CARE

COLLEGE OF ENGINEERING

(An Autonomous Institution)

Approved by AICTE, New Delhi | Affiliated to Anna University, Chennai

Accredited by NAAC with 'A' Grade

#27, Thayanur, Tiruchirappalli - 620009

REGULATION 2024
CURRICULUM AND SYLLABUS FOR FIRST YEAR
CHOICE BASED CREDIT SYSTEM

B.DES. DESIGN

Approved in the First Board of Studies meeting and passed in the first Academic Council meeting held on 18.07.2024 and 10.08.2024 respectively.

CARE COLLEGE OF ENGINEERING:: TIRUCHIRAPPALLI 620 009
(AN AUTONOMOUS INSTITUTION)

REGULATION 2024
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B.DES. DESIGN

Institute Vision

Transform Lives through Education and Research.

Institute Mission

To impart quality education to students through critical thinking, creativity, leadership and spirit of Entrepreneurship.

Institute Values

We develop in each member the ability and passion to work effectively for the betterment of humanity with cultural awareness, high ethical and moral values and a sense of social responsibility.

Department Vision

To be a centre of excellence in design education and research, empowering future generation to use design as a tool to create value, solve problems and find meaningful solution.

Department Mission

1. To cultivate an academic culture that promotes critical thinking, creativity, and ethical responsibility,
2. To prepare students to excel in design and make a positive impact on society

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

1. Become an adaptable and prolific designer who can provide design solutions to society's realized and unrealized needs.
2. Collaborate independently in design teams of any size, contributing to various design stages and organizations that honor diverse stakeholders and nature.
3. Become a contributor to the design discipline through higher studies, research, and development.
4. Become a thinker and entrepreneur who can direct the design world towards a better future in the metamodern world.

PROGRAMME OUTCOMES (POs)
After going through the four years of study, our B.Des. graduates will exhibit the ability to:

PO	Graduate Attribute	Programme Outcome
1	Design comprehension	Understand the various elements and principles involved in each phase of the design process.
2	Design exploration	Explore and represent abstract design ideas using different mediums (manual/ digital).
3	Design articulation	Communicate via various mediums - speech, text, image, text with clarity and brevity.

4	Anthropological Awareness	Appreciate and analyze design in the anthropological scope to be effective and harmonious for varied cultures.
5	Critical thinking	Analyze with awareness of objectivity and subjectivity, toward a better future with optimism.
6	Design implementation	Tangibilize the designs with knowledge of appropriate materials and their related processes.
7	Design commitment	Understand the need for design evolution and participate whenever the need arises.
8	Ecological Awareness	Understand the relationships between ecology and the design to reduce the harms of the Anthropocene.
9	Design refinement	Analyze and amend the design for varied criteria.
10	Ethical awareness	Serve as an effective professional designer and be ethical towards fellow designers, clients, and various stakeholders of design.
11	Design research	Practice appropriate research methods in design career and/or academic career.
12	Social awareness	Realize social impacts of design and use it as a catalyst for positive change.

CURRICULUM SEMESTER I

S. No.	Course Code	Course Title	Category	Periods Per Week			Total Contact Periods	Credits
				L	T	S		
THEORY COURSES								
1.	U24DS111	Design Appreciation	PCC	2	0	0	2	2
2.	U24HS111	Language and English Skills	HSMC	2	0	0	2	2
3.	U24SL111	History of Arts	SLA	2	0	0	2	2
THEORY CUM STUDIO COURSES								
4.	U24SL123	Visual Arts	SLA	1	0	3	4	4
5.	U24DS123	2D Representation Techniques	PCC	1	0	3	4	4
STUDIO COURSES								
6.	U24DS132	Basic Design Studio	PCC	0	0	6	6	6
		TOTAL		**8**	**0**	**12**	**20**	**20**

CURRICULUM SEMESTER II

S. No.	Course Code	Course Title	Category	Periods Per Week			Total Contact Periods	Credits
				L	T	S		
THEORY COURSES								
1.	U24DS211	Form Appreciation	PCC	2	0	0	2	2
2.	U24SL211	Materials and Manufacturing	SLA	2	0	0	2	2
3.	U24SL221	History of Technology	SLA	2	0	0	2	2
THEORY CUM STUDIO COURSES								
4.	U24SL233	Advanced Visual Arts	SLA	1	0	3	4	4
5.	U24DS223	3D Representation Techniques	PCC	1	0	3	4	4
STUDIO COURSES								
6.	U24DS232	Advanced Design Studio	PCC	0	0	8	8	8
		TOTAL		**8**	**0**	**14**	**22**	**22**

Department of Design

Regulation 2024 Third Semester Curriculum

Sl. No	Course Code	Course Name	Category	No. of periods/week			Total Periods per week	Credits
				L	T	S		
1	U24SL311	Semiotics for Designers	SLA	2	0	0	2	2
2	U24SL321	Ergonomics for Designers	SLA	2	0	0	2	2
3	U24SL331	Psychology for Designers	SLA	2	0	0	2	2
4	U24SL343	Design Research	SLA	1	0	3	4	4
5	U24DS313	Information Design	PCC	1	0	3	4	4
6	U24DS322	Linear Design Project	PCC	0	0	8	8	8
			Total	**8**	**0**	**14**	**22**	**22**

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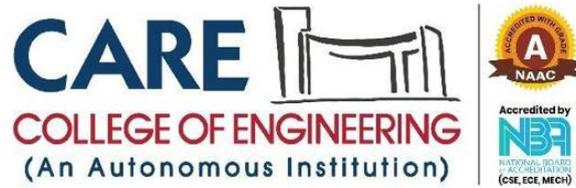
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Department of Design

Regulation 2024 Fourth Semester Curriculum

Sl. No	Course Code	Course Name	Category	No. of periods/week			Total Periods per week	Credits
				L	T	S		
1	U24SL411	Anthropology for Designers	SLA	2	0	0	2	2
2	U24SL421	Contemporary Materials for Designers	SLA	2	0	0	2	2
3	U24SL431	Design Philosophy	SLA	2	0	0	2	2
4	U24DS413	Ecocentric Design	PCC	1	0	3	4	4
5		Professional Elective Course – I	PEC	1	0	3	4	4
6	U24DS422	Agile Design Project	PCC	0	0	8	8	8
		Total		**8**	**0**	**14**	**22**	**22**

Professional Elective Course

Semester	Vertical I: Product Experience	Vertical II: Digital Experience	Vertical III: Spatial Experience
Fourth (IV)	Prototyping	Design with AR and VR	Parametric Modelling
Fifth (V)	Product Design	UX Design	Retail Design
Sixth (VI)	Furniture Design	Game Design	Set Design and Art Direction

Note: Student has to choose any one vertical to specilize in a particular domain. Based on the domain, he/she has to study the Professional Elective Courses as per the order in IV, V and VI semester respectively.

S. No.	Course Code	Course Title	Semester	Periods Per Week			Total Contact Periods	Credits
				L	T	S		
Vertical I: Product Experience (PE)								
1.	U24DSPE01	Prototyping	IV	1	0	3	4	4
2.	U24DSPE02	Product Design	V	1	0	3	4	4
3.	U24DSPE03	Furniture Design	VI	1	0	3	4	4
Vertical II: Digital Experience (DE)								
1.	U24DSDE01	Design with AR and VR	IV	1	0	3	4	4
2.	U24DSDE02	UX Design	V	1	0	3	4	4
3.	U24DSDE03	Game Design	VI	1	0	3	4	4
Vertical III: Spatial Experience (SE)								
1.	U24DSSE01	Parametric Modelling	IV	1	0	3	4	4
2.	U24DSSE02	Retail Design	V	1	0	3	4	4
3.	U24DSSE03	Set Design and Art Direction	VI	1	0	3	4	4

SYLLABUS SEMESTER I

U24DS111	**DESIGN APPRECIATION**	**L**	**T**	**P**	**C**
		2	**0**	**0**	**2**

Course Objective:
To be sure about design, its history and its possibilities from case studies.
To study significant designs and designers throughout history, including those from diverse backgrounds and non-traditional fields.
To investigate the design practices of tribal communities in Tamil Nadu, India, and worldwide.

UNIT I HISTORY OF DESIGN   **6**
Design in nature. Design eras. Design movements. Contemporary and future designs. Design Eras, Design Movements - Prehistory, Arts and Crafts Movement, Ancient, Art Nouveau, Classical, De Stijl, Medieval, Bauhaus, Renaissance, Art Deco, Baroque, International Style, Rococo, Modernism, Neoclassicism, Postmodernism, Romanticism, Brutalism, Victorian, Minimalism, Industrial, High-Tech, Modern, Pop Art, Postmodern, Memphis Group, Contemporary, Digital Design, Meta modernism, Ecological Design.

UNIT II GREAT DESIGNS   **6**
Great designs from different times and places. Great designers and non-designers of history. Design in daily life. Different verticals of design.

UNIT III DESIGN FUNDAMENTALS   **6**
Design elements - Line, Shape, Form, Space, Texture, Color, Value, Pattern. Design principles - Contrast, Balance, Emphasis, Proportion, Hierarchy, Repetition, Rhythm, Pattern, Movement, Unity, Harmony, Variety, Scale. Design levels - Conceptual Design, Schematic Design, Detailed Design, Prototyping, Testing and Refinement, Production Design, Post-Production Evaluation. Design definition. Design Terminologies.

UNIT IV NEW PERSPECTIVES: COMMUNITY DESIGN   **6**
Design in tribal areas of Tamil Nadu. Design in Indian tribals. Design in tribals of the world.

UNIT V NEW PERSPECTIVES: OCEAN CENTRIC HISTORY   **6**
History of ocean or water centric design. Design for Water transport. Design in coastal cultures.

TOTAL: 30 PERIODS

Text Books

1. Design: A Very Short Introduction by John Heskett (Author)
2. Design: The Whole Story by Elizabeth Wilhide
3. Design History and the History of Design by John A Walker and Judy Attfield
4. Design: History, Theory and Practice of Product Design by Bernhard E. Bürdek.

Reference Books

1. "Visual Grammar" by Christian Leborg
2. "Design History: Understanding Theory and Method" by Kjetil Fallan
3. "Universal Principles of Design" by William Lidwell, Kritina Holden, and Jill Butler
4. "Form, Function, and Design" by Paul Jacques Grillo.

Course Outcomes: At the end of the course, the students will be able to		
CO	**Course Outcome Statement**	**Knowledge level**
CO1	Describe the progression of design through different historical periods and movements.	Understanding
CO2	Design in daily life and across various industries and verticals.	Applying
CO3	Design terminologies and understand the different levels of design.	Applying

		L	T	P	C
U24HS111	**LANGUAGE AND ENGLISH SKILLS**	**2**	**0**	**0**	**2**

Course Objective:

- To give an introduction to the concepts and evolution of language in human society including its various expressions and functions.
- To Instill basic skills of English language in everyday situations involving speaking, listening, reading, writing, presenting.
- To enable the use of language to think, express an experience and communicate larger meaning.

UNIT I INTRODUCTION TO LANGUAGE AND LINGUISTICS   6
Communication in humans and animals. Language in humans – definition, function and hypotheses of evolution. Some concepts of language - Phonetics, Phonology, Morphology, Syntax, Semantics, Pragmatics.

UNIT II ENGLISH - SPEAKING AND LISTENING   6
Everyday communication and human interaction through language. Speaking and listening. Simple class exercises.

UNIT III ENGLISH - READING, WRITING, PRESENTING   6
Reading and writing. Language comprehension skills through reading and writing. Presenting information and ideas. Simple exercises.

UNIT IV LANGUAGE AS EXPRESSION AND COGNITION   6
Language as expression – poetry, prose, literature, etc., Cognitive function of language. Cognitive role of language in constructing reality, abstracting, projecting the future. Simple exercises.

UNIT V LANGUAGE AS DISCOURSE   6
Thinking, talking and writing about ideas and situations within a social context and conveying broader meaning and abstraction. Discourse, dialectic. Simple class exercises.

TOTAL: 30 PERIODS

Text Books

1. Sharon Heidenreich, 'English for Architects and Civil Engineers', Springer, 2014
2. www.cambridgescholars.com.
3. www.robertdwatkins.com/Englishworkbook.pdf
4. N. Chomsky, 'Reflections on Language', Fontana, 1975.
5. Steve Pinker, 'The Language Instinct', Penguin, 2015.
6. R.L. Trask, 'Language and Linguistics: The Key Concepts', Routledge, 2007.
7. R.L. Trask, 'Language: The Basics', Routledge 1999

Reference Books

1. Chris Mounsey, 'Essays and Dissertation', Oxford University Press, 2005.
2. Sidney Greenbaum, 'The Oxford English Grammar', Oxford University Press, 2005.
3. Krishna Mohan and Meera Banerji, 'Developing Communication Skills', 2nd edition, Laxmi Publications, 2009.

Course Outcomes: At the end of the course, the students will be able to		
CO	Course Outcome Statement	Knowledge level
CO1	Understanding of the basic role of language in humans.	Understanding
CO2	Develop skill and confidence in everyday requirements of the English language.	Understanding
CO3	Express an experience, explore meaning and construct reality through language.	Understanding

U24SL111   **HISTORY OF ARTS**

L	T	P	C
2	0	0	2

Course Objective:

- To learn major and minor movements in art.
- To learn art movements in and across different civilizations and cultures.
- To look at the effects of world events on art and vice versa.

UNIT I HISTORY OF ART   6
Eras. Prehistory. Ages. Premodern. Modern. Metamodern.

UNIT II ART MOVEMENTS   6
Early modern movements. Modern movements. Digital movements. Early Modern Movements: Art Nouveau, Bauhaus, De Stijl, Futurism, Constructivism, Modern Movements: Modernism, International Style, Brutalism, Postmodernism, High-tech Architecture, Deconstructivism, Digital Movements: Digital Minimalism, Pragmaticism, Algorithmic Design, Generative Design, Virtual Reality Design, Augmented Reality Design.

UNIT III REGIONAL ART   6
Japanese art. African art. colonial art exchanges. Art exchanges before colonization.

UNIT IV GREAT ART FROM HISTORY   6
Great art from history. Great artists in history. Mona Lisa, The Starry Night, The Persistence of Memory, The Scream, The Last Supper, Girl with a Pearl Earring, Guernica, The Birth of Venus, The Creation of Adam, American Gothic. Leonardo da Vinci, Vincent van Gogh, Salvador Dalí, Edvard Munch, Michelangelo, Johannes Vermeer, Pablo Picasso, Sandro Botticelli, Rembrandt, Grant Wood.

UNIT V ART THEORY   6
Elements of Art. Principles of Art. Art around. Evolution of Aesthetics. Evolution of art education.
                                                        TOTAL: 30 PERIODS

Text Books
1. Composition: Understanding Line, Notan and Color by Arthur Wesley Dow
2. The Story of Art, by E. H. Gombrich
3. Introducing Aesthetics: A Graphic Guide (Graphic Guides) by Christopher Kul-Want (Author), Piero Pierini (Illustrator)
4. The meaning of art by Herbert Read.

Reference Books
1. India: A Story through 100 Objects by Vidya Dehejia.

Course Outcomes: At the end of the course, the students will be able to		
CO	Course Outcome Statement	Knowledge level
CO1	Understand of Art History and Movements.	Understanding
CO2	Analysis of Regional and Cultural Art.	Analyzing
CO3	Understanding Art Theories and Aesthetic Principles.	Understanding

U24SL121	**VISUAL ARTS**	**L**	**T**	**P**	**C**
		1	**0**	**3**	**4**

Course Objective:

- To give an understanding of how to use different mediums to represent ideas on paper.
- To give an introduction to the discipline of visual art and its various facets.
- To introduce the importance of art and its relation to design through study and hands on work of techniques and mediums of Art.
- To introduce the vocabulary of Visual Arts in terms of elements and principles in application.

UNIT I INTRODUCTION TO FREEHAND SKETCHING
Exercises include freehand drawing and sketching studies - Exploring Line, Shape, Tone, Texture and Depth. Quality of line, Drawing shapes in proportion, Composition of shapes, Contour Drawing, Still Life Drawing, Line Studies. Basics of drawing one point and two-point perspectives. Construct basic to complex 3d platonic forms using the freehand method. Value Studies.

UNIT II INTRODUCTION TO ART MEDIUMS
Explore different mediums for sketching - Pencil, Ball pen, Ink pen, Charcoal sticks, brush pen etc.Explore different mediums and its techniques for artwork - oil and dry Pastels, Poster colors, Water colors, Oil colors, Glass colors, Fabric colors etc.

UNIT III INTRODUCTION TO GESTALT PRINCIPLES
Visual Tension, Visual Weight, Visual Direction, Visual Balance. Introduction to Gestalt Principles, Proximity, Symmetry, Similarity, Common Fate, Continuation, Isomorphism, Closure, Figure and Ground, Focal Point, Simplicity, Pragnaz, Unity.

UNIT IV COLOR THEORY AND APPLICATION
Learn the basics of color mixing, color relationships, and the impact of color in design. Create color wheels, practice mixing paints, and explore complementary, analogous, and triadic color schemes. Develop the ability to match colors accurately. Select colors from photographs or paintings and mix paints to match them precisely.

UNIT V INTRODUCTION TO PRINT TECHNIQUES TO REPLICATE ARTWORKS
Woodcut and Linocut, Lithography techniques, Etching and Engraving. Old Printing techniques, Letter press, Typography. Digital Printing process.

TOTAL: 60 PERIODS

Text Books

1. Bert Dodson, "Keys to Drawing," North Light Books, 1990.
2. Betty Edwards, "The New Drawing on the Right Side of the Brain," Tarcher, 1999.
3. Arthur L. Guptill, "Rendering in Pen and Ink," Watson-Guptill, 1997.
4. Bert Dodson, "Keys to Drawing with Imagination," North Light Books, 2006.
5. Rudolf Arnheim, "Art and Visual Perception: A Psychology of the Creative Eye," University of California Press, 1974.
6. Stephen Palmer, "Vision Science: Photons to Phenomenology," MIT Press, 1999.
7. Josef Albers, "Interaction of Color," Yale University Press, 1971.
8. Johannes Itten, "The Art of Color," John Wiley & Sons, 1974.

9. Carol Wax, "The Mezzotint: History and Technique," Abrams, 1990.
10. Adolf Dehn, "Water Color Painting," Studio Publications, 1950.

Reference Books

1. Kimon Nicolaides, "The Natural Way to Draw: A Working Plan for Art Study," Houghton Mifflin Harcourt, 1990.
2. Robert S. Oliver, "Perspective Drawing: A Step-by-Step Handbook," Dover Publications, 1995.
3. William F. Powell, "Color Mixing Recipes for Portraits," Walter Foster, 2005.
4. Ray Smith, "The Artist's Handbook," DK Publishing, 2009.
5. Richard Zakia and Per Madsen, "Perception and Imaging: Photography as a Way of Seeing," Focal Press, 2012.
6. Maurice Merleau-Ponty, "Phenomenology of Perception," Routledge, 2012.
7. Patti Mollica, "Color Theory: An Essential Guide to Color," Walter Foster Publishing, 2013.
8. Michael Wilcox, "Blue and Yellow Don't Make Green," School of Color Publishing, 2001.
9. William M. Ivins Jr., "Prints and Visual Communication," MIT Press, 1969.
10. Bamber Gascoigne, "How to Identify Prints: A Complete Guide to Manual and Mechanical Processes from Woodcut to Ink Jet," Thames & Hudson, 2004.

Course Outcomes: At the end of the course, the students will be able to		
CO	**Course Outcome Statement**	**Knowledge level**
CO1	Draw Freehand Sketching Techniques.	Applying
CO2	Develop Expertise in Art Mediums and Techniques.	Applying
CO3	Understand of Gestalt Principles and Color Theory.	Understanding

		L	T	P	C
U24DS122	**2D REPRESENTATION TECHNIQUES**	1	0	3	4

Course Objective:

* To develop an understanding of Geometrical Drawing.
* To master drawing the Geometric Shapes and Surfaces.
* To enable students to construct physical planar models of geometric shapes and surfaces.
* To familiarize students with the terminology and methods of orthographic, isometric, axonometric, and perspective projections.

UNIT I FOUNDATIONS OF GEOMETRICAL DRAWING
Relation between Geometry and Form. Introduction to Basic Elements: point, line, plane, solid. Definition of Geometrical Drawing. Drawing Lines and Angles.

UNIT II DRAWING GEOMETRIC SHAPES AND SURFACES
Drawing Shapes/Planar Surfaces: Triangle, square, rhombus, rectangle, polygon, hexagon, etc. Drawing Circles and Curves: Tangents, curves, conic sections (hyperbola, parabola, ellipse).

UNIT III CONSTRUCTING AND SKETCHING PHYSICAL MODELS
Construction of Physical Planar Models: All the above shapes and surfaces. Viewing models from different angles. Sketching with Light, Shade, and Shadow.

UNIT IV SECTION OF SOLIDS
Understanding Sections of Solids: Cutting block models, viewing from different angles, and sketching. True Shape of Sections: Analyzing and sketching true shapes. Simple Intersection of Solids: Creating composite forms through block models. Viewing and Sketching Composite Forms: Different angles, light, shade, and shadow.

UNIT V BASICS OF PERSPECTIVE
Types of Perspective Projections: One-point, two-point, three-point. Key Terminologies: Picture plane, stationary point, vanishing point, cone of vision, eye level. Methods of Constructing Perspectives. Drawing Perspective Projections of Simple Planar Surfaces/Shapes. Sciography for Perspective projections.

TOTAL: 60 PERIODS

Text Books

1. Robert S. Oliver, "Perspective Drawing: A Step-by-Step Handbook," Dover Publications, 1995.
2. Francis D. K. Ching, "Architectural Graphics," John Wiley & Sons, 2015.
3. David H. Ross, "Freehand Figure Drawing for Illustrators," Watson-Guptill, 2015.
4. Paul Laseau, "Freehand Sketching: An Introduction," W. W. Norton & Company, 2000.
5. Matthew Frederick, "101 Things I Learned in Architecture School," MIT Press, 2007.
6. Peter Stanyer, "The Complete Book of Drawing Techniques," Arcturus Publishing, 2012.
7. Francis D. K. Ching, "Design Drawing," John Wiley & Sons, 2010.
8. Keith H. Cullum, "Perspective Drawing," McGraw-Hill, 1989.
9. John Raynes, "The Complete Guide to Perspective Drawing: From One-Point to Six-Point," North Light Books, 2005.
10. Ernest R. Norling, "Perspective Made Easy," Dover Publications, 1999.

Reference Books

1. Ivor H. Seeley, "Building Quantities Explained," Macmillan, 1993.
2. John Montague, "Basic Perspective Drawing: A Visual Approach," John Wiley & Sons, 2012.
3. James Richards, "Freehand Drawing and Discovery," John Wiley & Sons, 2013.
4. Michael E. Doyle, "Color Drawing: Design Drawing Skills and Techniques for Architects, Landscape Architects, and Interior Designers," John Wiley & Sons, 2011.
5. Charles B. Wiest, "The Art of Perspective Drawing," McGraw-Hill, 2004.

Course Outcomes: At the end of the course, the students will be able to		
CO	**Course Outcome Statement**	**Knowledge level**
CO1	Develop Proficiency in Geometrical Drawing.	Understanding
CO2	Develop Skill in Drawing Complex Geometric Shapes.	Understanding
CO3	Construct and Sketching Physical Models.	Understanding
CO4	Understand of Projections and Sciography.	Understanding

U24DS133	BASIC DESIGN STUDIO	L	T	P	C
		0	0	6	6

Course Objective:

- To understand how design principles and elements manifest in everyday observations and natural phenomena.
- To acquire and utilize a comprehensive design vocabulary to effectively articulate design concepts and intentions.
- To develop proficiency in using Gestalt principles to ensure cohesive and visually appealing design compositions.
- To explore and apply diverse print techniques to accurately replicate and enhance art and design compositions.
- To experiment with different materials to create textured and relief artworks, gaining insights into light, shadow, and spatial depth.

CONTENT

Understanding design emerges naturally from everyday life and observations of nature. It involves utilizing design elements and principles adeptly to imbue creations with significance. Effective communication of design ideas hinges on employing precise design vocabulary. Mastery of shape and its arrangement in two-dimensional space across various mediums is essential. Applying Gestalt principles enhances design coherence and aligns with human perceptual tendencies. Meaningful use of color draws inspiration from natural palettes and the artistic legacies of masters, enriching visual compositions. Fundamental knowledge of geometry and form underpins effective representation techniques. Exploring diverse print methods facilitates the faithful reproduction of art and design compositions. Experimenting with different materials enables the creation of textured and relief works, fostering an understanding of light, shadow, and spatial depth.

TOTAL: 90 PERIODS

Text Books

1. Robin Williams, "The Non-Designer's Design Book", Peachpit Press, 2014.
2. Johannes Itten, "The Elements of Color: A Treatise on the Color System of Johannes Itten Based on His Book The Art of Color", John Wiley & Sons, 1970.
3. Ellen Lupton, Jennifer Cole Phillips, "Graphic Design: The New Basics", Princeton Architectural Press, 2008.
4. Kim Smith, "Design Fundamentals: Elements, Attributes, & Principles", Fairchild Books, 2012.
5. Francis D.K. Ching, "Architecture: Form, Space, and Order", John Wiley & Sons, 2014.
6. Lidwell, William, et al. "Universal Principles of Design", Rockport Publishers, 2010.

Reference Books

1. Anthony C. Antoniades, 'Poetics of Architecture: Theory of Design', John Wiley and Sons,1992.

Course Outcomes: At the end of the course, the students will be able to		
CO	Course Outcome Statement	Knowledge level
CO1	Apply theoretical knowledge to create designs that effectively communicate intended meanings and concepts.	Applying
CO2	Integrate design principles to enhance the communicative impact of their visual compositions.	Applying
CO3	Apply Gestalt principles to create visually coherent and aesthetically pleasing design solutions.	Applying
CO4	Reproduce and enhance art and design compositions.	Applying

SYLLABUS SEMESTER II

		L	T	P	C
U24DS211	**FORM APPRECIATION**	**2**	**0**	**0**	**2**

Course Objective:

- To introduce students to the fundamental elements and principles of design.
- To understand the cultural influences on the interpretation and evolution of form.
- To explore basic geometric shapes and their applications in design.
- To analyze form and space in design.

UNIT I ELEMENTS AND PRINCIPLES OF DESIGN   6
Elements: Line, shape, form, space, color, texture, and value. Principles: Balance, contrast, emphasis, movement, pattern, rhythm, and unity. Application: How these elements and principles contribute to the creation and appreciation of form.

UNIT II HISTORICAL AND CULTURAL CONTEXTS OF FORM   6
Historical Analysis: Study of significant forms and shapes in various historical periods (e.g., Renaissance, Baroque, Modernism). Cultural Significance: Understanding how different cultures influence and interpret form. Evolution of Form: How the perception and use of form has evolved over time.

UNIT III GEOMETRY AND PROPORTION IN DESIGN   6
Geometric Forms: Exploration of basic geometric shapes and their application in design. Proportional Systems: Golden ratio, Fibonacci sequence, and other systems used to achieve aesthetically pleasing forms. Symmetry and Asymmetry: Impact of symmetrical and asymmetrical forms on design aesthetics. Computation of geometry and proportion.

UNIT IV FORM AND SPACE   6
Form and Space, Basic Forms, Transformation of forms, Formal Collisions of Geometry, Defining Space, Spatial Organization, Spatial Relationships, Circulation.

UNIT V MATERIALITY, TEXTURE, LIGHT AND SHADOW   6
Material Properties: How different materials influence the perception and creation of form. Surface Texture: Role of texture in enhancing or altering the perception of form. Light Interaction: How light influences the perception of form. Shadow and Depth: Use of shadows to create depth and dimension in forms. Lighting Techniques: Different lighting techniques to highlight and manipulate form perception. Tactility and Interaction: How the physical interaction with materials and textures affects form appreciation.

TOTAL: 30 PERIODS

Text Books

1. Johannes Itten, "The Art of Color: The Subjective Experience and Objective Rationale of Color," John Wiley & Sons, 1997.
2. Wucius Wong, "Principles of Form and Design," John Wiley & Sons, 1993.
3. Rudolf Arnheim, "Art and Visual Perception: A Psychology of the Creative Eye," University of California Press, 1974.
4. Hugh Honour and John Fleming, "A World History of Art," Laurence King Publishing, 2009.
5. Ernst Gombrich, "The Story of Art," Phaidon Press, 1995.
6. Kimberly Elam, "Geometry of Design: Studies in Proportion and Composition," Princeton Architectural Press, 2001.
7. Jay Hambidge, "The Elements of Dynamic Symmetry," Dover Publications, 2005.
8. Francis D. K. Ching, "Architecture: Form, Space, and Order," John Wiley & Sons, 2014.
9. Simon Unwin, "Analysing Architecture," Routledge, 2014.
10. Robert McCarter, "Louis I. Kahn," Phaidon Press, 2005.
11. Gail Peter Borden, "Material Precedent: The Typology of Modern Tectonics," John Wiley & Sons, 2010.

12. Peter Zumthor, "Atmospheres: Architectural Environments - Surrounding Objects," Birkhäuser, 2006.

Reference Books

1. Nikolaus Pevsner, "An Outline of European Architecture," Pelican Books, 1963.
2. Mario Livio, "The Golden Ratio: The Story of Phi, the World's Most Astonishing Number," Broadway Books, 2003.
3. John F. Pile, "Interior Design," Pearson, 2014.

Course Outcomes: At the end of the course, the students will be able to		
CO	**Course Outcome Statement**	**Knowledge level**
CO1	Identify and apply elements such as line, shape, form, space, color, texture, and value in design.	Understanding
CO2	Understand Historical and Cultural Influences.	Understanding
CO3	Develop Skill in Geometry and Proportion.	Understanding
CO4	Understand and apply concepts related to material properties, texture, light, shadow, and spatial organization to enhance form perception.	Understanding

U24SL211	**MATERIALS AND MANUFACTURING**	**L T P C**
		2 0 0 2

Course Objective:

- To understand the fundamental differences between natural and synthetic materials, as well as their physical, mechanical, thermal, electrical, and optical properties.
- To explore the various types, properties, and uses of materials found in nature, including wood, stone, metals, natural fibers, and leather.
- To study synthetic materials, their classifications, properties, uses, and the advancements in smart materials, nano-materials, and biodegradable materials.
- To familiarize students with various manufacturing processes and their applications, including casting, molding, forging, machining, welding, joining, 3D printing, and surface treatments, with a focus on sustainability and environmental impact.

UNIT I INTRODUCTION TO MATERIALS   6
Natural vs. Synthetic Materials, Organic vs. Inorganic Materials. Physical Properties: Density, Hardness, Elasticity, Plasticity. Mechanical Properties: Strength, Toughness, Ductility, Malleability. Thermal Properties: Conductivity, Expansion, Resistance. Electrical Properties: Conductivity, Insulation. Optical Properties: Transparency, Reflectivity, Refractivity.

UNIT II MATERIALS IN NATURE   6
Wood: Types, Properties, Uses. Stone: Types, Properties, Uses. Metals: Types, Properties, Uses. Natural Fibers: Cotton, Wool, Silk, Hemp, Leather: Uses.

UNIT III SYNTHETIC MATERIALS   6
Plastics: Types, Properties, Uses. Composites: Types, Properties, Uses. Synthetic Fibers: Nylon, Polyester, Acrylic. Advanced Materials: Smart Materials, Nano-materials, Biodegradable Materials.

UNIT IV MANUFACTURING PROCESSES   6
Casting, Molding, Forging, Machining, Welding, Joining, 3D Printing and Additive Manufacturing, Surface Treatments: Coating, Painting, Plating. Woodworking tools and processes.

UNIT V SUSTAINABILITY IN MATERIALS   6
Recyclable and Recycled Materials, Biodegradable Materials, Life Cycle Analysis of Materials, Eco-friendly Manufacturing Processes. Sustainability and Environmental Impact while selecting materials.
TOTAL: 30 PERIODS

Text Books

1. Mark Miodownik, 'Stuff Matters: Exploring the Marvelous Materials That Shape Our Man-Made World', Houghton Mifflin Harcourt, 2014.
2. Michael F. Ashby and Kara Johnson, 'Materials and Design: The Art and Science of Material Selection in Product Design', Butterworth-Heinemann, 2013.
3. William D. Callister Jr., 'Materials Science and Engineering: An Introduction', Wiley, 2014.
4. Nancy G. H. Adams, 'Materials: Engineering, Science, Processing and Design', Butterworth-Heinemann, 2017.
5. Brian Curley, 'Material Matters: New Materials in Design', Black Dog Publishing, 2005.

Reference Books

1. David Blockley, 'Engineering: A Very Short Introduction', Oxford University Press, 2012.
2. D.K. Ching, 'Building Construction Illustrated', Wiley, 2014.
3. Vijay Kumar Thakur, 'Handbook of Composites from Renewable Materials', Wiley-Scrivener, 2017.
4. Julian Vincent, 'Survival of the Fittest: How Materials Shape the Evolution of Organisms', Cambridge University Press, 2018.
5. M. F. Ashby, 'Materials Selection in Mechanical Design', Butterworth-Heinemann, 2016.

Course Outcomes: At the end of the course, the students will be able to		
CO	**Course Outcome Statement**	**Knowledge level**
CO1	differentiate between natural and synthetic materials and understand their properties and applications in design.	Understanding
CO2	Explain the materials found in nature, their properties, and how to effectively utilize them in design projects.	Understanding
CO3	Identify and apply synthetic materials, including advanced materials, in their design projects, understanding their benefits and limitations.	Understanding
CO4	Understand and apply various manufacturing processes, considering sustainability and environmental impacts in material selection and design implementation.	Understanding

U24SL221	**HISTORY OF TECHNOLOGY**	**L T P C**
		2 0 0 2

Course Objective:

- To give understanding of architecture as an outcome of the act of design by human society across history and region.
- To give an introduction to the discipline of architecture and its various facets.
- To introduce the importance of form and its relation to design through study of nature and manmade environment.
- To introduce the vocabulary of form and space in terms of elements, principles, attributes and its organization.

UNIT I ERAS TECHNOLOGY   6
Different eras and their technologies. An overview from origins of technology to contemporary and future technologies. Technology in non-human species. Ocean centric vs Land centric histories: wheel vs ship history. Ocean or water centric technological history.

UNIT II PREMODERN TECHNOLOGY   6
Each pre modern era in detail. Technology before farming. Classical era. Alexandria and Heron. Early modern eras.

UNIT III MODERN TECHNOLOGY   6
Early modern. Industrialization. Post war. Digital revolution. Internet era. Social media era. Future technologies.

UNIT IV TRIBAL AND INDIGENOUS TECHNOLOGY   6
Introduction to Indigenous Knowledge Systems, Traditional Agricultural Practices, Indigenous Architecture and Construction, Traditional Craftsmanship and Tool Making, Communication and Storytelling.

UNIT V INTRODUCTION TO MACHINE LANGUAGE AND AI   6
Early Foundations of Computing and Machine Language: Alan Turing, Alonzo Church, Assembly language. Development of High-Level Programming Languages: LISP, C, Python. Early Concepts of Artificial Intelligence: Dartmouth Conference, ELIZA. Machine Learning and Neural Networks. Ethical and Societal Implications of AI.

TOTAL: 30 PERIODS

Text Books

1. The Sea and Civilization: A Maritime History of the World Paperback by Lincoln Paine
2. India: A Story through 100 Objects by Vidya Dehejia
3. The Philosophy of Technology: An Introduction Don Ihde
4. The Infinite Bit: An Inside Story of Digital Technology
5. James Burke, 'Connections', Simon & Schuster, 1978.
6. Lewis Mumford, 'Technics and Civilization', Harcourt, Brace & Company, 1934.
7. Jared Diamond, 'Guns, Germs, and Steel: The Fates of Human Societies', W. W. Norton & Company, 1997.
8. Brian Fagan, 'The Long Summer: How Climate Changed Civilization', Basic Books, 2004.
9. George Basalla, 'The Evolution of Technology', Cambridge University Press, 1988.
10. Lynn White Jr., 'Medieval Technology and Social Change', Oxford University Press, 1962.
11. Bertrand Gille, 'The History of Techniques', Gordon & Breach, 1986.
12. Thomas P. Hughes, 'American Genesis: A Century of Invention and Technological Enthusiasm, 1870-1970', Viking Penguin, 1989.
13. Mark Dery, 'Escape Velocity: Cyberculture at the End of the Century', Grove Press, 1996.
14. Kevin Kelly, 'What Technology Wants', Viking Penguin, 2010.

Reference Books

1. Walter Isaacson, 'The Innovators: How a Group of Hackers, Geniuses, and Geeks Created the Digital Revolution', Simon & Schuster, 2014.
2. Marshall McLuhan, 'Understanding Media: The Extensions of Man', McGraw-Hill, 1964.
3. Kate Shilton, 'Constructing an Ethical Framework for Big Data Research', Taylor & Francis, 2016.
4. Martin Ford, 'Rise of the Robots: Technology and the Threat of a Jobless Future', Basic Books, 2015.
5. Kate A. Berry and Martha L. Henderson, 'Geographic Thought: A Praxis Perspective', Routledge, 2003.
6. Margaret Mead, 'Coming of Age in Samoa: A Psychological Study of Primitive Youth for Western Civilization', William Morrow, 1928.
7. Paul E. Ceruzzi, 'A History of Modern Computing', MIT Press, 1998.
8. John Markoff, 'Machines of Loving Grace: The Quest for Common Ground Between Humans and Robots', HarperCollins, 2015.
9. Stuart Russell and Peter Norvig, 'Artificial Intelligence: A Modern Approach', Prentice Hall, 2010.
10. Nick Bostrom, 'Superintelligence: Paths, Dangers, Strategies', Oxford University Press, 2014.

Course Outcomes: At the end of the course, the students will be able to		
CO	**Course Outcome Statement**	**Knowledge level**
CO1	Appreciate the patterns of the past of technologies to counter the future of technology.	Understanding
CO2	Understand the evolution and development of artificial intelligence and machine learning.	Understanding

U24SL232   **ADVANCED VISUAL ARTS**

L	T	P	C
1	0	3	4

Course Objective:

- To introduce students to the fundamental elements of form making, such as points, lines, planes, and solids, and their relation to geometry.
- To familiarize students with key terminologies and attributes of form, including texture, contour, shape, volume, and more, essential for accurate design description and communication.
- To explore the principles of biomimicry and natural patterns, understanding how organic forms and natural processes inspire and influence design.
- To develop skills in using visual language, symbolism, and semantics to create emotionally and culturally resonant designs.
- To equip students with a variety of form generation techniques, from conceptual sketching and prototyping to advanced computational and digital modeling tools.

UNIT I FUNDAMENTALS OF FORM MAKING
Relation between Geometry and Form, Introduction to Basic Elements: Point, Line, Plane, Solid. Single curbed and doubly curved surfaces. Developable surfaces.

UNIT II FORM AND FORM ATTRIBUTES
Terminologies: Surface, Texture, Contour, Profile, Shape, Form, Volume, Mass, Density, Curvature, Symmetry, Asymmetry, Proportion, Scale, Geometry, Organic Form, Inorganic Form, Tangent, Intersection, Gradient, Transition, Perforation, Transparency, Opacity, Reflectivity, Matte, Gloss, Smoothness, Roughness, Concavity, Convexity, Tactility, Modularity, Dynamic Form, Static Form, Ergonomics, Aesthetics, Functionality.

UNIT III NATURE AND FORM
Biomimicry, Organic Forms, Natural Patterns, Fractals, Symmetry in Nature, Asymmetry in Nature, Natural Textures, Natural Materials, Evolutionary Design, Environmental Adaptation, Structural Efficiency, Natural Color Palettes, Fluid Dynamics, Growth Patterns, Cellular Structures, Geometric Forms in Nature, Topology, Surface Tension, Natural Proportions, Golden Ratio, Fibonacci Sequence, Ecosystem Interactions, Ecological Impact, Sustainability, Biodegradability, Renewable Resources, Natural Light Interaction, Weathering and Aging, Biomaterials, Environmental Responsiveness.

UNIT IV FORM AND EXPRESSION
Emotional Design, Visual Language, Symbolism, Semantics, Ergonomics, User Interaction, Aesthetic Appeal, Brand Identity, Cultural Context, Narrative Design, Sensory Experience, Texture and Tactility, Color Psychology, Proportional Systems, Balance and Harmony, Contrast and Emphasis, Dynamic Forms, Static Forms, Visual Hierarchy, Gestalt Principles, Form Simplification, Complexity and Detail, Light and Shadow, Material Expression, Surface Treatment, Iconography, Metaphor in Design, User Perception, Contextual Relevance, Functional Expression.

UNIT V FORM GENERATION

Conceptual Sketching, Ideation Techniques, Morphological Analysis, Form Development, Prototyping, Parametric Design, Generative Design, 3D Modeling, Surface Modeling, Solid Modeling, CAD Tools, Computational Design, Algorithmic Design, Digital Sculpting, Subdivision Modeling, NURBS Modeling, Topology Optimization, Rapid Prototyping, Additive Manufacturing, Subtractive Manufacturing, Material Exploration, Surface Finishing, Ergonomic Considerations, Aesthetic Considerations, Functional Integration, User-Centered Design, Design Iteration, Form Exploration, Design Refinement, Concept Validation.

TOTAL: 60 PERIODS

Text Books

1. John Montague, 'Basic Perspective Drawing: A Visual Approach', Wiley, 2013.
2. Stuart Melvin Shum, 'Architectural Representation and the Perspective Hinge', MIT Press, 2004.
3. Janine Benyus, 'Biomimicry: Innovation Inspired by Nature', William Morrow, 2002.
4. Philip Ball, 'Patterns in Nature: Why the Natural World Looks the Way It Does', University of Chicago Press, 2016
5. Don Norman, 'Emotional Design: Why We Love (or Hate) Everyday Things', Basic Books, 2004.
6. Bruno Munari, 'Design as Art', Penguin, 2008.

Reference Books

1. Francis D.K. Ching, 'Architectural Graphics', Wiley, 2015
2. Paul Lewis, 'Manual of Section', Princeton Architectural Press, 2016.
3. Tom Kelley, 'The Art of Innovation: Lessons in Creativity from IDEO, America's Leading Design Firm', Crown Business, 2001.
4. Michael F. Ashby, 'Materials and Design: The Art and Science of Material Selection in Product Design', Butterworth-Heinemann, 2013.

Course Outcomes: At the end of the course, the students will be able to		
CO	**Course Outcome Statement**	**Knowledge level**
CO1	Apply fundamental geometric principles to create and analyze complex forms, understanding the relationship between basic elements and their spatial configurations.	Applying
CO2	Demonstrate proficiency in using precise terminology to describe the attributes and characteristics of forms, enhancing their ability to communicate design concepts effectively.	Applying
CO3	Integrate principles of biomimicry and natural patterns into their design processes, creating sustainable and ecologically responsive forms.	Applying
CO4	Develop the ability to use visual language and semantics to create designs that are not only functional but also emotionally and culturally meaningful.	Applying
CO5	Explain competence in various form generation techniques, including digital modeling and rapid prototyping, enabling them to iterate and refine design concepts efficiently and effectively.	Applying

U24DS222	3D REPRESENTATION TECHNIQUES	L	T	P	C
		1	0	3	4

Course Objective:

- To provide foundational understanding of Geometric Solids and Model Construction.
- To ensure proficiency in Projections and Sciography.
- To develop advanced techniques in Sections, Intersections, and Digital Rendering.

UNIT I INTRODUCTION TO GEOMETRIC SOLIDS AND MODEL CONSTRUCTION

Introduction to Geometric Solids: Cube, prism, pyramids, cones, cylinders. Generation of Solids: Constructing physical models from lines and planar surfaces (concept of development). Construction of Block Models: Building solid models. Viewing and Sketching Models: Different angles, light, shade, and shadow.

UNIT II PROJECTIONS AND SCIOGRAPHY OF SOLIDS - ORTHOGRAPHIC

Drawing Problems: Orthographic, isometric, and axonometric projections of solids in different positions. Sciography for Projections: Shadow and shading techniques. Orthographic Projection of Solids: Techniques and exercises. Sciography for Orthographic Projections: Application on simple solids.

UNIT III PERSPECTIVE PROJECTIONS AND SCIOGRAPHY OF SOLIDS

Sciography for Perspective Projections. Types of Perspective Projections: One-point, two-point, three-point. Key Terminologies: Picture plane, stationary point, vanishing point, cone of vision, eye level. Methods of Constructing Perspectives. Drawing Perspective Projections of Simple Planar Surfaces/Shapes.

UNIT IV ADVANCED PROJECTION DRAWING

Drawing Problems: Orthographic, isometric, and axonometric projections of sections and intersections. Dynamic Perspective Drawing: Techniques for complex solids. Advanced Shading and Rendering: Using markers for detailed surface textures. Sketching Complex Surfaces: Techniques for advanced materials.

UNIT V DIGITAL RENDERING AND HIGH-FIDELITY MOCKUPS

Advanced Digital Techniques: Adobe Illustrator and Photoshop. Digital Rendering: Procreate and Sketchbook. Creating High-Fidelity Digital Mockups: Techniques for realistic digital models. Advanced Shading and Rendering: Digital tools for complex surfaces and materials.

TOTAL: 60 PERIODS

Text Books

1. Francis D.K. Ching, 'Architectural Graphics', Wiley, 2015.
2. Paul Lewis, Marc Tsurumaki, David J. Lewis, 'Manual of Section', Princeton Architectural Press, 2016
3. Robert W. Gill, 'Rendering with Pen and Ink', Thames & Hudson, 1984.
4. I.H. Morris, 'Geometrical Drawing for Art Students', Longmans, Green, and Co., 1912.
5. Ernest R. Norling, 'Perspective Made Easy', Dover Publications, 1999.
6. Scott Robertson, 'How to Render: the fundamentals of light, shadow and reflectivity', Design Studio Press, 2014.

Reference Books

1. John Montague, 'Basic Perspective Drawing: A Visual Approach', Wiley, 2013.
2. Thomas E. French, 'Engineering Drawing and Graphic Technology', McGraw-Hill, 1986.
3. Edward J. Muller, 'Projection Drawing', McGraw-Hill, 1986.
4. Michael E. Doyle, 'Color Drawing: Design Drawing Skills and Techniques for Architects, Landscape Architects, and Interior Designers', Wiley, 2011.

Course Outcomes: At the end of the course, the students will be able to		
CO	Course Outcome Statement	Knowledge level
CO1	Demonstrate the ability to construct physical models of geometric solids and accurately view and sketch them from different angles.	Understanding
CO2	Explain proficiency in perspective projection and shading techniques, creating visually coherent and realistic representations.	Understanding
CO3	Demonstrate advanced skills in digital rendering, producing high-fidelity mockups with realistic textures and complex surfaces.	Understanding

		L	T	P	C
U24DS233	**ADVANCED DESIGN STUDIO**	**0**	**0**	**8**	**8**

Course Objective:

- To explore natural form and observation.
- To enhance design communication skills.
- To experiment with color, texture, and prototyping.

CONTENT

Understanding form naturally from everyday life and observations of nature. Understanding how design elements and principles apply in form and space. Effectively communicating surfaces and forms by employing apt design vocabulary. Mastering form and its play in 3-dimensional space across various mediums is essential. Applying design principles to enhance design coherence and human perception of form and space. Making meaningful use of color and texture and understanding their influence on the perception of form. Exploring diverse manufacturing and prototyping methods. Building and manipulating form with different materials to foster an understanding of light, shadow, and spatial depth.

TOTAL: 120 PERIODS

Text Books
1. Francis D.K. Ching, 'Form, Space, and Order', Wiley, 2014.
2. Rudolf Arnheim, 'The Dynamics of Architectural Form', University of California Press 2009.
3. Rudolf Arnheim, 'Art and Visual Perception: A Psychology of the Creative Eye', University of California Press, 2004.
4. Josef Albers, 'Interaction of Color', Yale University Press, 2013.
5. William Lidwell, Kritina Holden, Jill Butler, 'Universal Principles of Design', Rockport Publishers, 2010.

Reference Books
1. László Moholy-Nagy, 'The New Vision: Fundamentals of Bauhaus Design, Painting, Sculpture, and Architecture', Dover Publications, 2012.
2. George D. Deming, 'Design Basics 3D', Cengage Learning, 2015.
3. Richard S. Hunter and Richard W. Harold, 'The Measurement of Appearance', Wiley, 1987.
4. John F. Pile, 'Interior Design', Prentice Hall, 2003.
5. Colin Ware, 'Information Visualization: Perception for Design', Morgan Kaufmann, 2012.
6. Kumar Vyas, 'Design and Environment- A Primer', National Institute of Design, 2009

Course Outcomes: At the end of the course, the students will be able to		
CO	Course Outcome Statement	Knowledge level
CO1	Apply Proficiency in Natural Form and Design Principles.	Applying
CO2	Design vocabulary to articulate surfaces and forms.	Applying
CO3	Apply diverse manufacturing and prototyping methods, demonstrating an understanding of light, shadow, and spatial depth in their form-building projects.	Applying

Department of Design

Regulation 2024 Third Semester Syllabus

		L	T	P	C
U24SL311	SEMIOTICS FOR DESIGNERS	2	0	0	2

Course Objective:

- Define semiotics as the study of signs, symbols, and their meanings in communication, emphasizing how it helps decode messages in visual and material culture.
- Apply semiotic principles to the design profession to enhance communication, user experience, and cultural relevance in visual and product design.
- Compare various Western schools of semiotics, such as structuralism and post-structuralism, focusing on their influence on media, art, and design.

UNIT 1: INTRODUCTION TO SEMIOTICS   6

Definition of Semiotics - Scope and Related Subjects: Linguistics, Aesthetics, Logic, Media Studies - History of Semiotics: Plato, Aristotle, Yaskha, Pāṇini, Tolkappiyar, Augustine of Hippo, John Locke - Types of Signs: Natural Signs vs. Conventional Signs - Key Figures & Concepts: Vilayanur Ramachandran – Synesthesia, Kiki-Bouba Effect - Western Schools of Semiotics: Moscow, Prague, Copenhagen, American, Paris, Tartu - Theoretical Approaches: Functionalism, Formalism, Structuralism, Post-Structuralism - Contemporary Divisions: Eco-semiotics & Digital Semiotics.

UNIT 2: STRUCTURALISM   6

Structuralism, Ferdinand de Saussure and His Theories: Langue and Parole, Dyadic Model of Signs, Arbitrariness of Signs, Diachronic and Synchronic Analysis, Syntagm and Paradigm, Pragmatism and Charles Sanders Peirce: Triadic Model of Signs, Categories of Signs: Icon, Index, Symbol, C.W. Morris: Syntax, Semantics, and Pragmatics

UNIT 3: POST-STRUCTURALIST SCHOOL   6

Post-Structuralism, Key Thinkers: Roland Barthes, Jacques Derrida, Julia Kristeva, Core Concepts: Denotation and Connotation, Studium and Punctum, Death of the Author, Logocentrism, Différance and Binary Oppositions, Deconstruction, Intertextuality, Myth, Communication Models: Shannon-Weaver Model, Marshall McLuhan – Medium is the Message.

UNIT 4: CONTEMPORARY SEMIOTICS   6

Anthroposemiotics, Biosemiotics, Zoo semiotics, Phyto semiotics, Key Thinkers: Jakob von Uexküll, Thomas Sebeok, Juri Lotman, Winfried Nöth, Kalevi Kull, Timo Maran, Core Concepts: Umwelt, Affordances, Consortium, Semiosphere, Eco Semiosphere, Semiotic Ground, Semiocide, Eco-Field Hypothesis, Ecological Communication Model, Digital Semiotics, Jean Baudrillard – Simulation, Simulacra, and Hyper-reality

UNIT 5: INDIAN SEMIOTICS   6

Indigenous & Tribal Semiotics: Tamil Semiotics, Indian Semiotics, Tribal Signs and Codes, Tolkappiyam: Porulathikaram, Indian Texts & Thinkers: Idukuri and Karanappeyar, Thinai and Semiotics of Culture, Saussure and Sanskrit Influence, Indian Semiotics: Vedanga, Nirukta, Vyakarana, Yaksha, Pāṇini, Patañjali, Bhartṛhari, Sphota Theory: Vakyapada, Masters of Indian Aesthetics: Bharata, Daṇḍin, Vāmana, Kuntaka, Kṣemendra, Pre-Dhvani (Prācīna) School and Post-Dhvani School, Ānanda Vardhana – Dhvanyāloka, Key Concepts in Indian Semiotics: Rasa,

Dhvani, Rīti, Alankāra, Guṇa, Kuntaka, Auchitya, Three Layers of Dhvani: Abhidha, Lakshana, Vyanjana.

Total: 30 Periods

Course Outcomes

CO	At the end of the course, the students will be able to	Knowledge Level
CO1	Identify key elements of communication that influence meaning-making.	Understanding
CO2	Evaluate the impact of meaning-making in popular or controversial communication designs.	Evaluating
CO3	Integrate semiotic principles in all phases of a communication design project to enhance clarity and effectiveness.	Analyzing
CO4	Demonstrate ethical responsibility by assessing the societal impact of communication beyond the project brief.	Creating
CO5	Interpret and apply Indian semiotic concepts by analyzing indigenous sign systems, classical texts, linguistic theories, and aesthetic principles.	Evaluating

Text Books

1 **Ferdinand de Saussure**, Course in General Linguistics, Open Court Publishing, 1983 (original lectures from 1906–1911, compiled posthumously).

2 **V. Murugan (Translator)**, Tolkappiyam: Porulathikaram, International Institute of Tamil Studies, (Year not clearly available; check edition for publication year).

3 **Charles Sanders Peirce**, Pragmatism as a Principle and Method of Right Thinking: The 1903 Harvard Lectures on Pragmatism, edited by Patricia Ann Turrisi, SUNY Press, 1997.

4 **Roland Barthes**, Mythologies, Translated by Annette Lavers, Hill and Wang, 1972.

5 **Jeff Collins (Author), Bill Mayblin (Illustrator)**, Introducing Derrida: A Graphic Guide, Icon Books, 1999.

6 **Bharata Muni**, A Treatise on Ancient Indian Dramaturgy and Histrionics: Natyasastram, Translated by M.M. Ghosh, Asiatic Society (original publication early 20th century; various reprints, e.g., 1951, 2002).

Reference Books

1 **Winfried Nöth**, Handbook of Semiotics, Indiana University Press, 1990.

2 **Tony Jappy**, Introduction to Peircean Visual Semiotics, Bloomsbury, 2013.

3 **Roland Barthes**, Camera Lucida, Translated by Richard Howard, Hill and Wang, 1981.

4 **Roland Barthes**, Signs and Images: Writings on Art, Cinema and Photography, Translated by Chris Turner, Hill and Wang (varies by edition; compiled posthumously, check latest edition for year).

5 **Timo Maran**, Ecosemiotics: The Study of Signs in Changing Ecologies, Cambridge Scholars Publishing, 2017.

6   **Bimal Krishna Matilal**, The Word and the World: India's Contribution to the Study of Language, Oxford University Press, 1990.

7   **Manish Chandi and Madhuri Ramesh**, Walking is the Way of Knowing: In a Kadar Forest, Tara Books, 2017.

U24SL321	ERGONOMICS FOR DESIGNERS	L	T	P	C
		2	0	0	2

Course Objective:
- Understand the key principles of ergonomics and how they influence design decisions.
- Gain practical experience in applying ergonomics to product design, workplace environments, and user interfaces.
- Develop the skills to conduct ergonomic assessments and improve existing designs based on human factors.
- Learn how to design for diverse user groups, considering factors like physical ability, culture, and demographic differences.

UNIT 1 ERGONOMICS AND HUMAN ANATOMY   6
Definition and history of ergonomics, Importance of ergonomics in design, Overview of human factors and their impact on design decisions, Human Anatomy & Physiology for Design: Basic understanding of human anatomy relevant to design, Anthropometric data and its role in design, Range of motion and physical capabilities, Case studies of ergonomic failures

UNIT 2 ERGONOMICS IN PRODUCT DESIGN   6
Designing for comfort, usability, and safety, Ergonomic principles in tools, furniture, and everyday products, Hands-on analysis of product designs (e.g., chairs, keyboards, etc.), Ergonomics and Inclusive Design, Designing for users with disabilities, Universal design principles and accessibility, Case studies in inclusive design (e.g., adaptive technology, user interface design for all). Medical systems and products.

UNIT 3 WORKPLACE ERGONOMICS   6
Principles of ergonomic workstation design, Adjusting furniture and equipment for maximum comfort, Ergonomic assessments for office, factory, and home workspaces, Ergonomic Evaluation Methods, Ergonomic tools and techniques (e.g., posture analysis, stress testing, user feedback), Conducting ergonomic assessments of designs and environments, Hands-on activities: conducting ergonomic evaluations of common products.

UNIT 4 CASE STUDIES IN ERGONOMICS 6
In-depth study of successful and failed ergonomic designs, Good and Bad Ergonomics case studies in : Chairs, Kitchen Tools, Household Tools like vacuum cleaners. Washing machines, Mobile phones, Computer mouse and Keyboard and Critical analysis of product redesigns.

UNIT 5 DESIGNING FOR DIFFERENT DEMOGRAPHICS 6
Age, gender, and cultural considerations in ergonomic design, Ergonomics for children, elderly, and people with physical limitations, Customization in ergonomic designs for varied user needs, Prototyping and User Testing, Iterative design process: from concept to prototype, Conducting user testing for ergonomic products, Analyzing feedback and making adjustments to design.

TOTAL: 30 PERIODS

Course Outcomes

CO	At the end of the course, the students will be able to	Knowledge Level
CO1	Demonstrate an understanding of fundamental principles of ergonomics, human anatomy, and their application in product design	**Understanding**
CO2	Analyze and evaluate the ergonomic aspects of various products (e.g., chairs, tools, computer mice) and provide detailed ergonomic critiques.	**Analyzing**
CO3	Identify products with poor ergonomic design and propose improved redesign solutions using ergonomic principles.	**Evaluating**
CO4	Develop a complete ergonomic design for a product by integrating user research, prototyping, and testing methodologies.	**Creating**
CO5	Design inclusive ergonomic products by considering diverse user needs and apply iterative prototyping and user testing to refine their designs	**Applying**

Text Books

1 **K.H.E. Kroemer & H.B. Kroemer**, Ergonomics: How to Design for Ease and Efficiency, Prentice Hall, 2000.

2 **Henry Dreyfuss Associates**, The Measure of Man and Woman: Human Factors in Design, Wiley, 2001.

3 **R.S. Bridger**, Introduction to Ergonomics, CRC Press, 2008.

4 **Mark S. Sanders & Ernest J. McCormick**, Human Factors in Engineering and Design, McGraw-Hill Education, 1993.

5 **K.H.E. Kroemer & H.B. Kroemer**, Ergonomics: How to Design for Ease and Efficiency, Prentice Hall, 2000.

6 **Don Norman**, The Design of Everyday Things, Basic Books, 2013 (Revised Edition).

Reference Books

1 **Jan Dul & Bernard Werkmeister**, Ergonomics for Beginners: A Quick Reference Guide, CRC Press, 2008.

2 **Martin Helander**, A Guide to Human Factors and Ergonomics, CRC Press, 2005.

3 **William Lidwell, Kritina Holden & Jill Butler**, Universal Principles of Design, Rockport Publishers, 2003.

4 **Karl H.E. Kroemer**, Fitting the Human: Introduction to Ergonomics, CRC Press, 2008.

5 **Vivek D. Bhise**, Ergonomics in Product Design and Development, CRC Press, 2011.

		L	**T**	**P**	**C**
U24SL331	**PSYCHOLOGY FOR DESIGNERS**	**2**	**0**	**0**	**2**

Course Objective:

- Investigate how users think, feel, and act to inform the design of user-centered products and experiences.
- Apply psychological concepts such as affordances, feedback, human-computer interaction, empathy mapping, and design testing to enhance usability and engagement.
- Explore psychological principles of perception, and emotional triggers to improve aesthetic appeal impact in design.

UNIT 1 PSYCHOLOGY (BEHAVIOURAL) AND COGNITIVE PRINCIPLES   6

Psychology, Behavioural psychology, Cognitive psychology, Psychology in design, Psychology of shapes, colour, font, space, Cognitive principles and biases, Principles of Psychology in design, Colour psychology, Mental model, Memory Models, Sensory adaptation. Importance of ethical and inclusive design. Neuroscience case studies to understand psychology.

UNIT II PSYCHOLOGICAL PRINCIPLES IN DESIGN   6

Hick's law, Gestalt principles, Confirmation bias. Anchoring bias, Visual hierarchy, Miller's law, Jakob's law, Social proof, Priming, Cognitive load, Fitt's law, Von Restorff effect, Juxtaposition, Tesler's law, Aesthetic-usability effect, Familiarity bias, Goal gradient effect, Decision fatigue, Labour illusion, Feedforward, Discoverability, Banner Blindness, Decoy effect, Attentional bias, framing, empathy gap, Visual anchors, Survivorship bias, etc.

UNIT III USER BEHAVIOUR AND PRODUCTS   6

Human factors and ergonomics, Cognitive psychology in industrial design, sensory design, Emotional design in industrial products, Behavioural psychology in product usage, Safety and risk perception, sustainability and environmental psychology, Social and cultural psychology, User research and testing.

UNIT IV USER BEHAVIOUR AND UI/UX   6

Cognitive Psychology in UX, Behavioural psychology and decision making (Fogg behaviour model), Emotional design, Human computer interaction, Visual perception and interaction, Motivation and habit, Visual perception and interaction, Accessibility and inclusive design, User research and testing, Social psychology in UI/UX.

UNIT V USER BEHAVIOUR AND SPACES   6

Environmental psychology, perception and wayfinding, emotional and psychological impact of spaces, behavioural psychology and space usage, Ergonomics and human factors in spaces, Social and Cultural Psychology in Spatial Design, Cognitive Load and Spatial Functionality, Sustainability and Environmental Impact, Therapeutic and Healing Environments, User Research and Spatial Testing.

Total: 30 Periods

Course Outcomes

CO	At the end of the course, the students will be able to	Knowledge Level
CO1	Explain behavioral and cognitive psychology concepts and assess their influence on design decisions.	**Understanding**
CO2	Apply psychological laws and cognitive biases to optimize user experience and product interaction.	**Applying**
CO3	Examine the roles of cognitive, emotional, and environmental psychology in shaping product and space design.	**Analysing**
CO4	Design user-centered, engaging, and inclusive UI/UX solutions using principles of cognitive and behavioral psychology.	**Creating**
CO5	Analyze and implement environmental and behavioral psychology principles to create user-centered spaces that consider ergonomics, emotional and cognitive responses, cultural context, and sustainability.	**Analysing**

Text Books

1   **Don Norman,** The Design of Everyday Things, Basic Books, 2013.

2   **Susan Weinschenk**, 100 Things Every Designer Needs to Know About People, New Riders, 2011.

3   **Stephen Anderson**, Seductive Interaction Design: Creating Playful, Fun, and Effective User Experiences, New Riders, 2011.

4   **Don Norman**, Emotional Design: Why We Love (or Hate) Everyday Things, Basic Books, 2004.

5   **Dan Ariely**, Predictably Irrational: The Hidden Forces That Shape Our Decisions, Harper, 2008.

6   **Scott Plous**, The Psychology of Judgment and Decision Making, McGraw-Hill, 1993.

Reference Books

1   **Nir Eyal**, Hooked: How to Build Habit-Forming Products, Portfolio, 2014.

2   **Barry Schwartz,** The Paradox of Choice: Why More Is Less, Harper Perennial, 2004.

3   **Steve Krug**, Don't Make Me Think: A Common Sense Approach to Web Usability, New Riders, 2000.

4   **Daniel Kahneman**, Thinking, Fast and Slow, Farrar, Straus and Giroux, 2011.

5   **Robert Cialdini,** Influence: The Psychology of Persuasion, Harper Business, 2006.

U24SL343	DESIGN RESEARCH	L	T	S	C
		1	0	3	4

Course Objective:
- Introduce the design process with a strong focus on practice-based design research methods.
- Foster critical and rational thinking to identify and solve complex problems with deeper meaning.
- Guide learners to identify, understand, and investigate a chosen topic or problem through systematic inquiry.
- Synthesize research findings into meaningful insights that inform effective ideation and solution development.
- Cultivate empathy and recognize opportunities within challenges, emphasizing the distinct nature of design research over conventional research methods.

UNIT I INTRODUCTION TO RESEARCH   12
Introduction to research – its importance & purpose. Key qualities/characteristics/skillsets of a researcher. Research in various fields. Difference between Design research and other research practices. Key differences & importance of Data – Information – Insights. Epistemology - Positivism, Interpretivism, Constructivism and Pragmatism Understanding the relevant target group: Users, Customers, Internal & external stakeholders, Experts, Vendors.

UNIT II INTRODUCTION TO DESIGN PROCESS (RESEARCH)   **12**

Introducing Design process - most popular design thinking framework - double diamond model, through activity. (Initial exposure to different phases of design process: Discover | Define | Ideate | Validate & Iterate | Outcome).

Introduction to Design Research - Understanding the research goals, objectives, timelines, resources, & target groups. Arriving at Initial brief (Hypothesis to be investigated). Planning & execution of Secondary & Primary research (Data collection, consolidation). Synthesis of research data to arrive at key insights & opportunity areas. Arriving at an actionable brief for ideation.

UNIT III RESEARCH TYPES   **12**

Relevant research types: Primary research (Direct data collection through field based or remotely); Secondary research (Existing data/information through Case studies, Competitor study, Trend study, Study on policies/law/norms). Quantitative & Qualitative research and how it can be utilized together. Design Ethnography, Participatory & Co-Design Research and Research-Through-Design

UNIT IV RESEARCH METHODOLOGIES IN DESIGN   **12**

Relevant Methodologies: Formal interviews (Structured & Semi-structured); Informal discussions (unstructured); Ethnography; Focus group discussions; Social experiments; Shadowing; Card Sorting; Survey; Games/Activities as a methodology; Survey; User testing (feedback collection) & Usability testing.Sampling in quantitative research (Survey); Sampling in qualitative research. Basic introduction to other useful tools/methods: Personas, Journey mapping, Mind maps, Stakeholder maps, Empathy maps, SWOT analysis, Bull's eye, Root cause analysis (5 whys), XY Matrix (Ex: Impact effort matrix), Life Cycle Assessment

UNIT V RESEARCH ETHICS AND SELF REVIEW   **12**

Self-Review: Reflecting upon the course/their own work, introspect & present the learnings/any new process/methods/tools that one has arrived at.

Ethics: Plagiarism/credits. Consent. Respecting participant boundaries/privacy & time. Facts Vs Fake data. Personal bias/preconceived notions/personal beliefs. Self-awareness on the impact & purpose for which your research is going to be used. Confidentiality of participant identity. Non-Disclosure Agreement. Fake promises. Being an advocate of Research.

Course Outcomes

CO	At the end of the course, the students will be able to	Knowledge Level
CO1	Identify the importance of research and distinguish between design research and other research methodologies.	**Remembering**
CO2	Apply the design thinking framework to conduct primary and secondary research and synthesize data into actionable insights.	**Applying**
CO3	Utilize qualitative and quantitative methods, including interviews, surveys, journey mapping, and SWOT analysis.	**Applying**
CO4	Develop ethical research practices, ensure data integrity, and present findings through clear visualization and reporting.	**Evaluating**
CO5	Reflect on the research process and demonstrate ethical awareness in responsible and respectful research conduct.	**Creating**

Text Books

1   **Blessing, Lucienne T.M., and Amaresh Chakrabarti.** DRM, a Design Research Methodology. Springer, 2009.

2   **Richey, Rita C., and James D. Klein.** Design and Development Research: Methods, Strategies, and Issues. Routledge, 2007.

3   **Kelly, Anthony E., Richard A. Lesh, and John Y. Baek, eds.** Handbook of Design Research Methods in Education. Routledge, 2008.

4   **Goodwin, Kim.** Designing for the Digital Age: How to Create Human-Centered Products and Services. Wiley, 2009.

5   **Dunne, David.** Design Thinking at Work: How Innovative Organizations Are Embracing Design. University of Toronto Press, 2018.

Reference Books
1   **Brown, Tim.** Change by Design: How Design Thinking Creates New Alternatives for Business and Society. Harvard Business Press, 2009.

2   **Lewrick, Michael, Patrick Link, and Larry Leifer.** The Design Thinking Playbook: Mindful Digital Transformation of Teams, Products, Services, Businesses and Ecosystems. Wiley, 2018.

3   **Cross, Nigel.** Design Thinking: Understanding How Designers Think and Work. Berg, 2011.

4   **Stickdorn, Marc, and Jakob Schneider.** This is Service Design Thinking: Basics, Tools, Cases. Wiley, 2011.

5   **IDEO.org.** The Field Guide to Human-Centered Design. IDEO.org, 2015.

U24DS313	INFORMATION DESIGN	L	T	S	C
		1	0	3	4

Course Objective:
- Apply principles of information design to organize and present information effectively.
- Develop skills to visualize and communicate data in a clear and accessible manner.
- Transform raw data into structured, engaging narratives through visual storytelling techniques.
- Design user-centered information systems for multiple media platforms, ensuring clarity and impact.

UNIT I: INTRODUCTION TO INFORMATION DESIGN (12)
Basics of Information Design, principles of effective communication through structured data. Understanding and defining information needs in different contexts, Data Humanism, History of Information Design. Information architecture, including taxonomy, navigation, and labeling for organizing complex data. Introduction to data types (quantitative, qualitative, categorical, and continuous) and data structures (hierarchical, relational, and networked). Fundamentals of information hierarchy and its role in guiding user attention. Designing for clarity with a focus on typography, color theory, contrast, spacing, and layout. Accessibility considerations in information design, including WCAG (Web Content Accessibility Guidelines) and inclusive design principles.

UNIT II: DATA VISUALIZATION TECHNIQUES (12)

Fundamentals of data representation, exploring different visualization methods for effective communication. Chart types: Bar, line, pie, scatter plots, heatmaps, treemaps, radar charts, and bubble charts. Best practices for selecting the right chart based on data type and audience. Diagrammatic Representations: Flowcharts for process mapping, timelines for chronological representation, mind maps for conceptual structuring, and network diagrams for relational data. Interactive vs. static visualizations and their impact on storytelling. Case studies on successful data visualizations in print and digital media, analyzing the effectiveness of different visualization approaches.

UNIT III: USER EXPERIENCE AND INTERACTION DESIGN (12)

Role of user experience (UX) in information design, ensuring clarity and usability. Basics of user interface (UI) design relevant to presenting information, including layout structuring, typography selection, and visual balance. Importance of user-centered design processes, incorporating user research, personas, and usability heuristics. Introduction to usability testing methods, including A/B testing, eye-tracking, and heuristic evaluations. Principles of designing for multiple platforms, including responsive design for web, adaptive layouts for mobile, and optimized formats for print. Web design standards and privacy guidelines, including data security considerations, GDPR compliance, and ethical concerns in user data handling.

UNIT IV: TOOLS AND TECHNOLOGIES IN DATA VISUALIZATION (12)

Exploring industry-standard tools for data visualization, including D3.js, Tableau, Power BI, and their applications in analytics and reporting. Building live dashboards for real-time data visualization, enabling businesses and organizations to track dynamic datasets. Introduction to data literacy, covering basic statistics, data cleaning techniques, and exploratory data analysis for effective visualization. Understanding data storytelling frameworks, combining insights with appropriate graphical representation. Practical exercises in using software tools to create compelling, informative, and interactive visualizations.

UNIT V: ADVANCED TOPICS AND APPLICATIONS (12)

Role of narrative and storytelling in information design, applying storytelling techniques to make data engaging and meaningful. Visual narratives to guide user understanding, improving decision-making through intuitive representation. Applications of infographics, instructional design, and corporate reporting, designing materials for education, business intelligence, and government communication. Emerging trends in information design, including augmented reality (AR) visualizations, machine learning-driven data representations, and automated infographic generation. Ethical considerations in visualization, avoiding misinformation, bias, and misleading graphical representation. Best practices in responsible and transparent data communication.

Course Outcomes

CO	At the end of the course, the students will be able to	Knowledge Level
CO1	Apply principles of information design to organize and present data clearly and accessibly.	**Applying**
CO2	Create effective data visualizations using charts, diagrams, and storytelling techniques.	**Creating**
CO3	Implement UX/UI design principles to enhance usability and user engagement.	**Creating**
CO4	Utilize industry-standard tools and explore emerging technologies in data and information design.	**Applying**

CO5	Evaluate and refine information design solutions for clarity, accessibility, and visual impact.	**Evaluating**

Text Books

1 **Edward Tufte**, The Visual Display of Quantitative Information, Graphics Press, 2001

2 **Colin Ware**, Information Visualization: Perception for Design, Morgan Kaufmann, 2012

3 **Alberto Cairo**, The Functional Art: An Introduction to Information Graphics and Visualization, New Riders, 2012

4 **Dona M. Wong**, The Wall Street Journal Guide to Information Graphics, W.W. Norton & Company, 2010

5 **Sandra Rendgen**, Information Graphics, Taschen, 2012

Reference Books

1 **Nathan Yau**, Visualize This: The FlowingData Guide to Design, Visualization, and Statistics, Wiley, 2011

2 **Kim Rees and Dino Citraro**, Data Visualization for Success: Interviews with 40 Experienced Designers, Flamant, 2017

3 **Stephen Few**, Show Me the Numbers: Designing Tables and Graphs to Enlighten, Analytics Press, 2012

4 **Garr Reynolds**, Presentation Zen: Simple Ideas on Presentation Design and Delivery, New Riders, 2008

5 **Andy Kirk,** Data Visualisation: A Handbook for Data Driven Design, SAGE Publications, 2016

U24DS322	LINEAR DESIGN PROJECT	L	T	S	C
		0	0	8	8

Course Objective:
- Investigate and apply semiotic principles to effectively use signs, symbols, and visual language that enhance clarity and meaning in design communication.
- Incorporate cognitive ergonomics to develop intuitive, user-friendly interfaces that align with human perception, attention, and memory processes.
- Utilize design psychology techniques to shape user behavior, foster deeper engagement, and craft emotionally resonant, meaningful user experiences.
- Conduct comprehensive design research to gather user insights, identify needs, and translate findings into evidence-based design solutions.
- Apply information design principles to structure and present complex data in a way that enhances user understanding, navigation, and decision-making.

CONTENT

Gaining hands-on experience with real-life design challenges is invaluable. It requires understanding human behavior and how user interactions influence design outcomes. Clear and effective communication of design ideas relies on the precise use of visual language, signs, and symbols. Mastery of spatial, product, and cognitive ergonomics across different scales is crucial. Applying design research methods to gather user insights enables informed decision-making. Presenting research data in a meaningful and structured way enhances comprehension and analysis. A strong foundation in distinguishing user needs from wants helps identify design opportunities. Developing a detailed design brief and outlining a structured, step-by-step design process is essential. The final design solution may take the form of a prototype in communication design (digital or print), product design, or spatial design.

Project Typology to be considered for the Linear Design process.

- Context: The context for the project should be in and around the campus so that it is accessible for the students easily. Like, college canteen, Hostel, Mess, Classroom etc
- Complexity: Everyday activities and tasks involving non professional individuals should be taken into consideration.
- Scale: The scale of the project should be limited to the size where there is a minimum of 1:2 physical prototype feasible.
- Fields of Specialization: The fields can be Information system (Digital or print), Spatial experience, Furniture, Product, Small application or a small design intervention system.
- Personal Challenges can also be considered as a design project.

Course Outcomes

CO	At the end of the course, the students will be able to	Knowledge Level
CO1	Explain the design process and demonstrate its application in real-world contexts.	Understanding
CO2	Demonstrate effective use of visual language, signs, and symbols to communicate design ideas clearly through sketches, models, and prototypes.	Applying
CO3	Analyze and infer insights from collected data.	Evaluating
CO4	Translate insights into clearly defined problems and formulate a design brief.	Analysing
CO5	Develop, prototype, and test design solutions with users in context.	Creating

Text Books

1 **Tim Brown**, Change by Design: How Design Thinking Creates New Alternatives for Business and Society, Harvard Business Press, 2009

2 **Jeanne Liedtka and Tim Ogilvie**, Designing for Growth: A Design Thinking Tool Kit for Managers, Columbia University Press, 2011

3 **Don Norman**, The Design of Everyday Things, Basic Books, 2013

4 **Nigel Cross,** Design Thinking: Understanding How Designers Think and Work, Bloomsbury Academic, 2011

5 **Michael G. Luchs, Scott Swan, and Abbie Griffin** (Eds.), Design Thinking: New Product Development Essentials from the PDMA, Wiley, 2015

Reference Books

1 **Peter G. Rowe,** Design Thinking, MIT Press, 1987

2 **Larry Keeley, Helen Walters, Ryan Pikkel, and Brian Quinn,** Ten Types of Innovation: The Discipline of Building Breakthroughs, Wiley, 2013

3 **Richard Buchanan and Victor Margolin (Eds.),** Discovering Design: Explorations in Design Studies, University of Chicago Press, 1995

4 **Christoph Meinel and Larry Leifer (Eds.)**, Design Thinking: Understand – Improve – Apply, Springer, 2011

5 **John Heskett, Design**: A Very Short Introduction, Oxford University Press, 2002

Department of Design
Regulation 2024 Fourth Semester Syllabus

U24SL411	ANTHROPOLOGY FOR DESIGNERS	L	T	S	C
		2	0	0	2

Course Objective:
● To introduce anthropology as a discipline that studies human societies, cultures, and behaviours across time and space.
● To enable design students to recognize the cultural, social, and material contexts that shape human interactions and practices.
● To equip students with tools of observation, ethnography, and participant inquiry to inform human-centred design.
● To critically reflect on issues of identity, tradition, modernity, ritual, space, and material culture in everyday life.

UNIT 1: FOUNDATION OF ANTHROPOLOGY	6

Definition and evolution of Anthropology: From colonial roots to contemporary relevance. Scope & Branches of Anthropology – Physical, Cultural, Social, Visual, Linguistic. Key Thinkers: E.B. Tylor, Franz Boas, Margaret Mead. Core Concepts: Culture, Enculturation, Ethnocentrism, Cultural Relativism, Kinship, Social Structure. Role of Anthropology in Design: Human behaviour, cultural variation, user contexts. Indian context and Indian Anthropologists.

UNIT 2: ETHNOGRAPHY & FIELDWORK METHODS	6

What is Ethnography? Immersion, observation, and participation. Key techniques including participant observation, field notes & journaling, etc., Ethics in fieldwork, informed consent, anonymity and respect. Introduction to Cultural Probes and Design Ethnography. Introduction to tools, such as visual diaries, mapping, storytelling, etc.,

UNIT 3: EVERYDAY LIFE, RITUALS & SPATIAL PRACTICES	6

Anthropology of the Everyday. Ritual, Routine, Performance – Understanding Repetition & Symbolism. Anthropology of Space: Domesticity, Gendered Space, Thresholds, Temporary Architecture. Urban Anthropology: Public vs Private: Use of Streets, Markets, Shrines, and Courtyards. Anthropological Reading of a Designed Object or Place.

UNIT 4: MATERIAL CULTURE & OBJECT BIOGRAPHIES	6

What is Material Culture? Objects as carriers of meaning and memory. Objects as Cultural Artifacts: Use, Memory, Transformation. The Life of Things – Ownership, Reuse, Discard. Material Semiotics and the Anthropology of Waste. Case Study: Traditional Craft, Heirloom Objects, or Everyday Artefacts. Indian examples.

UNIT 5: VISUAL & DESIGN ANTHROPOLOGY	6

Visual Methods in Anthropology, Photography, Film, and Mapping in Anthropological Inquiry. Sensory Ethnography – Sound, Smell, Texture in Design Contexts. Design Anthropology: People, Products, and Participatory Practices.

Total: 30 Periods

Exercises

1	Empathy-building in user research; identifying cultural codes in product and space design.
2	Conducting real-world design research; grounding concept development in observation.
3	Informing spatial layouts, experience design, and user interaction based on social behaviour.
4	Inspiring form, texture, reuse and symbolism in product, packaging, furniture, and spatial design.
5	Developing design solutions based on context-rich, co-created, and ethically grounded insights.

Text Books

1	Spradley, J. P. Participant Observation. Waveland Press. A classic primer on ethnographic fieldwork and observational techniques (1980).
2	Pink, S. Doing Visual Ethnography. Sage Publications. Essential for learning how to use photography and film as research tools(2013).
3	Margaret Mead – Coming of Age in Samoa, Harper Perennial. Foundational ethnography with insights into youth, gender, and society. (1928)
4	Daniel Miller – Stuff. Polity Press, Introduces the anthropology of material culture and everyday things. (2010)
5	Tim Ingold – Making: Anthropology, Archaeology, Art and Architecture, Routledge, Blends anthropology and design in discussing how people engage with materials. (2013)
6	Nigel Barley – The Innocent Anthropologist. Eland Publishing, A humorous yet insightful look at fieldwork and cross-cultural misunderstandings (1983).

Reference Books

1	Csikszentmihalyi, M. & Rochberg-Halton, E. The Meaning of Things. Cambridge University Press. Explores how people find meaning and identity through their possessions. (1981)
2	Appadurai, A. (Ed.). The Social Life of Things: Commodities in Cultural Perspective. Cambridge University Press. Examines how objects circulate and acquire social value. (1986)
3	Gunn, W., Otto, T., & Smith, R. C. Design Anthropology: Theory and Practice. Bloomsbury. A foundational book for bridging anthropology and design. (2013)
4	Ramesh, M., & Chandi, M. Walking is the Way of Knowing: In a Kadar Forest. Tara Books. (2017)
5	Christina Wasson et al. (Eds.) – Applying Anthropology in the Global Village Routledge, Collection on practicing anthropology in design, user research, and organizational culture. (2016)

Course Outcomes

CO	At the end of the course, the students will be able to	Knowledge Level
CO1	Define key anthropological concepts and their relevance to design practice.	Understanding
CO2	Apply ethnographic methods to observe and analyse human behaviour in context.	Applying
CO3	Interpret everyday rituals, spaces, and objects through cultural frameworks.	Analyzing
CO4	Evaluate how material culture and social practices shape design opportunities.	Evaluating
CO5	Create ethnographically informed design narratives or visual mappings.	Creating

U24SL421	CONTEMPORARY MATERIALS FOR DESIGNERS	L	T	S	C
		2	0	0	2

Course Objective:

- To introduce students to the breadth of contemporary material innovations
- To build a foundational understanding of material properties and behavior
- To evaluate material choice through the lens of sustainability and context
- To explore the sensory and cultural impact of materials on user experience
- To enable informed and ethical decision-making in material selection.

UNIT 1: UNDERSTANDING MATERIAL BEHAVIOUR   6

Physical and mechanical properties of materials, Material families: metals, polymers, ceramics, composites, etc., Form-function relationship in material choices, Cost, manufacturability, and availability factors, Failure and durability of materials, Selection tools (e.g., Ashby charts) and case studies.

UNIT 2: SMART AND EMERGING MATERIALS   6

Shape-memory alloys, piezoelectrics, and conductive polymers, Self-healing, phase-changing, and programmable materials, Materials in robotics, healthcare, and electronics, Responsive surfaces and embedded interactivity,4D printing and future-forward materials, Case studies in cutting-edge product design.

UNIT 3: SUSTAINABLE AND CIRCULAR MATERIALS   6

Biomaterials: mycelium, algae, bioplastics, Recycled and upcycled materials in design, Lifecycle analysis and material passports, Local sourcing and regenerative practices, Certifications and standards (Cradle-to-Cradle, EPEAT, etc.), Circular economy models in product design. Review the past materials and its relevance now, and comparative study of old and new materials.

UNIT 4: MATERIAL NARRATIVE AND EXPERIENCES   6

Tactility, weight, texture, and multisensory materiality, Material semantics and emotional design, Creating perceived value through material finishes, Brand storytelling through material choice, Materials and user perception of quality and function, Cross-cultural material associations.

UNIT 5: CONTEXT, CULTURE AND LOCALITY   6

Indigenous materials and traditional techniques, Local crafts and contemporary reinterpretation Geo-climatic material suitability in design, Ethics of sourcing and material exploitation Materials as cultural identity and resistance, Case studies from India and Global South. Explore material evolution in the Indian context.

Total: 30 Periods

Exercises

1	Material swatch exploration and documentation.
2	Sensory experience mapping of common objects.
3	Comparative analysis of traditional vs modern material for the same product.
4	Life cycle mapping of a selected product/material.
5	Mini case-study: A product made from smart or bio-materials.
6	Cultural deep-dive: One material's use across regions.

Text Books

1	Karana, E., Pedgley, O., & Rognoli, V. Materials Experience: Fundamentals of Materials and Design. Butterworth-Heinemann / Elsevier. Explores how materials shape user experience and emotional connection in design. (2014)
2	Lefteri, Chris. Making It: Manufacturing Techniques for Product Design. Laurence King Publishing. A comprehensive guide to contemporary manufacturing methods for designers. (2012)
3	Sudjic, Deyan. The Language of Things. W. W. Norton & Company. Discusses how objects communicate cultural values, identity, and meaning. (2009)
4	Dent, Andrew H., & Sherr, Leslie. Material Innovation: Product Design. Thames & Hudson. Showcases innovative uses of materials in modern product design. (2014)
5	Miodownik, Mark. Stuff Matters: Exploring the Marvelous Materials that Shape Our Man-Made World. Penguin Books. A fascinating look into the science and stories behind everyday materials. (2013)

Reference Books

1	McDonough, William, & Braungart, Michael. Cradle to Cradle: Remaking the Way We Make Things. North Point Press. A seminal work advocating sustainable design and closed-loop production systems. (2002)
2	Ratner, Buddy D. (Ed.). Biomaterials Science: An Introduction to Materials in Medicine. Academic Press / Elsevier. Comprehensive reference on materials used in biomedical and design applications. (2013)
3	Postrel, Virginia. The Substance of Style: How the Rise of Aesthetic Value Is Remaking Commerce, Culture, and Consciousness. HarperCollins. Explores how aesthetics influence consumer culture and design. (2003)
4	Ashby, Michael F., & Johnson, Kara. Materials and Design: The Art and Science of Material Selection in Product Design. Butterworth-Heinemann / Elsevier. A key text connecting engineering material properties with design thinking. (2014)

Course Outcomes

CO	At the end of the course, the students will be able to	Knowledge Level
CO1	Identify and categorize a wide range of contemporary and emerging materials.	Understanding
CO2	Analyze and justify material choices in relation to specific product contexts.	Analyzing
CO3	Integrate sustainability principles and apply lifecycle thinking in material selection.	Applying
CO4	Evaluate and articulate the sensory, emotional, and experiential roles of materials in design.	Evaluating
CO5	Interpret and connect materials to cultural contexts and design narratives.	Creating

U24SL431	DESIGN PHILOSOPHY	L	T	S	C
		2	0	0	2

Course Objective:

- To understand the history of various schools of thought in design across time and cultures.

- To develop awareness of ethical, cultural, and social responsibility in design.

- To critically analyze the role of design in shaping society and user experience.

- To cultivate each student's unique design sensibility and personal philosophy

UNIT 1: FOUNDATION OF DESIGN PHILOSOPHY   6
What is philosophy in design? Design philosophy of various products ,Design vs. Art vs. Craft, Function vs. Aesthetics Form follows function – revisited, Design as problem-solving vs. exploration, Meaning, symbolism, and semiotics in design, Eastern vs. Western design ideologies, Design as a cultural act. Gandhian philosophy and design.

UNIT 2: PHILOSOPHIES ACROSS DOMAINS   6
UX: Emotional Design (Don Norman), Product: Empathy & Minimalism-Dieter Rams, Naoto Fukasawa, Notable Quotes on Function and Form, Spatial: Phenomenology (Zumthor, Pallasmaa) Biomimicry & nature-based design, Japanese Zen design & Ma, Critical Regionalism, User psychology and design, Future-oriented & speculative philosophies

UNIT 3: HISTORY AND EVOLUTION OF DESIGN THINKING   6
Art History, Pre-industrial craftsmanship ,Bauhaus and Modernism, Postmodernism & Critical Design, When Art becomes Design ? User-centered & Human-centered design, Inclusive and Universal design, Technology and its influence, Systems thinking, What is Data, Data era (unified data),How to design with just data.

UNIT 4: ETHICS,RESPONSIBILITY AND IMPACT   6
What is ethical design? Greenwashing vs. true sustainability, Design and power, Responsibility to users, clients, and society, Privacy and surveillance(UX) , Design for marginalized voices, Design for circular economy Bias in design, Purpose-driven design

UNIT 5: PERSONAL DESIGN PHILOSOPHY   6
Self-reflection in design, what do you value as a designer? Designing from belief vs. market Visual storytelling of personal journey, Influence of mentors and inspirations, Developing a personal design manifesto.

Total: 30 Periods

Exercise

1	Identify a product, architectural space, or interface design influenced by a philosophy tree. Document its revolutionary impact and map its design influences through a philosophy tree diagram

2	Sketch a product or spatial idea that balance function and form. Select a traditional object from your home or community, analyze its cultural context, compare its effectiveness with western alternatives and explore its economic impact.
3	Compare two objects – one handmade and one machine made – analyzing differences in design, function and value
4	UX: Redesign an app interface based on emotional intelligence
5	Design an accessible public object or interface
6	Create a visual or zine expressing your core design value

Text Books

1	Anne-Marie Willis & Tony Fry. Design Philosophy Papers. Team D/E/S Publications. A critical journal exploring design theory, philosophy, and sustainability in design discourse. (2000)
2	Kenya Hara. Designing Design. Lars Müller Publishers. A reflective exploration of Japanese design aesthetics and the concept of "emptiness" as creative potential. (2007)
3	Norman Potter. What is a Designer: Things, Places, Messages. Hyphen Press. A classic text examining the ethics, practice, and social role of design. (2002)
4	Guy Julier & Viviana Narotzky Moor (Eds.). Making Meaning: Cultural Production of Design. Berg Publishers. A scholarly collection on how design shapes and is shaped by culture. (2009)
5	Anthony Dunne & Fiona Raby. Speculative Everything: Design, Fiction, and Social Dreaming. MIT Press. Explores speculative design as a method for envisioning alternative futures. (2013)
6	Anne-Marie Willis & Tony Fry. Design Philosophy Papers. Team D/E/S Publications. A critical journal exploring design theory, philosophy, and sustainability in design discourse. (2000)

Reference Books

1	Don Norman. The Design of Everyday Things. Basic Books. A landmark text on human-centered design and usability principles in everyday products. (2013)
2	Juhani Pallasmaa. The Eyes of the Skin: Architecture and the Senses. John Wiley & Sons. Explores the role of multisensory experience in architectural perception. (2005)
3	Dieter Rams. Less But Better. Gestalten. A collection highlighting Rams' minimalist design philosophy and influence on modern industrial design. (1995)
4	Christopher Alexander. The Timeless Way of Building. Oxford University Press. A foundational work discussing the organic, pattern-based process of creating meaningful architecture. (1979)
5	Naoto Fukasawa & Jasper Morrison. Super Normal: Sensations of the Ordinary. Lars Müller Publishers. Explores everyday design and the beauty of functional simplicity. (2007)
6	Peter Zumthor. Thinking Architecture. Birkhäuser Verlag. A reflective essay collection on atmosphere, materiality, and the emotional power of architecture. (2010)
7	Bruno Munari. Design as Art. Penguin Books. A classic manifesto exploring the intersection of art, design, and creativity in modern life. (1966)

Course Outcomes

CO	At the end of the course, the students will be able to	Knowledge Level
CO1	Identify and articulate core philosophical concepts and their relevance to design practice and theory.	Understanding
CO2	Evaluate the ethical and societal implications of design decisions, integrating principles of sustainability and user-centricity in design solutions	Evaluating
CO3	Analyze and critique various historical and contemporary design philosophies and their impact on design movements and societal values	Analyzing
CO4	Formulate and justify a personal design philosophy, applying theoretical frameworks to practical design challenges	Creating
CO5	Interpret and apply philosophical reasoning to address complex design problems and anticipate future trends in the design field.	Evaluate

U24DS413	ECO-CENTRIC DESIGN	L	T	S	C
		1	0	3	4

Course Objective:
- Understand the historical evolution, principles, and ethics of ecological and sustainable design.
- Explore and apply Life Cycle Assessment (LCA) methods for evaluating environmental impacts across physical, digital, and spatial contexts.
- Develop strategies for sustainable material use, energy-efficient digital design, and biomimicry-based innovations.
- Integrate systems thinking and circular economy principles to create holistic, cross-disciplinary design solutions.
- Collaborate on multidisciplinary projects that demonstrate measurable environmental impact and reflective practice in design.

UNIT 1: FOUNDATIONS AND ECOLOGICAL PRINCIPLES   12
History and evolution of ecological design, Key concepts: cradle-to-cradle, circular economy, biomimicry, regenerative design, Environmental psychology & design ethics, Cross-disciplinary case studies: eco-products, sustainable apps, green spaces.

UNIT 2: LIFE CYCLE ASSESSMENT AND IMPACT TOOLS   12
Life Cycle Assessment (LCA) basics for physical, digital, spatial designs, Material impacts, energy use, end-of-life considerations, Digital resource impacts: data storage, server load, UI efficiency, Tools demo: Open LCA, Website Carbon Calculator, One Click LCA.

UNIT 3: SUSTAINABLE DESIGN STRATEGIES   12
Low-impact materials & manufacturing, Energy-efficient UI/UX design and behavioral nudges, Biophilic design and biomimicry applications, Modular, passive, and resource-efficient spatial design, Workshop: Material & Digital Resource Passports.

UNIT 4: SYSTEMS THINKING AND CIRCULAR DESIGN   12
Systems mapping across product, UI, and space, Circular economy principles: reuse, repair, waste-to-value, Designing integrated service ecosystems. Critical thinking on ecological responsibilities.

UNIT 5: INTEGRATED STUDIO PROJECT AND REFLECTION
Multidisciplinary team project combining product, UI/UX, spatial design, Measure environmental impact: energy, waste, resource savings, Final presentation to faculty and industry. Deliverables: prototypes, impact report, systems map, LCA summary.

Total: 60 Periods

Exercises

1	Activity: Mapping ecological footprints of product, UI, and space.
2	Assignment: Perform LCA on chosen design
3	Workshop: Material & Digital Resource Passports
4	Mini-project: Blueprinting an eco-design solution spanning discipline

5	Reflective essay: personal ecology in design practice
6	Case studies in sustainable design

Text Books

1	William McDonough & Michael Braungart. Cradle to Cradle: Remaking the Way We Make Things. North Point Press. A pioneering manifesto on sustainable, closed-loop design systems and eco-effectiveness. (2002)
2	Michael Braungart & William McDonough. The Upcycle: Beyond Sustainability—Designing for Abundance. North Point Press. A follow-up to Cradle to Cradle, proposing regenerative design solutions that go beyond minimizing harm. (2013)
3	Matthias Finkbeiner, Annekatrin Inaba, R. Tan, & R. Hischier. Life Cycle Assessment: Theory and Practice. Springer. A comprehensive academic resource detailing methodologies for assessing environmental impacts across product life cycles. (2016)
4	Daniel A. Vallero & Chris Brasier. Sustainable Design: The Science of Sustainability and Green Engineering. John Wiley & Sons. Explores the intersection of science, engineering, and design for environmental responsibility. (2008)
5	John R. Ehrenfeld. Sustainability by Design: A Subversive Strategy for Transforming Our Consumer Culture. Yale University Press. Examines sustainability as a mindset and moral imperative beyond technical solutions. (2008)
6	David Bergman. Sustainable Design: A Critical Guide for Architects and Interior, Graphic, and Industrial Designers. Princeton Architectural Press. A practical and critical overview of sustainable practices across design disciplines. (2012)

Reference Books

1	Janine M. Benyus. Biomimicry: Innovation Inspired by Nature. Harper Perennial. A groundbreaking work introducing how natural systems inspire sustainable innovations in design and technology. (1997)
2	Ezio Manzini. Design, When Everybody Designs: An Introduction to Design for Social Innovation. MIT Press. Explores design's evolving role in fostering social change and collaborative innovation. (2015)
3	Steffen Lehmann. Sustainable Architecture and Urban Design. Routledge. Examines strategies for sustainable city planning, architecture, and resource-efficient design. (2010)
4	Ken Yeang. Ecodesign: A Manual for Ecological Design. John Wiley & Sons. A comprehensive guide integrating ecological principles into architectural and urban design. (2006)
5	Tony Fry. Design Futuring: Sustainability, Ethics and New Practice. Berg Publishers. A critical text that redefines design ethics and calls for transformative sustainable practice. (2009)
6	Nancy B. Tuchman & Michael A. D. Lang. Introduction to Sustainability. Oxford University Press. Provides a scientific and systems-based understanding of sustainability across disciplines. (2018)

Course Outcomes

CO	At the end of the course, the students will be able to	Knowledge Level
CO1	Analyze the history, principles, and ethical considerations of ecological design to inform sustainable decision-making.	Analyzing
CO2	Apply Life Cycle Assessment (LCA) tools to evaluate environmental impacts of physical, digital, and spatial designs	Applying
CO3	Develop sustainable design strategies using low-impact materials, energy-efficient digital practices, and biomimicry-inspired approaches.	Creating
CO4	Design integrated, circular solutions by applying systems thinking and service ecosystem mapping across disciplines.	Creating
CO5	Produce and present a multidisciplinary eco-design project, supported by measurable impact data and reflective analysis.	Creating

U24DS422	AGILE DESIGN PROJECT	L	T	S	C
		0	0	8	8

Course Objective:

- Understanding anthropology to deeply understand users' cultural contexts, behaviors, and needs, leading to more human-centered, adaptable design solutions.
- Understanding design philosophy to align design decisions with core values, ensuring purposeful, adaptable, and user-focused outcomes.
- Understanding ecological design to be adaptable, resource-efficient, and responsive to environmental and contextual changes.
- To apply prototyping and AR/VR tools for rapid visualization and assessment of initial design solution feasibility.
- Use acquired knowledge to develop flexible design solutions while embracing a fail-fast mindset and learning from mistakes.

CONTENT

Hands-on experience with real-world design challenges is one of the most valuable lessons a designer can have. It demands an awareness of how cultural contexts, human behaviors, and user needs shape the outcome of a design. Learning how successful designers think and make decisions enables you to anchor your work in core values, ensuring that every solution is purposeful, adaptable, and user-centered.

An ecologically conscious mindset—combined with an understanding of a design's life cycle and its environmental impact—guides you toward creating truly sustainable outcomes. Mastering contemporary visualization skills, from advanced rendering to AR/VR, empowers you to communicate ideas clearly and compellingly to a wide audience.

Above all, adaptability is key. Embracing change, failing fast, and learning quickly from those failures allows you to refine and improve ideas through rapid iterations. The final solution might emerge as a series of digital, physical, or spatial prototypes—each one tested and evolved to meet the demands of real-world challenges.

Project Typology to be considered for the Agile Design process.
- Your project begins with choosing a **context** you can easily access—this could be a physical space, a digital platform, or a spatial environment you can explore and study.
- Tackle a **complexity** that already exists in the real world: an existing design, product, or system that you can reimagine to be not only functional but also sustainable and ready for the future.
- Keep your **scale** practical. Your outcome should be a prototype—digital, physical, or a virtual space—that you can design, build, and test within the project timeframe.

You're free to explore a wide range of **fields**:
- Digital apps (web, Android, iOS)
- Virtual spatial experiences
- Urban furniture
- Products for mass manufacturing

- Redesign of an existing system
- Digital plugins for using design software efficiently

You can even turn a **personal challenge** into your project—sometimes the most impactful solutions come from problems you've faced yourself.

Examples:

- **Redesigning a Mobile App UI** (User-Centered Design & Rapid Prototyping)
- **Developing a Smart Home Product** (Product Prototyping & Feature Iteration)
- **Temporary Event Pavilion Design** (Spatial Design & Visualization Tools)
- **E-commerce Website Overhaul** (Data-Driven Design Decisions)
- **Urban Furniture Design** (Public Space & Inclusive Design)

Text Books

1	Tim Brown. Change by Design: How Design Thinking Creates New Alternatives for Business and Society. Harvard Business Press. Introduces the principles of design thinking and its application to business innovation and social change. (2009)
2	Ezio Manzini. Design, When Everybody Designs: An Introduction to Design for Social Innovation. MIT Press. Explores the shift from professional design to collaborative, socially driven design practices. (2015)
3	Don Norman. The Design of Everyday Things. Basic Books. A foundational text on human-centered design, usability, and cognitive ergonomics. (2013)
4	Nigel Cross. Design Thinking: Understanding How Designers Think and Work. Bloomsbury Academic. Examines the cognitive processes and methods underlying expert design practice. (2011)
5	Michael G. Luchs, Scott Swan, & Abbie Griffin (Eds.). Design Thinking: New Product Development Essentials from the PDMA. John Wiley & Sons. A collection of perspectives linking design thinking to innovation management and product development. (2015)

Reference Books

1	Peter G. Rowe. Design Thinking. MIT Press. A seminal text exploring the cognitive and methodological processes behind design thinking. (1990)
2	Larry Keeley, Helen Walters, Ryan Pikkel, & Brian Quinn. Ten Types of Innovation: The Discipline of Building Breakthroughs. John Wiley & Sons. Discusses a systematic approach to innovation across products, services, and business models. (2013)
3	Richard Buchanan & Victor Margolin (Eds.). Discovering Design: Explorations in Design Studies. University of Chicago Press. A foundational collection on design theory, methodology, and interdisciplinary studies. (1995)
4	John Heskett. Design: A Very Short Introduction. Oxford University Press. A concise overview of design history, principles, and its impact on society. (2002)

| 5 | Christoph Meinel & Larry Leifer (Eds.). Design Thinking: Understand – Improve – Apply. Springer. Offers frameworks for applying design thinking in research, practice, and education. (2011) |

Course Outcomes

CO	At the end of the course, the students will be able to	Knowledge Level
CO1	Use the agile design process and demonstrate its application in real-world contexts.	Understanding
CO2	Showcase the use of prototyping and/or AR/VR through sketches, models, virtual environments, and physical prototypes.	Applying
CO3	Analyze existing designs to validate the design outcomes from the design process	Analyzing
CO4	Be eco-conscious in using new age materials and systems for the design solutions	Evaluating
CO5	Fail fast - adapt and be agile in finding solutions.	Creating

U24DSPE01	**PROTOTYPING**	**L**	**T**	**P**	**C**
		1	**0**	**3**	**4**

Course Objective:
- To develop hands-on skills in building, testing design ideas and iterative mindset for exploration and refinement
- To understand materials, tools, and processes used in prototyping
- To integrate user feedback in the design evolution.
- To develop fluency in building prototypes of varying fidelity
- To communicate design intent effectively through tangible prototypes

UNIT 1: FOUNDATION OF PROTOTYPING   12
Role of prototyping in the design process , Differences between model making and prototyping Understanding "looks-like", "works-like", and "feels-like" prototypes , Prototyping as a tool for thinking, testing, and communication , Prototyping across stages of the design process.

UNIT 2: LOW, MEDIUM AND HIGH - FIDELITY PROTOTYPES   12
Characteristics of low-, mid-, and high-fidelity prototypes , choosing fidelity based on design stage and objective , Techniques for sketch modeling and quick mockups, Mid-fidelity prototypes for functional testing , High-fidelity prototypes for detailing and presentation, when to move from one fidelity level to another.

UNIT 3: TOOLS AND MATERIALS OVERVIEW   12
Hand tools and power tools: usage and safety, Introduction to laser cutting, 3D printing, and CNC Working with paper, cardboard, foam, wood, and acrylic, Adhesives, fastening methods, and joints, Understanding material behavior and properties, Digital tools and file prep for fabrication. Sustainable, low waste methods and eco-friendly materials in prototyping.

UNIT 4: PROTOTYPING MINDSET : TEST, LEARN, REPEAT   12
Iterative prototyping and versioning, Timeboxing and rapid cycles, integrating user feedback into iterations, Learning through failure and quick testing, Cost-effective hacks and improvisation Documenting process and evolution.

UNIT 5: PROTOTYPING AS STORYTELLING TOOLS   12
Communicating function and intent through form, using prototypes to simulate user experience Prototypes as tools in stakeholder conversations, Designing for interaction and emotion Storyboarding and context-based testing, Preparing prototypes for presentations and critiques.

Total: 60 Periods

Exercises

1	Sketch modelling challenge with basic materials
2	Build a medium-fidelity ergonomic prototype
3	One-day rapid prototyping and feedback loop
4	Collaborative build using mixed materials
5	Final prototype showcase with storytelling focus

Text Books

1	Bjarki Hallgrimsson, Prototyping and Modelmaking for Product Design, Laurence King Publishing, (2012).
2	Chris Lefteri, Making It: Manufacturing Techniques for Product Design, Laurence King Publishing, (2012).
3	Koos Eissen & Roselien Steur, Sketching: Drawing Techniques for Product Designers, BIS Publishers, (2007).
4	Tom Kelley, The Art of Innovation: Lessons in Creativity from IDEO, America's Leading Design Firm, Currency/Doubleday,(2001).
5	Karl T. Ulrich & Steven D. Eppinger, Product Design and Development, McGraw-Hill Education, (2015).
6	Scott Hurff, Designing Products People Love: How Great Designers Create Successful Products, O'Reilly Media, (2016).

Reference Books

1	Steve Krug, Don't Make Me Think: A Common Sense Approach to Web Usability, New Riders, (2014).
2	Don Norman, The Design of Everyday Things, Basic Books, (2013).
3	Sung Jang & Martin Thaler, 101 Things I Learned in Product Design School, Three Rivers Press, (2020)
4	Dustyn Roberts, Making Things Move: DIY Mechanisms for Inventors, Hobbyists, and Artists, McGraw-Hill Education, (2010).

Course Outcomes

CO	At the end of the course, the students will be able to	Knowledge Level
CO1	Demonstrate understanding of material behavior and manufacturing constraints	Understanding
CO2	Ability to build functional and aesthetic prototypes across fidelity levels	Creating
CO3	Use digital and manual tools appropriately for prototyping	Applying
CO4	Translate user insights into refined design iterations	Analyzing
CO5	Present prototypes with clarity, precision, and storytelling	Creating

U24DSDE01	DESIGN WITH AR AND VR	L	T	P	C
		1	0	3	4

Course Objective:
- To broaden and deepen students' understanding through the latest advancements in virtual and augmented reality technologies.
- Improving the probability of project acceptance from clients.
- Learning simple communication language of clients instead of technical language.
- To stay unique from competitors after they graduate.
- To improvise their presentation skills and design using VR and AR as design tools.

UNIT 1 : INTRODUCTION AND TYPES OF AR AND VR   **12**

Definition and Introduction of VR and AR, Difference between VR and AR. Classifications of VR and AR. Applications of VR and AR in Architecture and Interior design. Sample videos and lecture with examples.

UNIT 2: STATIC VR : VIRTUAL + MIXED REALITY   **12**

Definition of static VR. How the immersive experience works behind static VR. Backstage process to do it. Enhancing and post production of backstage processes. Virtually creating a static VR using software. Recording a real-world static VR on campus. Adding and editing elements in Real world static VR for Mixed reality.

UNIT 3: INTERACTIVE VR & WALKTHROUGH VR   **12**

Definition of interactive VR. Possibilities and applications of Interactive VR in Architecture and interior design. Backstage process of interactive VR. Offline and online mode for creating interactive VR. Exploring online platforms for creating interactive VR. Definition and applications of walkthrough VR. Backstage process of walkthrough VR. Hands-on experience of both interactive VR and walkthrough VR. 360o video creation and 3D projection on physical surfaces. Application in tourism, heritage and story telling.

UNIT 4: TRIGERLESS AR & IMAGE TRACKING AR   **12**

Definition and difference between Triggerless AR and Image tracking AR. Applications of triggerless AR and Image tracking AR in Architecture and interior design. Hands-on process to create a triggerless AR and image tracking AR. Immersive experience of Triggerless AR in an open site. Immersive experience of image tracking AR in a construction site.

UNIT 5: OBJECT TRACKING AR & VIRTUAL HOLOGRAM   **12**

What is an object tracking AR. Applications of object tracking AR in construction sites and heritage conservation. Backstage process of object tracking AR. Hands-on experience of object tracking AR. Definition of Virtual hologram. Hands-on process of virtual hologram. Immersive experience of virtual hologram.

	Total: 60 Periods

Exercises

1	Creating a Virtual static VR.
2	Recording a real world static VR.
3	Creating a mixed reality static VR.
4	Hands-on exercise of interactive VR.
5	Hands-on exercise of walkthrough VR.

6	Creating a Triggerless AR.
7	Creating an image tracking AR.
8	Creating a virtual hologram.

Text Books

1	Sherman, W. R., & Craig, A. B. Understanding Virtual Reality: Interface, Application, and Design. Morgan Kaufmann / Elsevier. A comprehensive guide to VR systems, interface design, and applications for research and industry. (2018)
2	Burdea, G. C., & Coiffet, P. Virtual Reality Technology. Wiley. Covers the technical foundations, hardware, and software components of virtual reality systems. (2003)
3	Jerald, J. The VR Book: Human-Centered Design for Virtual Reality. Association for Computing Machinery (ACM) / Morgan & Claypool. Focuses on VR design principles, interaction, and user experience. (2015)
4	Aukstakalnis, S. Practical Augmented Reality: A Guide to the Technologies, Applications, and Human Factors for AR and VR. Addison-Wesley Professional. Explores practical applications, human factors, and design challenges for AR and VR. (2016)
5	Miller, M. Virtual & Augmented Reality For Dummies. For Dummies / Wiley. A beginner-friendly guide covering VR and AR technologies, trends, and use cases. (2020)
6	Rheingold, H. Virtual Reality. Summit Books. One of the early explorations of VR concepts, applications, and societal implications. (1991)

Reference Books

1	LaValle, S. M. Virtual Reality. Cambridge University Press. Provides a technical and theoretical overview of VR systems, applications, and algorithms. (2017)
2	van Krevelen, D. W. F., & Poelman, R. Augmented Reality: Concepts, Methodologies, Tools, and Applications. IGI Global. Covers the principles, technologies, and applications of AR across industries. (2010)
3	Kim, S., & Bailenson, J. Experience on Demand: What Virtual Reality Is, How It Works, and What It Can Do. W. W. Norton & Company. Discusses VR's psychological, social, and practical impact on human experience. (2018)
4	Luckey, P., & Carmack, J. VR / AR Enterprise Insider: Guidebook for Virtual Reality and XR. Apress. A practical guide for implementing VR and AR technologies in enterprise contexts. (2021)
5	Zhang, Y., & Zhu, Q. Augmented Reality and Its Application. Springer. Explores the fundamentals, techniques, and applications of AR in multiple domains. (2018)
6	Earnshaw, R. A. Virtual Reality Systems. Academic Press. Covers VR hardware, software, simulation, and system integration for research and design. (2014)

Course Outcomes

CO	At the end of the course, the students will be able to	Knowledge Level
CO1	Demonstrate complete understanding of the working systems of both VR and AR technologies.	Understanding
CO2	Create static VR, interactive VR, triggerless AR, image-tracking AR, and virtual hologram experiences for design communication.	Creating
CO3	Apply VR and AR tools, platforms, and workflows to develop functional immersive environments.	Applying
CO4	Evaluate the suitability of VR and AR solutions for specific design problems and presentation contexts.	Evaluating
CO5	Present immersive design outcomes effectively to jurors and clients using VR and AR resources.	Creating

U24DSSE01	PARAMETRIC MODELLING	L	T	P	C
		1	0	3	4

Course Objective:
- Learn parametric thinking and generative design for product development.
- Explore how Rhino and Grasshopper can be used for computational modeling.
- Build skills in visual programming and data-driven modeling.
- Create designs that can improve through testing and performance feedback.
- Get ready for real-world design work using digital prototyping, material limits, and industry projects

UNIT 1: INTRODUCTION TO PARAMETRIC MODELLING   12

Definition of parametric modeling, Understanding of 3D, Components of 3D model - Line, splines, NURBS, surface, mesh, 3D & SubD, Difference between rule based & intuitive design, Generative design and methodologies, parametric logic as a method for generating variation, performance, and customization in product, iterative modelling process, Introduction to Rhino - Interface, Creating geometry & Precision modelling

UNIT 2: SOLID MODELLING & EDITING   12

Modelling with solids, Advanced modelling using Rhino, Editing objects - Twisting, superposition, triangulation, repetition & scaling, creating surface, mesh and subD, Creating deformable shapes, importing and exporting model, Free-form & Organic modelling, Boolean tool set, Panelling tools, other modelling aids

UNIT 3: INTRODUCTION TO VISUAL CODING   12

Introduction to Grasshopper - Interface & components of visual coding, Constructing polysurfaces, NURBS, Brep & meshes, Data types, Simple operations, Array, Vectors, planes & Intersections. Iterative modelling workflow, Variables and constraints, Modifiers & Manipulators.

UNIT 4: ADVANCED PARAMETRIC MODELLING   12

Data tree, List & Domain, Mesh operation, NURBS operations, SubD operations, Point & Line attractor, Graph mapper

UNIT 5: GENERATIVE & PERFORMATIVE MODEL   12

Introduction to computational & rule based modelling techniques - Voronai, Aggregations & tessellations, L-System, Fractals, Shape grammar, Mesh relaxation & Genetic algorithm, Simulation & Analysis

Total: 60 Periods

Exercises

1	Create a 3D modular unit to explore formal variations within a repeatable system using various geometry types such as NURBS, surfaces, and meshes.
2	Model a small scale product using surface / SubD manipulation techniques.
3	Develop a parametric screen or panel system in Grasshopper using slider-controlled input variables to manipulate pattern, scale, or density across a surface.
4	Design a customizable wall partition using attractor points and graph mapper controls to generate spatial variations across a surface.
5	Create a generative lighting system using a combination of Voronoi and mesh relaxation techniques.

Text Books

1	Arturo Tedeschi, Parametric Architecture with Grasshopper: Primer for Professional Use in Architecture, Le Penseur, (2021).
2	Christopher Reilly, Design Modeling with Rhino and Grasshopper for the Built Environment, Routledge, (2022).
3	Michael Kling & Holger Krieg, Inside Rhinoceros 5, mitp-Verlag, (2017).
4	Karam Zubin, Mastering Grasshopper: Beginner to Advanced, Self-published, (2016).
5	Michael E. Schwartz, Rhino 5 for Designers, SDC Publications, (2013).
6	Kostas Terzidis, Algorithmic Architecture, Architectural Press, (2006).
7	Robert Woodbury, Elements of Parametric Design, Routledge, (2010).

Reference Books

1	Andrew Payne & Rajaa Issa, The Grasshopper Primer (2nd ed.), Self-published, (2010).
2	Robert Woodbury, Sean Williamson & Philip Beesley, Parametric Modelling as a Design Representation in Architecture: A Process Account, Proceedings of the Canadian Engineering Education Association (CEEA), (2006).
3	Daniel Vogel, Form+Code in Design, Art, and Architecture (by Casey Reas, Chandler McWilliams & LUST), ACM Computing Reviews, (2012).
4	Terri Peters & Brady Peters, Inside Smartgeometry: Expanding the Architectural Possibilities of Computational Design, John Wiley & Sons, (2013).
5	William J. Mitchell, The Logic of Architecture: Design, Computation & Cognition, MIT Press, (1995).
6	Gary William Flake, The Computational Beauty of Nature: Computer Explorations of Fractals, Chaos, Complex Systems, and Adaptation, MIT Press, (1998).

Course Outcomes

CO	At the end of the course, the students will be able to	Knowledge Level
CO1	Understand the principles of parametric logic and generative design for product development.	Understanding
CO2	Use Rhino and Grasshopper to create dynamic, responsive design systems and computational models.	Applying
CO3	Build technical skills in visual programming and data-driven modeling workflows.	Creating
CO4	Develop iterative, performance-based design solutions using computational approaches.	Creating
CO5	Apply industry-relevant practices by integrating digital prototyping, material constraints, and real-world design briefs.	Applying