

PROGRAM AIMS AND LEARNING OUTCOMES

The program aims to provide students in-depth knowledge of product design process which integrates social understanding, historical context, business planning and development, material research, fabrication and manufacturing methods to realize new exciting innovative ideas and design solutions.

The course is designed to create an opportunity to:

- Prepare for a career in the Product Design field by providing an educational experience which balances learning essential technical design skills with developing the critical and conceptual capacity of the individual student.
- Prepare clear and concise recommendations through drawings, models and descriptions.
- Create and execute design solutions for problems of form, physical ergonomics, marketing, brand development and sales.
- Raise awareness of the evolving role of product designers and the changing context of design practice.
- Understand the approaches and strategies enabling a flexible response to practice and career paths now and in the future.

MISSION STATEMENT

The department of Product & Industrial Design's mission is to equip the prospective design student with an excellent foundation for careers in the design field, giving high value to creative and practical skills, as well as the tools to lead innovation in a fast changing world. The program benefits hugely from the cultural diversity of our student's backgrounds enriching the learning experience and the potential for creativity and innovation, which will prepare students to work within a competitive commercial environment with successful students working within a variety of design fields both locally and internationally.

The program is meant to develop skills, knowledge & aptitude among students to become creative problem solvers who can bring about innovation in the manufacturing & communication industry. The course commence with developing in the students the perceptual abilities & techniques, social & general awareness leading to projects, characteristics of problems of Pakistan, in relation to industry , government and other institutions / organizations. The program at PID have the flexibility to evolve change and to respond to new challenges, therefore, courses especially electives can be updated in response to new developments.

FIRST SEMSTER

PID:101 FUNDAMENTALS OF DESIGN -I

The objective is to lay foundation of design. Lectures leading to practical assignments on elements of design Line, form, shape, color, circle, color consideration & its dimensions, hue value & chroma, color meaning in tradition and psychological use of colors. texture along with different mediums pencil and black fiber tip. Basic techniques, cutting, pasting, tracing, gluing and mounting, symmetry balance, mass, unity and variety.

Reference books

1. The Elements of Design by Poppy Evans and Mark A. Thomsan – 3rd Edition 2013
2. Design Basics by David A. Lauer and Stephen Pentak(2008)
3. New typographic Design by David Jury(2007)

PID: 102 VISUAL COMMUNICATIONS-I

This course will provide the framework for students to understand and manipulate visual elements effectively in a variety of communication mediums. This course will enhance communicating abilities in the form of freehand visual sketches. The course will include fundamentals of Visual drawings, Practice of freehand sketching, straight lines, pencil shades, Speed drawing, basic techniques of still life sketching. Perceiving angular views of objects, Shading by identifying a light source, drawing shadows of objects. Crow coil Dot technique, Charcoal sketching, gradients, positive & negative shading of solids. Drawing and understanding human body proportions, introduction to Key drawing, introduction to drawing freehand perceptive, Types of perspective. Ball point sketching, Hatching, Rendered Sketching & techniques, highlighter rendering, creating single color tints & shades, water color pencil rendering, visualization of products. Detailed sketching for products, piece part drawing, section of the product, blow ups, mechanism drawing.

Reference books

1. Erik Olofsson and KlaraSjolen “Design Sketching”, 2005
2. KlaraSjolen and Allan Macdonald “Learning Curves”, 2005
3. Carl Liu’s “Design Book”, 1991
4. KoosEissen and RoselienSteur “Drawing Techniques for Product Designers”, 7th Jan, 2013
5. Inc. Sterling Publishing Co, “Art of Sketching”, June 1, 2007

MET: 103 MATERIALS & TECHNOLOGY-1

Classification of materials, Metals, Alloys and their common uses, polymeric materials Introduction to Ceramics (traditional & engineering ceramics), Comparison between metals, polymers & ceramics, Concept of ductility & comparison of ductility of metals, ceramics & polymers, Concept of strength & hardness, composite materials, Structural components of composite materials, Crystallinity in materials, Concept of unit cell, lattice parameters &

difference crystal structures, Atomic arrangement in metals, Concept of coordination number Calculation of APF for FCC, BCC & HCP crystal structures, Stacking sequence in crystalline solids, Theoretical density calculation, Concept of grain & grain boundary, Dislocation in crystals, Dislocation movement, Grain/dislocation interaction, Tensile test of metals, Load-extension curve, Stress-strain curve Grain/dislocation interaction, Concept of fatigue, Fatigue loading (zero-to-max, varying load superimposed on constant load, full reversing load), Fatigue testing, S-N curve & limiting stress level, Introduction to Metal Fabrication, Metal Casting, Sand casting, Introduction to patterns used in metal casting procedures, Mold making practice., Defects of castings and their rectification using risers, Types of risers used, Riser location, Introduction to melting & pouring, Die Casting Process, High Pressure Die Casting, Low Pressure Die Casting, Merits/demerits of Die Casting, Introduction to metal rolling processes, Rolling process description, Production of rolling processes, Flat rolling & its parameters, Introduction to welding & other joining processes, Basic terminologies, Arc Welding, Types of welded joints, Soldering of alloys, brazing of alloys, corrosion of metals, mechanism of corrosion, electrode potential, Galvanic cells, Common cathodic reactions, Galvanic corrosion, Tin plating, Galvanization, Corrosion Prevention

Practical:

Introduction to Inspection & Testing lab equipment, Layout of Inspection & Testing Lab, To perform hardness test using Brinell hardness testing machine, To perform hardness test using Rockwell hardness testing machine, To study deep drawing quality of metals using Erichsen Cupping Machine, : to observe tensile behavior of Al, brass & mild steel and finding mechanical parameters such as stress, strain, young's modulus, elastic limit, yield point, ultimate tensile stress, %elongation, %reduction in area, fracture stress

Reference books

1. William F. Smith, "Principles of Material Science & Engineering" 3rd Edition, John Wiley & Sons, Inc.
2. J.T. Black "DeGarmo's Material Processes in Manufacturing" 10th Edition, John Wiley & Sons.

PID: 104 HISTORY OF CREATIVE ARTS & DESIGN-I

It course includes Architecture, sculpture and painting in their social and historical contexts Civilization, Archeology, Agricultural Revolution, Settlement Of Human, Egyptian civilization, The Gift Of Nile, Geography, Farming, Transportation, Classification Of Egyptian History, Egyptian Architecture, Egyptian pyramids, Egyptian Writing Medium, Trade, Religion, Concept Of After Life, Furniture, Egyptian God, Egyptian products, Earliest Civilization The Fertile Crescent, Geographic Conditions, History Of Mesopotamia, Religion---ziggurats, Sumerians, Mesopotamia, Earliest Civilization The Fertile Crescent, Geographic Conditions, History Of Mesopotamia, , Indus Valley Civilization, Economy, Agriculture, Artifacts, Unicorn, Clay Sculpture, Ornaments, Collapse Of Harappa Civilization, Four Theories Of Collapse, Products, Mughal Empire, Muslim Rule In India, Delhi Sultanate, Mughal Empire Classic Period, Akbar-The Great, Akbar's Achievements, Sikhism, Shah Jahan, Religion, Economy, Currency, Agriculture, Industries, Social And Cultural, Astronomy, Mughal Paintings, Ancient Rome, Classical Roman Empire, Geography, Plebeians Struggle For Equal Rights, Political Powers, Culture And Language, Economy, Decorative Arts, Clothing, Products.

Practical:

Free hand sketching of Egyptian products
Charcoal sketching of Mesopotamian sculptures
Crow coil Dot technique for Indus valley civilization
Glass painting for Mughal art inspired by Mughal art patterns
Chandelier design as final project (inspired by one of above mentioned civilization)

Reference books

1. Fred Kleiner, “A history of Roman Art”, Enhanced Edition 2010
2. Michael Cothren, “A brief History”, 5th Edition 2015
3. Horst De La Croix “Garner’s Art Through Ages”, 10th Reiss Edition
4. David Raizman, “History of Modern Design”, 2nd Edition

PID:105 INTRODUCTION TO COMPUTERS

Introduction to computer system and its characteristics, functions, users and types. The course includes basic parts of computer, software, hardware and its categorization of devices. Input, its types, input devices, pointing devices, source data-entry devices. Output & its types, output devices, components of computer: (CU, ALU, RAM), I/O Unit, bus interconnections, units of data storage, operating system, functions of operating system, user interface. Programming languages, language translators, data communication & its devices. Networks, types of network, internet & working of internet, CAD/CAM, viruses, types and prevention, security violation, data protection, legislation and copyright laws.

Practical:

Basic computer applications training, preparing presentations, computerized library skills, word processing and electronic spreadsheets. Introduction to MS.OFFICE (MS. WORD, MS. EXCEL and MS. POWERPOINT). Introduction to graphic tablets / Workstations, detailed explanation & demo of free hand digital sketching.

Reference book

1. Introduction to Computers By Gary Shelly, Steven Freund, Misty Vermaa 8th edition
2. “Introduction to Computer Science” By I. T. L. Education Solutions Limited, ItlEsl September 1, 2004
3. Gary Shelly, Misty Vermaat “ Microsoft Office 2010: Introductory”, 1st Edition
4. David Beskeen, “Microsoft Power Point 2013: Illustrated Brief” , 1st Edition
5. Maria Langer “Microsoft Office Excel 2007”, 1st Edition

IS: 101 Islamic and Pakistan Studies – I**HU: 120 Communication Skills**

SECOND SEMSTER

PID: 111 FUNDAMENTALS OF DESIGN-II

Different types of layouts, such as centralized, balance, rhythmic, spatial, and conjunction layout. Analytical view of letters, development, differences and suitability of typefaces. Primary, secondary and tertiary messages, its importance through placement, contrast and color. Principles of Design ,balance, symmetry, asymmetry, Radial symmetry and radial balance, emphasis in design, unity , harmony, Proportion, Rhythm, use of drawing tools(set square, T square, stencil).

Practical:

Poster colors(balance)

Pastel colors(rhythm)

Wire sculptures(proportion)

Paper quilling(harmony)

Oil paints on canvas(symmetry)

Reference books:

1. David A. Lauer and Stephen Pentak, “Design Basics”, 2008
2. David Jury, “New typographic Design” 2007
3. Fichner Rathus, “Foundation of Art & Design”, 2008

PID:112 VISUAL COMMUNICATIONS – II

Introduction to drafting tools, scales and drafting techniques. Sheet layout, seal making, lettering, pencil Grades, scaling of objects, angular lines, basic angles. Glass Box Technique, Orthographic projections in oblique and auxiliary planes, Cabinet & Cavalier projections. Presentation of material specifications & inner details. Techniques to draw measured perspective, types of Viewing angles (Man’s Eye View, Bird’s Eye View, Worm’s/ Frog’s Eye View). Standard Views used in Architectural Drawing, Space planning basics, Floor plans, elevations of buildings or rooms, Cross section, Intersection and development of surfaces. Introduction to Model Making, pattern or mock-ups, 3d forms generation through paper, prototyping, proportions, drafting technical working of products.

Reference Books

1. Dum-Rankin Peter, “Scaling Method”, London, L.E.A, 1983
2. Francis D.K., Ching & Steven P. Juroszek, “Design Drawing”, Van Nostrand Reinhold, New York, 1997
3. Ilan Jefferies and David A. Madsan, Basic Drafting Skills; Work Book, Delmar Publishers Inc. New York, 1991
4. Giesecke, Frederick E., Technical Drawing, 9th ed. New York Macmillan Publishing, 1991
5. Technical Drawing By David L. Geotsch, William S. Chalk and Raymond I. Rickman, 6th Edition

MET: 113 MATERIALS & TECHNOLOGY – II

Structure of hydrocarbon molecules, Macromolecules & its nomenclature, Polymer chemistry, Types of polymers, Types of polymers based on functionality, Concept of number average molecular weight & weight average molecular weight, Degree of polymerization, Linear, branched, cross-linked & branched polymers, Molecular configurations (stereoisomerism & geometrical isomerism), thermosetting & thermoplastic polymers, Concept of copolymers (random, alternating, block, graft), Polymer crystallinity, Chain fold model & Spherulitic structure, Defects in polymers, Mechanical behavior of polymers, Viscoelastic deformation, Viscoelasticity & viscoelastic relaxation modulus, Viscoelastic creep, Addition polymerization, Condensation polymerization, Forming techniques (compression & transfer molding, injection molding, extrusion, blow molding, casting), Polymer additives, Application of polymers, Critical fiber length, Tensile stress-strain, types of fibers, matrix phase, Glass fiber reinforced polymer composites, Carbon fiber, Aramid fiber reinforced polymer composites, Introduction to ceramics, between metals & ceramics, properties of ceramics, application of ceramics, Bonding in simple ceramics, Concept of ionic/covalent character, Radius ratio & its relation with central ion, Silicate Ceramics, Polymorphism in Silica, Silica glass, Silicates & its types, Nature of clays, Non-plastic raw materials, characteristics of engineering materials, physical and mechanical properties of engineering materials, fabrication techniques

Practices:

Identification of Thermoplastic and Thermosetting Polymers

Thermal Degradation of Thermoplastics

Swelling of Polymers

Processing of Thermoplastic Materials by Plastic Injection Molding Machine

Processing of Thermosetting Plastic Materials by Compression Molding

Observation of Stress Concentration in Plastic Materials Using Polariscope and To Study the Design Considerations in Engineering Materials

Physics of Density, its types, Archimedes' Principle and applications

Determination of Bulk Density of Solid Ceramics by Buoyancy Method

Determination of Apparent Porosity, Water Absorption, Apparent Specific Gravity, and Bulk Density of Burned Refractory Brick and Shapes by Boiling Water

Reference books:

1. William F. Smith, "Principles of Material Science & Engineering" 3rd Edition, John Wiley & Sons, Inc.

2. J.T. Black "DeGarmo's Material Processes in Manufacturing" 10th Edition, John Wiley & Sons.

MA: 114 APPLIED MATHEMATICS

Review of complex numbers including their properties. Product and quotient of complex numbers in polar form; Logarithm of a complex number; De Moivre's Theorem, The nth roots of a number; Solution of equations.

A review of matrices, determinants and finding inverse of a matrix through elementary row operations; Solution of the system of linear equations; Eigenvalues and eigenvectors.

Function and its different kinds; Inverse of a function; Graphs of some well-known functions; Continuous functions;

A review of differentiation; Geometrical interpretation of a derivative; Infinitesimal; Differential coefficient; Derivatives of higher order; Indeterminate forms and L. Hopital's rule; Asymptotes; Increasing and decreasing functions; Maxima and minima of a function; Directional derivatives.

Further techniques of Integration; Integration by reduction formula; Fundamental Theorem of Integral Calculus; Definite integral and its properties ; Area enclosed between curves; Arc length;

Scalar and vector triple products. Scalar and vector point functions; Differentiation and integration of vector point functions.

Formation of differential equations and solution of various types of first order differential equations.

Cartesian, cylindrical and spherical coordinates; The ratio formula; Equations of a straight line in R^3 ; Direction ratios and direction cosines; Angle between two straight lines, Distance of a point from a line; Equations of a plane; Angle between two planes; The sphere;

Recommended Books:

1. "Mathematics for Engineers and Scientists" by Muhammad Iqbal Bhatti and Muhammad Nasir Ch, published by Allied Book Centre, Urdu Bazar Lahore.
2. "Advanced Engineering Mathematics" by E. Kreyszig, published by John Wiley & Sons,
3. "Vector Analysis" by M.R. Spiegel, McGraw – Hill Book Company.
4. "Elements of Complex Variables" by Pennisi, L. L. Holt, Rinehart and Winston, U.S.A.
5. "Vector and Tensor Analysis" by N.A. Shah, A–One Publishers, Urdu Bazar, Lahore.

PID:115 DIGITAL GRAPHICS

This course is structured around practical computer lab classes, the usage of the tools for creative line, shapes and form, correct use of color for communication and effective textures for various surfaces and effects. The course includes Corel Draw, Macromedia Freehand and Adobe Photoshop. It includes Introduction of Corel draw, Setting up a page, Creating pages, Floating toolbox, Entering text, Arranging objects, Changing nudge offset distance, Applying fountain fill, pattern fill, Inserting images, Rounding corners of rectangle or square, Using superscript and subscript, Adjusting properties of individual letters, Adjusting spacing between letters, Converting text to curves, outline scale of text/object's, Using envelope effect on text, outline corners of a text, Removing text frames from paragraph, Creating power clip text, Inserting special characters , Extrude tool, Transparency tool, the Blend tool, the Contour tool, drawing tool, Introduction of interface, Photoshop Document Window, Toolbox, Panels, Shortcuts, Arrangements, Vector, Size & Resolution, Resize Documents, The Canvas, Undo & Step,

Introduction to layers, Add Delete & Merge layers, Layer Options, Opacity & Fills, Blend Modes, Adjustment Layers, Layer Styles, Auto Align Layers, Crop Tool, Crop & Rotate, Crop Perspective, Color Palettes, Create Swatches, Color Picker & Eyedropper, Selection Tools, Quick Select, Marquees & Strokes, Feather & Anti-alias, Save & Load, Transform tool, Free Transform, Warp Tool, Arbitrary Rotation, Adjustments Panel, Curves, Levels, Vibrance Adjustment, Color Correction, Brushes, Pen Tool, Filters & Effects, Lighting Effects, Gradients, Dodge - Burn & Sponge, Smudge - Sharpen & Blur

Practical:

Tracing of cartoon character

Logo making

Office stationary

Ad design

Magazine design

Tablet sketches

Catalogue design

Reference books

1. The CorelDraw Wow by Linnea Dayton, Shane Hunt, May 1999
2. Corel draw Studio Techniques by David Huss, March 1998
3. Corel DRAW Design Workshop by J. Scott Hamlin, January 1995
4. An Introduction to Adobe Photoshop by Steve Bark, 2012
5. Adobe Photoshop CS6 Top 100 Simplified Tips and Tricks, 1st Edition

ME: 116 WORKSHOP PRACTICE

This is a Workshop course for inducting student into the safe operation of hand tools, power tools, stationary machinery and other equipment for the fabrication and finishing techniques are followed by “hands – on” student exercise, using a wide variety of modeling material, including timber, plastics and metals.

THIRD SEMSTER

PID-201 PRODUCT DESIGN – I

Design a product with the concept of user friendly, attractive and attention seeking. This course comprises of introduction to product design, its applications, basic design parameters, product design process, types of structure, frame structure, forces in frame structure, rigid and non-rigid structure, structure failure, stable and unstable structures, centre of gravity, basic rules of structural stability, members, structural sections, beams, cantilever structure, general mechanisms, belt and pulley transmission system, no-slip belt and pulley system, chain and sprocket, worm and worm wheel, gear systems, rack and pinion, cam and follower, crank and slider, types of lever, their mechanical advantage and linkages.

Projects:

- Wall Clock Design: To design a wall clock that is functional yet innovative / Creative to be a part of that particular environment and eliminates the monotonous of design.
- Product that incorporates frame structures: Structure is the backbone of every product. Frame structures incorporate the arrangement of multiple elements that give the rigidity / firmness to the structure and make the composition to appear visually stable as well as aesthetically appealing. The project was to design any product that integrates its basic structure using frame bars to verify the rigidity as well as the aesthetics.
- Portable Speakers: To design speaker that is functional, trendy and easy to carry anywhere. The task was to design the outer body of the speaker keeping in mind the shape and material specification to enhance the quality of sound and to target maximum audience.

Reference book:

1. James Garratt “Design and Technology”, 2nd edition, 1993
2. Design and Technology by James Garratt, September 1996

PID-202 ERGONOMICS - I

The subject encompasses the technical data of human physical measurements-anthropometrics, to relate them with the design of products, so as to improve efficiency, productivity, safety and health in work settings. Furthermore it includes introduction, basic parameters, types, principles, benefits, anthropometry, importance of anthropometry in ergonomics, basic ergonomic factors, evolution of ergonomics , brief history of ergonomic products in different eras, fields of ergonomics, chair ergonomics, posture explanation, features of ergonomic chair, human anatomy, musculoskeletal disorders, their reasons and effects, ways to minimize MSDs, workspace design, guidelines of designing ergonomically fit workspace, posture incorporation, work surface setup, workspace envelope, working zones, workspace motions and postures, visual workspace and anthropometric sheets of different body postures.

Projects:

Anthropometric sheets of standing and sitting postures.
Ergonomics of Barstool. (Strong and weak example.)
Redesigning of symbols and signs according to visual ergonomics.
Redesigning of prayer chair according to ergonomic factors.
Ergonomic workstation designing

Reference book:

1. James Garratt “Design and Technology”, 2nd edition, 1993.
2. “Ergonomics and Design A Reference Guide”, Compiled and Written by Scott Openshaw, Allsteel & Erin Taylor, Allsteel, 2006.
3. “The ergonomic seating guide handbook” by HAWORTH, 2008.
4. “Human Factors and Ergonomics”, José J. Cañas, Boris B. Velichkovsky and Boris M. Velichkovsky, April 2011
5. Ergonomics and Design A reference guide By Scott openshaw, Allsteel and Erintaylor, August 2007

MET:203 ADVANCED MATERIALS & SCIENCE

Introduction to phase Diagrams, Phase Diagram, Types of Phase Diagrams, Lever Rule, Solidification of Alloys, Introduction of alloys, Types of Alloys, Ferrous Alloys, Classification of Ferrous Alloys, AISI-SAE Designation System, Stainless steels, Commercial steels, cast irons, types of Cast irons, mechanical properties of copper, Types of Brasses and Bronzes, mechanical properties of Nickel, mechanical properties of Magnesium, metal fabrication techniques,

Reference Books:

1. William D. Callister, Jr. David G. Rethwisch. “Materials Science and Engineering, An Introduction” 7th Edition, John Wiley & Sons, Inc.
2. Sydey H. Avner “Introduction to physical Metallurgy”2nd Edition, McGrawHill Book Company

PID: 204 HISTORY OF CREATIVE ART & DESIGN-II

This course is in continuation to the previous course. In this course students will study the development of product and industrial design from advent of Islam to 1900 A.D. This will include early Muslim arts, Umayyad(661–750), Abbasid (750–1258), Fatimid Dynasty (909–1171), Sultanate of Delhi (1206 – 1526), Ottoman Empire(1299-1922), Sultanate period, Mughal Dynasty(1526-1857), Medieval Period(5th to the 15th century), Romanesque(1000-1200), Colonialism and the Sikh Rule (1762-1849), Gothic(mid 12th to late 16th century), Renaissance(14th to the 17th century),. It will deepen the understanding of the arts and why society might be enriched by the arts and technologies. It pays special attention to cultural exchanges and common themes that ran through different civilizations. It adopts historical and comparative perspectives to achieve an understanding of the civilizations in their own terms and from a holistic view of arts. It compares and contrasts styles and delves into how they developed.

Practicals

Storyboard of Umayyad dynasty

Tile making in clay (decorative patterns inspired from Umaayad, Abbasid & Fatimid dynasty)

Design of any kind of product inspired from early Muslim art

Reference Books

1. Art Across Time- (Laurie Schneider Adams), 2007
2. History of Art architecture sculpture and painting by Jacques Thuillier, 2002
3. Horst De La Croix “Garner’s Art Through Ages”, 10th Reiss Edition

PID: 205 COMPUTER AIDED DESIGN

The software associated with this is Auto CAD. Complete 2D commands, Page limit, units, command panel line, construction line, curve line, polygon, mirror, offset, array, move , rotate, scale, stretch, trim, extend , join, fillet, chamfer, explode. Orthographic projections, measured 3d isometric views, sections. Layer properties, Inquiry, Blocks, Dimension and Printing. All of these 2D commands will be then exercised to make 2D Drawings of various objects/ Products.

Reference Book:

Engineering Graphics with Auto CAD By Kulkarni, Rastogi and Sarkar (2009)

HU-201 Technical Report Writing**FOURTH SEMSTER****PID-211 PRODUCT DESIGN - II**

The major objective of this course is to further strengthen the concepts of the students in terms of product design, to make them familiar with the materials especially wood and many other dimensions to improvise their skills and abilities This course comprises of design psychology, color psychology, implementation of design principles in product design, fibonacci series, sense of proportion, safety factor, structure and types of wood, band saw, circular saw, hand held circular saw, jig saw, chain saw, wood defects, its causes and precautions, log cutting methods, seasoning of wood, wood joints, wood protection, by products of wood, properties and types of glass, interior design perspective and concept of space .

Projects:

- Key Holder/Doorbell: To design a product that can be used to place the keys or to inform the person in the house that someone is outside irrespective of the limitation of key holder/ door bell.
- Furniture Design
- To design furniture items of any of the following areas according to the comfort and ambience of that particular area.
 - Bedroom
 - Dinning
 - Drawing
 - Kitchen
 - Lounge
 - Classroom

Reference book:

1. “Technical Wood Working” by McGraw Hill, 2nd edition, 1976.
2. The art of wood working, handbook of joinery by Marc Cassini, 1993.
3. The Quark and the jaguar By Murray Gell-Mann, September 1995

IME: 251 WORK STUDY & ERGONOMICS

It includes further up-gradation of the basic Ergonomics course, a range of technical and mathematical information, to understand the advance concepts, four major factors to improve human comfort level, which are thermal conditions, ventilation, light, and acoustics. Thermal data, thermal conditions, sensations, regulation, comfort and thermal performance. Ventilation includes human respiration, perspiration, indoor air quality and the ways to improve it. Lighting

emphasizes on human vision, light, color, sources, luminaries, lighting design, visibility, glare and lighting research. Acoustics involve noise, noise control, sounds in buildings, speech privacy and whole body vibrations.

PID: 215 ADVANCED COMPUTER AIDED DESIGN

3D Model making ,Use of 3D Commands from different Toolbars , Solids, Extrusion, Subtract, Revolve, Shapes, Views, UCS-I, UCS-II, 3D Orbit, Solids Editing, Poly Line, Surfaces, and Printing Techniques. All of these 3D Commands will be then exercised on design exercises to make 3D Models of various Objects / Products.

Reference Book:

1. QCAD An Introduction to Computer Aided Design By Andrew Mustun, March 2012

PID:216 AESTHETICS

It includes theories of Aesthetics, Proportion and Scale, Introduction to classical proportioning systems, Golden Ratio, Fibonacci Series, Ken System, Anthropometry and Ergonomics, Geometrical Analysis, Golden grid software and its application in reference to product design.

Reference Book:

1. Aesthetics: An Introduction By George Dickie, 1st Edition 1971
2. Aesthetics: A comprehensive Anthology By Steven M. Cahn, 2007

MA: 217 STATISTICS

This course will introduce students to the basics of statistics, measures of central tendency, dispersion, moments and skew. Curve fitting by the least squares methods, Simple regression and correlation, probability, random variable, discrete probability distribution and continuous probability distribution.

IS:201 Islamic and Pakistan Studies –II (copies attached)

FIFTH SEMSTER

PID: 301 PRODUCT DESIGN III

This course is in continuation of Product Design II, previously studied by the students. Understand principles and concepts of design and designing, Learn about the Product Design Specification; Case study in design and innovation, Manufacturing process that includes the study of cutting, machining, drilling, milling, shaping, turning, water jet cutting, laser cutting, etching, shearing, different joining process that include the thorough study of adhesive bonding,

types of adhesive bonding, soldering and brazing, welding, types of welding, mechanical fixings. Metal stamping, bending, embossing, hemming, forging. They'll also gain insights from industry veterans.

Practical

The aim this time, is to introduce the students with the research aspect of the design projects, conceptualize and evaluate ideas, making them tangible through products in a more systematic approach. At the end of this course, students should have the ability to manage design projects, and subcontract areas to other sectors of the design industry. They should also be able to deal with important aspects including technology, ergonomics, usability, human factors and material technology. The course will include the projects relating to commercial products.

- Counter Hanging Light
- Library book shelf
- Exhibition Design
- Footwear design

Reference Books:

1. Materiology by Frame Birkhauser , 2009, Expanded Edition
2. Product Design Paul Rodgers & Alex Milton ,2006
3. Materiology By Daniel Kula and Elodie Ternaux, December 2008

PID:302 3-D MODELING

It's a practical subject. The materials to be explored are, Card Board, Clay, Wood, Plaster of Paris, thermo pole, paper mashie and mild steel, It also includes basic modeling techniques which includes modeling, casting and welding.

Reference Book:

1. Prototyping and Model Making for Product Design By Bgarki Hullgrimsson, September 2012

PID:303 PHOTOGRAPHY

Historical perspective of photography and an in-depth elementary knowledge of cameras, technical function and usage for a variety of purposes such as product photography, gradually taking them to professional handling of cameras and preparing photographic visuals for advertising as well as theoretical and historical aspect of photography. This course would lead to the use of multimedia studies. The course generally encompass Short history (camera), Types of camera, Handling of camera, Type of camera lens, Type of camera filters, Film speed, Enlarger, Depth of field, Principal Focus, Shutter & Aperture, Angle of view, Color theory of light, Tripack film,iso number.

PRACTICAL

- Background manipulation,
- Outdoor photography (miniature)
- Architectural photography
- Product photography in studio
- Jewelry photography

Reference Book:

1. Foundations for Art & Design (A guide to Creative Photography) by Mark Galer, 4th Edition 2010

PID: 304 HISTORY OF CREATIVE ARTS AND DESIGN-III

The basic requisite for History of Creative Arts and Design-III is to have firm grip on the history of the art movements from the baroque era to Art Deco period. The fundamental stages of ‘modernity’, modern movements starting from Baroque, Rococo, Barcelona Exhibition, Art and Craft movement, Art Nouveau, Art Deco, role of Bauhaus, post modernism, hi Tech, deconstructivism. The areas to be emphasized in all these movements would be mainly product including history, development in arts, architecture, furniture, painting and sculpture.

Reference books:

- Art across Time – Third edition Volume II The fourteenth Century to the present BY LAURIE SCHNEIDER ADAMS, 2010
- History of art architecture sculpture and painting by Jacques Thuillier(2002)
- Art Deco by Camllad e Bedoyer & Alan Power(2005)

PID:305 COMPUTER MODELING & RENDERING

The course will include introduction to the software, familiarity with different toolbars. All these commands will help the students to render their 3d models, give the feel of different types of materials and design of the ambience to evaluate product. Includes Pivoting, Scale tool, Snaps toggle/angle snap toggle, Percent snap toggle/ spinner snap, transforming, interactive gizmos , Selection filters, Selecting with the Edit menu, Locking selection sets, Setting Object Properties, Hiding and Freezing Objects, Drawing and Editing 2D Splines and Shapes, Arrays, Grouping , Linkage, Modeling with Polygons, Editing Poly Objects, Editing geometry, Working with Compound Objects, Modifiers, Applying Materials and Textures , Creating Compound Materials and Using Material Modifiers, Unwrapping UVs, Configuring and Aiming Cameras, Using Lights and Basic Lighting Techniques, Using Atmospheric and Render Effects, Photometric light parameters, Rendering a Scene, Assigning renderers, Rendering with mental ray, Rendering With VRAY, Understanding Animation and Keyframes

Practical:

Basic 3d shapes

Make computer keyboard by help of 2d default drawings make use of these basic commands

Make Shop Interior with complete branding and generate scan line renders

Explore Modifiers or make products by using modifiers

Make outdoor complete scene like ground , play area etc

Make different type of materials like wood texture , paint etc.

Make map for road make a corridor scene on max

Generate renders by apply camera scene of different views.

Create a scene with involve use of lighting like bed room, dining room etc.

Write a report on rendering introduction for understanding of renderings

Make sunlight scene with different timings of sun

Make room interior with proper lighting

Make 2 products on max and generate their studio renders

Make animation of 2-3 minutes like on snooker game, helicopter movement

Reference book:

1. Mastering Autodesk 3ds Max Design, 2013
2. Autodesk 3ds Max 2013 Bible By Kelly L. Murdoc

PID: 306 PACKAGING PHYSICS

Introduction to Fundamentals of Physics, Introduction to semiconductors, energy band theory of solids, n-type and p-type semiconductors, pn junction diode their characteristic curves, applications of semiconductor materials and devices. Structured Design (life size and scaled), shelf life (examples by the teacher w.r.t. Product Design), Quality Assurance, Package Design Process, CAD, CAM, Rapid Prototyping, Document Automation, Packaging Materials, Product Housing, Study the effect of energy flow on packaging (current, sound, magnetic waves, radiations), Environmental consideration, sustainable packaging (environment, social, economical), packaging life cycle, logistics, transportation (manufacturing till end user), packaging legislations (ISO standards, health & safety standards)

SIXTH SEMSTER

PID: 311 PRODUCT DESIGN IV

This course is in continuation of Product Design III, previously studied by the students. Introduction to different materials and its detailed applications this include fiberglass, types of fiberglass, properties of fiberglass, study of different products made up of fiberglass, introduction to plastics, define what polystyrene is and what are the further characterization like GPPS, EPS, HIPS,ABS, Glass, borosilicate(pyrex), alucobond, overview of packaging, need for packaging, types of packaging, hazards in distribution, function of package, design fundamentals of package design, need for changes in package design, features of effective design, customers

appeal, packaging graphics, package color, shelf life, materials for package design, paper & paperboards, folding cartons, setup boxes, corrugated boards, metal package, types of metal package, advantages of metal package, methods of manufacture-three piece tin, two piece tin, one piece tin, aerosols package, metal foils, plastic lamination, glass packaging, types of glass containers, label for package, purpose of label, components of label, wooden containers, types of wooden boxes, printing, pre-press process, proofing, importance of CMYK in printing, different printing process, rotator letterpress printing, offset printing electrotyping, silkscreen printing process, digital printing.

Practical

Gondola Design (Point of Sale Design) place where a retail transaction is completed for variety of products or brands.

- Choosing a brand
- Be bold to command attention
- Add Value
- Make it interactive

Study of Materials in detail

Bus Stop Design

- Designing proper shelter and sitting space
- Make it interactive
- Study of Materials
- Utilizing Renewable Energy like solar, wind and rain water
- How bus stops can be use for advertisement purpose

Design any product with a problem statement involve the technical aspect of the design, the mechanics used, and the industry requirements.

Reference Books:

1. Fundamentals of packaging technology - by s. Natarajan, m. Govindarajan, b. Kumar, 2009
2. Materiology by Frame Birkhauser & Product Design Paul Rodgers & Alex Milton, July 2011
3. Prototype to Product a Practical Guide for Get Into Market By Alencohen, October 2013

PID:313 GRAPHIC DESIGN

This course deals with a mature thought process in design from concept making to the Final production of design for Advertising, using a Variety of Typography and Printing processes in detail. The course comprises of Letterpress printing, Offset printing, Half tone screen printing, Ink making, Paper manufacturing, Color separation, Surface plate, Deep etch plate, Camera processing.

Practical

Logo & Stationary Products Design
Modular grid (Grid based format design)
Typographic Poster Design
Book Title Design
Printed Submission of Magazine & Newspaper Ad
Brochure design

Reference Books

1. Graphic Design Solutions by Robin Landa, January 2010
2. Visual Dictionary Of Graphic Design by Ambrose & Harris, November 2006
3. Materials, Process Print Creative Situations For Graphics Design by Daniel Mason, October 2007
4. Graphic Design Basics by Amy. E. Arnston, February 2006

PID: 314 RESEARCH METHODOLOGY

This course comprises of the tools & techniques of scientific research methods & their application in the field of product and Industrial design. Understanding of topics which focuses on the formation of the problem & related hypotheses; development of research design; measurement of variables; data collection methods; various sampling techniques; construction of questionnaires; interviewing techniques, analysis of data & its interpretation & writing of the research report. The course objectives addresses on the aspects that familiarize the students with qualitative research methods as independent or complementary to the quantitative methods in all aspects and spheres. At the end of this course the students will be able to design a comprehensive (quantitative and qualitative) inquiry to at least one selected issue related to product and Industrial design.

Reference Book:

1. Research Methods for Product Design By Alex Milton and Paul Rodgers, December 2013

PID:315 Introduction to Management

Introduction to management basics, definitions by different authors & their perspective, management in terms of process, Elements, functions, importance and levels of management. Leadership, managers, managerial skills, role and functions. 14 principles of management, theory X and Y by Douglas, Planning, goals, Human Resource Management, controlling, organizational mission, MBO, decision making process, biases and errors. Strategic Management, differentiation and integration in management, organizational structures, span of management, work specialization and organizational Chart.

Practical:

Details of management hierarchy, Presentations and debating about importance of management, organizational chart of a company and its relationship with product designing. Preparing

questionnaire and interviewing a renowned manager from industry to understand the managerial role of that manager in company.

Reference book:

Management by Stephen P. Robbins, Mary Coulter. 10th Edition

ME:201 STRENGTH OF MATERIALS & MACHINE DESIGN

Mechanical properties of materials, tensile and compressive loads and stresses, Hook's Law, Modulus of elasticity, permissible and yield stresses and factor of safety, thermal stresses, cross section of beams, moments of inertia, beam loading, pointed and evenly distributed loads, pure bending of beams, cantilever and simply supportive beams, shearing force and bending moment diagrams, shear load and shear stresses in beams, deflection of beams, modulus of rigidity, torsion of circular bars, hollow and compound shafts, strain energy, theory of columns

Recommended Books

1. Mechanics of Materials by F.P. Beer & E. R. Johnston, January 2014
2. Mechanics of Engineering Materials by P.P. Benham & R.J. Crawford , 2nd Edition, May 1996
3. Mechanics of Materials by R.C. Hibbeler, 8th Edition 2010
4. Mechanics of Materials by JM Gere, SP Timoshenko, February 2008
5. Strength of Materials by Andrew Pytel, Ferdinand L. Singer, February 1987

SEVENTH SEMSTER

PID: 401 PRODUCT DESIGN V

Sustainability, sustainable product design, waste management and the 3R concept, reduce, reuse, and recycle, application of sustainability in product design, Eco Friendly systems, Sustainability and environment, Design for Disassembly (Product Life Cycle), Energy Efficient products, Energy Rating of products, Conversion methods of renewable sources, Green Economy, Recycling Basics (Cell phones, Electronics and computer, Waste prevention and recycling).

Practical:

Each student will independently select a small project, in consultation with the concerned teacher and undertake a comprehensive study of a specific region including the traditions and available resources / materials. At the end of this course and based on analysis of the study each student

will produce a prototype on an appropriate scale along with necessary drawings linking materials and forms to create innovative designs. The selected product / project may be in line with the topic selected for thesis design.

Reference books:

1. Creative Design of Products And Systems by Niku (2009)
2. Research Methods for Product Design by Alex Milton & Paul Rodgers(2006)
3. Green Guide for Artists by Karen Michael (2009)
4. Eco Design By Silvia Barbero and Brunella Cozzo, October 2009

PID: 402 FINAL YEAR PROJECT -I

In the seventh term the student will select a thesis project with the consent of teachers constituting the Thesis Board and undertake a comprehensive study to develop an independent approach towards a comprehensive design. The study would include aspects like materials, forms, social, economic, functional, aesthetic, ergonomic and ecological. At the end of this course the students will submit analysis of undertaken research case study/ies, design brief and design ideas in the form of a comprehensive report to be pursued in the next semester.

PID-403 ELECTIVES (FURNITURE DESIGN)/Ceramics/Interior/Advertisement

This course integrates introduction to furniture design, applications, categorization of furniture on the basis of function that includes utility, structural integrity and aesthetics, categorization on the basis of social use, furniture style timeline, furniture design process, factors effecting choice of material, selection of material, properties of material, material classification i.e. Composite boards, wood, metal, stone, plastic, glass and furniture joinery.

Projects:

- Jewelry chest design.
- Desk accessories for designers
- Kids furniture

Reference book:

1. “Furniture design” by Jim Postell, 2007.

PID: 403 ELECTIVE (ADVERTISEMENT DESIGN)

The basic requisite for Advertisement Design-Elective Subject is to introduce the students with the conceptualizing of ideas on soft form and then getting it print to have a complete insight of print media. The course will include introduction to advertising, printing process in detail, and

development of advertising, understand what brand is, branded world, target market, crafting ideas, copy writing, art directing, design principles, packaging and graphics. In this course, you'll establish a firm foundation for taking on professional design work. They'll gain insights from industry veterans and explore the challenges of designing posters, logos, magazine covers, book layouts, 3D designs, and brand identities. They'll understand the relationship between graphic design to other disciplines and to society. Upon completion of this course, students will have a good knowledge and the ability to manage the flow and form of communication media. This course teaches communication graphically, how we communicate today might be different tomorrow. One of the main requirements for the advertising industry is creative thinking, students should know how to deliver their message creatively yet attractive enough to grasp users/customer attention. By the end of the course they should be able to tackle a wide range of projects from identity design to editorial design to product and packaging design.

Practicals

Background making

Making of icons precisely and accurately to enhance software use

Making OF ADVERTISEMENT ON REVOLUTION

Making annual report of a company both in soft and hard form

Campaign for any brand

1. Change the brand name
2. Make a new logo
3. Make a new package box
4. Magazine Ad
5. Billboard
6. Animation with studio rendering

Reference Books

- Creative Advertising An introduction By Miriam Sorrentino, 2014
- Graphic Workshop Step By Step Guide Chuk Green , 2004

PID: 403 Elective (Visual Communication Design)

PID: 403 Elective (Advanced Ceramics)

PID: 403 Elective(Product Development And Manufacturing)

HU: 401EnterprenurensHIP& Leadership (Copy attached)

EIGHTH SEMSTER

PID: 411 Final Year Project -II

In the final semester, during this course the students will utilize the information, data collected and analyzed during the seventh semester (PID-402) and will execute the thesis project under the

guidance of the faculty members. Thus fusing and utilizing all the skills acquired during their professional educational carrier in this Department and also demonstrating his / her talent as a product designer. Much of this effort would be depicted in term of drawings, models and presentations by the students individually.

PID-412 Professional Practice

It incorporates major components of professional practice, characteristics of a professional, professional practice module/framework, purpose and format (cover letter, resume, Curriculum vitae), types of organization, organizational structure, contract document, continued contract document, ending contract document, types of work systems, work system framework, work system life cycle model, professional ethics, memorandum of understanding, human resource management, labor laws set by the government of Pakistan, feasibility report, TELOS rule, patent and portfolio.

Projects:

Class assignments such as conducting interviews, professional behavior, presentation skills and oral presentations have been practiced throughout the semester during practical classes. Furthermore, documents such as cover letter, cv, contract document, MOU and feasibility report.

Reference book:

1. Understanding and researching professional practice by Bill Green, 2009.