration of algebraic, exponential, and logarithmic functions in order to apply them to the solutions of problems in different areas.

FM1001 / Physics I
To understand the basic concepts of classical mechanics in order to analyze, explain, and solve problems related to bodies that move in one, two or three dimensions.

FM1100 / Presentation Techniques for Product Design I
Desarrollar habilidades instrumentales básicas de representación rápida en dibujos y bocetos de ideación para la comunicación visual de proyectos de diseño industrial.

DI 1220 / Presentation Techniques for Product Design I
By completion, the student will have developed quick, basic representation skills, such as drawings and sketches for visual communication in industrial design projects.

CS3010 / Environmental Sociology
Know and analyze the link between environment, ecology and sustainability, within a context that integrates technological development, production systems, and social management of available resources.
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DA2066 / Sustainable Architecture - Theory
Recognize and comprehend the principles and basic concepts of sustainability in architecture, in order to be able to give a critical analysis of renowned projects because of its sustainability, its proposals and paradigms, having the design as a response to the environment, including the passive systems.

DI1120 / Effective Project Presentation
The student will learn and apply diverse techniques, methods and strategies for the successful presentation of ideas and design projects in front of a given audience.

AD2001 / Sustainability, Ethics, and Social Responsibility in Business
The students will be able to identify the ethical, social, and environemntal issues which are relevant to a business, in order to devise strategies to address them.

FM 1105 /Probability and Statistics
To apply the fundamental concepts of probability theory and mathematical statistics (random variables, mathematical expectation, discrete and continuous probability distributions, joint distributions, sampling distribution, estimation theory, classical theory of hypothesis testing and non parametric methods) in solving engineering problems.

DI2190 / Digital Solids Modelling
The student will understand and apply the tridimensional solid parametric modeling tools and their usage criteria. Thus the student can create detailed product models for its prototype construction or mass production.

FM1002 / Physics II
To apply the main laws that govern wave motion, fluid mechanics, thermodynamics, and gas theory in the solution of science and engineering problems.

DI1310 / Creativity Studies I
By completion, the student will be able to: 1. Understand and apply different strategies in the creative development process. 2. Exercise the use of drawing tools and previously acquired sketching knowledge. 3. Finally, the student will be able to create user-centered solutions for low and medium complexity products, creating or satisfying a user need. This would be done in alignment with basic principles, methods and requirements, selecting, justifying, relating, demonstrating and solving all design-related factors.

IN1211 / Modern Energy Systems
To Discover the importance that has the energy in our daily life to make use reasonable of her and motivate the development of alternate energies.

DE3425 / Environmental Law
Analyze the legal framework for environmental law and its impact on the company.

FM2200 / Electricity and Magnetism
To understand the laws and principles that act on bodies when they are exposed to the influences of electric and magnetic fields. To understand the relation between electricity and magnetism.

LI3110 / Environmental Standards and Certifications
The students will be able to apply the concepts and principles of sustainability to locate the project within applicable standards and certification processes and to analyze passive and active bioclimatic strategies and eco- technologies applied in improve energy efficiency and apply them to architectural , urban and energy facilities projects.

DI2110 / Sustainable Design Theory
The student will be able to: 1. Create solutions for sets of products having medium-complexity usage problems. 2. Apply research, analysis and problem identification techniques in the design of different lines, families and product sets configuration. This is applied while paying attention to different parameters, such as: use, context, brand language and market. 3. Consolidate the previously acquired knowledge and skills during courses such as: sketching, drawing, studio model construction, morphology and materials and processing.

DI1330 / Process and Manufacturing of Metals
The student will be able to describe the physical, chemical and conversion attributes of off-the-shelf metallic, vitreous materials and composites. Furthermore, the student will be able to describe the technology and available resources in the processing of those materials and composites for their application in the product and object creation market.

DI2310 / Business Strategies for Designers
This course provides entrepreneurship tools for designers. By completion, the student will understand the accounting principles and their application. Furthermore, the student will understand the methodologies for the launch of innovative and profitable business.

FM1030 / Linear Algebra
To apply the techniques of matrix algebra, including the fundamental concepts of vector space and linear transformations, in the study and future application of linear models for different fields of work.

CI 2115 / Communication and Marketing
The students will know the close relationship and dependency that exists between communication and marketing as well as its development and implementation in the global work fileld.

DI2210 / Product Development and Study I
By completion, the student will be able to: 1. Create solutions for sets of products having medium-complexity usage problems. 2. Apply research, analysis and problem identification techniques in the design of different lines, families and product sets configuration. This is applied while paying attention to different parameters, such as: use, context, brand language and market. 3. Consolidate the previously acquired knowledge and skills during courses such as: sketching, drawing, studio model construction, morphology and materials and processing

LI3010 / Housing and Building Automation
Understanding of the different terms in the technical language of smart facilities and meet the elements of an automated management. Analyze and understand the objectives of a demotic system and standards and systems on the market today , to make a correct choice in the implementation of a project of interior design, taking into account the advantages and disadvantages of the systems, as appropriate technical specifications for proper installation

DI2220 / Product and Distribution
The students will design products focused on logistics systems, designing the packaging according to the structure of the supply chain, considering the cost of the product, packaging and damage. It will include relevant aspects of transportation management and inventory. The student will be capable to improve the operating performance of the chain designing the distribution system / package considering issues of environmental impact and energy consumption from the product development.

DI2130 / Process and Manufacturing of Polymers
After course completion, the students will know and understand the physical, chemical, processing characteristics and sustainable considerations of existing polymers and composites on the market, for its application in the creation of products and objects. As well as the technology and resources to process them; visualizing the incorporation of intelligent materials.

LI3150 / Interior Energy Analysis
The student will know and be able to manipulate programs thermodynamic simulation projects high energy in buildings , the fundamentals of the Energy + , Equest , DesignBuilder and understand how the new module HVAC systems to enter the detailed modeling of air conditioning in order to perform energy modeling and simulation.

DI3310 / Interdisciplinary Design Solutions
Upon completion of this course, students will be able to develop projects jointly with students from other design programs, assessing collaborative learning, and experience interdisciplinary learning.

GE3110 / Energy and Sustainability Studies
At course completion, the student will understand the concepts related to energy and resources, as well the relevance of the ecological vision in its different scales or levels of integration and its usefulness in the energy subjects and available resources, their use and effect.

DA3080 / Technology for the Analysis of Sustainable Projects
Distinguish the digital tools of analysis and simulation towards the environment as an optimization means, applying the analysis methodologies and techniques of the different factors that intervene in the sustainable buildings design.

DI2120 / Parametric Modeling
The student will be able to understand 3D parametric modeling tools to create detailed models and assimilate criteria of use for the basic development of a product to build its prototype or manufacture it in series.

IN1400 / Project Feasibility and Management
Operate and apply the drawing and evaluation methodology of projects in their diverse dimensions: market, technician, economic. Study and manage the techniques and methods for the administration and control of projects including PERT, CPM and the use of computer tools.

GE3120 / Design Study of Energy Application
Provide technical criteria, management and design enabling the application or the development of new technologies related to energy, efficiency, and the environment.

DI3110 / Introduction to Means of Transport
The student will be able to understand and apply different illustration techniques in the visualization of designs. Additionally, the student will be capable of developing research and communication systems in the presentation of ideas to a customer. The main aim of the course is to develop a vehicle, which enhances the experienced emotions in humans against a car or other type of vehicle. In order to achieve the above, the student will have to research the psychology and anthropology fields as a way to have deep understanding of human behavior and its reaction to vehicles, movement and technology.

DI3120 / Introduction to Consumer Goods and their Life Cycle
At the end of the course the student will be able to use and assimilate the criteria of use and the tools of parametric modeling of three-dimensional solids, to create detailed models of a product to build his prototype or manufacture it in series.

DI3320 / Materials Strenght and Simulation
The student will understand and be able to interpret the product and environment using specialized software. Furthermore, the student will be able to analyze the internal and external forces within a product with the intention of strength calculation. Finally, the student will be capable of studying and modeling a product based on its operational conditions.

GE3150 / Design of Energy and Sustainability Systems
Acquire knowledge for the analysis, design and application of technology, systems and tools for the use of energy.

GE3170 / Research Methodologies
The student will understand the methodology of descriptive research with the use of qualitative tools applied to the development of the proposal for the finalevaluation project, in order to focus it on a real client or the development of a product or system within the area of design applied to energy and sustainability.

GE3160 / Innovation for Clean Energies
The student will integrate and analyze tools and public regulations in the social, economic and environmental dimensions to business management strategies and solutions for the creation of new technologies and efficient use of energy.

GE3180 / Technological Research
At course completion, the student will learn how to obtain competitive advantages of products and services in order to improve them, as well as an introduction to the process of innovation. Apply qualitative and quantitative methods to analyze, synthesize, and evaluate the potential of a technological opportunity or idea of eco-technology (product, process, or service), based on the technological avenues not intellectually protected and not scanned in its technological development to management and sustainable innovation.

GE4100 / Sustainable Innovation and Energy Engineering Professional Practices
The student will be able to apply the criteria, knowledge and skills acquired through the study of the career in the real work field.

GE4200 / Sustainable Innovation and Energy Engineering Final Evaluation Program
Determine if the student is qualified for the exercise of their profession. In order to achieve this, students are exposed to models of situations that they have to face in their professional life, evaluating their responsibility, their methodological capacity to search, process and use information, pose problems, design solutions and apply the appropriate technique in each case.

	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH	EIGTH	NINETH
ENERGY AND EFFICIENCY	**GE1110** 6 Energy and Resources	**AD2001** 6 Sust., Ethics, and Social Resp. in Business	**IN1211** 6 Modern Energy Systems	**LI3110** 6 Environmental Standards and Certifications	**LI3150** 6 Interior Energy Analysis	**GE3110** 6 Energy and Sustainability Studies	**GE3120** 6 Design Study of Energy Application	**GE3160** 3 Innovation for Clean Energies	**GE4200** 12 IISE Final Evaluation Program
SUSTAINABILITY AND ENERGY	**DI1210** 6 Constructive Geometry	**CS3010** 6 Environmental Sociology	**DE3425** 6 Environmental Law	**DI2110** 6 Sustainable Design Theory	**LI3010** 6 Housing and Building Automation	**DA3080** 6 Techn. for the Analysis of Sust. Projects	**DI3110** 6 Introduction to Means of Transport	**DI4110** 6 Design of Energy and Sustainability Systems	**HU1005** 6 Social Thinking of the Church
SUSTAINABILITY	**DI1110** 12 Conceptual and Morphological Studies I	**DA2066** 6 Sustainable Architecture - Theory	**DI1310** 3 Creativity Studies I	**DI1330** 6 Process and Manufacturing of Metals	**DI2220** 6 Product and Distribution	**DI2120** 6 Parametric Modeling	**DI3120** 6 Design Study of Energy Application	**GE3170** 6 Research Methodologies	
INNOVATION	**DI1220** 3 Presentation Techniques for Product Design I	**DI2190** 6 Digital Solids Modelling	**FM2200** 6 Electricity and Magnetism	**DI2310** 6 Business Strategies for Designers	**DI2130** 6 Process and Manufacturing of Polymers	**DI3310** 6 Interdisciplinary Design Solutions	**DI3320** 6 Materials Strenght and Simulation	**GE3180** 6 Technological Research	
MANAGEMENT	**FM1009** 6 Quantitative tools for Business	**DI1120** 6 Effective Project Presentation	6 Complementary Course *	**CI2115** 6 Communication and Marketing	**DI2210** 3 Product Development and Study I	**IN1400** 6 Project Feasibility and Management	**HU1015** 6 Comparative International Contexts	**AD1200** 6 Leadership in Organizations	
EXACT SCIENCES	**FM1001** 6 Physics I	**DI1002** 6 Physics II	**ID1500** 6 Academic Writings	**FM1030** 6 Linear Algebra		6 Elective Course of Professional Studies	6 Elective Course of Professional Studies	6 Elective Course of Professional Studies	
ELECTIVES, GENERAL AND SPECIALTY	**FM1100** 6 Interpretation of Statistical Information	**FM1105** 6 Probability and Statistics		6 Elective Course of General Studies	6 Elective Course of General Studies	**HU1010** 6 Global Competitions	6 Elective Course of General Studies	**GE4100** 6 Professional Practices	
GENERAL STUDIES MANDATORY	Induction Seminar 1	Co-Curricular	Co-Curricular	Co-Curricular	Co-Curricular	Social Training Workshop	**GE3100** 6 Energy Tech. Invention	**GE3130** 6 Tech., Evaluation and Diagnosis	**GE3140** 6 Transfer of Technology
				THREE CONCENTRATIONS		TECHNOLOGICAL RESEARCH - ENERGY OPTIMIZATION - SUSTAINABLE DEVELOPMENT STRATEGIES	**GE3210** 6 Energetic App. Design	**GE3220** 6 Energy Efficiency	**GE3230** 6 Energy Forecast
							GE3310 6 Mitigation Strategies	**GE3320** 6 Syst. Anal. Socio-Environmental	**GE3330** 6 Management of Sust. Projects
							GE3340 6 Actual Studies of Energy		
	42 CREDITS	**42 CREDITS**	**42 CREDITS**	**42 CREDITS**	**42 CREDITS**	**42 CREDITS**	**42 CREDITS**	**39 CREDITS**	**18 CREDITS**

351 CREDITS

* Complementary course: CB2020 Fundamentals of organic and inorganic chemistry