PROPOSED UNDERGRADUATE COURSE OULTINE FOR SESSION 2024 AND ONWARDS

FIRST SEMESTER

PID-121 FUNDAMENTALS OF DESIGN -I

Course Description:

This course focuses on developing the fundamentalskills of design and teaches practical competenciesrelevant to creative design process which are applicable in the field of Design. It will coverfundamental aspects of any design which include elements of design i.e. line, shape, form, color,value, and texture. Different mediums pencil and black fiber tip, poster colors, cutting, pasting are used in the form of composition to achieve the objectives of the course.

Objectives:

- To understand concepts of design and its application in different fields of art. Express concepts of design by using dots, lines, and shapes.
- To create understanding of different types of organizational relationships and their psychological impression in design.
- To apprehend the application of natural and artificial textures to make the design more realistic.
- To create an understanding of different color theories and their application in visual designs.

Recommended Books:

- William Lidwell, Kristina Holden, Jill Butler, 2023, *Universal Principles ofdesign*.
- kaufman JC ,2021, *Creativity an introduction.*
- Stephen Pentak, David A. Lauer.,2015,*Design Basics*.

PID-121L FUNDAMENTALS OF DESIGN -I

Course Description:

This course focuses on developing the concept of design and teaches different practical skills used tocreate visual designs. Elements of design are studied in detail with the help of small assignmentsfor complete understanding of the content and to enhance creative skills of the students. Students will create different compositions by using pencils,black fiber tip, poster colors, cutting, pasting etc.

Objectives:

- To create understanding of design and express design ideas by using dots, lines, and shapes by using pencils, black fiber tip
- To give Expression of different types of organizational relationships by usingcutting pasting techniques.
- To learn how to create textures in compositions by using pencils and black fiber tip.
- To comprehend color wheel to understandthe analogy of colors. Application of poster colors to understand the expression of different color theories in design.

Recommended Books:

1. William Lidwell, Kristina Holden, Jill Butler, 2023, *Universal Principles ofdesign.*
2. kaufman JC ,2021, *Creativity an introduction.*
3. Stephen Pentak, David A. Lauer.,2015, *Design Basics*.

PID-110L VISUAL COMMUNICATION

Course Description:

This course will provide the framework to understand and manipulate visual elements effectively in a variety of communication

mediums. It will enhance communicating abilitiesin the form of freehand visual sketches usingfundamentals 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 andunderstanding 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, watercolor pencil rendering, visualization of products. Detailed sketching for products, piece part drawing, section of the product, blow ups, mechanism drawing.

Objectives:

- To illustrate line sketching & shape manipulation while rendering light in highlights and shadows in a drawing subjectusing different mediums.
- To identify and capture the effects of 1- and2-point perspective and their implementation.
- To understand and draw proportional relationships of multiple objects placed in complex still life which help perceive the environment of the product. It will help to manipulate the formal elements and principles to achieve better design solutions, compositions, and layouts.

Assignments:

1. Line exercise
2. Still Life Sketching, Scaling & SpeedDrawing
3. Box drawings / Basic Shape sketching
4. Shape Manipulation
5. Lighting & Shading of forms
6. One- & two-point Perspective
7. Detailed Product Sketching & Rendering

Recommended Books:

1. Koos Eissen and Roselien Steur, 2017,"*Sketching for Product Designers: APractical Guide*", 3rd edition
2. Kevin Henry, 2017, "*Design Sketching: Drawing Techniques for ProductDesigners*", 2nd edition
3. Inc. Sterling Publishing Co, June 1, 2007, "*Art of Sketching"*
4. Erik Olofsson and Klara Sjolen, 2012, "*Design Sketching*", 2nd edition

PID 114 MATERIALS AND TECHNOLOGY-I

Course description:

Classification of materials, Metals, Alloys and their common uses, polymeric materials 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, , Atomic arrangement in metals, , Theoretical density calculation, Concept of grain & grain boundary, , 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 Due 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.

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.

Recommended 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

IS 102 Islamic studies

CSC 106 Applications of Information and Communication Technologies

PID-108 HISTORY OF CREATIVE ARTS &DESIGN-I

Course Description:

Learning Islamic the history of creative arts and designprovides a deep understanding of design evolution andunderstanding how cultural, social, and technologicalfactors over time have influenced the design. This subject explores creative art history and visual culturefrom the Medieval era to the Muslim period. As the progress of the contents, the student would learn aboutthe design history of the prehistoric era, Egyptiancivilization, Greek and Roman influence on the Art culture, Mughal creative art history, and the great periods (Umayyad, Abbasid, Fatimah, Ottoman, and Delhi).

The course offers a broad choice of subject areas, paired with in-depth study and research on product design.

Objectives:

- To get inspiration for the new designs and help the product designers to avoid repeating previous mistakes.
- To be able to understand the cultural context in which products will be used.

Recommended Books:

1. Ahmed, L. 2019. *The Empire of the Sultans: Ottoman art from the collection of Nasser D. Khalili. Khalili Collections.*

Laurie Schneider Adams. 2010. *Art Across Time*- 4th Edition.

HU 111L COMMUNICATION SKILLS

Course Description:

Communication Skills is a practical course that offers an opportunity to learn, apply and practise the principles of interpersonal communication in daily life. Psychological, social, cultural, and linguistic aspects that influence interpersonal and inter-organizational interactions have been emphasized.

Course Objectives:

1. To improve the students' communication skills required to be competent communicators.

2. To improve the students' understanding of day-to-day functional use of language.
3. To increase the students' understanding of communication skills leading to successful behavior in business setups.
4. To enhance the students' basic written communication in a professional context.
5. To apprise the students with social and business etiquette and manners.
6. To acquaint the students with the importance of non-verbal communication.

Reference Books and sources:

1. Herta A. Murphy, Herbert W. Hildebrandt & Jane P. Thomas. Effective Business Communications. McGraw-Hill/Irwin [1997].
2. Raymond V. Lesikar & Marie E. Flatley. Basic Business Communication. McGrawHill/Irwin [2001].
3. Terry Mohan, Helen McGregor, Shirley Saunders & Ray Archee. Communicating as Professionals. Cengage Learning Australia [2007].
4. Pat Maier, Anna Barney & Geraldine Price. Study Skills for Science, Engineering and Technology Students. Pearson [2009].
5. Janet Gerber. 650+ English Phrases for Everyday Speaking. [2014]
6. Harvard University Competency Dictionary
7. Academic Language Function Toolkit. District-Wide Academic Support Teams [2010].

SECOND SEMESTER

PID-122 FUNDAMENTALS OF DESIGN-II

Course Description:

This subject is in continuation of the previous course i.e., Fundamentals of Design-I. This course will teachyou fundamental principles of design and how to effectively evaluate your design ideas with users. Theprinciples of design are the most important part of anydesign process, without understanding these principles, it would be very difficult for the users to understand the type of message that the designer is trying to communicate. It involves different types of layouts design and creating small products by focusingon different principles of design, such as balance,rhythmic, harmony, unity and variety, spatial tension,proportion, and movement.

Objectives:

- To understand basic concept of designprinciples and its application in design.
- To comprehend the concept of balance in design by focusing different types of balance (symmetrical, asymmetrical, and radial)
- To understand the concept of Proportion by elaborating its use in history, to improve the proportion of the products.
- To maintain coherence and interest in a composition concept of Unity and variety willbe discussed in detail.
- To elaborate the use of Harmony Rhythm andmovement to make a design interesting.

Recommended Books:

1. William Lidwell, Kristina Holden, Jill Butler,2023, *Universal Principles of design.*
2. kaufman JC ,2021, *Creativity an introduction.*

Stephen Pentak, David A. Lauer.,2015,*Design Basics*.

PID-122L FUNDAMENTALS OF DESIGN-II

Course Description:

In this course we understand principles of design by exploring different mediums for design application. The course starts with basic compositions, layout design and reaches till creating of small products.After understanding the concept of principles of design its application will be expressed with the help of small assignments. Different medias like box board,glass, ceramic, wood, and wire will be introduced to express design ideas.

Objectives:

- To understand basic concept of design principles by creating some design compositions and focusing on layout design.
- To explore different medias to make a 3d modelto express design ideas. These medias can be use of modelling sheet, wood, glass painting, ceramic, wires etc.
- After understanding the principles of design, create small products by considering both its form and function.

Recommended Books:

1. kaufman JC ,2021, *Creativity an introduction*

2. Stephen Pentak, David A. Lauer.,2015,*Design Basics.*

William Lidwell, Kristina Holden, Jill Butler ,2010, *Universal Principles ofdesign*

PID-123L TECHNICAL DRAWING

Course Description:

This course is an introductory-level course that focuses on providing students with an understanding of the basics of drafting tools, scales, and drafting techniques. The course starts with an overview of drafting tools and how they are used in drafting. Students will also learn aboutdifferent drafting techniques, such as projection methods.

The course then moves on to sheet layout, sealmaking, lettering, pencil grades, scaling of objects,angular lines, basic angles, and the Glass Box Technique. Students will learn about Orthographic projections in oblique and auxiliary planes, Cabinetand Cavalier projections, and how to present.material specifications and inner details.

In addition, students will learn how to draw measured perspective and different types of viewingangles such as Man's Eye View, Bird's Eye View, and Worm's/Frog's Eye View. Students will also learn about Standard Views used in Space planningbasics.

Throughout the course, students will be required tocomplete several projects that will help them develop and apply the skills and techniques they have learned in class. By the end of the course, students will have a solid foundation in drafting tools, drawing techniques, and be able to create technical drawings that effectively communicatedesign concepts.

Objectives:

- To highlight the basics of technical drawing, its significance and description of Instruments used intechnical drawing as well as introduction to basic shapes and line types along with the application.
- To provide instructions regarding multipledrawing projection methods used in technical drawing, by which an image of a three-dimensional object is projected onto a planar surface as well as brief introduction to the types ofperspective.
- To execute the concept of sections, assembly drawing and exploded views are essential to explain the material specifications and manufacturing details of any product.
- To implement basic Model Making, shapes or mock-ups to have a better understanding of how 3D forms can be generated by using cardboard onany sort of paper.

Recommended Books:

1. Ilan Jefferies and David A. Madsan, 1991, *Basic Drafting Skills; Workbook, Delmar Publishers Inc.New York.*

2. Frederick E. Giesecke, Alva Mitchell, and Henry C.Spencer 2016, *Technical Drawing with Engineering Graphics,* 15th Edition. David E. Goetsch and Raymond L. Rickman 2016, *Technical Drawing for EngineeringCommunication,* 8th Edition .

PID 119 MATERIALS AND TECHNOLOGY-II

Course Description:

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, thermosetting & thermoplastic polymers, Concept of copolymers (random, alternating, block, graft), Chain fold model & Spherulitic structure, Defects in polymers, Mechanical behavior of polymers, Forming techniques (compression & transfer molding, injection molding, extrusion, blow molding, casting), Polymer additives, Application of polymers.

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.

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

Recommended Books:

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

PID-120L DIGITAL GRAPHICS

Course Description:

This course is structured around practical computer lab classes, introducing to the students, 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 fundamentals of design are practiced withthe help of Computer Aided Design. All of these to be linked to the enhanced skill of project presentation. The software associated with the course includes Corel Draw and Adobe Photoshop.

Objectives:

- To understand and demonstrate practical knowledge of Corel Draw software, including its features and functionalities for

vector illustration, page layout, andcreating layouts for brochures and multi-page documents.

- To develop proficiency in using Corel Draw tools to create professional graphic designs and effectively communicate visual elements.
- To develop proficiency in Photoshop software forimage manipulation, editing, and special effects, and demonstrate the ability to calibrate images accuratelyfor various output methods, both print and web.

Recommended books:

Peter Schiessl , Oct. 27 2019, *CorelDRAW 2019 & CorelDRAW Home and Student 2019 - Training Book with many Exercises Paperback* Andrew Faulkner, 2020 release, *Adobe Photoshop Classroom in a Book* 1st Edition.

ME 100L WORKSHOP PRACTICE

Course Description:

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.

MA 154 QUANTITATIVE REASONING- I

Quantitative Reasoning (1) is an introductory-level undergraduate course that focuses on the fundamentals related to quantitative concepts and analysis. The course is designed to familiarize students with the basic concepts of mathematics and statistics and to develop students' abilities to analyze and interpret quantitative information. Through a combination of theoretical concepts and practical exercises, this course will also enable students cultivate their quantitative literacy and problem-solving skills while effectively expanding their academic horizon and breadth of knowledge of their specific major / field of study.

Recommended Books:

1. Quantitative Reasoning: Tools for Today's Informed Citizen" by Bernard L. Madison, Lynn and Arthur Steen.
2. "Quantitate Reasoning for the Information Age" by Bernard L. Madison and David NI. Bressoud.
3. "Fundamentals of Mathematics" by Wade Ellis.
4. "Quantitative Reasoning: Thinking in Numbers" by Eric Zaslow.
5. "Thinking Clearly with Data: A Guide to Quantitative Reasoning and Analysis" by Ethan Bueno de Mesquita and Anthony Fowler.
6. "Using and Understanding Mathematics: A Quantitative Reasoning Approach" by Bennett, J. 0., Briggs, W. L., & Badalamenti, A.
7. "Discrete Mathematics and its Applications" by Kenneth H. Rosen.
8. "Statistics for Technology: A Course in Applied Statistics" by Chatfield, C.
9. "Statistics: Unlocking the Power of Data" by Robin H. Lock, Patti Frazer Lock, Karl Lock Morgan, and Eric F. Lock.

QT 101 TRANSLATION OF THE HOLY QURAN-I

HU 214 PSYCHOLOGY

Course Description:

This course introduces the important principles and theories of human behavior. Students will learn about psychological concepts, methodologies, approaches, key terms, and case studies. Students will not only apply psychological theories, concepts, and studies to real-life situations, but also assess their personalities, work on their emotional health, and take care of others' well-being. Students will gain a better understanding of why people do what they do and how they think, feel and act. In addition, learners will develop scientific and critical evaluation skills involving tolerance and a fundamental understanding of human ethics in personal, social, and professional domains.

Recommended Books:

1. Introduction to Psychology (A critical approach), Rose M. Spielman; Kathryn Dumper; William Jenkins; Arlene Lacombe; Marilyn Lovett; and Marion Perlmutter. Edited further by Jill Grose-Fifer, 2021.
2. Introduction to Industrial/Organizational Psychology, Ronald E. Riggio, Stefanie K. Johnson, Routledge, 8th Edition, 2022.
3. Moral Psychology: A Contemporary Introduction, Valerie Tiberius, Routledge, 2nd Edition, 2023.
4. Understanding Psychology, Robert S. Feldman, McGraw Hill Companies Inc., 12th Edition, 2012.

Psychology, David G. Myers, C. Nathan DeWall, 11th Edition, 2015.

THIRD SEMESTER

PID-210 PRODUCT DESIGN – I

Course Description:

This course provides an in-depth understanding of theprinciples and processes involved in product design and development. The course covers several essential topics related to product design, including design and ideation, aesthetics, product development and process selection, andfactors considered in product design.

The structure and forces section focuses on the physics of structures and forces that impact product design. Students will learn about structural stability and center of gravity, aswell as the properties of structural members and mechanisms, such as pulleys, chains, gears, worm drives, racks and pinions, cranks and sliders, cams and followers, levers, and linkages.

Overall, this course provides a comprehensiveunderstanding of product design principles and processes, equipping students with the skills and knowledge necessaryto create innovative and successful products.

Objectives:

- To understand the concept of design thinking and ideation to empathize with what Product Design is,learn various stages in design process and analyzethe importance of aesthetics in product design.
- To understand new product development, evaluating the product through break even analysisalong with the processes involved and factors considered in product design.
- To analyze types of structures with different examples to create stable structures.

- To understand mechanisms in different machines to remember that how different mechanisms work like pulley, gear, screw and linkage mechanisms inreference to products.

Recommended books

1. James Garratt, 1996, "*Design and Technology*", 2nd edition.
2. Richard Morris, November 17, 2016 "*The Fundamentals of Product Design*", 2nd Edition.

PID-210L PRODUCT DESIGN – I

Course Description:

This practical course provides students with hands-on experience in designing and creating innovative and functional products. The course covers several essential topics related to product design, including the implementation of association mapping concepts, inspecting structures, and constructing products using different mechanisms. Throughout the course, students willwork on a variety of design projects that will help them develop their skills in product design, prototype development, and product analysis. They will learn how touse product design tools and software to create and refine their product designs.

Objectives:

- To implement association mapping concept for thecreation of design idea.
- To inspect Structures (Stability of frame or shell structures) through different products and application of stability rules

To construct product by combining different mechanisms and then analyzing the efficiency of product with the existing products.

Projects:

Project 1: Wall clock Design:

The project objective is to create a unique and functional wall clock design that blends seamlessly into a specific environment while also introducing an innovative and creative touch. The project aims to eliminate the monotonyof conventional clock designs and create a visually appealing and functional product that fulfills the functionalrequirements of a clock while also complementing its surroundings.

Project 2: Frame Structures:

The aim of this project is to design a product that incorporates frame structures to provide the necessary rigidity and aesthetic appeal. The project will involve designing a product that integrates frame bars to create a visually stable and appealing structure. The final design will be assessed based on its functionality, aesthetic appeal,and ability to meet the project objectives. Throughout the project, the students will develop their skills in product design, prototyping, and manufacturing. They will gain a comprehensive understanding of frame structures and theirapplications in product design, as well as the importance offunctionality and aesthetic appeal in product design.

Project 3: Mechanism-based projects:

Mechanism-based projects involve designing and prototyping a product that incorporates various mechanicalsystems, such as pulleys, gears, and linkages etc. These projects aim to develop the skills and knowledge of students in designing and developing complex mechanical systems. The design team must also have a thorough understanding of the functional requirements andperformance characteristics of the mechanical systems theyare incorporating into their design.

Recommended books:

1. James Garratt, 1996, "*Design and Technology*",2nd edition.

Richard Morris,November 17, 2016 "*TheFundamentals of Product Design*", 2nd Edition

PID-202 ERGONOMICS

Course Description:

Ergonomics is the study of designing products and workenvironments that are optimized for human use. The subject encompasses the technical data of human physical measurements, called anthropometrics, torelate them with the design of products, to improve efficiency, productivity, safety and health in work settings. This course introduces the basic parameters, principles, types, and benefits of ergonomics, explains the importance of anthropometry in ergonomics andprovides an overview of basic ergonomic factors.

Additionally, the course covers the evolution of ergonomics and a brief history of ergonomic products indifferent eras and fields of ergonomics.

The course also delves into chair ergonomics, posture explanation, and features of ergonomic chairs. Human anatomy is explored in relation to musculoskeletal disorders (MSDs), their causes, and effects. The course provides ways to minimize MSDs and guidelines for designing ergonomically fit workspaces.

The course also covers posture incorporation, work surface setup, workspace envelope, working zones, workspace motions and postures, visual workspace. Hand tool ergonomics are also discussed, as well as cognitive ergonomics and user-centered design.

By the end of the course, students will have a comprehensive understanding of ergonomics. They willalso be equipped with practical knowledge and guidelines for designing and optimizing work environments to prevent MSDs and promote wellbeing.

Objectives:

- To understand the concept of ergonomics, historical evolution, its principles, factors and theimportance of its application in product design inorder to make the products, systems and environment user friendly.
- To apply ergonomic principles w.r.t the practicalexamples from everyday life, describing the basicguidelines.
- To understand the anatomy of joints to make the students familiar with the human structure so that the risks of MSDs associated with manual tasks should be minimized.
- To understand the concept of cognitiveergonomics, the mental processes involved and the importance of user centered design methods to guarantee the usability of the end product.

Recommended books:

1. Garratt, J. 1993. *Design and Technology* (2nd ed.).
2. HAWORTH. 2008. *The ergonomic seating guidehandbook*.
3. Dul, J., & Weerdmeester, B. 2019. *Ergonomics for Beginners: A Quick Reference Guide*.

Lee, J. D., Wickens, C. D., & Liu, Y. 2019.*Designing for People: An Introduction to HumanFactors Engineering*.

PID-202L ERGONOMICS

Course Description:

The aim of the course is to introduce students to the basicperception of Ergonomics. The course concentrates on theinteraction between the user and his or her physical environment and provides a basic explanation of the systems of the body to establish a foundation for understanding and

consistently applying ergonomic principles. The subject encompasses the technical data of human physical measurements-anthropometrics, to relatethem with the design of products in order to improve efficiency, productivity, safety, and health in work settings.

Objectives:

- To create anthropometric sheets of human body postures related to any specific task.
- To evaluate chair ergonomics keeping in mind theconsiderations of ideal sitting posture.
- To create an ergonomic workspace for the specified target users to increase the efficiency andproductivity of that particular task.
- To understand the importance of product data sheets to incorporate each and every ergonomic details of any specified product.

Projects:

1. Anthropometric data sheets of human hand, sitting and standing postures w.r.t any specified product or task.
2. Conduct a chair comfort survey in the form of a questionnaire to determine the ergonomic flaws keeping in mind the considerations of ideal sitting posture.
3. Designing an ergonomic workplace w.r.t a specified user and the tasks to be performed.
4. Prepare a product data sheet in order to incorporate each and every ergonomic detail of any specified product.

Recommended books:

- Garratt, J. 1993. *Design and Technology* (2nd ed.).
- HAWORTH. 2008. *The ergonomic seating guidehandbook.*
- Dul, J., & Weerdmeester, B. 2019. *Ergonomics for Beginners: A Quick Reference Guide.*

Lee, J. D., Wickens, C. D., & Liu, Y. 2019.*Designing for People: An Introduction to HumanFactors Engineering.*

PID 203 ADVANCE MATERIALS & SCIENCE

PID-208 HISTORY OF CREATIVE ART & DESIGN-II

Course Description:

Overview of the major art movements and styles that emerged between the Baroque period and Art Deco (Baroque Art, Art and Craft movement, Rococo Art, Art Nouveau, Role of Bauhaus, and Art Deco). The historical, cultural, and social context of these art movements, as well as the artists and artworks associated with eachmovement.

The area to be emphasized in all these movements wouldbe mainly product and their art styles including the industrial revolution which ultimately gave way to brandspecializations.

Objectives:

- To provide students with an understanding of major art movements and styles from the Baroqueperiod to Art Deco.
- To explore the historical, cultural, and socialcontext of the art movements.
- To examine the relationship between art movements and product design, particularly in the context of the industrial revolution and brandspecializations.

Recommended Books:

1. Tom Nichols; published in 2022; "*Baroque: From St. Peter's to St. Paul's*"
2. Jennifer Milam; published in 2021; "*Rococo: TheEssentials*"

Charlotte Benton, Tim Benton, and GhislaineWood; published in 2017; "*Art Deco: The 20s and 30s*"

PID-209L COMPUTER AIDED DESIGN

Course Description:

This course focuses on AutoCAD software for creating digital designs of different products with precision and accuracy. It involves the study of technicalities,applications, and other aspects of computer-aided designto create drawings and models for visualizing a product. The scope of this course ranges from interface introduction, creation of technical measured two- dimensional drawings and finally visualizing 3d model ofdifferent products using solids, meshes and surfaces commands.

Objectives:

- To understand software Interface, units, layers and to create 2-dimensional drawings of differentobjects using draw and modify toolbars.
- To construct 3D solids from orthographic views using solid commands which will help integrate industrial modeling practices and standards.
- To create complex geometrical shapes of different products using surfaces and mesh modelmaking techniques.
- To apply different materials, lighting and rendering techniques to give a more realistic lookto 3D's by using the same software.

HU 221 TECHNICAL REPORT WRITING AND PRESENTATION SKILLS

Course Description:

The course has been designed to teach students how to adapt their writing to different audiences and purposes. It will help learners develop strategies for making subjects clear to readers who need to understand them. Through this course, learners will learn to write in a clear and concise style, present information logically, and design documents in which format contributes to clarity and efficiency.

Course Objectives:

1. To enable the students to learn principles of effective technical writing.
2. To help the students recognize and adapt writing for a variety of audiences and situations.
3. To enable the students to apply effective writing strategies in order to produce concise, clear and meaningful documents ranging from technical definitions to technical proposals and reports.
4. To facilitate the students in developing effective presentation skills for presenting technical and research reports, proposals, or abstracts.

Reference books:

1. Raymond V. Lesikar & Marie E. Flatley. Basic Business Communication. McGraw- Hill/Irwin [2001].
2. Sharon J. Gerson & Steven M. Gerson. Technical Communication: Process and Product. Boston: Pearson Inc. [2017].
3. Suzan Last; Candice Neveu & Monika Smith. Technical Writing Essentials: Introduction to Professional Communications in the Technical Fields. [2019]

Andrea J. Rutherford. Basic Communication Skills for Technology. Pearson [2000].

Projects:

1. Preparing detailed working/ technical drawing ofany product using all 2D commands

2. Creating a 3 D model of any product using solidmodel making commands to visualize a product.
3. Creating complex 3D models using meshes andsurfaces to visualize complex products.
4. Preparing a final project to show all the skills oftechnical design and software applications.

Recommended Books:

1. Brian C. Benton, George Omura, 2022, Mastering AutoCAD 2021 and AutoCAD LT2021 2nd Edition, Kindle Edition.
2. Paul Richard 2021, Introduction to Auto CAD 2020: *A modern perspective*,
3. James D. Bethune, 2009, *Engineering Graphics with Auto Cad.*
4. D.M. Kulkarni. A.P. Rastogi. A.K. Sarkar 2009,

Engineering Graphics with Auto Cad.

HU 212 CIVICS AND COMMUNITY ENGAGEMENT

Course Description:

The course has been designed to provide students with the fundamental knowledge of civics, citizenship, and community engagement. The course aims at teaching the undergraduate students about the essentials of civil society, government, civic responsibilities, inclusivity, and effective strategies for actively influencing and shaping society. It will help them apply theoretical knowledge to real-world situations and make a positive impact on their communities.

Reference Books:

1. Krista M. Soria, Tania D. Mitchell (Eds.). Civic Engagement and Community Service at Research Universities: Engaging Undergraduates for Social Justice, Social Change and Responsible Citizenship. Palgrave Macmillan UK, 2016.
2. Will Kymlicka and Wayne Norman (Eds.), Citizenship in Diverse Societies, Oxford-New York, Oxford University Press, 2000.
3. Christine M. Cress; Peter J. Collier; Vicki L. Reitenauer. Learning Through Serving: A Student Guidebook for Service-Learning and Civic Engagement Across Academic Disciplines and Cultural Communities. Taylor & Francis, 2023.
4. Carole Cox, Tina Maschi. Human Rights and Social Justice: Key Issues and Vulnerable Populations. Routledge, 2022.
5. Muslim Volunteering in the West: Between Islamic Ethos and Citizenship. Springer International, 2020.

FOURTH SEMESTER

PID-218 PRODUCT DESIGN – II

Course Description:

This course will provide a comprehensive understandingof materials, their properties, and how to choose the rightmaterial for a successful outcome. The course will covera range of materials and their properties, including woodand plastics. Students will learn how to evaluate theproperties of different materials, such as strength, durability, and flexibility, and how these properties impact the final product. The course will also cover the fundamentals of wood joinery, including the different types of joints and tools used in woodworking. Furthermore, the basic principles of hydraulic and pneumatic systems, including their construction and operation and the basic theories and concepts ofcontemporary marketing, including market research, product development, advertising, customer satisfaction,quality and product management will be covered.

Objectives:

- To discuss the range of materials along with their properties to determine the successful outcome of theproduct through the right choice of material

- To describe the fundamentals of wood joinery, tools, and different types of joints as well as basics to develop skills on designing joints and gluing differentcomponents.
- To develop comprehensive grounding in the basic principles; construction and operation of hydraulicand pneumatic systems and discuss the practical applications.
- To explain the basic theories and concepts ofcontemporary marketing and to develop and utilize analytical, decision- making, and problem-solving skills that approximate "real world" marketing.

Recommended books:

1. James Garratt, 1996, "*Design and Technology*", 2nd edition.
2. Philip T. Kotler, Kevin Lane Keller , 2011, "*Marketing Management*", 14th Edition.

Tom Carpenter and Mark Johansson ,2020, "*TheComplete Book of Woodworking: Step-by-Step Guide to Essential Woodworking Skills, Techniques and Tips*"

PID-218L PRODUCT DESIGN – II

Course Description:

This course is designed to provide students with hands-onexperience in product design, specifically focusing on thedesign and development of a portable speaker, wooden joinery and marketing. Students will understand the principles of product design and how to apply them to create a functional and aesthetically pleasing product. Beproficient in using design software to create 3D models ofproducts. Have a working knowledge of wooden joinery and how to use hand and power tools to create joints. Be able to conduct market research to identify the needs andpreferences of their target audience.

Objectives:

- To implement the concept of portability into an electronic product while keeping in mind all the technical specifications and the components involved in it.
- To implement knowledge in furniture and product design about construction, joints, materials, and production. Understanding relationships between furniture – function – space, and product – function.
- To explain the basic theories and concepts of contemporary marketing and to develop and utilize analytical, decision- making, and problem-solving skills that approximate "realworld" marketing.

Projects:

Project 1: Portable Speaker Design:

The objective of this project is to implement the concept of portability into an electronic product (speaker) while considering all the technical specifications and components involved. The goal is to design and develop a speaker that is easy to carry and transport while ensuringthat the performance and functionality of the product arenot compromised. The project will also involve conducting market research to identify potential customersegments and understanding their needs and preferences.This will help in the development of a product that meetsthe expectations of the target audience.

Project 2: Furniture Design incorporating woodenjoinery:

The objective of this project is to design a furniture item (stool, end table, shelves) that incorporates wooden joinery to provide comfort ability and stability. It must besuitable for a small environment, match the surroundings,and limit the amount of space it

requires. The design canbe a universal design or for any specific age group. In addition to the joinery and ergonomic considerations, thedesign will incorporate the characteristics of a design movement that should reflect its principles of simplicity,functionality, and geometric forms while also consideringthe comfort of the user.

Project 3: Survey Analysis to determine Garvin's quality dimensions:

Conduct a survey in the form of a questionnaire to determine the customer requirements for a consumer electronic product. Record/gather the responses and organize them like Garvin's quality dimensions.

Recommended books:

1. James Garratt, 1996, "*Design and Technology*", 2nd edition.
2. Philip T. Kotler , Kevin Lane Keller , 2011, "*Marketing Management*", 14th Edition.

Tom Carpenter and Mark Johansson ,2020, "*TheComplete Book of Woodworking: Step-by-Step Guide to Essential Woodworking Skills, Techniques and Tips*"

PID-221L COMPUTER MODELING & RENDERING

Course Description:

This course is designed to enable the students to render their 3D models and design the environment for theproduct. 3-D studio max is the software which will be taught to achieve these tasks. The course will include introduction to the software, and familiarity with differenttoolbars. 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.

Objectives

- To gain proficiency in 3D modeling and rendering techniques using 3D Studio Max. They will be able to create detailed and accurate3D models of products and environments.
- To develop the skills to effectively render 3D models and simulate materials. They will acquire the knowledge and skills to apply various materials and textures to their models,giving them the ability to simulate different surface properties and accurately represent thelook and feel of different materials
- To design and evaluate product environments.They will acquire the necessary skills to set uplighting, manipulate camera angles, and createrealistic ambient settings to showcase their products in a visually appealing and contextually appropriate manner.
- To develop the ability to evaluate and analyzethe impact of different design choices on the overall product presentation and user experience.

Projects:

- Basic 3d shapes
- Make computer keyboard by help of 2d defaultdrawings make use of these basic commands
- Make Shop Interior with complete branding andgenerate scan line renders
- Explore Modifiers or make products by usingmodifiers
- Make outdoor complete scene like ground, playarea etc
- Make different type of materials like woodtexture, paint etc.
- Make map for road make a corridor scene on max

- Generate renders by apply camera scene ofdifferent views.
- Create a scene with involve use of lighting likebed room, dining room etc.
- Write a report on rendering introduction forunderstanding of renderings
- Make sunlight scene with different timings of sun
- Make room interior with proper lighting
- Make 2 products on max and generate their studiorenders
- Make animation of 2-3 minutes like on snookergame, helicopter movement.

Recommended Books:

1. Pradeep Mamgain, 2020, *Autodesk 3ds Max 2020: A Detailed Guide to Arnold Renderer*, 2ndEdition

Kelly L. Murdock, 2019, *Autodesk 3ds Max 2019Complete Reference Guide*

MA 259 QUANTITATIVE REASONING II

Quantitative Reasoning (II) is a sequential undergraduate course that focuses on logical reasoning supported with mathematical and statistical concepts and modeling / analysis techniques to equip students with analytical skills and critical thinking abilities necessary to navigate the complexities of the modern world. The course is designed to familiarize students with the quantitative concepts and techniques required to interpret and analyze numerical data and to inculcate an ability in students the logical reasoning to construct and evaluate arguments, identify fallacies, and think systematically. Keeping the pre-requisite course of Quantitative Reasoning (I) as its base, this course will enable students further their quantitative, logical and critical reasoning abilities to complement their specific major / field of study.

Recommended Books:

1. "Using and Understanding Mathematics: A Quantitative Reasoning Approach" Bennett, J. O., Briggs, W. L., & Badalamenti, A.
2. "Discrete Mathematics and its Applications" by Kenneth H. Rosen.
3. "Discrete Mathematics with Applications" by Susanna S. Epp.
4. Applied Mathematics for Business, Economics and Social Sciences" by Frank S Budnick.
5. "Elementary Statistics: A Step-by-Step Approach" by Allan Bluman
6. "Introductory Statistics" by Prem S. Mann.
7. "Applied Statistical Modeling" by Salvatore Babones.

"Barrons SAT' by Sharvon Weiner Green, M.A and Ira K. Wolf:

IS 202 IDEOLOGY AND CONSTITUTION OF PAKISTAN

QT 201 TRANSLATION OF THE HOLY QURAN-II

FIFTH SEMESTER

PID-306 DESIGN INTEGRATION-I

Course Description:

The aim is to introduce the research aspect of the design knowledge of Product design specifications(PDS), Engineering Design Process, evaluate productperformance, furniture design its form, types and categorization, Kerf bending. Practical knowledge in design and innovation, Manufacturing process thatincludes the study of metal manufacturing techniques(joinery, process, merits demerits, guidelines), Universal Design Concept (UD), Design for All (Dfa),Inclusive Design, affordances & Social interaction in urban spaces.

Objectives:

- To evaluate the product based on Product design specifications (PDS), Engineering Design Process, product performance, market constraints and capability issues.
  To articulate furniture designs its form, types, and categorization along with metal manufacturing techniques (joinery, process, merits demerits, guidelines).
- To understand the Universal Design Concept (UD), its process, and related concepts like Design for All (Dfa), Inclusive Design, affordances & Socialinteraction in urban spaces

Recommended Books:

1. Birkhäuser. F; 2009; "*Materiology*" Expanded edition. Birkhäuser
2. Kalpakjian, S., & Schmid, S. R; 2013; "*Manufacturing engineering and technology.*" Pearson
3. Ulrich, K. T., & Eppinger, S. D; 2021; "*Product Design and Development*". McGraw HillEducation
4. Kiani, M; 2018; "*Inclusive Design Principles: The Basis for Designing Products for All*". Springer International Publishing

PID-306L DESIGN INTEGRATION-I

Course Description:

Introduction to the research aspect of the design projects, conceptualize and evaluate ideas, making themtangible through products in a more systematic approach. This course will develop the ability to managedesign projects, and subcontract areas to other sectors ofthe design industry. Equip the skills to deal with important aspects including technology, ergonomics,usability, human factors, and material technology. The course will include projects relating to commercialproducts.

Objectives:

- To create innovative design solutions using their knowledge of aesthetics, material technology, ergonomics, and human factors to develop commercially viable products.
- To analyze information gathered through researchto identify design problems and opportunities for effective design solutions in meeting the needs of end-users, including considerations foraccessibility and inclusivity.
- To apply critical thinking skills to evaluate designconcepts based on material properties, geometry, and structural analysis to meet designrequirements.

Project 1: Product Up-cycling

This project aims to transform used products into uniqueand stylish pieces through up-cycling techniques. Using a variety of tools and materials, the project involvesrepairing, refinishing, and repurposing old products to give it a new life, function and reduce waste.

Project 2: Product Design based on Universal Design Concept

This project focuses on creating an inclusive design basedon the principles of Universal Design. The project will explore ways to design products that are accessible, comfortable, and accommodating for people of all ages, abilities, and sizes. The goal is to create an environment that promotes social interaction and inclusivity for all.

Project 3: Kerf Bending

This project aims to explore the use of kerf bending techniques in product design. Students will learn to create functional forms by applying structural analysis and geometry using wood, acrylic, and other materials.

Recommended Books

1. Goel, A; 2021; "*Furniture Design: A Practical Guide to Design and Make Beautiful Furniture from Scratch*". Kindle Edition.
2. Bralla, J. G; 2015; "*Design for manufacturability handbook*." McGraw-Hill Education.
3. Boothroyd, G., Dewhurst, P., & Knight, W. A; 2011; "*Product design for manufacture andassembly*." CRC Press.

PID-310L PROTOTYPING

Course Description:

This course aims to identify and develop individual strengths in material investigation and model-making, andto develop an understanding of the significant role of 3D manual processes within a design context. This studio- based course will focus on a series of material and processexercises, in which a range of alternative model-making materials will be explored.

Objectives:

- To Recall and demonstrate basic principles ofprototyping.
- To Apply critical thinking skills to analyze and evaluate material properties.
- To Engage in effective communication and collaboration within a design context.

Projects:

1. Prototyping Methods Showcase
2. Material Properties Analysis
3. Collaborative Prototyping

Recommended Books:

1. Hallgrimsson, B. 2019. *Prototyping andModelmaking for Product Design*: Second Edition.
2. Norman, D. 2019. *The Design of Everyday Things*:Revised and Expanded Edition
3. McElroy, K. 2020. *Prototyping for Designers: Developing the Best Digital and Physical Products*.

PID-312 PRODUCT PHOTOGRAPHY

Course Description:

Product Photography is a branch of photography that dealswith the presentation of products intended to create awareness to the public to drive sales of that product or products. The Product Photography course would teach students how to take pictures of products to be used for

advertising and campaigns. This course generally encompasses various types of commercial and advertising photography, using traditional film as well as digital cameras. Students will learn the use of the view camera, view camera techniques, selection of lenses, camera angles,and movements. Studio and location lighting will be studied, with an emphasis placed on using various types

oflight modifiers (e.g., soft boxes, umbrellas, reflectors) for different effects. Students will learn various lighting techniques for different subjects.

Objectives:

- To understand the basics of digital productphotography and camera settings.
- To understand the types of product photography anduses of different lighting setup.
- To identify the rules for product photography andpicture framing and composition.
- To remember the advertising and branding conceptsused in Product Photography

Recommended Books:

1. Edward, G. (2020). *Product Photography Magic*(3rd ed.). Independently.
2. Sakura, N. (2023). *Product Photography: Lighting, Composition, and Shooting Techniques* (1st ed.). Rocky Nook.

PID-312L PRODUCT PHOTOGRAPHY

Course Description:

This course is intended to provide knowledge about productphotography in the studio and on the location. This will help to take shots with individual products, some complexand detailed photos to enhance the beauty of the product. Packaging shots, still life, food, jewelry etc. for the advertising of any brand and for the ecommerce purpose. This is all will be done with the help of the DSLR camera,camera techniques, selection of lenses, camera angles, andmovements. The types of lighting and the location play a vital role in making it more interesting.

Objectives:

- To understanding of objective and designing thelayout for product photography.
- To understand the usage of camera and lightingconditions in different environments.
- To remember the types of product photography tomake it experimental with diverge techniques.
- To Practically imply photography to sell theproduct swiftly.

Projects:

1. Individual Shots
2. Detailed Photography
3. Packaging shot
4. Scale Photography
5. White Background shots
6. Hero Shots
7. Food Photography and styling
8. Still life Photography

Recommended Books:

1. Barnbaum, B. 2019. *The Art of Photography: A Personal Approach to Artistic Expression* (2nd ed.). Rocky Nook.
2. Molnar, David. 2022. *Learning to see: A photographer's guide from zero to your first paid gigs*.

PID-309L.PRODUCT.VISUALIZATION.ANDANIMATION

Course Description:

Product visualization and animation is a course that focuseson teaching students the skills and techniques necessary tocreate and use 3D models and animation stations of products. The course is designed to provide students with an understanding of the principles and practices involved in creating effective product visualizations and animations.

The students will use 3d modeling techniques, lighting andshading, materials and textures, camera, and animationcontrols, and rendering processes to create amazing productanimation.

Objectives:

- To be able to create photorealistic renders andanimations.
- Understand the principles of animation.
- To be able to apply effective animations that can meet the company's demand/scope.

Hands on experience on these software's will be providedto the students:

1. Blender
2. Zbrush
3. After Effects, etc.

Recommended Books:

1. Villar, A. 2020. *Blender 3D By Example: A project-based guide to learning the latest Blender 3D, EEVEE, and Python*. Packt Publishing.
2. Christiansen, M. 2020. *After Effects Expressions Quick Reference: Guide to Creating Expressions in After Effects*. Adobe Press.

PHY 301 PACKAGING PHYSICS

SIXTH SEMESTER

PID-319 DESIGN INTEGRATION-II

Course Description:

This course is in continuation with course DesignIntegration-I. Design integration-II is an advanced course that focuses on enhancing the skills in packaging design, function, hand its types; various materials for packaging design and their shelf life; types of cartons and boxes; process of design and manufacturing package using different tools; template design and making; pre-press process, proofing and different printing process. Sustainable product design, materials and development; sustainable design theories; Product Life cycle; Carbon Footprint and Circular economy of products. Concepts of DfM, (Design for manufacturing); DfA (Design for assembly) and DfD (Design for dis-assembly), Design for Production and Prototyping. Introduction to Arduino and different sensors for product automation, Role of Artificial Intelligence in product design.

Objectives:

- To create innovative design solutions using their knowledge of aesthetics, material technology, ergonomics, and human factors to develop commercially viable products.
- To analyze basic theories, methodological tools and practical examples on how to apply sustainabledesign in products.
- To apply critical thinking skills to evaluate designconcepts based on material properties, geometry, and structural analysis

to meet design requirements.

Recommended Books:

1. Kevin Otto and Kristin Wood; 2021; "*Product Design: Techniques in Reverse Engineering, Systematic Design, and New Product Development*"
2. Caroline Till and Caroline Clark; 2020; "*Radical Matter: Rethinking Materials for a Sustainable Future*"
3. Randy J. Hunt; 2019; "*Product Design: Practical Methods for the Systematic Development of NewProducts*"

PID-317 GRAPHIC DESIGN

Course Description:

This course provides an in-depth knowledge of the businesspractices of the graphic design industry. Students are taughtan intensive studio-based program using industry-standardsoftware. Familiarize yourself with the shape and messagedevelopment. Emphasis on visual concepts and basic design theory. The purpose of this course is to make students aware of brands, brand identities, and various marketing strategies for launching and promoting newly launched products. Design is not just for the finished product.

It's about the process. This is what we call the "design process," and it can become an applied system to address almost any problem that surrounds us as a society. That's where our true contemporary value as graphic designers lie.This course includes lectures, group discussions, presentations, and creative work. Participation indiscussion and criticism is critical to the success of this class. Class assignments include finding designed artifacts,conducting research, reading handouts, and creatingpresentations.

Objectives:

- To describe the meaning of graphic design and demonstrate a thorough understanding of the elements of graphic design, basic principles ofgraphic design and basic typography to create effective visual communication for a range of outcomes.
- To examine the concepts of brand identity, tagline,and logo. Read, understand, and communicate in the language of graphic design.
- To discuss the importance of six theories of visualcommunication. Use of appropriate rules of graphics in terms of editorial design and web development.
- To evaluate and analyze the role of printing in the industry through different printing processes.Demonstrate an ability to find and use informationrelevant to the task, from a variety of information sources.

Recommended Books:

1. Bello, R. D. 2020. *Citizen First, DesignerSecond*. COUNTER PRINT.
2. Reinfurt, D. 2022. *A New Program forGraphic Design by*. Inventory Press/D.A.P.
3. Amy. E. Arnston, February 2006.Graphic *Design Basics.*

PID-317L GRAPHIC DESIGN

Course Description:

This course provides an in-depth knowledge of the businesspractices of the graphic design industry. Students are taughtan intensive studio-based program using industry-standardsoftware. Familiarize yourself with the shape and messagedevelopment. Emphasis on visual concepts and basic design theory. The purpose of this course is to make students aware of brands, brand identities, and various marketing strategies for launching and promoting newly launched products. Design is not just for the finished product.
It's about the process. This is what we call the "design process," and it can become an applied system to address almost any problem

that surrounds us as a society. That's where our true contemporary value as graphic designers lie.Class assignments include finding designed artifacts, conducting research, reading handouts, and creating presentations using various software, primarily Adobe Illustrator and Adobe Photoshop mainly.

Objectives:

- To implement an understanding of visualvocabulary to build various visual elements (diagramming, story boarding, key framing, etc.
- To design the data and pictures through different visual techniques. Identify methods and processes for conceptualizing in time-based media to create different mediums like books and prospectus.
- To build innovative forms and styles based on the design concept, keeping in mind the purpose and legibility of final graphic element.
- To organize information to make compelling and experimental visual expressions for presentation.

Projects:

1. Logo & Stationary Products Design
2. Modular grid (Grid based format design)
3. Typographic Poster Design
4. Book Title Design
5. Printed Submission of Magazine & Newspaper Ad
6. Catalogue Design
7. Redesign of Book Cover page
8. Website Design
9. Portfolio Design

Recommended Books:

1. Elam , K. 2020. *E. Mcknight Kauffer: The Artist InAdvertising* (1st Ed.). Rizzoli Electa.
2. Adams, S. 2021. *How Design Makes Us Think by*.Princeton Architectural Press.

PID-314 RESEARCH METHODOLOGY

Course Description:

This course comprises of the tools & techniques of scientific research methods & their application in the fieldof Product and Industrial Design. Understanding of research problems which focuses on the formation of the synopsis, literature review techniques, development of research design; data collection methods; case study; sampling techniques; construction of questionnaires; interviewing techniques, measurement of variables, analysis of data, its interpretation and writing of the research report. The course will objectively address the aspects that familiarize the students with quantitative, qualitative, and mixed method research in design domain.

Objectives:

- To acquaint students with research design, applicablyused in product design practices and to train them fortheir final year project.

Recommended Books:

1. Gibbons, S. January 2021. *Design Thinking inPractice*: *Research Methodology.*
2. Panagiotis Kyratsis, N. E. 2022. *Advances inProduct Design Engineering.*

3. Rodgers, A. M. December 2013. *ResearchMethods for Product Design*.

PID-314L RESEARCH METHODOLOGY

Course Description:

The course will help students to formulate a research problem, identify its sub-problems for product design research. During the course the students will apply researchtechniques on one selected issue related to product and Industrial design. They will search the relevant literature todevelop a matrix that can innovate a new design solution for the problem under investigation. Students will select one method of research design to explore design solutions.It will equip students to write the design consideration based on the research process applied earlier. They will alsolearn about presenting their research findings for a productdesign-based solution.

Objectives:

- To equip students with research, report writing and design presentation skills and preparing them for theirfinal year project.

Recommended Books:

1. Gibbons, S. (January 2021). *Design Thinking inPractice: Research Methodology.*
2. Panagiotis Kyratsis, N. E. (2022). *Advances inProduct Design Engineering.*
3. Rodgers, A. M. (December 2013). *ResearchMethods for Product Design*

PID-318 INTRODUCTION TO PROJECTMANAGEMENT

Course Description:

Introduction to project management basics, definitions by different authors & their perspective; management in termsof process; Elements, functions, importance and levels of management. Leadership, managers, managerial skills, roleand functions. 14 principles of management, theory X andY by Douglas. Management functions: Planning; goals; Organizing; staffing (Human Recourse Management); leading; 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.Product marketing; Marketing Mix; consumer phycology; ethics. Product Design Management; Project manager role& responsibilities.

Introduction to project management, emphasizing the benefits and value it brings to organizations; role of effective communication in achieving project success; define projects, differentiate them from programs and portfolio management, gain an understanding of the projectmanagement process. The course also covers the various phases involved in project management, from initiation to closure.

Objectives:

- To understand the critical management termsinvolved in management functions and principles.
- To interpret issues involved in decision making, and
- how it affects a manager's contribution towards organization, its structures and decision-making processes.
- To evaluate the effectiveness of strategies, role and responsibilities of project managers in product design and team management. Analyze product marketing principles and ethical considerations.
- To demonstrate a comprehensive understanding of project management principles and effectively applythem in product design projects.

Recommended Books:

1. Stephen P. Robbins and Mary A. Coulter; 2021; "*Management*" 16th Edition

2. Richard L. Daft; 2019; "*Management*" 13th Edition
3. Gareth R. Jones and Jennifer M. George; 2020; "*Essentials of Contemporary Management*" 9th Edition
4. Harold Kerzner; 2018; "*A Systems Approach to Planning, Scheduling, and Controlling*" 12th Edition

PID-318L INTRODUCTION TO PROJECTMANAGEMENT

Course Description:

A comprehensive practical understanding ofmanagement. The management hierarchy and communication structures within a selected company, aswell as the significance of effective management. Study a world-renowned business manager and analyze their exceptional leadership qualities and management style. To evaluate the organizational chart of a company and its cross-hierarchal communication at different management levels. To conduct an interview with a renowned managerto gain insights into their role within their company.

To further enhance the understanding of management, students will formulate a small business company based on a product line. This project will require them to develop a thorough business plan, including a marketingplan, and clearly define the hierarchy roles and responsibilities of group members.

Application of project management principles using software Primavera. Learn to utilize Primavera for projectplanning, scheduling, and monitoring, enhancing their project management skills in a real-world context.

Objectives:

- To practice frameworks of a qualitative and quantitative nature to managerial, operational, and strategic decision situations through experience of managers working in field.
- To strengthen individual's leadership quality and management ability to work collaboratively with a diverse group of individuals in project development and acquire necessary knowledge to develop business/marketing plans and company structures.
- To effectively utilize Primavera software for project planning, scheduling, and monitoring, enhancing their practical project management skills.

Assignments:

1. Participate in presentations and debates about the importance of management.
2. Analyze the management and leadership style of aworld-renowned business manager with exceptional qualities.
3. Assess the details of the organizational chart of management hierarchy and communication structure between levels of management in a selected company.
4. Prepare a questionnaire and conduct an interview with a manager to understand their managerial rolewithin their company.
5. Develop a business plan, marketing plan, and define hierarchy roles and responsibilities of groupmembers for a small business company based on aproduct line.
6. Using Primavera software, students are tasked withcreating a project plan, developing a comprehensive schedule, and monitoring project progress, demonstrating their proficiency in practical project management using software tools.

Recommended Books:

1. Peter F. Drucker; 2019; *"The Essential Drucker: The Best of Sixty Years of Peter Drucker's Essential Writings on Management*"
2. Gareth R. Jones and Jennifer M. George; 2020; "*Essentials of Contemporary Management*" 9th Edition
3. Stephen P. Robbins and Mary A. Coulter; 2021; "*Management*" 16th Edition

4. Daniel L. Williams; 2012; "*Oracle Primavera P6 Version 8: Project and Portfolio Management*" 2nd edition

PID-320 AESTHETICS

Course Description

This course will introduce the concepts and theories of aesthetics, highlight the work of famous designers, and will learn some practical examples of beautiful objects, good design and beauty. The student will learn about emotional design, pleasurable products, golden mean ratio, and gestalt principles. The students will learn aboutthe computational approaches in the field of productdesign to achieve aesthetics and beauty.

Objectives:

- To familiarize students with theories of product aesthetics and the contribution of designers, highlighting the aspects of aesthetics.

Recommended Books:

1. Herriott, R. 2021. T*he Aesthetics of Industrial Design; Seeing, Designing and Making*. Routledge.
2. Tom Peters, T. K. *The Art of Innovation: Lessonsin Creativity from IDEO*, America's Leading Design Firm. 2016 Edition
3. Weinschenk, S. M. 2011. *100 Things Every Designer Needs to Know About People*. New Riders.

PID-320L AESTHETICS

Course Description:

Students will be asked to choose one product from the work of famous designers, redraw its sketches and development of free from using aesthetics sensibility andsoftware's. They will also explore the visual vocabularyof same product, exploring market design, reading relevant literature and images to support the final analysis relevant to the design of form, color and material choice and other relevant parameters dependingon the diversified ideas. Based on the work, they will befurther asked to develop a portfolio from the assignments(both manual and digital).

Objective:

To apply aesthetics theories to products toperceive built environment with aesthetics sensibility. It will also give students hands-onexperience on theories of aesthetics.

Projects:

1. Contributions of famous designers
2. Reading Relevant Text and literature
3. Sketching and Manual Rendering
4. Developing Visual Collections
5. Portfolio Design
6. Presentation

Recommended Books:

1. Herriott, R. 2021. *The Aesthetics of Industrial Design; Seeing, Designing and Making*. Routledge.
2. Tom Peters, T. K. *The Art of Innovation: Lessonsin Creativity from IDEO*, America's Leading Design Firm. 2016 Edition
3. Weinschenk, S. M. 2011. *100 Things Every Designer Needs to Know About People*. . New Riders.

ME 229 MECHANICS OF MATERIAL AND MACHINE DESIGN

QT 301 TRANSLATION OF THE HOLY QURAN-III

SEVENTH SEMESTER

PID-404 INDUSTRIAL DESIGN

Course Description

This course is designed to provide students with a comprehensive understanding of the industrial design process, its successful practices, involving research and ideation, prototyping, evaluation, and the preparation of afinal model. This includes design of product, system and services through learning, keen observation, designing and evaluation from the industrial perspective. It will familiarize students with the developments of previous industrial revolutions and transition and adaptability towards the 5th industrial revolution in design and manufacturing.

They will develop an understanding of how to create user-centered designs that balance form and function and willlearn to iterate into the design process and incorporate theuser feedback. They will work in groups to complete a comprehensive industrial design project, from initial research to final prototype.

Objectives

- To develop students' practical skills in the product design process, enabling them to create innovative andeffective designs that balance form and function.
- Provide students with a comprehensive understanding of industrial design and industrial revolutions through hands-on projects and group collaboration, covering research, ideation, prototyping, and evaluation.
- To Empower students to independently undertake a "Thesis Design" project by developing a portfolio thatdemonstrates their design skills and creative thinking

Recommended Books:

- Herriott, R. 2021. *The Aesthetics of Industrial Design: Seeing, Designing and Making. Routledge*.
- Knapp, J., Zeratsky, J., & Kowitz, B. 2016. *Sprint:How to Solve Big Problems and Test New Ideas inJust Five Days*. Simon and Schuster
- Norman, D. 2013. *The Design of Everyday Things*:Revised and Expanded Edition. Hachette UK.
- Lidwell, W., Holden, K., & Butler, J. 2010. *Universal Principles of Design*, Revised and Updated:. Rockport Pub
- Saffer, D. 2006. *Designing for Interaction: Creating Smart Applications and Clever Devices*. Pearson Education
- Ulrich, K. T., & Eppinger, S. D. 2004. *Product*

Design and Development. Irwin/McGraw-Hill.

PID-404L INDUSTRIAL DESIGN

PID-498 FINAL YEAR PROJECT -I

Course Description:

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

Objectives:

- To analyze and synthesize research data and design requirements to develop a comprehensive andindependent approach towards product design.
- To create and present high-quality design solutions that effectively address social, economic, functional,aesthetic, ergonomic, and ecological factors, while also showcasing individual talent and skill as a product designer.
- To utilize and apply acquired knowledge and skills in materials, forms, and other aspects of product design to execute a final thesis project, including thecreation of detailed drawings, models, andpresentations that effectively communicate the design intent and vision.

Recommended books:

1. IDEO.org and Acumen; 2020; "*The Field Guideto Human-Centered Design*"
2. Jeanne Liedtka and Tim Ogilvie; 2020; "*Designing for Growth: A Design Thinking ToolKit for Managers*"
3. Rebecca Proctor; 2021; "*The Sustainable Design Book*"

PID-403 ELECTIVE (VIDEO PRODUCTION)

Course Description:

This course explores the principles and techniques of video production within the context of product and industrial design. Students will learn the fundamentals of creating compelling video content to showcase design concepts, prototypes, and final products. Through a combination of theoretical concepts and hands-on practical exercises, students will develop proficiency in scripting, storyboarding, shooting, editing, and post-production techniques tailored specifically to the needs of product and industrial design projects.

Objectives:

1. Understand the role of video production in the promotion and communication.
2. Gain proficiency in planning, shooting, and editing video content to effectively communicate design ideas and narratives.
3. Develop critical thinking and creative problem-solving skills through the application of video production techniques to real-world design projects.
4. Explore emerging trends and technologies in video production relevant to product and industrial design contexts.

The tool requirement/need/scope will change according to the market trend.

- Video Editing Software: Adobe Premiere Pro.
- Graphic Design Software: Adobe Photoshop, Adobe Illustrator.
- Camera Equipment: DSLR or mirrorless camera with video recording capabilities, tripod, and lighting equipment.
- Sound Recording Equipment: External microphone, audio recorder.

Recommended books:

1. "The Filmmaker's Handbook: A Comprehensive Guide for the Digital Age" by Steven Ascher and Edward Pincus (2020) - Provides a comprehensive overview of filmmaking techniques, including cinematography, editing, and production management.
2. "Making Media: Foundations of Sound and Image Production" by Jan Roberts-Breslin (2020) - Covers the basics of media production, including storytelling, visual aesthetics, and audiovisual communication.

PID-403 ELECTIVE: (ADVANCED CERAMICS)

Course Description:

This course aims at guiding students through a gradual, well directed path, right from concept to execution of different products in ceramic design. This course, includes theoretical, historical and practical aspects of Ceramic Design by consideringdifferent trends, techniques and philosophies. In this course students will be introduced with basic tools and techniques needed to solve design problems within the discipline of ceramicdesign. Finally, students will be able to make small decorative products with ceramics.

Objectives:

- To understand basic theoretical and historicalbackground of ceramic design
- To be familiar with different upcoming trends andtechniques in the field of ceramic design.
- To demonstrate different methods and techniques important to make reliefs and to decorate the ceramic forms.
- To design products and develop ceramic forms byusing appropriate tools and techniques.

Recommended Books:

- Schwartzkopf, D. 2022. *Creative Pottery: Innovative Techniques and Experimental Designs in Thrown and Handbuilt Ceramics.*
- Córdova, C. 2022. *Mastering Sculpture: The Figure in Clay: A Guide to Capturing the Human Form for Ceramic Artists.*
- Ford, K. L. 2021. *Pottery for Beginners.*

PID-403L ELECTIVE: (ADVANCED CERAMICS)

Course Description:

This course aims at guiding students through a gradual, well directed path, right from concept to execution of different products in ceramic design. This course, includes theoretical, historical and practical aspects of Ceramic Design by considering different trends, techniques and philosophies. In this course students will be introduced with basic tools and techniques needed to solve design problems within the discipline of ceramic design. Finally, students will be able to make small decorative products with ceramics.

Objectives:

- To understand basic clay tools and hand building techniques to make basic forms in the material of ceramic.
- To demonstrate different methods to make reliefs and to decorate the ceramic forms by addition andsubtraction of clay to make small products.
- To design products and developing ceramic formsby using appropriate clay fabrication technique.
- To introduce the students with kiln firing process (bisque) of Terracotta clay to bake their final products

PID-403 ELECTIVE (FURNITURE DESIGN)

Course Description:

The Furniture Design course integrates conception and development of furniture, bridges historical context with contemporary design thinking, importance of ergonomic design, aesthetic appeal, functionality, and the environmental impact of furniture design. history and evolution of furniture design, design principles and concepts, cultural and social impacts, materials, advanced manufacturing processes and techniques, digital design and fabrication, sustainability in

furniture design, ergonomics and human factors, inclusivity in furniture design, color theory and application, role of lighting, furniture restoration and conservation; global design perspectives.

Reference Books:

1. Andy Dong; "Furniture Design: Theory and Practice"; (2021, 1st edition)
2. Karen M. Smith; "Theoretical Foundations of Furniture Design: A Contemporary Perspective"; (2020, 2nd edition)
3. John F. Pile; "Furniture Design Theory: From Modernism to Postmodernism"; (2022, 3rd edition)
4. Patricia Bouckley; "Contemporary Furniture Design: Theoretical Perspectives and Practical Applications"; (2019, 2nd edition)

PID-403L ELECTIVE (FURNITURE DESIGN)

Course Description:

The Furniture Design practical module focuses on the tangible application of theoretical knowledge acquired throughout the course. The processes of furniture design and fabrication, from initial concept through to the finished product. Students will engage directly with a variety of materials, tools, and fabrication techniques, fostering a deep understanding of the physical and practical aspects of furniture creation.

Students will embark on a series of structured projects of furniture design that challenge them to apply design principles, material understanding, and ergonomic considerations. Development of students' proficiency in using both traditional woodworking tools and modern digital fabrication technologies, such as CNC routers and 3D printers. Emphasis will be placed on sustainable design practices, encouraging the exploration of eco-friendly materials and efficient manufacturing processes.

Assignments:

1. **Eco-Friendly Workspace Solution:** Design and fabricate a sustainable, ergonomic desk using reclaimed materials and incorporating modular features for customization.
2. **Innovative Seating for Public Spaces:** Create a durable, weather-resistant outdoor bench that promotes social interaction, using advanced manufacturing processes like CNC machining.
3. **Transformative Multi-Use Furniture Piece:** Develop a compact, transformable furniture piece that serves multiple functions (e.g., sofa to bed transformation) for small urban living spaces, focusing on smart material use and user-centric design.

Reference Books:

1. Peter Korn; "The Why & How of Woodworking: A Simple Approach to Making Meaningful Work"; (2020, 2nd Edition)
2. Christopher Stuart; "DIY Furniture 3: A Step-by-Step Guide"; (2021, 1st Edition)
3. Jim Postell; "Furniture Design (Second Edition)"; (2022, 2nd Edition)

PID-403 ELECTIVE (DIGITAL INTERACTIVE DESIGN)

Course Description:

User experience (UX) design is a critical component of creating successful digital products and services. The objective of this course is to let the students explore the principles of UX design and how to apply them to create intuitive, user-friendly, and engaging

products. There will be a combination of lectures, hands-on exercises, and real-world projects, conducting user research. The major focus of this subject is to equip a designer, developer, product manager, or anyone else involved in creating digital products.

Objectives:

- To understand the principles of user-centered design: Learning how to put the needs and preferences of users at the center of the design process.
- To be able to conduct user research: Learning howto gather feedback from users through surveys, interviews, and other methods to inform design decisions.
  To be able to conduct usability testing: Learning how to evaluate the effectiveness of a design by testing it with users and identifying areas for improvement.
- To Establish a positive engagement working with development teams: Learning how to communicatedesign decisions and collaborating effectively withdevelopers to ensure that designs are implementedas intended.

Recommended Books:

1. Goodwin, K. 2020. *Designing for the digital age: How to create human-centered products and services* (2nd ed.). Wiley.
2. Norman, D. A. 2013. *The Design of everyday things*: Revised and expanded Edition. Basic Books.
3. Buley, L. 2019. *The user experience team of one: A research and design survival guide*. Rosenfeld Media.
4. Krug, S. 2014. *Don't make me think, revisited: A common sense approach to web usability* (3rd ed.).New Riders.

PID-403L ELECTIVE (DIGITAL INTERACTIVEDESIGN)

Course Description:

User experience (UX) design is a critical component of creating successful digital products and services. The objective of this course is to let the students explore the principles of UX design and how to apply them to create digital products that are intuitive, user-friendly, and accessible. There will be a combination of lectures, hands-on exercises, and real-world projects. The major focus of this part of the subject is to equip a designer with current market tools to build accessible and responsive low-fidelityand high-fidelity digital prototypes.

Objectives:

- To understand the design process: empathize with users, define pain points, create user journey maps, draw personas, and user stories to ideate solutions.
- To create digital and hand-drawn wireframes andprototypes to test and iterate the designs for a common user.
- To apply foundational UX concepts, like user- centered design, accessibility, and equity-focused design.
- To create a professional UX portfolio that includes 3 end-to-end projects: a mobile app, a responsive website, and a cross-platform experience.

Hands on experience of these software's will be provided to the students:

1. Figma
2. Adobe Xd

Platforms and Recommended Books:

1. Material.io
2. Figma Community online
3. Wood, B. 2019. *Adobe XD CC Classroom in a Book*. Adobe Press.

4. Schwarz, D. 2020. *Mastering Adobe XD: Design professional-grade mobile and web apps*. Packt Publishing.

PID-403 INTERIOR DESIGN (ELECTIVE)

Course Description:

This course will provide a comprehensive overview of the theoretical fundamental principles and concepts of designing interior spaces. Through a combination of lectures, readings, discussions, and case studies, students will delve into the various factors that influence historical, psychological, social, cultural, andenvironmental factors. The course will cover topics such as principles of color theory, spatial perception & planning, lighting design, ergonomics, furniture design,and material selection. The course will also cover sustainability and ethical considerations in interior design, and provide students with the tools to evaluate and critique design solutions. By the end of the course,students will have comprehensive understanding of thecurrent trends and innovations shaping the industry. They will be equipped with the knowledge to create effective and impactful interior spaces.

Objectives:

1. To demonstrate competency in the use of design fundamentals as principal tools in establishing design criteria and developing the overall design process.
2. To analyze the attributes of space for effectivecommunication of spatial relationships through theapplication of proxemics.
3. To apply theoretical knowledge and precedents in design research to develop dynamic relationship between function, human behavior, and the built environment. .

Recommended Books:

1. John Pile & Judith Gura; 2020; "*A History of Interior Design*", (Published by Laurence King),4th Edition
2. Jo Ann Asher Thompson & Nancy H. Blossom; 2019; "*The Handbook of Interior Design*",(Published by John Wiley & Sons, Limited)
3. Drew Plunkett; 2021; "*Drawing for Interior Design*", (Published by Laurence King), 2nd Edition

PID-403L INTERIOR DESIGN (ELECTIVE)

Course Description:

Interior design is a multifaceted practice that involves the design and planning of the interior space of a building, encompassing everything from walls, windows, doors, and finishes to lighting, furniture, andfurnishings. The purpose of interior design is to create functional, safe, and visually appealing spaces that meetthe needs of the building's users. To achieve this goal, interior designers employ a range of technical skills, including site analysis, program analysis, space planning, color theory, lighting design, furniture designand material selection. By mastering these skills, students of interior design gain the knowledge andexpertise necessary to create spaces that are both functional and aesthetically pleasing.

Objectives:

- To recognize the technical aspects of interior building systems to design degrees of interiorenclosure, spatial scale and continuity.
- To develop two dimensional and volumetric compositions of spaces, layering, circulation, entry/exit, transition, and sequence to accommodate activities, functions andaccessibility.
- To implement qualitative use of planes, surfaces, and openings that enclose space to demonstrate competency in color theories, perception, materials and the psychological and emotionalresponses to color and light.

Project 1: Office/ commercial/ Residential Interior Students will conduct a site analysis to evaluate theexisting conditions

of a specified space. They will thendevelop a program analysis to identify the requirementsand constraints of the space. Based on this analysis,students will create a zoning then concept developmentplan that aligns with the needs and preferences of the client. Finally, students will design and render acomplete interior design plan that includes furniture,finishes, and lighting, as well as any necessary technicaldetails and layouts.

Project 2: Retail shop / Restaurant Interior

Students will conduct a site analysis to evaluate the existing conditions of a specified space. They will thendevelop a program analysis to identify the requirementsand constraints of the space. Based on this analysis, students will create a zoning then concept developmentplan that aligns with the brand and target market.

Finally, students will design and render a complete interior design plan that includes space, furniture, finishes, and lighting.

Recommended Books:

1. Francis D.K. Ching and Corky Binggeli, Wiley, 2020; "*Interior Design Illustrated*", 5th Edition.
2. Simon Dodsworth, (Fairchild Books, 2021); "*TheFundamentals of Interior Design*", 2nd Edition.
3. Joseph DeChiara, Julius Panero, and Martin Zelnik, McGraw-Hill Education, 2018; "*Time- Saver Standards for Interior Design and Space Planning*", 2nd Edition.

Maureen Mitton and Courtney Nystuen, (Wiley, 2019); "*Residential Interior Design: A Guide to Planning Spaces*", 3rd Edition.

PID-403 ELECTIVE: ADDITIVE MANUFACTURING

Course Description:

Introduction to Additive Manufacturing (AM) / 3Dprinting; computer-aided design models to create 3D objects by sequentially adding materials; comparison with traditional prototyping/manufacturing methods; and transformation of products as they are designed, created, and brought to the market. Fabrication of parts in a layer- by-layer technique; to create 3D integrated products using a wide range of functional materials. Manufacturing of lightweight structures; consolidated assemblies; and functionally gradient structures using multi-material components to enhance performance. Advantages and limitations of additive manufacturing (AM) / rapid prototyping compared to traditional manufacturing; technical principles; Design parts usingcomputational design tools; AM equipment, materials, andapplications; Workflows for AM of polymers, metals, and composites; Production cost, performance, and use case ofmanufactured parts; AM value across the entire product lifecycle; quality control in 3D printing. This course will provide an overview of available AM processes and basic scientific understanding of this emerging technology to develop integrated product parts.

Objectives:

- To understand the technical principles and workflows for AM processes of polymers, metals,and composites.
- To evaluate the advantages and limitations of additive manufacturing (AM) and rapid prototyping in comparison to traditional manufacturing.
- To understand and analyze the role of additive manufacturing in the design process and the implications for design.

Recommended Books:

1. Alessandro Ruggiero, A. Erman Tekkaya, and Harald Meerkamm; Published in 2018; "*Additive Manufacturing: Design, Methods, and Processes"*.
2. Li Yang, Keng Hsu, and Shuangxi Zhou; Publishedin 2017; "*Additive Manufacturing of Metals: The Technology, Materials, Design and Production*".
3. Ben Redwood, Filemon Schöffer, and BrianGarret; Published in 2017; "*The 3D Printing Handbook: Technologies, Design*

and Applications".

4. Martin Leary; Published in 2019; "*Design for Additive Manufacturing (Additive Manufacturing Materials and Technologies*)".

Sheku Kamara; Published in 2021; "*Fundamentals of Additive Manufacturing for the Practitioner(Additive Manufacturing Skills in Practice*)".

PID-403L ELECTIVE: ADDITIVEMANUFACTURING

Course Description:

Different software will be introduced to create and process3d models of products for 3d printing. MeshLab (3d product scanning), Cura / PrusaSlicer (3d model processingfor printing)

Objectives:

- To apply computational design tools to create 3D models for AM by combining process knowledge,considering the selection of materials, equipment, and applications for polymer, metal, and compositematerials.
- To analyze the production cost, performance, and use case of manufactured parts.
- To evaluate the value of AM across the entire product lifecycle and the quality control measures necessary in additive manufacturing.

Projects:

1. Redesign and Fabricate an Integrated Product: In this project, students will use computational design toolsto redesign an integrated product and select appropriate materials for printing. The project will cover the workflows
for AM of selected material, and students will gain hands- on experience in using AM equipment to manufacture the product. The project will focus on production cost, performance, and use case of the manufactured part, as wellas quality control in 3D printing.

2. **Create a Functional Prototype of a New Product**For this project, students will be required to design and fabricate a functional prototype of a new product using 3d printing. Students will work in teams to develop a new product idea and use computational design tools to create a3D model. Students will gain an understanding of the AM value across the entire product lifecycle, from design to manufacturing to market. The project will emphasize the advantages and limitations of rapid prototyping compared to traditional manufacturing.

Recommended Books:

1. Alessandro Ruggiero, A. Erman Tekkaya, and Harald Meerkamm; Published in 2018; "*Additive Manufacturing: Design, Methods, and Processes*".
2. Li Yang, Keng Hsu, and Shuangxi Zhou; Publishedin 2017; "*Additive Manufacturing of Metals: The Technology, Materials, Design and Production*".
3. Ben Redwood, Filemon Schöffer, and BrianGarret; Published in 2017; "*The 3D Printing Handbook: Technologies, Design and Applications*".
4. Martin Leary; Published in 2019; "*Design for Additive Manufacturing (Additive Manufacturing Materials and Technologies*)".
5. Sheku Kamara; Published in 2021; "*Fundamentalsof Additive Manufacturing for the Practitioner (Additive Manufacturing Skills in Practice*)".

PID-403 ELECTIVE: GAME DESIGN

Course Description:

This course introduces the principles and practices of gamedesign. Through a combination of lectures, discussions, andhands-on projects, students will learn about the various stages of game development, from creating a game design document to prototyping, playtesting, and refining game mechanics and systems.

Students will explore the key concepts and practices of game design, including game mechanics, aesthetics, story,and technology.

Objectives:

- To be able to develop a foundational understandingof game design.
- To be able to consolidate a game design documentand prototype.
- To Develop critical thinking and problem-solvingskills.

Recommended Books:

1. " Schell, J. 2019. *The art of game design: A book of lenses* (3rd ed.). CRC Press.
2. Fullerton, T., Swain, C., & Hoffman, S. (2018). *Game design workshop: A polycentric approach tocreating innovative games* 4th ed.. CRC Press.
3. Adams, E., & Rollings, A. 2019. *Fundamentals ofgame design* (4th ed.). New Riders.

PID-403L ELECTIVE: GAME DESIGN

Course Description:

User experience (UX) design is a critical component of creating successful digital products and services. The objective of this course is to let the students explore the principles of UX design and how to apply them to create digital products that are intuitive, user-friendly, and accessible. There will be a combination of lectures, hands-on exercises, and real-world projects.

Students will explore the key concepts and practices of game design, including game mechanics, aesthetics, story,and technology. They will also gain experience with gameengines such as Unity and Unreal Engine and learn how tocreate 2D and 3D art and audio assets using industry- standard tools like Blender, Photoshop, and Maya.

Throughout the course, students will work in teams to develop their own game project, which will culminate in aplayable game demo presented at the end of the program. Along the way, students will receive feedback from instructors and peers, and learn about different monetization strategies, marketing, and publishing games,and designing games for different platforms.

Objectives:

- To gain practical experience with game engines andindustry-standard tools.
- To understand the game development process.
- To develop critical thinking and problem-solving.
- To understand the different monetization strategiesand marketing techniques.

Hand on experience of these software's will be provided tothe students:

- Game engines such as Unity, Unreal Engine, and Godot
- Graphics software such as Photoshop, Illustrator, and GIMP
- 3D modeling software such as Blender, Maya, and3DS Max

- Sound editing software such as Audacity and Pro Tools
- Programming languages such as C#, Java, andPython

Recommended Books:

1. Villar, A. 2020. *Blender 3D By Example: A project-based guide to learning the latest Blender 3D,* EEVEE, and Python. Packt Publishing.
2. Kelby, S. 2020. *Adobe Photoshop Classroom in a Book* (2020 release). Adobe Press.
3. Wood, B. 2021. *Adobe Illustrator Classroom in a Book* (2021 release). Adobe Press.
4. Harrison, H. (2019). *Unity in Action: Multiplatform Game Development in C#*. ManningPublications.
5. Fernandez, A., & Gregory, J. 2020. *Unreal Engine 4 for Design Visualization: Developing Stunning Interactive Visualizations, Animations, and Renderings.* Addison-Wesley Professional
6. Meyer, C. 2018. *After Effects Apprentice: Real- World Skills for the Aspiring Motion GraphicsArtist*. Adobe Press.

MGT318 ENTERPRENURENSHIP AND MANAGEMENT

Course Description:

Introduction to management and entrepreneurship; functions of management; developing successful business ideas; recognizing opportunities and generating ideas; feasibility analysis; developing an effective business model; industry and competitor analysis; writing a business plan; moving from an idea to an entrepreneurial firm; preparing the proper ethical and legal foundation; assessing a new venture's financial strength and viability.

Recommended Books:

1. Entrepreneurship _ successfully launching new ventures, Barringer and Ireland, Prentice Hall(2016)
2. Absolute Essentials of Business and Economics, Nerys Fuller-Love, Absolute Essentials of Entrepreneurship-Routledge (2020)
3. Essentials of Entrepreneurship and Small Business Management, Jeffrey R. Cornwall Norman M.Scarborough, Pearson (2018)

Entrepreneurship and Management in an Islamic Context, Veland Ramadani, Léo-Paul Dana,Shqipe Gërguri-Rashiti, Vanessa Ratten (eds.), Springer International Publishing (2017)

QT 401 TRANSLATION OF THE HOLY QURAN-IV

PID 406L INTERNSHIP

Course Description:

This internship gives students hands-on experience in different design areas like product, industrial, interior, furniture, graphics, and UI/UX design or any other relevant areas. It helps them learn practical skills, understand how design works in real projects, and make connections with the industry.

Course Objectives:

1. Gain practical design skills.
2. Learn industry-standard design tools.

3. Work with professionals to solve design problems.
4. Understand how design impacts different industries.
5. Develop communication and teamwork skills.
6. Reflect on learning experiences for personal growth.

Course Structure:
1. Orientation: Introduction to internship goals and rules.
2. Placement: Students placed in design relatedorganizations.
3. Internship Period: Work on real design projects in industry during summer break.
4. Supervision and Evaluation: Regular check-ins with supervisors.
5. Documentation: Keep track of work and feedback.
6. Presentation: Share internship experience and lessons learned.

Assessment:
1. Supervisor Evaluation.
2. Internship Report.
3. Presentation.

Prerequisites: Completed relevant design coursework.

EIGHTH SEMESTER

PID-499 FINAL YEAR PROJECT -II

Course Description:

In the final semester, 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 their talent as product designers. Muchof this effort would be depicted in terms of drawings, models, and presentations by the students.

Objectives:

- To analyze and synthesize research data and design requirements to develop a comprehensive and independent approach towards product design.
- To create and present high-quality design solutions that effectively address social, economic, functional, aesthetic, ergonomic, and ecological factors, while also showcasing individual talent and skill as a product designer.
- To utilize and apply acquired knowledge and skills inmaterials, forms, and other aspects of product design to execute a final thesis project, including the creationof detailed drawings, models, and presentations that effectively communicate the design intent and vision.

Recommended books:

1. IDEO.org and Acumen; 2020; "*The Field Guideto Human-Centered Design*"
2. Jeanne Liedtka and Tim Ogilvie; 2020;"*Designing for Growth: A Design Thinking ToolKit for Managers*"

3. Rebecca Proctor; 2021; "*The Sustainable Design Book*"

PID-412 PROFESSIONAL PRACTICE

Course Description:

The course will equip students with a thorough comprehension of the field, encompassing various types of organizations, working systems, professional ethics, and human resource management.

The course is designed to cover a wide range of topics, including the essential attributes of designers, the processof setting up a design office, how to find clients, effectivebusiness correspondence, brief and briefing, letter of contract, as well as professionalism and ethics.

Moreover, the course delves into finance and accounting,costing design and the various types of agreements involved, tender and contract documents. Additionally, itexplores the human factors involved in managing designand teamwork, design evaluation, patents, trademarks, and copyright, and the laws and procedures of design registration.

Objectives:

- To create a comprehensive business plan for a design office, including setting up effective working systems and strategies for finding clients, while adhering to professional ethics and human resource management principles.
- To analyze the financial and legal aspects of designmanagement, including the costing of designprojects, types of agreements involved, and the lawsand procedures of design registration. They will also be able to critically evaluate the success of a design project and identify areas for improvement.
- To evaluate the effectiveness of teamwork and collaboration in design projects, as well as assess the impact of patents, trademarks, and copyright ondesign management. They will also be able to evaluate and improve their own professionalism and ethical standards in the design industry.

Recommended books:

1. Robert L. Mathis and John H. Jackson; 2021; "*Human Resource Management*".
2. Van Lindberg; 2018; "*Intellectual Property and Open Source: A Practical Guide to Protecting Code*".

Kathryn Bes; 2012; "*Design Management: Managing Design Strategy, Process and Implementation*".

PID-412L PROFESSIONAL PRACTICE

Course Description:

A comprehensive understanding of the design industry, including organizational structures, professional ethics, and human resource management. Students will learn about the essential skills required for designers, setting upa design office, and how to effectively communicate withclients. They will also gain knowledge in finance, accounting, and costing design. The course covers various agreements involved in design projects, such as tender and contract documents. Additionally, studentswill learn about managing design and teamwork, design evaluation, patents, trademarks, and copyright, as well asthe laws and procedures of design registration. Through practical examples and case studies, develop a solid foundation for pursuing a career in the design industry.

Objectives:

- To create a comprehensive business plan for a design office, including setting up effective working systems and strategies for finding clients, while adhering to professional ethics and human resource management principles.

- To analyze the financial and legal aspects of designmanagement, including the costing of designprojects, types of agreements involved, and the lawsand procedures of design registration. They will also be able to critically evaluate the success of a design project and identify areas for improvement.
- To evaluate the effectiveness of teamwork and collaboration in design projects, as well as assess the impact of patents, trademarks, and copyright ondesign management.

Projects:

1. Mood board
2. Cover letter
3. Cv/Resume
4. Memorandum of Understanding
5. Financial evaluation of business
6. Contract Document
7. Conducting interview

Recommended books:

1. Robert L. Mathis and John H. Jackson; 2021; "Human Resource Management".
2. Van Lindberg; 2018; "Intellectual Property and Open Source: A Practical Guide to Protecting Code".
3. Kathryn Bes; 2012; "Design Management: Managing Design Strategy, Process and Implementation".

PID-413 SUSTAINABLE DESIGN PRACTICES

Course Description:

The course will give the concepts of various theories related to Sustainable Product Design. It will include product life cycle, ecofriendly design, cradle to cradle, cradle to grave, circular economy, use of 7Rs, biophilic design etc. that support sustainable developmentgoals 2030. Students will be introduced to the concepts ofenvironmental impacts of different design related projects which lead to the need for green certification, labeling, standards, and codes on products. This course will enable designers to practice sustainable approachesprofessionally.

Objectives:

- To train students for the future practices of sustainable design products, processes and systems andbring a continuous improvement in existing codes, standards, and certification.

Recommended books:

1. Anoop Desai, A. M. (2021). *Sustainable ProductDesign and Development*.
2. Chapman, J. (2017). *Handbook of SustainableProduct Design. Routledge.*
3. Su, D. (2020). *Sustainable Product Development Tools, Methods, and Examples*