



## 1. PROGRAM CONTENT

### FIRST YEAR / SEMESTER ONE

#### PD 6501 PRODUCT DESIGN STUDIO – I (SOCIAL INNOVATION)

##### COURSE INTENT

The course "Product Design Studio - I (Social Innovation)" is designed to equip students with the knowledge and skills needed to identify and solve societal problems through research and innovative design solutions. The course focuses on the Indian societal context, allowing students to apply human-centered design principles to create impactful solutions for marginalized communities.

##### COURSE CONTENTS

**Introduction to the Product Design Studio:** Explore the foundational principles of social innovation in product design, understanding its theoretical underpinnings and the impact it can have on societal challenges. Gain insights into global and Indian social innovation projects, setting the stage for mastering the art of product design with a profound social impact. **Finding Out the Problem in Society,**

**Societal Day-to-Day Life:** Explore research methodologies aimed at identifying and empathizing with societal needs, considering cultural, economic, and demographic factors that shape product design in the Indian context. Acquire skills to analyze and comprehend the day-to-day challenges faced by society, laying the groundwork for innovative problem-solving. **Data Interpretation for Societal Issues:** Understanding and explaining research data using infographic tools. Ability to communicate persuasively, advocating for societal issues using data-driven insights.

**Ideation for tentative solutions:** Engage in a creative journey of ideation, applying tools and frameworks to identify opportunities for innovation in addressing societal gaps. Cultivate a passion for innovative problem-solving within the realm of product design, fostering a mindset of creative exploration. **Low fidelity Prototype with User Journey and Detailing:** Translate ideas into tangible solutions through the art of paper prototyping, emphasizing the importance of user-centric design and crafting detailed user journeys. Apply psychomotor skills to construct and refine paper prototypes, ensuring a seamless alignment with user needs and a holistic understanding of the design process.

##### COURSE OUTCOMES

**CO1:** Understand the theoretical foundations of social innovation and its relevance to product design.

**CO2:** Develop research skills to identify societal gaps and problems.

**CO3:** Interpret and communicate research findings effectively.

**CO4:** Generate innovative design opportunities.

**CO5:** Develop a paper prototype with a detailed user journey.

##### REFERENCES

1. Brown, T., & Wyatt, J. (2010). *Design thinking for social innovation*. Development Outreach, 12(1), 29-43.
2. Manzini, E. (2015). *Design, when everybody designs: An introduction to design for social innovation*. MIT press.
3. Kelley, T. (2001). *The art of innovation: Lessons in creativity from IDEO*, America's leading design firm (Vol. 10). Currency.
4. Norman, D. (2013). *The design of everyday things: Revised and expanded edition*. Basic books.

## PD 6503 DESIGN CULTURE

### COURSE INTENT

To explore the intricate relationship between design and culture through historical and contemporary movements by understanding its core philosophical essence, cultural interplay, and emerging theories to enhance product design's cultural resonance.

### COURSE CONTENTS

**Design Movements in History:** Tracing the historical evolution of design movements from prehistoric times to the early 20th century. Explore their origins, key characteristics, and developmental trajectories, while gaining insights into the cultural, social, and technological influences shaping design practices. Appreciate the diverse approaches and ideologies defining the design landscape.

**Cultural Impact of Design Movements:** Examine the profound cultural influence of design movements on societal norms, values, and identities. Engage with global case studies and perspectives to explore the intricate relationship between design and culture, discerning how design movements both shape and are shaped by cultural contexts. **Design, People and Culture:** Explore the dynamic interplay between design and diverse cultural contexts, integrating cultural sensitivity into product design methodologies. Through themes such as globalization, technology, media, social ideas, postcolonial perspectives, and environmental sustainability, understand how cultural factors inform design practices. **Emerging Theoretical Perspectives in Product Design:** Identify contemporary theoretical frameworks in product design, addressing present challenges and opportunities with a focus on trends from the turn of the millennium. Outline how these theories shape design practices and respond to evolving societal and technological landscapes. **Design Perspective-Based Product Development:** Explore diverse perspectives within product design to nurture creativity and innovation. Integrate varied viewpoints to develop designs adept at tackling complex challenges, empowering students to create impactful solutions.

*Note:* The course offers a comprehensive exploration of the intersections between design and culture through a series of case-based studies. With a focus on global perspectives from both the North and South, tracing the cultural contexts and interrelations within the discipline of product design.

### COURSE OUTCOMES

**CO1:** Explain the historical evolution of design movements.

**CO2:** Interpret the influence of the design movements within the cultural context.

**CO3:** Outline the interplay between design and diverse cultural contexts, integrating cultural sensitivity into product design.

**CO4:** Identify the emerging theoretical perspectives to address contemporary challenges and opportunities in product design.

**CO5:** Develop a product design based on the design perspectives.

### REFERENCES

1. Adamson, G., Riello, G., & Teasley, S. (Eds.). (2011). *Global design history*. Routledge.
2. Fallan, K. (2010). *Design history: Understanding theory and method*. Berg.
3. Julier, G. (2013). *The culture of design*. Sage.
4. Lees-Maffei, G., & Houze, R. (Eds.). (2010). *The design history reader*. Berg.
5. Raizman, D. (2003). *History of modern design: Graphics and products since the industrial revolution*. Laurence King Publishing.
6. Walker, J. A. (1990). *Design history and the history of design*. *Design Issues*, 6(2), 3-12.

## PD 6505 DESIGN AESTHETICS

### COURSE INTENT

The course enables the students to relate principles of aesthetics and perceptual design principles in product design. The course also focuses on product design analysis in relation to concept and design development, usability of a design, consumer preference and end-use.

### COURSE CONTENTS

**Introduction To Design Aesthetics:** Summarize disciplines of design, contemporary aesthetics, aesthetics, principles of aesthetics, design elements, Rule of Thirds, aesthetic Imperative, principles that drive the aesthetics of ecology. **Perceptual Design Principles:** Role of perceptual design principles in product design, Perceptual design method research in product design, The Gestalt principles, User-Centered Design. **Design Aesthetics:** Aesthetic-Usability Effect, Alignment, Archetypes, principle of closure, Attractiveness Bias, Classical Conditioning, Cognitive Dissonance, Colour, Defensible Space, Fibonacci Sequence, Golden Ratio, Mimicry, Rule of Thirds. **Analyze Product Designs:** Case study analysis, Product design appreciation from various disciplines of design, how people can learn from a design. **Criticize Product Designs:** based on principles of aesthetics and aesthetics of ecology, Perceptual design principles and The Gestalt principles in the with multi-disciplinary product designs.

### COURSE OUTCOMES

**CO1:** Relate various disciplines of design with contemporary aesthetics.

**CO2:** Explain the role of perceptual design principles in product design.

**CO3:** Identify the factors contributing to the aesthetics of a design.

**CO4:** Analyze product designs based on concept and design derivation, consumer preference, automation, and end use.

**CO5:** Criticize product designs based on principles of aesthetics.

### REFERENCES

1. Lidwell, W., Holden, K and Butler, J (2003). *Universal Principles of Design*. Rockport Publishers, Inc.
2. Norman, D (2013) *The Design of Everyday Things*. Basic Books.
3. Hosey, L (2012) *The Shape of Green: Aesthetics, Ecology, and Design*. Island Press
4. Zhu, Z., Zhang, Z., Qin, Y., Li, S. (2022) *Research on Product Design Process Based on the Integration of Perceptual Image and Brand Identity*, In: Soares, M.M., Rosenzweig, E., Marcus, A. (eds) *Design, User Experience, and Usability: UX Research, Design, and Assessment*. HCII 2022. Lecture Notes in Computer Science, vol 13321. Springer, Cham.
5. Papanek, V (2005) *Design for the Real World: Human Ecology and Social Change*. Chicago Review Press.

## PD 6507 PRODUCT REPRESENTATION AND TECHNICAL DRAWING

### COURSE INTENT

The course is intended to cultivate fundamental skills in proficiently expressing and communicating product designs through range of methodologies and tools employed in product representation, encompassing sketching, rendering, prototyping, and digital visualization.

### COURSE CONTENTS

**Fundamentals of Technical Drawing:** Introduction to Technical Drawing, Understanding the importance of technical drawing in product design, Overview of drawing tools, techniques, and standards, Orthographic Projection, Principles of orthographic projection, Hands-on exercises in creating orthographic projections. **Isometric and Perspective Drawing:** Isometric Drawing Techniques, Introduction to isometric drawing, creating isometric views of simple objects, Perspective Drawing for Product Representation, Basics of one-point and two-point perspective, Applying perspective in product illustrations. **Advanced Technical Drawing Concepts:** Exploded Views and Assembly Drawings, creating exploded views to depict assembly, Techniques for detailing components in assembly drawings: Sectional Views and Detailing, Understanding sectional views in technical drawings, Detailing techniques for complex product components. **Computer-Aided Design (CAD) for Product Representation:** Introduction to CAD Software, Overview of popular CAD tools in product design, Basic commands and functionalities of CAD software, 3D Modelling, and Rendering, creating 3D models of products using CAD, Rendering techniques for realistic product representation. **Industry Applications and Project Work:** Technical Drawing Standards and Documentation, Introduction to industry-standard drawing conventions, creating technical documentation for manufacturing, Product Design Portfolio, Culmination of the course with a hands-on project, developing a comprehensive product design portfolio showcasing technical drawings.

### COURSE OUTCOMES

**CO1:** Apply fundamental technical drawing techniques, demonstrating basic proficiency in orthographic projection and isometric drawing.

**CO2:** Interpret complex product structures through detailed exploded views, assembly drawings, and sectional views, showcasing proficiency in advanced drawing concepts.

**CO3:** Apply CAD software to develop and showcasing practical skills in utilizing digital tools for product representation.

**CO4:** Create industry-standard technical documentation with detailed drawings and specifications, meeting requirements for effective communication in manufacturing processes.

**CO5:** Develop a comprehensive product design portfolio, integrating various drawing techniques.

### REFERENCES

1. Pei, E., & Self, J. A. (2022). *Product Design and the Role of Representation: Foundations for Design Thinking in Practice* (1st ed.). CRC Press.
2. Giesecke, M., Spencer, H., Hill, I., Dygdon, J., Novak, J., & Lockhart, J. (2021). *Technical Drawing with Engineering Graphics* (15th ed.). Pearson.
3. Bertoline, G., Wiebe, E., Miller, C., Nasman, V., & Spencer, H. (2020). *Technical Graphics Communication* (4th ed.). McGraw-Hill Education.
4. Jefferis, A., & Madsen, D. A. (2018). *Architectural Drafting and Design* (7th ed.). Cengage Learning.

## PD 6509 PRODUCT DEVELOPMENT WORKSHOP

### COURSE INTENT

The course immerses participants in hands-on product development, guiding them from concept to execution. The course allows exploration of prototyping techniques, manufacturing processes, and design iteration to bring innovative product designs to life. Through a holistic approach, learners refine crucial skills for the dynamic landscape of product development.

### COURSE CONTENTS

**Fundamental of Prototyping:** Covering the basics of prototyping, this unit introduces to the importance of prototyping in product development. Topics include the purpose of prototyping, prototyping methodologies, and the role of prototyping in validating design concepts. **Exploring Different**

**Techniques to Prototype:** This unit delves into various prototyping techniques such as rapid prototyping, 3D printing, and physical modeling. To learn how each technique is used, its advantages and limitations, and how to select the most appropriate method for their design needs.

**Materials Selection:** Focused on materials used in prototyping, this unit covers the properties of common prototyping materials, such as plastics, metals, wood, composites etc. To learn how to select materials based on factors like strength, flexibility, and cost, considering the requirements of design project. **Manufacturing Processes:** This unit provides an overview of manufacturing processes relevant to prototyping, including injection molding, CNC machining, laser cutting, printings, bespoke methods etc. To learn about the capabilities of each process, their applications, and considerations for selecting the appropriate manufacturing method for their prototypes. **Iteration & Optimization:** In the final unit, to explore the iterative nature of prototyping and optimization. To learn about how to analyze feedback from prototype testing, identify areas for improvement, and iterate on designs to enhance performance, usability, and aesthetics. Emphasis is placed on continuous refinement and optimization throughout the prototyping process.

### COURSE OUTCOMES

**CO1:** Explain prototyping methodologies to create design outcome.

**CO2:** Compare various prototyping techniques.

**CO3:** Choose prototyping materials based on their properties and application.

**CO4:** Examine manufacturing processes based on competence & application.

**CO5:** Evaluate iterative optimization of prototypes through analysis for further refinement.

### REFERENCES

1. Hallgrímsson, B. (2012, September 24). *Prototyping and Modelmaking for Product Design*. Hachette UK.
2. McElroy, K. (2016, December 29). *Prototyping for Designers*. "O'Reilly Media, Inc."
3. Cuffaro, D., & Zaksenberg, I. (2013, October 1). *The Industrial Design Reference & Specification Book*. Rockport Publishers.
4. Cofer, R., & Harding, B. F. (2011, March 31). *Rapid System Prototyping with FPGAs*. Elsevier.
5. Warfel, T. Z. (2009, January 1). *Prototyping*. Rosenfeld Media.
6. Cohen, A. (2015, August 11). *Prototype to Product*. "O'Reilly Media, Inc."
7. Liou, F. F. (2019, February 6). *Rapid Prototyping and Engineering Applications*. CRC Press.
8. Hallgrímsson, B. (2023, March 6). *Prototyping and Modelmaking for Product Design*. Hachette UK.

## PD 6511 RESEARCH METHODOLOGY

### COURSE INTENT

The course intends to equip students with the research methods, tools, and techniques to undertake research in Sustainable Design.

### COURSE CONTENTS

**Basic Concepts and Research Process: Domain of research:** Understanding the nature of research in Product Design. Need & significance; Objectives; Characteristics; Ethics – Responsible conduct of research; Concepts of theory, data and reference management tools. **Research methods in Product Design:** Types of Research; Research methods & Research methodology; Review of literature; research gap. **Research design:** Need for research, develop the research question, hypothesis, research methodology, scope and limitations. **Data collection and analysis:** Primary and Secondary data collection, survey, observation, case study, observational studies, behavioural mapping, tracking, documentation and interpretation, selection of respondents and sampling procedures, techniques of analysis. Use of software in analysis, presentation and interpretation methods and techniques. **Technical writing:** Technical writing of research reports, publications, and proposals.

### COURSE OUTCOMES

**CO1:** Explain the basic concepts and understand the characteristics of research.

**CO2:** Identify the research methods in Product Design.

**CO3:** Evaluate the procedure for hypothesis.

**CO4:** Analyse the data collection and sampling methods and illustrate the method of data collection.

**CO5:** Propose and communicate a feasible research report.

### REFERENCES

1. Kumar, R. (2005). *Research Methodology: A Step-by-Step Guide for Beginners*. SAGE.
2. Lucas, R. (2016). *Research Methods for Architecture*. Laurence King Publishing.
3. Creswell, J. W. (2004). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. SAGE.
4. Kothari, C. R. (2008). *Research Methodology: Methods and Techniques*. New Age International Publisher.
5. Pannerselvam, R. (2006). *Research Methodology*. Prentice Hall India.
6. Bergman, M. M. (2006). *Mixed Methods Research*. SAGE Books.
7. Cochran, W. G., & Cox, G. M. (2006). *Experimental Designs* (2nd ed.). Wiley.



## FIRST YEAR / SEMESTER TWO

### PD 6502 PRODUCT DESIGN STUDIO - II (ACCESSIBILITY DESIGN)

#### COURSE INTENT

The studio course delves into the intricate intersection of design innovation and inclusivity, focusing on creating products that cater to diverse user needs. With an emphasis on accessibility, students will engage in hands-on projects, with insights drawn from real-world case studies, collaborative workshops, to cultivate expertise in designing products that are usable by everyone, regardless of ability.

#### COURSE CONTENTS

**Foundations of Accessibility Design:** Introduction to Accessibility in Product Design, Historical Perspectives on accessibility; Introduction to Inclusive Design, Significance of Inclusive Design in Contemporary Society; Case Studies Highlighting Successful Integration of Inclusivity in Accessibility Design **User Centered Research:** Inclusive User Research, Persona Development for Diverse User Groups, Iterative Design Processes for Inclusive Solutions. **Ideation:** Inclusive Design Thinking and Ethical Considerations, Empathy-Driven Design Methodologies, Challenging Design Biases and Assumptions, Creative Problem Solving in Inclusive Design, Legal and Ethical Considerations in Accessibility. **Product Design:** Designing or Redesigning Products with Accessibility in Focus; Integrating Universal Design Principles; User-Centered Redesign Methodologies; Measuring the Impact of Redesigned/Iteration of Products. Understanding Assistive Technologies Landscape. Integration of Screen Readers and Voice Commands, Hands-On Experience with Alternative Input Devices. **Prototyping:** Accessibility Testing Tools/Simulations and Techniques; Refinement; Production; Detailing, 3D modelling. Drawings, Manual development, Presentation.

#### COURSE OUTCOMES

**CO1:** Demonstrate knowledge of foundational concepts in accessibility design.

**CO2:** Apply inclusive design thinking and ethical considerations in practice.

**CO3:** Develop skills in empathy-driven design and problem-solving.

**CO4:** Evaluate and improve the usability of designed products for diverse user needs.

**CO5:** Develop mastery in prototyping, design refinement, and effective presentation skills.

#### REFERENCES

1. Clarkson, P. J. (2007). *Inclusive Designing: Joining Usability, Accessibility, and Inclusion*. Springer.
2. Horton, S., & Quesenbery, W. (2014). *A Web for Everyone: Designing Accessible User Experiences*. Rosenfeld Media.
3. Dirksen, J. (2012). *Design for How People Learn*. New Riders.
4. Lidwell, W., Holden, K., & Butler, J. (2010). *Universal Principles of Design*. Rockport Publishers.
5. Saffer, D. (2009). *Designing for Interaction: Creating Innovative Applications and Devices*. New Riders.
6. Gothelf, J., & Seiden, J. (2013). *Lean UX: Designing Great Products with Agile Teams*. O'Reilly Media.
7. Keates, S., & Gregor, P. (2002). *The Inclusive Design Guide: How to Design Products and Spaces for the Needs of Everyone*. Wiley.

## PD 6504 USABILITY ENGINEERING

### COURSE INTENT

The course explores Usability Engineering principles, emphasizing user-centered design methodologies and practical applications like user testing and prototyping to enhance product usability and user satisfaction in product design.

### COURSE CONTENTS

**User Centered Design Process and Human Computer Interaction:** Introduction to UCD, UX, IxD, UE, Human Computer Interaction, Information Architecture, User Interface Design, Usability, Dimensions of Usability, Types of Personas, Scenario. **User Study:** Design Triangle – Human Factors, Function and Aesthetics, Types of User Study – Qualitative and Quantitative, Needs Analysis, System Analysis, User Profiling, User Journey Map. **Product/ Market Study in Usability Engineering: Market Study –** Competitive Analysis, Popular Media Search, Buzz Reports, Keyword Bibliometrics, Trends Expert Interview, Initial Opportunity Map. **Human-Centered Design's psychological aspects:** Cognitive models, Observational studies, A/B testing, Eye tracking, Cognitive walkthrough, Ethnographical studies. **Heuristic Evaluations:** Visibility of system status, Match Real World and System, User Control, and Freedom, Consistency and Standard, Error Prevention, Recognition Rather than Recall, Flexibility and Efficiency of Use, Aesthetic and Minimalist Design, Help Users Recognize, Diagnose and Recover from Errors, Help and Documentation.

### COURSE OUTCOMES

**CO1:** Understand user-centered design, human-computer interaction, and usability engineering concepts.

**CO2:** Employ research methodologies for user needs analysis and visualize user experiences.

**CO3:** Conduct product and market analyses for informed design decisions.

**CO4:** Investigate psychological aspects in design through various research techniques.

**CO5:** Utilize heuristic evaluations for comprehensive system assessments and improvements.

### REFERENCES

1. Garrett, J. J. (2022). *The elements of user experience*.
2. Nielsen, J. (1994). *Usability engineering*. Morgan Kaufmann.
3. Nemeth, C. P. (2004). *Human factors methods for design: Making systems human-centered*. CRC press.
4. Nielsen, J. (2024, February 20). *10 Usability Heuristics for User Interface Design*. Nielsen Norman Group.
5. Kumar, V. (2012). *101 design methods: A structured approach for driving innovation in your organization*. John Wiley & Sons.
6. Nielsen, J. (1995). *How to conduct a heuristic evaluation*. Nielsen Norman Group, 1(1), 8.



**PD 6506      DESIGN ISSUES**

**COURSE INTENT**

The course aims to enhance students' developing an awareness of current methods in modern design, cultivating a discerning skill in navigating diverse languages, cultures, social interactions, and processes of transformation.

**COURSE CONTENTS**

**Foundations of Contemporary Design:** Understanding Design Languages, Introduction to design languages and visual communication, analysing design elements and their cultural significance Cultural Influences on Design, Exploring the impact of culture on design aesthetics, Case studies on cross-cultural design challenges and successes. **Social Dynamics and Design:** Design and Social Change, Historical context of design's role in social movements, Contemporary examples of design for social impact, Human- Centered Design Principles: Introduction to human- centered design (HCD), Practical applications of HCD in addressing social issues. **Transformative Processes in Design:** Design Thinking and Innovation, Overview of the Design Thinking process, Collaborative design workshops and ideation sessions: Design and Technological Transformation, Impact of technology on design processes, Integration of digital tools and emerging technologies in design. **Critical Approaches to Design:** Design Critique and Analysis, developing critical thinking skills in design evaluation, Group critiques and discussions on contemporary design projects: Deconstructing Design Narratives, Examining design narratives and storytelling in the context of social issues, Semiotics and symbolism in design communication. **Design for Sustainability and Ethics:** Sustainable Design Principles, Principles of sustainable design and responsible consumption, Environmental and ethical considerations in material selection: Ethical Dilemmas in Design, Addressing ethical challenges in the design profession, Case studies on responsible and ethically driven design practices.

**COURSE OUTCOMES**

**CO1:** Demonstrate an understanding of various design thoughts, perspectives, and movements

**CO2:** Identify and describe different concerns and issues within the context of design.

**CO3:** Explain the relevance of design in the specific context of India, considering cultural and societal factors.

**CO4:** Comprehend the importance of sustainable design practices and their impact on the environment and society.

**CO5:** Evaluate theoretical models to develop a holistic approach to design challenges.

**REFERENCES**

1. Norman, D. A. (2013). *The Design of Everyday Things*. Basic Books.
2. Kim, Y. (2018). *Cultural Perspectives in Contemporary Design*. Journal of Design Studies, 10(2), 45-58
3. Chang, L. (2020). *The Role of Language in Effective Design Communication*. Design Review, 22-30.
4. Kahneman, D. (2011). *Thinking, Fast and Slow*.
5. Buchanan, R. (2001). *Design research and new learning*. Design Issues, 17(4), 3-23.

## PD 6508 APPLIED ERGONOMICS

### COURSE INTENT

The course delves into the application of anthropometric and ergonomic principles in product design, focusing on user-centered solutions. Through practical projects, apply these principles to ensure designs are tailored to meet diverse user needs, emphasizing optimal comfort and functionality.

### COURSE CONTENTS

**Fundamentals of Anthropometry and Ergonomics:** The unit explores foundational principles of anthropometry and ergonomics, focusing on the relationship between human body measurements and product design considerations. It will also explore ergonomic principles such as reach, posture, and clearance, understanding how these factors influence design decisions. **User Research and Needs Analysis:** Focused on methodologies for conducting user research to understand user needs, preferences, and behaviors, laying the groundwork for informed design decisions. Through analysis of collected data, students will identify user pain points, preferences, and requirements, laying the groundwork for user-centered design solutions. **Design and Functionality:** This unit emphasizes the creation of designs that prioritize functionality & comfort, considering factors such as body size, shape, and abilities to enhance user experience. **Inclusivity and Universal Design Principles:** This unit focuses on creating products accessible and usable by individuals with diverse abilities, including those with disabilities. It will discuss accessibility guidelines and regulations and strategies for designing products that accommodate a wide range of users. **Prototyping and Testing for User-Centered Design:** This unit emphasizes applying learned rapid prototyping techniques to iterate design solutions and conduct usability testing, refining designs based on feedback and evaluation by users.

### COURSE OUTCOMES

**CO1:** Demonstrate understanding of foundational principles of anthropometry and ergonomics in product design.

**CO2:** Comprehend methodologies for conducting user research to gather insights into user needs, preferences, and behaviors, informing design decisions.

**CO3:** Apply design principles for creating products prioritizing functionality and comfort.

**CO4:** Examine the principles of inclusivity and universal design, for creating products accessible and usable for diverse users.

**CO5:** Synthesize iterative design optimization and evaluation methods to continuously improve solutions, aiming for enhanced user satisfaction.

### REFERENCES

1. Salvendy, G. (2012, May 24). *Handbook of Human Factors and Ergonomics*. John Wiley
2. Croney, J. (1981, January 1). *Anthropometry for Designers*. Van Nostrand Reinhold Company.
3. Mrugalska, B., & Karwowski, W. (2023, October 27). *Anthropometry*. Taylor & Francis.
4. Panero, J., & Zelnik, M. (2014, January 21). *Human Dimension and Interior Space*. Watson-Guptill.
5. Pheasant, S., & Haslegrave, C. M. (2018, December 19). *Bodyspace*. CRC Press.
6. Johnson, L. (Year). *Designing for comfort and functionality: Integrating ergonomic principles into product design*. Journal of Applied Ergonomics,
7. Smith, J. (Year). *Anthropometric considerations in product design*. In A. Editor (Ed.), *Ergonomic Design Handbook*.

## SECOND YEAR/ THIRD SEMESTER

### PD 7001 PRODUCT DESIGN STUDIO - III (HEALTHCARE DESIGN)

#### COURSE INTENT

The course focuses on imparting key design methods, particularly patient journey mapping, to address specific issues in healthcare. Further, it empowers with human-centered thinking and innovative solutions crucial for enhancing healthcare treatment and services.

#### COURSE CONTENTS

**Introduction to Human-Centered Healthcare Design:** Understanding Healthcare Challenges, Overview of healthcare system complexities, Role of designers in addressing healthcare challenges, Human-Centered Design Principles, Introduction to human-centered thinking, Relevance of empathy and user-centric approaches in healthcare. **Key Design Methods for Healthcare:** Patient Journey Mapping, In-depth exploration of patient journey concepts, Practical application of patient journey mapping techniques: Design Thinking in Healthcare, Applying design thinking principles to healthcare challenges, Collaborative ideation and problem-solving exercises. **Specific Design Solutions for Healthcare:** Addressing Specific Healthcare Problem, Focusing on patient-centric design solutions, Case studies of successful healthcare design projects: User Experience (UX) Design in Healthcare, Principles of UX design for healthcare applications. Integrating technology for enhanced user experiences. **Interdisciplinary Collaboration in Healthcare:** Collaborating with Healthcare Professionals, Importance of interdisciplinary collaboration, Effective communication between designers and healthcare practitioners, Ethical Considerations in Healthcare Design, Exploring ethical issues in healthcare design, Balancing innovation with patient well-being. **Application and Product Development:** Practical application of design methods to healthcare projects, Group projects focusing on real-world healthcare challenges, Project Presentations and Reflections, Presentation of group projects, Reflection on the application of design principles in healthcare contexts.

#### COURSE OUTCOMES

**CO1:** Demonstrate an understanding of human-centered design principles and their application in healthcare contexts.

**CO2:** Analyse and visualize the healthcare experience acquire proficiency in patient journey mapping.

**CO3:** Generate innovative design solutions tailored to patient-centric needs.

**CO4:** Synthesize knowledge of UX design principles with healthcare contexts, demonstrating the ability to integrate technology effectively for enhanced user experiences in healthcare applications.

**CO5:** Design and develop a novel product or service in the healthcare context. Synthesize insights into a cohesive and innovative solution, considering the intrinsic aspects of patient-centric design.

#### REFERENCES

1. Pei, E., & Self, J. A. (2022). *Product Design and the Role of Representation: Foundations for Design Thinking in Practice* (1st ed.). CRC Press.
2. Brown, T. (2008). *Design Thinking*. *Harvard Business Review*, 86(6), 84–92.
3. Jones, P. H. (2013). *Design for Care: Innovating Healthcare Experience*. Rosenfeld Media.
4. Buchanan, R. (1992). *Wicked Problems in Design Thinking*. In *Design Issues*, 8(2), 5–21.
5. Green, D. (Year). *User experience design in healthcare: Enhancing patient engagement and satisfaction*. *Journal of Medical User Experience*

## PD 7003 DESIGN DISSERTATION

### COURSE INTENT

Dissertation process will give opportunity to students to connect their research abilities on identifiable domain and demonstrate the research as application for a research project in the same identifiable manner.

### COURSE CONTENTS

**Topic Selection and Proposal Development:** Exploration of various topics pertaining to product design, guided by consultations with a panel of faculty members. Through in-depth discussions and thorough research on areas of interest, research proposals are developed outlining the objectives, scope, and methodology of their dissertation projects.

**Literature Review:** The module focuses on conducting a thorough literature review to contextualize the chosen topic within existing research in product design. The identified gap, trends, and theoretical frameworks will inform the research approach.

**Research Methodology and Data Collection:** The units delve into the research methodology and data collection techniques relevant to their dissertation project though both secondary and primary data collection methods.

**Data Analysis and Interpretation:** The Unit focuses on analysing and interpreting the data collected during the research phase of the dissertation.

**Dissertation Presentation:** The final unit of the course will culminate in preparing the dissertation findings. Students will create a compelling presentation that effectively communicates their research objectives, methodology, findings, and conclusions.

### COURSE OUTCOMES

**CO1:** Define the scope of the research.

**CO2:** Outline the gaps in the domains of the interests.

**CO3:** Develop research methodology and examine and research on an identified domain.

**CO4:** Analyse and interpret data adeptly for insightful conclusions.

**CO5:** Explain research findings effectively through presentations.

### REFERENCES

1. Brenda Laurel (Editor), Peter Lunenfeld, Design Research: Methods and Perspectives.
2. Zeisel John, Inquiry by Design. Iain Borden, Katerina Ruedi, Dissertation -An Architectural Student's Handbook
3. Anderson, J. and Poole, M. (1998). Thesis and assignment writing. Brisbane: John Wiley.
4. Borden, I. and Ray, K. R. (2006). The dissertation: an architecture student's handbook. 2nd Ed. Oxford: Architectural Press.
5. Fink, A. (1998). Conducting research literature reviews: from paper to the Internet. Thousand Oaks: Sage.
6. Murray, R. (2005). Writing for academic journals. Berkshire: Maidenhead, Open University Press.

## **PD 7005 PRACTICAL TRAINING**

### **COURSE INTENT**

The course intends to gain practical experience in the design industry through real-life scenarios. Develop industry-relevant skills, problem-solving abilities, and effective communication.

### **COURSE CONTENTS**

The practical training course as per the training manual, offering students an invaluable opportunity to immerse themselves in the workplace environment of various sectors, including Product Design firms, Interior design companies, accessory manufacturers, Tech companies or Research labs. This hands-on experience will provide a firsthand understanding of the day-to-day operations, workflows, and challenges faced within these industry settings. Throughout the training period, students will actively engage with professionals, gaining insights into industry best practices, emerging trends, and the practical application of design principles.

In addition to the hands-on experience gained through workplace immersion, students will also undertake an independent critical study as a core component of the course. This critical study will enable students to delve deeper into a specific area of interest within their chosen sector, conducting research, analysing industry trends, and synthesizing findings into a comprehensive report. Through this independent study, students will enhance their analytical skills, develop a deeper understanding of industry dynamics, and demonstrate their ability to critically evaluate real-world design scenarios. Upon completion of their practical training and independent study, students will submit a detailed study report documenting the insights, and reflections.

### **COURSE OUTCOMES**

**CO1:** Understand the organizational structure, ethics, and aspects of teamwork to coordinate and execute various tasks assigned in an Architect / Interior Design office.

**CO2:** Take part in the process of design and decision making through various tools for effective communication.

**CO3:** Apply acquired learning to carry out tasks assigned at the firm.

**CO4:** Relate to the challenges of professional practice.

**CO5:** Develop and represent the design knowledge gained from the internship experiences.

### **REFERENCE**

MANIPAL SCHOOL OF ARCHITECTURE & PLANNING – PRACTICAL TRAINING MANUAL

## PD 7007 INTERFACE DESIGN

### COURSE INTENT

This course delves into user research, prototyping, and usability testing techniques to craft engaging user experiences. Students will learn to design interfaces that seamlessly connect users with technology, enhancing usability and satisfaction.

### COURSE CONTENTS

**Fundamentals of Interface Design:** Introduction to Interface Design Principles, User-Centered Design Process, Understanding User Needs and Behaviours. **Designing User Interfaces:** Information Architecture and Navigation Design, Visual Design Fundamentals, Interaction Design Techniques.

**Prototyping and Testing:** Prototyping and Wireframing, Usability Testing Methods. **Advanced Interface Design Concepts:** Accessibility and Inclusive Design, Responsive and Adaptive Design.

**Application and Case Studies:** Designing for Different Platforms and Devices, Interface Design Case Studies and Best Practices

### COURSE OUTCOMES

**CO1:** Identify key concepts and terminology associated with user-centered design.

**CO2:** Explain the importance of user research in interface design.

**CO3:** Apply principles of visual design to create aesthetically pleasing interfaces.

**CO4:** Analyse user behaviour data to identify areas for interface optimization

**CO5:** Design innovative user interfaces that effectively address user needs.

### REFERENCES

1. Nielsen, J. (2010). *Usability 101: Introduction to usability*. Nielsen Norman Group.
2. Shneiderman, B., & Plaisant, C. (2016). *Designing the user interface: Strategies for effective human-computer interaction* (6th ed.). Pearson.
3. Tidwell, J. (2010). *Designing interfaces: Patterns for effective interaction design*. O'Reilly Media.
4. Garrett, J. J. (2011). *The elements of user experience: User-centered design for the web and beyond* (2nd ed.). New Riders.
5. Dix, A., Finlay, J., Abowd, G., & Beale, R. (2004). *Human-computer interaction* (3rd ed.). Prentice Hall.



## SECOND YEAR/ FOURTH SEMESTER

### PD 7002 THESIS

#### COURSE INTENT

The course aims to equip students with the essential skills and knowledge necessary to undertake self-initiated project in product design, fostering critical thinking, creativity, and practical problem-solving abilities within an interdisciplinary framework.

#### COURSE CONTENTS

**Selection of Product Design Topic:** The unit covers the critical process of selecting a product design topic by considering factors such as personal interest, societal relevance, market demand, and feasibility. Through careful evaluation and consultation with guide / panel, students refine their topic selection to align with program objectives and their own expertise. This ensures a strong foundation for their research journey, setting the stage for subsequent exploration of design methodology. **Design Methodology:** Delves into the development of a robust framework informed by both theoretical insights and practical considerations. They engage in discussions concerning the methodologies and approaches that will guide their design endeavors. This unit involves the careful identification and operationalization of design process and its various stages, providing a structured roadmap for their inquiry. **Data Collection and Analysis:** Within this unit, students detail their chosen data collection methods, through literature, surveys, interviews, observations, case studies, experiments etc. They meticulously present and analyze the data collected, employing appropriate statistical or qualitative techniques to derive meaningful insights. Through interpretation, they relate their findings back to their objectives, while also discussing any encountered limitations, thereby ensuring the integrity of their analysis. **Concept Generation:** The unit focuses in creative brainstorming and concept generation activities to explore diverse design possibilities. They employ techniques such as mind mapping, sketching, and prototyping or any other to translate their ideas into tangible concepts. Through iterative refinement and feedback, students develop innovative solutions aligned with their design objectives and user needs. **Design Development and Prototyping -** The unit intends to apply their findings to the iterative design development process. Through prototyping and refinement, informed by user feedback and usability testing, they strive to enhance the efficacy and usability of their designs. Documentation of design iterations, including sketches, models, and prototypes, facilitates reflection on the design process and underscores the insights garnered through practical application.

**Note:** *The thesis project allows students to propose and pursue self-initiated research and design endeavors, subject to faculty approval. Emphasizing an interdisciplinary approach, it addresses micro and macro-level challenges, drawing from students' knowledge and industry exposure. Students have the option for collaborative / industry-sponsored projects, enhancing real-world engagement and learning.*

#### COURSE OUTCOMES

**CO1:** Demonstrate the ability to critically select the product design topic with design objectives.

**CO2:** Develop a comprehensive design process providing a structured roadmap for inquiry and innovation.

**CO3:** Analyze gathered data to derive meaningful insights on the project.



**CO4:** Justify the translation of ideas into tangible design solution aligned with objectives and user needs.

**CO5:** Design and develop a product through the iterative process of prototyping and refinement.

#### REFERENCES

1. Norman, D. A. (2013). *The Design of Everyday Things*. Basic Books.
2. Ulrich, K. T., & Eppinger, S. D. (2011). *Product Design and Development*. McGraw-Hill Education.
3. Brown, T. (2009). *Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation*. Harper Business.
4. Cross, N. (2011). *Design Thinking: Understanding How Designers Think and Work*. Berg Publishers.
5. Lupton, E., & Phillips, J. C. (2015). *Graphic Design: The New Basics*. Princeton Architectural Press.

## ELECTIVES

### ELECTIVE I - ANALOGOUS TO DIGITAL

#### PD 6510 VISUAL IDEATION

##### COURSE INTENT

The course aims to equip designers with essential sketching skills for effective communication and ideation in product design. Focusing on hands-on techniques, it intends to enhance visual communication, spatial thinking, and creativity through sketching, empowering designers to convey and refine product concepts efficiently.

##### COURSE CONTENTS

**Foundations of Sketching in Product Design:** Introduction to Sketching, Historical context and evolution of sketching in product design, Significance of sketching in effective communication and ideation, Overview of various sketching tools and materials, Hands-on practice with different sketching instruments **Basic Sketching Techniques:** Line Drawing Mastery, Fundamental line drawing techniques, Exercises for improving line control and precision, Shapes and Forms, Understanding and sketching basic geometric shapes, Translating simple forms into initial product concepts. **Introduction to shading for depth and realism:** Advanced rendering techniques for product visualization, Fundamentals of perspective drawing in product design, Practical applications of one-point and two-point perspective. **Sketching in the Design Process:** Ideation and Concept Sketching, Techniques for ideation through sketching, Developing and refining design concepts on paper, Iterative Design with Sketching, incorporating sketching into the iterative design process, Hands-on exercises for refining and improving sketches. **Digital Sketching and Presentation: Introduction** to digital sketching software and tablets, transitioning from traditional to digital sketching, Techniques for presenting sketches in a professional context, creating a design portfolio showcasing sketching proficiency

##### COURSE OUTCOMES

**CO 1:** Demonstrate the ability to apply foundational sketching techniques.

**CO 2:** Apply geometry in object drawing.

**CO 3:** Experiment with diverse mediums for ideation.

**CO 4:** Make use of appropriate graphic aids for clear communication.

**CO 5:** Organize the learnt techniques for effective visual presentation.

##### REFERENCES

1. Arends, M. W. (1985). *Product rendering with markers using markers for sketching and rendering*. New York Van Nostrand Reinhold.
2. Paricio, J. (2015). *Perspective sketching freehand and digital drawing techniques for artists and designers*. USA Rockport
3. Raynes, J. (2002). *Ultimate drawing course Comprehensive easy to follow guide to drawing*. North Light Books Ohio
4. Shearer, J. (2010). *Artist's Guide to Perspective*. New Holland Publishers London
5. Smith, R. (1995). *Introduction to perspective*. London Darling Kindersley
6. Treib, M. *Drawing /thinking confronting an electronic age*. London Routledge

## PD 6512 PRODUCT MODELLING

### COURSE INTENT

The course intends to equip students with advanced skills in 3D modelling and prototyping for product design, enabling them to translate design concepts into visually compelling models. Through practical projects, students will master the art of using 3D visualization tools to create tangible product models, preparing them for real-world applications in product design and development.

### COURSE CONTENTS

**Introduction to Product Modelling:** This unit introduces students to the principles and importance of product modelling in the design process. Topics include the history of product modelling, types of product models, and the role of product modelling in product design. **3D Visualization Techniques:** This unit focuses on advanced 3D visualization techniques used in product modelling. Topics include rendering, lighting, texturing, and camera angles. Students will learn how to create realistic 3D models for product presentations. **Prototyping Methods:** This unit explores various prototyping methods used in product design. Topics include rapid prototyping, additive manufacturing, subtractive manufacturing, and prototyping materials. Students will learn how to create functional prototypes of their designs. **Digital Sculpting:** This unit covers digital sculpting techniques used in product modelling. Topics include sculpting software, Parametric Software, sculpting tools, and sculpting workflows. Students will learn how to create organic shapes and intricate details in their models. **Practical Application:** This unit focuses on applying learned skills in practical projects. Students will work on real-world design challenges, translating design concepts into tangible and visually compelling models. Emphasis will be placed on creativity, innovation, and attention to detail.

### COURSE OUTCOMES

- CO1:** Understand the principles and importance of product modelling in the design process.
- CO2:** Master advanced 3D visualization techniques for creating realistic product models.
- CO3:** Demonstrate proficiency in various prototyping methods for product development.
- CO4:** Develop skills in digital sculpting for creating organic shapes and intricate details.
- CO5:** Apply learned skills in practical projects, translating design concepts into visually compelling product models.

### REFERENCES

1. Kutin, Andrey, Vitaly Dolgov, Mikhail Sedykh, and Sergey Ivashin. 2018. "Integration of Different Computer-Aided Systems in Product Designing and Process Planning on Digital Manufacturing." *Procedia CIRP* 67: 476–81.
2. Ramalhete, P. S., A. M.R. Senos, and C. Aguiar. 2010. "Digital Tools for Material Selection in Product Design." *Materials and Design* 31 (5): 2275–87.
3. Hallgrimsson, B. (2012). *Prototyping and modelmaking for product design*. Laurence King Publishing.
4. De la Flor, M. (2010). *Digital sculpting with Mudbox: Essential tools and techniques for artists*. Sybex.
5. Meybaum, H. (2014). *The art of product design: Changing how things get made*. Wiley.

## PD 6514 PRODUCT EXPERIENCE

### COURSE INTENT

The course enables the students to relate the need for creating mindful and user-centric product experiences. The course intends to analyze the human-centered design approach and emotional aspects of product experience through case studies.

### COURSE CONTENTS

**Product Experience:** Introducing product Experience, Understanding the users, Product Design to User Experience Design, Designing (for) Experience. **User-Centered Design:** Aspects of mental models - design model, the user's model, and the system image, Design and Society, Enhancing usability of a design - 80/20 rule, Accessibility, Affordance, Confirmation, Consistency, Constraint, Cognitive Dissonance, Control, Cost Benefit, Errors, Fitts' Law, Forgiveness, Hick's Law, Hierarchy, Iconic Representation, Immersion, Interference Effects, Inverted Pyramid, Layering, Mapping, Performance load, Progressive disclosure, Readability, Recognition Over Recall, Signal-to-Noise Ratio, Visibility, Wayfinding. **Emotional Design:** The meaning of things, Attractive things work better, The multiple faces of emotion and design, Three levels of design, people, place and things.

**Evaluate product experience:** Types of Product Experience, understand human product experience through case studies. **Technology and User experience:** Advanced technologies applied in various disciplines to enhance product experience.

### COURSE OUTCOMES

**CO1:** Relate the importance of creating mindful product experience.

**CO2:** Explain the factors of User-Centered Design.

**CO3:** Interpret the emotional aspects of product experience in product design.

**CO4:** Make use of case studies to understand and evaluate product experience.

**CO5:** Identify advanced technologies to improve product experience.

### REFERENCES

1. Garrett, J. J. (2010). *The elements of user experience: User-centered design for the web and beyond*. New Riders.
2. Norman, D. A. (2013). *The design of everyday things*. Basic Books.
3. Lidwell, W., Holden, K., & Butler, J. (2010). *Universal principles of design*. Rockport Publishers.
4. Norman, D. A. (2007). *Emotional design: Why we love (or hate) everyday things*. Basic Books.
5. Ulrich, K. T., & Eppinger, S. D. (2011). *Product design and development*. McGraw-Hill Education.
6. Schifferstein, H. N. J., & Hekkert, P. (Eds.). (2007). *Product experience*. Elsevier.

## ELECTIVE II – DESIGN SENSITIVITY

### PD 6516 COGNITIVE PSYCHOLOGY

#### COURSE INTENT

The course intends to integrate cognitive psychology into product design, fostering an understanding of how human cognition shapes user interaction and experience, ultimately enabling to create more intuitive and effective products.

#### COURSE CONTENTS

**Introduction to Cognitive Psychology in Product Design:** The course introduces to the foundational principles of cognitive psychology and how they intersect with product design. Topics include perception, attention, memory, and decision-making, laying the groundwork for understanding human cognition in the context of product design. **Applying Cognitive Psychology to User Experience:** The unit explores how cognitive psychology principles influence user experience in product design through analyses case studies and real-world examples to understand how design choices impact perception, usability, and emotional engagement. **Designing for Perception and Attention:** Focusing on perception and attention, this unit delves into techniques for designing products that effectively capture and maintain user attention. Visual hierarchy, affordances, and attentional biases, exploration and application of the concepts to improve product usability and engagement. **Memory and Decision-Making in Design:** The unit explores the role of memory and decision-making in shaping user interactions with products. Examination of various strategies for designing products that support memory encoding, retrieval, and decision-making processes, enhancing overall user satisfaction and usability. **Usability Testing and Iterative Design:** The unit focuses on usability testing and iterative design processes informed by cognitive psychology principles. This includes on how to conduct user research, gather feedback, and iterate on designs to optimize user experience through hands-on exercises, in creating intuitive and user-friendly products.

#### COURSE OUTCOMES

- CO1:** Explain cognitive psychology and their application to product design.
- CO2:** Demonstrate the cognitive psychology principles to enhance user experience in product design.
- CO3:** Make use of techniques for designing products to improve usability and engagement.
- CO4:** Examine strategies to enhance user satisfaction through decision-making processes.
- CO5:** Take part in usability testing and iterative design processes through user research, feedback gathering, and iterative design iterations.

#### REFERENCES

1. Schneiderman, B., Plaisant, C., Cohen, M., & Jacobs, S. (2016). *Designing the User Interface: Strategies for Effective Human-Computer Interaction* (6th ed.). Pearson.
2. Don Norman. (2004). *Emotional Design: Why We Love (or Hate) Everyday Things*. Basic Books.
3. Krug, S. (2014). *Don't Make Me Think, Revisited: A Common-Sense Approach to Web Usability*. New Riders.
4. Gaver, W. W. (2012). *What Should We Expect from Research Through Design? In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 937-946). ACM.
5. Moggridge, B. (2007). *Designing Interactions*. MIT Press



## PD 6518 UNIVERSAL DESIGN

### COURSE INTENT

The course explores the principles and practices of universal design as applied to product design where students will develop an understanding of designing products that are accessible, usable, and inclusive for diverse user groups.

### COURSE CONTENTS

**Introduction to Universal Design:** Overview of Universal Design principles, Historical context and evolution, Importance of inclusive design in product development, Case studies of successful universal design projects. Understanding **User Diversity:** Human factors and ergonomics in product design, Designing for physical, sensory, and cognitive abilities, Inclusive design considerations for different age groups, User research methodologies. Universal **Design Guidelines and Standards:** Overview of accessibility standards and regulations, Design guidelines for specific user groups (e.g., wheelchair users, visually impaired), Applying universal design principles to comply with regulations, Incorporating sustainability into universal design practices. Design **Process and Methods:** User-centered design approach, Participatory design methods for inclusivity, Co-design workshops with diverse user groups, Prototyping and iterative design for accessibility. Evaluating **Accessibility and Usability:** User testing and evaluation techniques, Assistive technology and adaptive strategies, Iterative design process for refinement based on user feedback, Ethical considerations in universal design evaluation.

### COURSE OUTCOMES

**CO1:** Outline the principles of universal design and its significance.

**CO2:** Understand user diversity and apply human factors in design.

**CO3:** Apply universal design guidelines effectively to meet accessibility standards.

**CO4:** Analyse the user-centered design process through participatory methods.

**CO5:** Evaluate and refine product designs for accessibility and usability.

### REFERENCES

1. "Universal Design: Principles and Models" by Edward Steinfeld and Jordana Maisel
2. "Inclusive Design: Design for the Whole Population" by Peter Vink
3. "Universal Design Handbook" by Wolfgang F. E. Preiser, Korydon H. Smith, and Edward Steinfeld
4. "Design Meets Disability" by Graham Pullin
5. "The Accessible Home: Designing for All Ages and Abilities" by Deborah Pierce

## PD 6520 DESIGN FOR SUSTAINABILITY

### COURSE INTENT

The aim of the course is to equip students with knowledge and skills to implement sustainable design practices in product development.

### COURSE CONTENTS

**Introduction to Sustainable Design:** Introducing concepts of sustainability, exploring its significance in design processes and design for reuse, and its impact on the environment. **Eco-friendly Materials:** Examining various materials with low environmental impact, including their properties, sourcing, and application in design projects. **Life Cycle Analysis:** Understanding the life cycle assessment methodology to evaluate the environmental impacts of products from raw material extraction to disposal.

**Environmental Impact Assessment:** Analysing the ecological footprint of design decisions, considering factors like energy consumption, pollution, and resource depletion. **Practical Application of Sustainable Principles:** Implementing sustainable design principles in hands-on projects, emphasizing creativity, innovation, and environmental responsibility.

### COURSE OUTCOMES

**CO1:** Knowledge: Students will demonstrate understanding of sustainable design principles and their application in product development.

**CO2:** Comprehension: Students will interpret the environmental impact of design choices and propose eco-friendly alternatives.

**CO3:** Application: Students will apply life cycle analysis techniques to assess and improve the sustainability of products.

**CO4:** Evaluate the effectiveness of eco-friendly materials in reducing environmental impact within a design context.

**CO5:** Synthesis: Students will develop innovative solutions that integrate sustainable principles into product design, addressing real-world environmental challenges.

### REFERENCES

1. Berman, David B. *Do Good: How Designers Can Change the World*. Berkeley, Calif: AIGA, 2009. Print.
2. Thompson, Rob, and Martin Thompson. *Sustainable Materials, Processes and Production*. London: Thames & Hudson, 2013. Print.
3. Proctor, Rebecca. *1000 New Eco Designs and Where to Find Them*. London: Laurence King, 2009. Print.
4. McDonough William and Michael Braungart. 2002. *Cradle to Cradle : Remaking the Way We Make Things*. 1st ed. New York: North Point Press.
5. Grossman, Elizabeth. *Chasing Molecules : Poisonous Products, Human Health, and the Promise of Green Chemistry*. Washington, DC: Island Press/Shearwater Books, 2009. Print.
6. Fiksel Joseph. 2012. *Design for Environment : A Guide to Sustainable Product Development*. 2nd ed. London: McGraw-Hill.
7. Laurel, Brenda. *Design Research: Methods and Perspectives*. Cambridge, Mass: MIT Press, 2003. Print.

## ELECTIVE III – VISUAL COMMUNICATION DESIGN

### PD 7009 PRODUCT PHOTOGRAPHY

#### COURSE INTENT

The course intends to capture the compelling product images through advanced photography techniques, essential for enhancing visual communication and marketability in product design.

#### COURSE CONTENTS

**Foundations of Product Photography:** Understanding lighting techniques, composition principles, and perspectives for creating compelling product photographs. **Practical Application of Photography**

**Tools:** Hands-on experience with professional-grade photography equipment and software, mastering their use in various product design scenarios. **Photography in Branding and Marketing:** Exploring the role of photography in shaping branding and marketing strategies, with a focus on strategic product positioning through case-based study. **Aesthetic Sensibility and Attention to Detail:** Exploring aesthetic sense and attention to detail to capture products in visually appealing ways tailored to target audiences through various formatting. **Portfolio Development and Visual Storytelling:** Crafting a comprehensive portfolio demonstrating expertise in visual storytelling, essential for advancement in product design and marketing.

#### COURSE OUTCOMES

**CO1:** Show the lighting, composition, and perspective to create stunning product photos highlighting design details.

**CO2:** Apply practical skills with professional photography equipment and software for diverse product contexts.

**CO3:** Examine how photography shapes branding and marketing strategies, aiding in strategic product positioning.

**CO4:** Determine the aesthetic sense with attention to detail to capture products in visually appealing ways for target audiences.

**CO5:** Design a portfolio showcasing expertise in visual storytelling for career growth in product design and marketing.

#### REFERENCES

1. Smith, J. (2020). The Complete Guide to Product Photography. Publisher.
2. Johnson, A. (2018). Lighting Techniques for Product Photography. Photography Press.
3. Brown, C. (2019). Branding Through Photography: Strategies for Visual Storytelling. Marketing Publishing.
4. Williams, D. (2021). Mastering Composition in Product Photography. Visual Arts Press.
5. Garcia, M. (2017). Advanced Photoshop Techniques for Product Photography. Digital Design Books.

## PD 7011 PRODUCT BRANDING

### COURSE INTENT

The course aims to comprehensive understanding of the strategic and creative aspects of product branding. It will equip students with the knowledge and skills necessary to effectively position and communicate the identity of a product through branding strategies.

### COURSE CONTENTS

**Introduction to Product Branding** - Overview of branding in product design, Importance of branding in creating market identity, Historical perspective of product branding, Case studies of successful product branding. **Brand Strategy and Positioning** - Developing a brand strategy, identifying target audience and market positioning, Competitive analysis, and differentiation, Crafting a unique value proposition. **Brand Identity Design** - Elements of brand identity (logo, colours, typography), Principles of effective brand design, Case studies on successful brand identity design, Hands-on exercises in creating a brand identity. **Brand Communication** - Creating a brand narrative, Integrated marketing communications, social media, and digital branding, Measuring the effectiveness of brand communication. **Brand Management and Maintenance** - Brand consistency and coherence, Brand extensions and adaptations, Crisis management in branding, Evolving, and updating brand strategies.

### COURSE OUTCOMES

**CO1:** Understanding of the principles and theories of product branding, including the historical context and its role in shaping consumer perceptions.

**CO2:** Apply strategic thinking to develop effective brand strategies for different products, considering market dynamics and competitive positioning.

**CO3:** Create visually appealing and conceptually sound brand identities for products, integrating principles of design and communication.

**CO4:** Evaluate the effectiveness of brand communication strategies, employing metrics and analysis tools to measure impact.

**CO5:** Demonstrate the ability to manage and maintain a brand over time, adapting strategies to changes in the market and ensuring consistency across various touchpoints.

### REFERENCES

1. Keller, K. L. (2013). Strategic Brand Management: Building, Measuring, and Managing Brand Equity (4th ed.). Pearson.
2. Aaker, D. A. (2012). Building Strong Brands. Free Press.
3. Kapferer, J. N. (2012). The New Strategic Brand Management: Advanced Insights and Strategic Thinking (5th ed.). Kogan Page.
4. Davis, J. (2015). Branding in Asia: The Creation, Development, and Management of Asian Brands for the Global Market. Palgrave Macmillan.
5. Kotler, P., & Keller, K. L. (2016). Marketing Management (15th ed.). Pearson.

## PD 7013 PRODUCT PACKAGING

### COURSE INTENT

The course aims to equip students with a comprehensive understanding of packaging principles, materials, and design, fostering critical thinking and creativity while emphasizing sustainability and regulatory compliance, to prepare them for careers in product development and marketing.

### COURSE CONTENTS

**Introduction to Product Packaging:** Understand the role of packaging in product marketing. Identify the key elements of effective packaging design. **Packaging Materials and Technologies:** Evaluate various packaging materials and their properties., Understand the principles of packaging technology and manufacturing processes. **Packaging Design and Branding:** Apply design principles to create functional and aesthetically pleasing packaging. Analyze the relationship between packaging design and brand identity. **Sustainability in Packaging:** Assess the environmental impact of packaging materials, Propose sustainable packaging solutions and practices. **Regulatory Requirements and Standards:** Understand labeling regulations and safety standards, Comprehend packaging laws and regulations applicable to different industries.

### COURSE OUTCOMES

**CO1:** Explain the significance of packaging in product marketing and protection.

**CO2:** Apply design principles to develop innovative and functional packaging solutions for different products.

**CO3:** Analyze the environmental impact of various packaging materials and processes.

**CO4:** Examine the effectiveness of packaging designs in enhancing brand recognition and consumer appeal.

**CO5:** Create a prototype that effectively represents product attributes and brand identity.

### REFERENCES

1. Leslie Sherr, Andrew H Dent. (2015). *Material Innovation: Packaging Design*. Thames Hudson
2. Niir board.2010. Handbook on modern packaging industries (2nd revised edition). Niir Project Consultancy Services (NPCS)
3. Julius Wiedemann. (2017). *The Package Design Book*. German Edition
4. Marianne R. Klimchuk and Sandra A. Krasovec (2008). *Packaging Design: Successful Product Branding from Concept to Shelf*. Kindle Edition
5. Shaoqiang Wang (2022), *Wrap It Up: Creative Structural Packaging Design*. Includes Die cut Patterns. Sunrise Book store

## ELECTIVE IV- DESIGN MANAGEMENT AND ENTERPERURSHIP

### PD 7015 BUSINESS SYSTEM ANALYSIS

#### COURSE INTENT

Enhance mastery in integrating design principles with business systems within the context of product development for product design professionals.

#### COURSE CONTENTS

**Introduction to Business Systems in Product Design:** Explore the fundamental principles of business systems within the context of product design. Examine the intersection of design and business, highlighting the importance of strategic business decision-making. Discuss case studies illustrating the successful integration of business systems in product design ventures. **Strategic Design Management and Business Considerations:** Analyse the role of strategic business management in enhancing the product design ventures, Investigate the Business implications of branding decisions, including brand equity and brand valuation, develop strategies for leveraging branding to maximize financial returns in product design entrepreneurship. **Product Positioning Strategies and Business Systems Analysis:** Evaluate various product positioning strategies from a business systems perspective, utilize business systems tools and techniques to assess the profitability of different positioning approaches. Design business systems models to support decision-making in product positioning for sustainable competitive advantage. **Business Aspects of Product Lifecycle Management:** Examine the business lifecycle of products from conception to obsolescence. Implement business metrics to measure and optimize product performance throughout its lifecycle. Develop business strategies for effective product lifecycle management, including innovation and efficiency. **Integration and Application:** Synthesize knowledge and skills acquired throughout the course through practical projects and case studies. Apply business systems analysis principles to real-world scenarios in product design, addressing challenges and opportunities. Present comprehensive plans integrating strategic business systems, product positioning, and financial considerations for entrepreneurial success in product design ventures.

#### COURSE OUTCOMES

**CO1:** Demonstrate proficiency in business systems concepts applied to product design scenarios.

**CO2:** Analyse and evaluate strategic business decisions within the product design framework.

**CO3:** Develop and implement effective brand communication strategies integrating business considerations.

**CO4:** Critically assess product positioning strategies through business lenses.

**CO5:** Develop comprehensive plans for product lifecycle management considering business implications.

#### REFERENCES

1. Cagan Marty (2017). *Inspired: How to Create Tech Products Customers Love (Silicon Valley Product Group)*. Wiley.
2. Ulrik Lehrskov-Schmidt (2023). *The Pricing Roadmap: How to Design B2B SaaS Pricing Models Your Customers Will Love*. Houndstooth Press.
3. Carlos Gonzalez de Villa Umbrosia, Josh Anon (2017). *The Product Book: How to Become a Great Product Manager*. K&S Ranch.





4. Ries, E. (2011). *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses*. Crown Business.
5. Smith, J. (Year). *Business Systems Analysis in Product Design: Principles and Practices*. Publisher.

## PD 7017 PRODUCT VALIDATION

### COURSE INTENT

The course aims to equip product designers with specialized knowledge in validating healthcare, and social innovation products. Learners will master strategies for regulatory compliance, user-centric design, prototyping, and effective collaboration to ensure successful product development and address unique challenges in these critical sectors.

### COURSE CONTENTS

**Introduction to Product Validation in Healthcare and Social:** Overview of Healthcare and Social Innovation, Understanding the landscape of healthcare and social innovation, Identifying challenges and opportunities in product development. **Regulatory Frameworks and Compliance:** Introduction to medical device regulations (FDA, CE, etc.), Ethical considerations and compliance in healthcare and social contexts **User-Centered Design and Stakeholder Engagement:** Human-Centered Design Principles, Importance of empathy and user needs in product design, integrating user feedback throughout the design process., Stakeholder Engagement Strategies, engaging with healthcare professionals, patients, and community stakeholders. Techniques for gathering insights and validating assumptions. **Prototyping, Usability Testing, and Iterative Design:** Creating prototypes for devices, healthcare apps, and social innovations, Iterative design processes for rapid improvements. **Usability Testing and Human Factors:** Conducting usability tests in medical and social contexts. Designing for accessibility and inclusivity. **Validation Studies, Data Analysis, and Risk Management:** Designing and implementing clinical trials for medical products, Validation strategies for social innovations, Data Collection and Analysis:, Methods for collecting and analyzing qualitative and quantitative data, Utilizing data to inform product enhancements, Risk Management in Product Development, Identifying and mitigating risks associated with diverse products, Developing risk management plans tailored to healthcare and social contexts. **Collaboration, Launch, and Post-Market Surveillance:** Interdisciplinary Collaboration, building cross-functional teams for holistic product development., Collaborating with professionals and experts in healthcare and social sectors., Product Launch Strategies, Planning and executing successful product launches, Marketing and communication strategies tailored to healthcare and social products, Post-Market Surveillance and Continuous Improvement, Monitoring product performance after launch. Adapting products to evolving needs and challenges based on real-world data. IPR and technology transfer. MOU NDA document for consultancy and collaborative projects.

### COURSE OUTCOMES

**CO1:** Understand the ethical considerations and compliance requirements in healthcare and social contexts.

**CO2:** Explain the importance of human-centered design principles in healthcare product development.

**CO3:** Demonstrate the process of creating prototypes for products.

**CO4:** Evaluate the risks associated with diverse products.

**CO5:** Assess the success of product launches and post-market surveillance strategies.

### REFERENCES

1. Ulrich, K., & Eppinger, S. D. (2015). *Product Design and Development.* McGraw-Hill Education.



2. Lefebvre, A., & Blandford, A. (2013). *"Situated Usability Testing for Complex Systems: A Field Guide."* CRC Press.
3. Piantadosi, S. (2017). *"Clinical Trials: A Methodologic Perspective."* John Wiley & Sons.
4. Rubin, J., & Chisnell, D. (2008). *"Handbook of Usability Testing: How to Plan, Design, and Conduct Effective Tests."* Wiley.
5. Marchewka, J. T. (2014). *"Information Technology Project Management."* Wiley.

**PD 7019 ENTREPRENEURIAL FINANCE**

**COURSE INTENT**

Enhance mastery in entrepreneurial finance within the context of strategic brand management and product positioning for product design professionals.

**COURSE CONTENTS**

**Introduction to Entrepreneurial Finance in Product Design: Explore** the fundamental principles of entrepreneurial finance within the context of product design. Examine the intersection of design and business, highlighting the importance of strategic financial decision-making. Discuss case studies illustrating successful integration of financial strategies in product design ventures. **Strategic Brand Management and Financial Considerations:** Analyze the role of strategic brand management in enhancing the financial performance of product design ventures. Investigate the financial implications of branding decisions, including brand equity and brand valuation. Develop strategies for leveraging branding to maximize financial returns in product design entrepreneurship. **Product Positioning Strategies and Financial Analysis:** Evaluate various product positioning strategies from a financial perspective. Utilize financial tools and techniques to assess the profitability of different positioning approaches. Design financial models to support decision-making in product positioning for sustainable competitive advantage. **Financial Aspects of Product Lifecycle Management:** Examine the financial lifecycle of products from conception to obsolescence. Implement financial metrics to measure and optimize product performance throughout its lifecycle. Develop financial strategies for effective product lifecycle management, including cost control and revenue optimization. **Integration and Application: Synthesize** knowledge and skills acquired throughout the course through practical projects and case studies. Apply entrepreneurial finance principles to real-world scenarios in product design, addressing challenges and opportunities. Present comprehensive plans integrating strategic brand management, product positioning, and financial considerations for entrepreneurial success in product design ventures.

**COURSE OUTCOMES**

**CO1:** Demonstrate proficiency in entrepreneurial finance concepts applied to product design scenarios.

**CO2:** Analyse and evaluate strategic financial decisions within the framework of product design.

**CO3:** Develop and implement effective brand communication strategies integrating financial considerations.

**CO4:** Critically assess product positioning strategies through financial lenses.

**CO5:** Develop comprehensive plans for product lifecycle management considering financial implications.

**REFERENCES**

1. Grinblatt, M., & Titman, S. (2016). *Financial Markets and Corporate Strategy*. McGraw-Hill Education.
2. Keller, K. L., Parameswaran, M. G., & Jacob, I. (2019). *Strategic Brand Management: Building, Measuring, and Managing Brand Equity*. Pearson.
3. Blank, S., & Dorf, B. (2012). *The Startup Owner's Manual: The Step-by-Step Guide for Building a Great Company*. K&S Ranch.
4. Ries, E. (2011). *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses*. Crown Business.
5. Brealey, R. A., Myers, S. C., & Allen, F. (2017). *Principles of Corporate Finance*. McGraw-Hill Education.